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OFFICE ELECTRIC VEHICLES
TIRES OF PRESTIGE

OBSERVE the giant CORDS pictured below!
—Each Cord strong enough to support a Man’s weight!
—So strong indeed, that only TWO (2) layers of this flat, rubber-impregnated, Cord are used in any Silvertown Tire.

These two layers of giant CORD,—with a layer of live Rubber between, to prevent friction,—have 50% to 75% more strength than had the 5 to 7 layers of Thread (or ‘Thread-Fabric’) we formerly used in our ‘Palmer-Web’ Auto Tires of 1906 to 1913.

That ‘‘Thread-Fabric’’ Tire we abandoned in 1913.

Because Silvertown CORDS so far outclassed ‘‘Thread-Fabric’’ Tires in Strength and ENDURANCE,—which means Mileage.

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So,—if you would give to your Car the Prestige of genuine CORD Tire equipment,—with 17% more Net-power to your Motor,—and 25% more Mileage from each gallon of Gasolene, do this:

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80 PER CENT

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THE REASONS—
GREATER MILEAGE
HIGHER SPEED
LONGER LIFE

WILL IT NOT BE TO YOUR ADVANTAGE TO SPECIFY A
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For large garages—your advice on battery charging equipment is often solicited. In recommending Fort Wayne apparatus you are assured that when the installation is made it will be entirely satisfactory in every way; a credit to your judgment, because of Fort Wayne quality and because we furnish these charging equipments to meet exactly the requirements called for. Moreover, the distributing panels are built to give the particular control of the charging circuits desired by the customer.

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General Electric Company
A Short History of the Electric Taxi-Cab

Developments Leading to the Latest Models in Chicago

After two years of satisfactory service of electric taxicabs of the Detroit Taxi-Cab and Transfer Company to serve as an immediate example, Guy Woods, the progressive proprietor of the American Motor Livery Company of Chicago, has ordered twelve new electrically driven broughams to take care of his business. (This type of vehicle is erroneously referred to quite often by the public as a limousine. However, the driver's seat is not protected by a roof.) This announcement made during the annual N. E. L. A. convention at Chicago created great enthusiasm and resulted in favorable press comments all over the country.

These comments, however, seem to indicate that the field is entirely virgin and no effort has ever been made along these lines before the last two years. This is not true, and before proceeding with the description of the beauties of the new cars let us go back to London some twenty years ago. There we see, in 1896, the original yellow cabs, electrically propelled, gliding through the heavy maze of London traffic easily and successfully. They were heavy, cumbersome things, it is true, but they more than paid dividends to their owners, the London Electric Cab Company, who kept them going for a number of years. The open spur drive made them somewhat noisy but outside of this they were a big advance over the horse-drawn barouche, the victoria, or the hansom. They were very much in demand among those of the dernier-crit and those of the foreign legations who wished to be in the van of the new thought of that day hired them for certain hours of each day for making their morning calls or rides through the parks.

The efficiency shown then in the unique battery charging devices certainly would make the modern efficiency engineer sit up and take notice. The cars in changing batteries, which were of the 40 E. P. S. cell type with a 170 ampere hour capacity, were run over a hydraulic lift in the floor. This lift was raised until it raised the battery tray about two inches from its position in the car. The latch fastenings were then loosened automatically and as the lift was let down the battery was slid off on rails and rolled to an elevator which took it up to the charging floor, where it fell into line and was charged on the platform.

In the meantime a new battery was being rolled on the rails over the lift and when raised into position was fastened by four latches and the terminals connected. The car was then ready to move out under its own power, the heavy trays having never once been lifted by hand. A most unique equipment that has been equalled but never surpassed.

The cars as shown in the illustration had the driver's seat up on a high platform in front, with a horizontal steering wheel mounted on a pillar similar to that on a boat, operating the wheels through a worm gearing. This forward platform was supported by two full elliptic springs, the wheels being mounted on long roller bearings. A double chain drive was used, the motor on a countershaft driving a Hans Renold laminated silent chain from a 25-tooth sprocket to a 62-tooth on the rear wheel. The efficiency obtained was so high that though the motor only pulled 24 amperes at full speed it was possible to make 50 miles on one charge. The motors were American, built by the Johnson Lundell interests, used in connection with a Bersey controller designed by W. C. Bersey, who was the manager of the business. This, however, was discarded for an American controller later.

At one time, in 1898, there were as high as sixty-five on the street, although, in 1897, there were only fifteen running.

The next installation was that of the Compagnie Generale des Transports Automobile (System Jenatzy) who, emboldened by the success across the channel, built about ten or more cabs. These were converted horse
cabs but must have been very efficient, for in the now historical cab tests of June-July, 1898, in Paris a 44-cell battery job did 67 miles on one charge in the trials.

Finally Americans could not stand the strain of seeing a good thing get away from them and in September, 1898, the Electric Vehicle Company of New York, which had operated twelve cabs of the design shown intermittently for nearly a year, decided to go into business on a large scale and opened up, at 1684 Broadway, a charging station and garage, which was a mammoth one for those days. Although the brougham is shown here, the majority of the cabs were of the hansom cab variety, with the doors in front and the driver in the rear on a high pedestal seat, steering the car by a vertical lever swinging it back and forth as he wished to go to the right or left.

In the meantime, after losing $30,000 through breakage of jars and careless handling of untrained employees and damage suits, the London Electric Cab Company withdrew its cumbersome vehicles about August, 1899.


These concerns unfortunately were purely speculative, for the total capitalization was over $100,000,000, including that of the parent concern, the Electric Vehicle Company of New York, and at no time did they ever approach in actual value one-fiftieth of their capitalization. This manipulation of electric vehicle stock, in which some of the biggest financiers of America participated, and grossly exaggerated claims, did more irreparable injury to the electric vehicle business than anything that has ever happened or will happen. The public got disgusted, capitalist and banker withdrew their support, weakening the stocks to such an extent they fell to 6 asked for and 2 bid.

The Illinois, New York and New England companies were the only actual operating companies; the latter for example, having some twenty cabs and sixty men working. While the Illinois company in Chicago had quite a few going, it had considerable trouble with its drivers at both the Michigan avenue station and the Cottage Grove avenue station, which latter was on the present site of Harry Salvat’s Fashion Garage in that city.

The drivers went out on a strike Saturday, March 2, 1901, on account of a change in the system of pay. Instead of two dollars a day, they wanted twenty per cent of the gross earnings, which the topheavy and water-logged company could ill afford. The men had organized under the United Brotherhood of Electrical Workers and demanded 16 2-3 cents an hour and were flatly refused. The Lead Cab structure was about to fall. A flying trip by the president of the company to New York for consultation resulted in the Illinois company giving up its business at a loss of some $128,000.

News reached the stock markets and for a while the stock boomed and then fell, kept to its level a while and by the middle of the year, when some 1,500 shares of a prominent stockholder was dumped in disgust on the market, the bubble exploded and the Lead Cab Trust with its ramifications, passed into history, leaving a heavy cloud on the electrical vehicle industry and a stain it took some ten years to eradicate.

Abroad the Parisian Cab Company had been struggling with some sixty cabs to make ends meet. These cabs, however, were very much under-battered. They paid a mean of twenty-five francs a day from their drivers and cost the company fifteen francs. Their touring radius was limited, their looks were worse. They stood at the Opera some three miles from the Aubervilliers charging station and as the batteries were only good for 28 miles this left only 22 miles available for touring. In spite of this almost impossible handicap they were making ends meet but the hue and cry resulting from the Lead Cab Trust reached the French public which began to distrust anything and everything con-
nected with electricity. Business fell with a slump and
on November 10, 1900, the company closed its doors.

In Germany the automobile engineers had been look-
ing the situation over carefully and about 1904 put
into use some of the things they had learned. The cars
were built low and individually owned. The batteries were
owned by the central power stations and leased out.

An Arrol-Johnston Electric

Where the small concerns owned the cabs they ran them
twenty-four hours a day with new drivers every eight
hours. Each driver had his own battery for which he
was responsible and was not allowed to take the car
out unless his battery was used. The drivers were
skilled men and the cars they handled were fairly speedy,
being capable of 32 kilometers to the hour—about 20
miles an hour. Their cruising radius was sixty miles.

These machines were so efficient and silent that they
had increased their numbers up to nearly 600 cabs be-
fore the European war started in 1914.

An effort had been made with the old companies in
London to get them started again but to no avail as its
vehicles were too antiquated. However, about 1912 the
Arrol-Johnston works in Dumfries, Scotland, built two
or more cars for this work, which were highly successful.
The cars had a long wheel base of 100 inches which gave
easy riding qualities, with a ten and half road clearance
and a low center of gravity. They were closely followed
on this side by the Commercial Truck Company which
built some cabs for New York city use. These cabs,
however, did not look like private cars and although they
took well, the better class would not use them. With
this in mind, when the Detroit Taxicab and Transfer
Company decided to put on electrics they chose a more
refined and luxurious type, which is shown in the ac-
companying illustration. This cab was described in
these columns in November, 1913. This had all the
good points of its predecessors and none of its bad ones
and it then was the last word in all that was desirable.
At present somewhere around a hundred cabs are in
use in the city of Detroit, silent, comfortable and lux-
urious.

The latest word in electric vehicle cabs, however, is
the new model which has been made necessary by Chi-
cago competition, as Mr. Woods of the American Motor
Livery Company of Chicago prides himself on having the
best service in the city. It is necessary to supersede
the gasoline cabs, as his patrons are far above the or-
dinary kind and the livery is on contract basis. So about
the last of September of this year you will see twelve
volt low hung electrics in his garage. They are being
built by the Milburn Wagon Co., the manufacturers of
the Milburn Electric. Their long wheel base of 112
inches and 34x4½ inch tires on wire wheels should
make them ideal for city work. According to Harry
Salvat, who sold the cars to Mr. Woods, the cars have
a speed of 25 to 30 miles an hour and can do 100 miles
on a charge. The 42 cells will be deposited under the
driver's seat and the hood. The exterior color will be
very dark with a dark hair line striping. The interior
is furnished in imported whipcord in a light color with
silver vanity boxes and flower holders. The driver's
seat will have a protecting curtain for rain and snow
storms. Electric side lights and dark colored liverys
of the drivers will complete this tendency to give the
cars the appearance of being privately owned.

The initial order of twelve cabs will without doubt
be increased later by some twenty more, bringing the
fleet up to thirty cars which are the acme of all things
desirable at this time.

C. S. F.

Rabbits Have Nothing on Electrics

S. W. Menefee is smiling and happy these days.
When New York City confines prove burdensome he
starts selling abroad. The first week in June he suc-
cceeded in placing a Detroit Electric in the hands of the
eminent visiting Brazilian, Lieutenant-Commander Rad-
ler de Aquino, B. N., of Rio de Janeiro, who is the
commanding officer of the Brazilian transport ship Sar-
gento Alberquerque. Mr. Menefee states that the lieu-
tenant-commander said that the American electric is
finding much favor in South America.

The Brooklyn Citizen, in commenting upon the
incident, phrases it thusly:

"The electric car is finding much favor in South
America, particularly in Brazil, where they are multi-
plying rapidly."
Truck Transformation
Interesting Installation Made Necessary by Heavy Traffic

There are approximately twenty-seven thousand electric trucks and wagons in service in the United States today operating either as complete or partial equipment for the delivery system in one hundred and twenty-four lines of trade. The New York Edison Monthly in a recent article states some five thousand are used for hauling extremely heavy loads or for what might be called freight-vehicle work. They go on to state that in hauling of this character the prime requirements of a motor vehicle are reliability and economy of operation, neither an extremely wide radius nor a high degree of speed being demanded. That the electric truck is especially fitted for this sort of work is amply demonstrated by the satisfactory experience of such users.

An instance of the splendid effectiveness of the electric truck in the freight-vehicle field is to be found in the equipment of the National Fire Proofing Company, contractors and manufacturers of fireproof hollow tiling. The company's New York territory up to three years ago had depended upon horse-drawn trucks for all delivery requirements. Then the question of motorizing the vehicles was taken up and after considerable time spent in an exhaustive canvass of the motor truck field, the electric was decided upon as the logical type. This for the reason that the work would not be beyond the city limits, and also that the trucks would be called upon to haul heavy dead weight loads through the press and jam of crowded streets. Further, the fire-proof tiling which the company manufactures is shipped to New York from a Boston factory and landed on the East River docks. As has been the case with other concerns, so it was with the National Fire Proofing Company, electrics were found to be easier to handle around the docks than gasoline cars of the same capacity.

Three years ago the first trucks of the present equipment were put into commission. These two were later increased to five, and these again, within the past few months have been augmented by two more, bringing the total operated by this company in New York City to seven.

The type of truck used—a conversion from horse-drawn wagons—is of interest and gives rise to the heading of this article, "Truck Transformation." At the time the change from horses to electrics was decided upon, the company was well supplied with horse vehicles which it seemed inadvisable to part with, not only because of the money sacrifice involved but because they had proved, in actual service, to be of a design best adapted to the particular business in hand. As a consequence it was decided to conserve the wagon bodies and equip them with motor-contained wheels, as shown in these illustrations. These wheels, manufactured by the Couple-Gear Freight Wheel Company, include as an integral part of their mechanism both an electric motor and driving gears. This construction not only results in a front wheel drive but also permits of transforming ordinary horse-drawn vehicles into electrics by the simple addition of the motor wheels, the batteries and the necessary control apparatus.

The advantages of this type of construction in this particular case as applied to the needs of hauling fire brick, are that it permits of standard wagon design with high rear wheels which pull more easily, ride more easily, cut less into soft ground and bad spots in city pavement, and rise more easily over obstructions. Another important consideration is the fact that the bulk of the heavy load is carried on the steel tires of the rear wheels, resulting in a considerable saving in the purchase of new rubber tires.

That the work of these trucks for the National Fire Proofing Company is of the most satisfactory character is amply testified by the frequent additions to the fleet.

The details of the truck may vary but the essential points are the same. Such things as frame reinforcements necessary to carry the body entail many variations but the trucks themselves remain satisfactory.

Arthur Williams.

It is not modern unless it's electric.
Building the Detroit Electric

A Visitor's Impressions of the Anderson Electric Car Company's Detroit Plant

OVER in Detroit, Michigan, there is an automobile plant, which covers fourteen acres of floor space. It is the home of the Detroit Electric. Ten years ago that plant was devoted to the manufacture of fine carriages. Then the automobile entered the industrial field and the plant became converted into an electric care factory. Today this factory's products are known in every city of the country. And although people recognize the merit of the electric car, few of them have any idea of the large proportions of the industry.

To visit the Anderson Electric Car company and see just how the cars are built is to become a convert to the electric motor car, provided that the road performance of these vehicles, their beauty and economy of operation has not already won your admiration. There is nothing insignificant about the factory. It is a giant industry to which more units are soon to be added that will increase its present capacity by more than one-half.

When the motor car came on the scene, the present site of the factory was occupied by the Anderson Carriage company, makers of high class horse drawn buggies and carriages. W. C. Anderson had been making carriages a long time and his business was well established. But he was quick to see that the automobile had come to stay and that carriages would be less used in the future than they had been in the past.

Mr. Anderson, however, did not look toward the gasoline motor car. He turned his attention in the direction of the electric vehicle and started to build a few electric cars, at the same time continuing his carriage business. The electrics sold as rapidly as they were built and it was not long before the Anderson Carriage company ceased to be and the present firm took its place.

Expert workmanship, the finest materials and the care in construction that offers no chance for error was the building policy for Anderson carriages. This same principle was adopted for its new product. Viewed in comparison with the luxurious 1916 model, the earliest models are crude machines but the fact that they were built to run for many years needs no better proof than that some of the first cars built are still running today and operating well.

The first cars had chain drive while today they have a direct shaft drive without even a chain reduction. The first electrics lacked the graceful lines of the present cars and the luxurious fittings. But these things are matters of development that have come with the years of manufacturing and with the care that has been taken to adapt new things to the cars.

While a brief review of the past is interesting, it is with the present factory that the greatest interest lies, and with the present methods of construction.

"Unless someone else can do it better, do it yourself," has been a favorite slogan of the company from the start. Experience has taught that in building electric automobiles the best work can be done by manufacturing the car complete in one factory, and as a result, the motor car is made from start to finish in the company's own plants. Time and again certain parts of this car have been contracted for with other manufacturers and in every instance the manufacture of these parts has been taken over because it found that it could not get the best quality in any other way.

This policy has made the factory of the Detroit Electric a real manufacturing plant, not an assembling institution. With the exception of drop forging blanks, wheels and tires, there is very little that is not designed and manufactured in the factory. Systematic production methods have been put in force and developed to a point where the manufacture of each bit of the mechanism and appointments of these cars is linked with the others into a smoothly moving unit. Yet, with that, there has come none of the hurry and confusion that characterizes some motor-car factories.

The building of a quality electric car is of necessity a slow process because of the time that must be allowed for manufacturing and assembling its vital parts such as the motor, batteries, rear axle and controller—all of which must be mechanically perfect so as to insure the highest efficiency from the finished car. There are
always a great number of machines under construction in the factory. The only way to secure an adequate idea of the care and expert labor that goes into the cars is to study the various processes one by one.

In the first place let it be said that the materials for all parts of the car are selected with the utmost care. Purchase specifications are prepared by the purchasing department in conjunction with the engineering department. Material delivered on these specifications are received in the company's first inspection department. Every single article purchased must pass this department before it can be distributed to the regular department stock rooms. Any article, no matter how small, which does not measure up to standard is either returned or scrapped. The selection of material alone is a big problem and the company often sends its own engineers to sources of supply and other manufacturing plants to ferret out troubles that are evidenced in the raw stock and to remedy them.

To begin at the chassis, which is the foundation of the car, one must visit the machine shop, nearly a block long and four stories in height. To this building comes the rough stock used in the assembly, together with the blue prints of the chassis parts as designed by the engineers. The superintendent of the department lays out his work and then calls into consultation the chief tool designer. Special jigs and tools for manufacturing the various parts have to be made and these are constructed in the tool making department, which is located on the main floor and adjoining the machine shop.

Each part is card indexed and then routed to its proper place in the various groups of machines. There are no verbal instructions in the manufacture of the cars. Every order is written and the path of each part through the various processes is so arranged that there is no lost time in the production. While these plans are going on, the raw material to be used in the work is stocked in the basement of the building. It goes down a chute from the receiving room to an inspector's department where it receives its second examination for defects and then is shifted to a stock room ready to be sent to the machines.

The chassis frames are purchased in the form of angle steel pieces, cut to size. They go first to the frame assembly and there are riveted together and drilled with the proper holes. The forgings for the gears in the rear axle, differential and other parts are purchased but they are cut and ground to size in the machine shop on a battery of gear cutters. The housings for these parts are all machined in the machine shop. Many of the other parts of the axle are made there on automatic screw machines.

One of the methods of insuring accuracy in this department is the grinders. Instead of turning the materials to size on lathes, as in the old days, they are turned down to within a few thousandths of an inch of the right size and are then ground down on the grinding machines to the proper size. As each of these parts is finished, it is examined by an inspector who is equipped with a micrometer, which records the thousandths of inches. Each piece must tally in size or it is rejected.

All parts of the car, such as the axles, the steering levers and the controllers are machined on the first floor of the building. The assembly is on the second floor. In this department the various parts are put together. The rear axles when assembled are given a rigid test here before they are attached to the chassis frame. A full floating rear axle, so carefully adjusted that a light push of the car, with the brakes released, will set it in motion, is used.

In the assembly department special care is taken to see that no small bolt, nut or cotter pin is left out of the construction. Some years ago the habit of surgeons to leave any instrument or sponge inside of a patient after an operation caused the leading hospitals of the country to make rules requiring a count of the instruments and sponges before and after each operation. This same system is used in the assembly of Detroit Electrics to see that nothing is left out.

Each day a department stock truck is loaded with the proper number of small parts for assembling the cars to be made that day and is rolled out to the assembly department. If any parts remain in the truck at the close of the working hours then there is a certainty that some piece has been omitted. Every bit of work turned out that day then has to be gone over to locate the "skipped" part.

All of the steering knuckles and rods are made in the plant. They are welded with acetylene blow torches and each part is then subjected to a test to make positive that the weld is strong. For a time the company tried to have some of its welding done outside but it was found that some of the work did not meet the required tests. The welding, which looks like an insignificant process, is so important that this operation is given over to only skilled workmen.

The factory has its own heat treating department. There the knuckles, nuts, bolts and other parts that must be tempered to a high degree of hardness are put through the case hardening process and are heat
treated in special furnaces and oil vats. This is under the direction of a metallurgist who is an expert in iron and steel.

When the rear and front axles have been fitted to the chassis, the springs are put on. These also are built to the joint. Although the spring leaves are purchased outside, they are assembled with their various parts made in the factory.

The controller, a delicate piece of mechanism, is built completely in the plant with the use of special machines, which have been designed for the work. It has been the policy of the Detroit Electric makers to have the car parts interchangeable—therefore, the utmost care is taken to make all parts, such as controller segments, absolute duplicates.

The housings for the controller and for the automatic cut-out, a safety feature of the car, are made of aluminum. In fact every part of the car that can be so constructed is built from this light durable metal. The cut-out makes it impossible to start the motor after the brakes have been set without going into neutral and then advancing the speed through the various degrees on the controller. This prevents the car making a jerky start and also removes any possibility of bad effects on car or tires.

After the rear and front axles are put on the chassis, the motor is placed in its position. The motors are not made in the Detroit plant. They are built from the bottom up in the Cleveland plant of the company, which is devoted to this part of the work. Each motor is thoroughly tested before it ever comes to the Detroit plant, and the reliability of the construction is attested by the fact that only a few complaints of motor trouble have been received in the last four years. The motor is of the series wound type and weighs 287 pounds. It is completely housed, so that no dirt can get at its working parts. The bearings are of the annular type and are packed in a supply of grease sufficient for one year's running.

One particular point worthy of note in the motor construction is the commutator. Considering the size of the motor the area of the commutator is twice as large as that found on motors of the same size that are in general use. Instead of a single brush, each set has two brushes, giving more than enough capacity to handle the heavy overloads to which the motor is subject at times.

When the motor is installed it is joined to the rear axle by the driving shaft. The drive is through one universal joint. The motor is located on a sub frame on the chassis, so compactly arranged that it is not visible in the finished car unless one bends down and looks under the car.

After the motor is installed commes the wiring. Not only has the highest grade wire of large size been used in its make-up, but every bit of it is given a thorough inspection before it is used. Mistakes in wiring are to all purposes an impossibility. In the first place, the number of wires used has been reduced to a minimum. Secondly, every wire is cut to its correct length, bent to proper shape, and assembled in forms before it is placed in the car. Finally every wire is numbered so that the electricians can read exactly where each connection goes.

The wires that carry the current from the battery to the motor are heavily insulated and formed of nineteen strands of copper, forming a cable of No. 1 size. Tapered terminals form the proper connection. These terminals are soldered on in the plant. To make certain that the soldering will be strong, the bare ends of the wire are first dipped in solder, which welds them into a solid mass. They are again heated before being soldered into the terminal, the metal between strands melts into that surrounding them and forms a complete and strong joint. In the soldering, space is left between the terminal and insulation so that an inspector can see whether the soldering has been properly done. This space is covered with tape after the inspection and is then painted with an insulating waterproof paint.

In arranging the layout of the wiring the engineers gave special attention to making the plan simple and so comprehensive that any electrician could trace the wires without difficulty. They also gave special attention to the strength of the terminals and there is now in use a wedge terminal, which after being drawn taut by a screw will hold solidly even though the screw should work out, which it has never been found to do. One of the little points of this important part of the electric car building is the special paper wrapping that is found on all the wire used. It lies between the copper and the rubber insulation. The engineers found that when the rubber touched the metal, scraping it off for a connection made the copper rough and tended to form faulty connections. The paper permits of a clean copper surface for this work.

All wheels are purchased in the rough and then fitted and painted in the factory. Both wood and wire wheels are used, as the customer chooses. They both come to the factory without hubs and are fitted with
special hubs, made to fit the Detroit Electric axles. The wheels are added to the car at an early stage in assembly. When wire wheels are used they are first enamelled and baked in enameling ovens.

After the wheels have been put on the chassis and the motor has been installed and wired, the cars are taken to the next department where the fenders and running boards are put on and the steering and control units are completed as much as can be before the body is set on the chassis.

The fenders used on all models are fashioned in the factory from sheet aluminum. They are hammered to shape by big hammers fitted with dies. Then they are dipped in enamel and baked in huge ovens in the paint department. The fenders are hung on huge racks to dry after being dipped and when baked have the glossy hard wearing finish that characterizes all the exterior parts of the modern car. Painting of chassis is done largely by compressed air paint spray, which is found to be much more practicable than the old hand brush method. The use of the paint spray insures every portion of the chassis receiving an even coat of paint and at the same time prevents accumulation of paint in angles of frame which it is impossible to prevent when painting with a hand brush.

It is in the body department of the big factory that the person unschooled in motor car technique finds a great deal of interest because the operations are more easily understood. The same carefulness, the same ideals of simplicity, beauty and richness that characterize the rest of a well built car are followed in the bodies.

Each year some changes have been made in the body and ideas are continually being worked out in the hope of some further improvements. An experienced coach builder is employed to make up any suggested features of design. His shop, located near the offices of the company, is always filled with several ideas submitted by officers or employes. Many of them are rejected and a few are accepted.

Every part of the bodies is designed and constructed in the company's factory. Each detail receives as careful an inspection as is given the working parts of the automobiles. The body frames, which are built of wood, are sawed and finished in the mill building, are made from selected ash and not a single knot is permitted to go by the inspector.

The lumber comes to the factory in long lengths direct from the wholesale lumber yards. It is supposed seasoned as the company is careful to procure only well dried lumber. But this seasoning is not enough. Before it is worked at all, it is dried thoroughly by a special kiln process. Then it is sawed into proper shapes, planed and finished ready for the joiners. In many cases, the inspection, which follows the sawing and planing, results in the discarding of pieces not up to standard.

From the mill the frame pieces go to the joiners, who put the pieces together. Every joint is either shouldered or mortised, according to the part of the frame for which it is used. All joints are glued and then anchored with a screw. This is given a careful inspection and no joint is passed which has been drawn together by a screw. They must fit perfectly.

The exteriors of the bodies are made of sheet aluminum. This light, flexible metal, unlike wood, will not check or warp; furthermore it forms a foundation that lends itself perfectly to painting and finishing. The various sections of aluminum are stamped and cut from sheets in the factory. Like the fenders they are turned out by huge stamping machines, fitted with dies for the different shapes. Even the door and window frames are made of aluminum.

The aluminum plates are first nailed on the frame, then anchored by mouldings; these aluminum mouldings are punched for nails in such a manner that a bar is left extending on the surface into which the nail is driven; after driving in and countersinking the anchoring nail, the bar is hammered back over the top of the nail. It is then filed and sanded down smooth so that no trace of the nail can be found. This method practically hermetically seals the nail—thereby preventing rust or corrosion. The surface of the moulding which is placed next to aluminum panels is slightly concaved, so that as the anchoring nail draws the moulding into place, a suction effect takes place that joins moulding and panel almost as closely as a welding process could accomplish.

The top is formed of one single sheet of aluminum without joints or connections of any kind. Next to the wood frame is a canvas cover, which is stretched tightly across the top. Then a layer of cotton felt is applied and finally the aluminum sheet is adjusted. The felt between the metal and interior of the car gives full heat insulating properties. It is cool in summer and warm in winter. Another point of merit in this construction is the fact that the felt deadens the sound of falling rain, a thing that is annoying at times.

The doors of the bodies are made and painted
ELECTRIC VEHICLES

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separately. They are not hung until after the car is nearly completed.

When the bodies have been put together, they are taken to the paint shop. This operation usually takes a period of nearly two months, which with the other careful work in the finishing and building, makes it necessary for the company to have between 200 and 300 bodies in the process of construction all the time. The painting of the bodies calls for careful and expert work. The wooden frames receive coats of one type of paint while the metal covering has an entirely different kind. To give the lustrous finish and lasting quality to the bodies, twenty-three coats of paint and varnish are applied to the surface. After the priming coats, which are allowed to dry well, the paint is sprayed on in a fine film by air blown sprayers—thus insuring the most even distribution of paint. Each coat is allowed to dry and then the body goes to the rubbing department. Here the surface is thoroughly rubbed with rotten-stone and water. The light layer of paint is reduced to a fine film by this process and the finish is given a dull smooth surface, gradually assuming the color of the finished car, as the various coats are applied and rubbed. Were it not for this method the large number of coats of paint could not be applied without making the finished article likely to check and crack. The rubbing and building up of layer upon layer makes a thin hardened surface which will wear perfectly for years if properly cared for.

The final coat of the body is applied with a brush by expert painters. It is a colorless varnish, which produces the high glossy finish. The varnish is applied as the finishing touch and it is dried in rooms that are absolutely free from dirt or dust so that there will be no specks to mar the smooth surface.

The color of the finish depends largely upon the customer’s wish in the matter, the Anderson Electric Car company having several styles of finish of paint and upholstery which are optional. Monograms are also added when desired. A corps of artists is maintained for this work and the factory in addition to having many styles of lettering and special insignias can copy the coat or arms or monogram of any customer.

Painting the body is, however, only one of the many steps necessary to finish it. The upholstering of the seats and backs and the finish of the interior of the car occupies another large department in the factory.

Every bit of upholstering material used—and there are several beautiful designs—is manufactured solely for the company. No other make of car can obtain the same design for the company takes the entire output of a single pattern.

A survey of the interior of a completed car shows a smooth and elegant cloth or leather covering. Where no hair padding is used, at places such as ceilings, a smooth rich appearance is obtained by inserting a layer of heavy cotton batting before the finishing material is adjusted. Expert upholsterers, whose work is as fine as that of any artisans employed in finishing the most expensive furniture, put in the trimmings. They cover the sides and roof of the car, with pieces that have already been cut to exact size in the cutting department.

The tufted upholstering for seat cushions and backs is all made in the factory. A unique way of making this is used. There are large pattern frames for the different forms required. Over them is stretched a heavy canvas which eventually acts as a backing for the curled hair padding.

Then another form is utilized. This is marked with little slots, where each button is to go. The buttons covered with the proper material are put in these slots. Each button is fastened on two long thin metal prongs. The upholstering pattern cut to exact size is then put over this, the prongs piercing the fabric and spacing the buttons in their proper place.

Next, covering the button prongs with wooden spikes, an upholsterer's fluffs out and evenly distributes a lot of fine white hair on this form, packs it down to the right thickness, places the canvass backing form in place and then puts the complete form in a pressing machine, which forces the cushion into perfect specified dimensions. In this machine the prongs of the but-
ter wearing quality, the Detroit Electric designers claim to have discovered.

After the painting and trimming, the body goes into the final body assembly department. There the lamps are added, the shades for the windows are put on, the electric light switches and flower vases are installed. In fact every one of the little niceties that are to be found in a quality car is placed in the bodies with the exception of the floor coverings and a few minor details that have to be adjusted when the bodies are on the chassis.

As soon as the body is firmly adjusted on the chassis, the car is ready for the batteries. A large department in the main building is devoted to the building of them.

It takes about two weeks to build a set of batteries. There are forty-two cells in every set and each set contains seven positive and eight negative plates. Philadelphia plates of Diamond Grid type are used. The jars are made of extra heavy Vulcan rubber and all trays are constructed of uniform size and coated with acid resisting paint, which will wear for a long time. After the batteries are assembled and filled with the acid solution, they are grouped in sets and charged.

Then this charge is exhausted by forcing the current to discharge through resisting coils. The batteries are then charged a second time. Again they are attached to the resistance coil and this time they are carefully watched and tested for capacity. They are tested for about five hours with readings at regular intervals. To be used in a car, a set of batteries must show better than 80 volts. Each cell on every set is tested separately at this time and must come up to standard else it is discarded. The connections between the cells of the sets are soldered, making them absolutely firm and unbreakable.

The Detroit Electric now reaches the final survey. It is taken into the testing department and placed with its wheels on wide and revolving rollers, set in the floor. The car is then anchored so that it cannot move and the current is turned on. The wheels of the car revolve, propelled by its own power, at various speeds as the controller is regulated and the various road conditions are simulated by raising and lowering the floor rollers. A speedometer is attached to the car wheel to show the rate at which the car is theoretically traveling.

In this test the ammeter in the car is tested out again and the batteries are watched to see that they are giving the right current. This also gives a general test of the moving parts of the car. Having passed this test, the car is sent out on the road for another test. Here operating under actual conditions it is thoroughly tried out. The steering apparatus is inspected and every little sound is investigated.

Unlike a gasoline car, there is no noise about an electric to cover up the squeaks and grinds that might come from slight defects in the gears or moving parts. The slightest unnatural noise which may develop in any of the tests means another adjustment. The trouble is first located by the testing department and the car is then sent back to the factory and the cause of the noise is eliminated even if a new part has to be put in.

After the car has passed this final inspection, the floor carpet and revolving seats are adjusted, the windows are polished and the body is shined. If during the operation it is found that a speck of enameled has been knocked from one of the wheels by the road test, this is retouched and the car is gone over carefully for any marks that may come from handling in the factory.

The car is then ready to be loaded on to freight cars in the factory siding. It is taken to a loading platform and run into the automobile freight cars. Three electric motor cars can be shipped in one railroad car. They are blocked into place with curved blocks, which are turned out in the wood shop. Then they are covered with a cloth envelope that keeps the dust from them. The cars need no assembling on arrival at their destination and there is current in their batteries to run them away to the owners when they are unloaded.

Since the day that the first electric was built, every jig and die used in the construction of Detroit Electrics, every pattern of body and little detail have been preserved and these are ready for use when new parts for old models are needed. The company's engineers of course feel that the ideal electric car has been ap-
of parts and simplify the handling of repairs and adjustments.

When it comes to the final analysis of the success of any manufacturing proposition, attention turns to the men of the factory. There is a spirit of co-operation in the Detroit Electric plant that is felt by even the visitor. The careful way in which the system of building has been laid out has brought the employees together into a unit that moves in harmony.

The spirit is not alone confined to the executives, to the high salaried engineers and technical men, but it is found among the rank and file of the employees. There are about 1,000 men employed in the plant, and many of them have been there for years. Statistics prepared by the employment department show that the percentage of shifting among the employees is extremely low.

What is the reason?

It seems to be answered by a glance at a single room in the factory. In it are broad tables with book-racks on them. The tables are filled with magazines. There are technical ones, fiction, current opinion, and in fact every kind of publication. This is the men’s noon hour rest room, where they read in bad weather and where they eat their lunches.

Every day some beverage, such as coffee, soup and lemonade, is supplied by the company for the employees as a supplement to their dinner pail lunches. The men are served with this at the start of the 40 minute noon hour. After lunching they can read or play ball in the factory yard, a sport that is popular in good weather.

In addition to the reading room, the company furnishes its employees with books. A request to the foreman of any department will supply an employee with books for study or amusement. The magazines can be taken home if an order is obtained.

Because of the care with which the cars are built and the fact that skilled labor is used in every operation there is little place for the unskilled laborer in the plant. The majority of the employees are products of schools in this country and are trained mechanics and artisans. Not once in the history of the Anderson

The Man Responsible for the Detroit, W. C. Anderson.

operating ten hours a day and this gives the men one hour’s overtime, for which time and one-quarter is paid.

Contented workmen, modern machinery, efficient management, the use of only high grade materials, have made the Detroit Electric the car that it is today. It hasn’t been by the magic of an Alladin’s lamp or the gift of some hidden force.

Ten years of building Detroit Electrics have seen its ideal approaching a reality. And furthermore it has helped to lift the building of electric vehicles to a stable industry—one which has gained and will hold the high esteem of the motoring public.

Barcelona Conditions Favor Electric Vehicles

Although there is in Barcelona, Spain, a supply of electricity available for charging electric trucks and passenger automobiles, such vehicles are not seen here, said Consul General Carl Bailey Hurst.

The local demand, then, is essentially for a car to be used almost entirely in town and suburbs, where the streets are of asphalt, blocks or macadam, for a car to be used almost entirely in town and suburbs, where the streets are of asphalt, blocks, or macadam.

The country is hilly, and even the city has appreciable grades, which complicate the operation of cars and requires efficient brakes. Women rarely operate automobiles here, but many of the owners of the somewhat more than 2,100 machines now registered in this city at times drive their cars. There is no apparent reason why, with the price of gasoline approximately 60 cents a gallon, electric passenger vehicles should not find a market here in view of their usually good appearance, a characteristic very generally demanded by local purchasers. It would seem, too, that electric trucks might be introduced for the important carrying trade of this city.
Rain and Floods Fail to Stop This Electric

An Interesting Trip of One Hundred Twenty-Five Miles in a Detroit

HE report that some parts of Iowa were deeply flooded did not deter Wayne S. Bashaw of Davenport from making an extended tour in his electric when he made up his mind to take it.

His confidence in the modern electric was not misplaced, for he made the one hundred and twenty mile trip without any difficulty.

Leaving Davenport on Friday, May nineteenth, about half-past nine in the morning, he drove to Muscatine, Iowa, a distance of some thirty-nine miles, over some of the worst roads that the section had seen for some time. Although the going was heavy and rough, due to the steady rains, the run was made in less than two hours. The ammeter registered all the way from sixty to seventy-five amperes draw on the batteries while running on the level. While the steady squish-squish of the tires indicating the mud through which the car was plowing could reach the ears of the occupants, there was no other sign observed or felt which would have told them of the rough riding they were doing. However, we shall have Mr. Bashaw tell the story in his own words:

"On arriving at Muscatine, which, by the way, is far from being a level city, having grades that vary from five to ten per cent and are two to five blocks long, I gave three or four short demonstrations, working up to 10 o'clock that night. In the evening after these demonstrations the odometer registered fifty-five miles for the day's trip.

"I stayed in Muscatine on Saturday, transacting business. Saturday evening and night it rained quite hard. Sunday noon at 1 o'clock I put the car on charge after using it Saturday and Sunday morning and charged it until 2:30, getting the gravity up to the normal density.

"Then started for Washington, Iowa, a distance of about fifty miles. In order to get to Washington I had to travel a distance of five miles through some very low lands which were flooded from the high water backed up from the Mississippi River. In that five miles I drove through a number of mud holes which were twenty to thirty inches deep, and along a mile of newly built road, which was very soft and sticky.

"After getting out of the river bottoms, and going over the bluff, we drove through two miles of newly built roads which were nothing but ruts and bumps. In many cases the differential housing was dragging on the road because of wheels dropping into ruts a foot and more deep.

"During the miles of new road the ammeter registered from 125 to 150 amperes.

"The balance of the trip from Muscatine to Washington was over fairly good country, but the roads were anything but perfect. I arrived in Washington, Iowa, about a quarter of an hour past 5, making this distance of approximately fifty miles in two hours and forty-five minutes over some of the worst roads in the country, which is about 18.2 miles per hour.

"After arriving in Washington and having my car cleaned up, I gave a demonstration which covered considerable country territory around Washington, and in the evening when I put my car on charge the odometer registered sixty-three miles for the day's run.

"Taking into consideration the weather condition and the road conditions, I feel that this is remarkable, as the entire trip was made in a Model 60 Detroit Electric with standard equipment and taken right out of the showroom without being adjusted or tested in any way."

The Ohio Highway Commission has awarded contracts for road improvements in twenty-six counties in the Buckeye State totaling 92 miles at a cost of $1,367,000. This is the third letting of contracts by the Ohio highway department during the present season. When the work is completed Ohio will have improved 267 miles of roadway during the present year.
Electric Vehicles’ Question Box

A Service Department for All Readers

There are many owners or prospective owners of electric automobiles desiring questions answered and information of an unbiased nature. Electric Vehicles, through these pages, will endeavor to answer questions of any nature pertaining to the electric automobile, its care and operation. The answers will be given as fully as possible and based upon our interpretation of the questions. We assume no responsibility as to results. Our position is merely to help all to the end of securing the very best results from electric automobiles, therefore correspondence is invited.

Johnson.—Alabama.—I am charging the 42-cell 13-plate battery in my electric car from 110 volt alternating current line. A motor generator set made by a Cleveland concern was installed. Now I would like to know what the cost of current should be for a complete charge.

Presuming that your battery is totally depleted it will require between 22½ to 23 kilowatt hours to completely charge your battery. If you are paying 4c a kilowatt hour for the current it would mean a total cost of from 90c to 92c for a charge. If you are paying 5c per kilowatt hour it would be $1.12 to $1.15.

C. W. M.—Muncie.—The electric we have is equipped with an old set of Motz Cushion tires. It is our desire to renew these with pneumatic tires. What do you recommend?

Above all things be sure to obtain a cord tire. For detailed information see the article on tires as it appeared in the May-June issue of Electric Vehicles. Any garage in your city should be in position to rebuild the felloes of your wheels and have the new quick detachable clincher rims attached.

H. D. D.—Marshalltown.—Some time ago we purchased an electric brougham made by —. We want some advice as to how to best care for the paint on the car.

The first requisite in the proper care of any highly finished surface is to have an ample supply of water that can be used in showering the surface without an undue amount of pressure. See that you have a soft, clean sponge for use on the body and keep a separate sponge for use on the wheels and running gear. This practice eliminates the chances of grease getting to the body. Do not use soap of any kind on the body, and on the chassis use just enough to remove the dirt and grease. There are special automobile soaps that are best suited for this purpose. As to chamois, we would recommend keeping two, one for the body and the other for the underneath part of the fenders and chassis. When drying the body first see that the chamois is moistened and then wrung out. Never allow the water to stand on the body after it has been showered; dry it as quickly as possible. Do not wash a vehicle with the sun shining on it. Our advice would be to have your car varnished after it has been in service from seven to eight months. You will be preserving the paint and keeping up its appearance at the same time. If the varnish on a body is not allowed to wear off the paint will remain in condition for a good period of time.

O. B. C.—Janesville.—I have had an electric for the past two years and a half and now find that the bills for current are a little higher than they were at first. I am charging through a rectifier. What is the trouble?

The rectifier efficiency is just the same today as it was when first installed. We take it for granted that the rate your light company is charging is just the same as when you first purchased the car. You do not state how many miles you drove the car per month when it was new, and how much you are driving it now. The probabilities are that it is being used more now (due to its utility) than it was used at first. If you have not had the batteries renewed, due to their age more current is necessary to give you your mileage than was needed at first. Provided your tires are in good shape and the car in good shape mechanically and provided you use it the same as you did at first we feel quite positive the renewal of the battery will cause your current bills to return to the same point they averaged in the beginning.

G. B.—Savannah.—The question of the car to purchase is before our family and various arguments are advanced on the utility of the gasoline and electric cars. We judge your staff has possession of facts that will enable you to offer advice to one situated as I am. Why should I purchase an electric automobile?

The question is fair but the answer will have to be general as you do not give any idea of your requirements. The electric automobile is primarily intended for city, town and immediate suburban service. The manufacturers have designed and built their cars with the enclosed body since they have learned from experience that this type of body is the most practical for an “all season” car. Very seldom do we hear of a family giving up or doing without their electric vehicle. It is very evident these vehicles perform in a satisfactory manner and rarely does an electric automobile owner offer his car in trade for a gas vehicle. Families who have owned electric automobiles for five to seven and even nine years are in one accord when talking of their electric automobile economy of operation and upkeep. Of course, there is a vast difference in what operating costs amount to with the different families, but naturally this is due to the different modes of living, and in the case of the vehicle it also varies with the size of the family. Where comparable data has been available, the upkeep cost figures on the electric have averaged below the upkeep cost figures on other methods of locomotion. This fact is true because of the more reasonable speed of the electric car; it has the constant torque motive power, there is a total absence of reciprocating motion and the ease or simplicity of control permits one to handle the car in such a way as to protect it to the utmost.

As many electric automobiles have been sold on account of their service and reliability as on account of their economy. Regardless of weather conditions the electric automobile is ready to perform at the operator’s will. In the most severe climates such as they experience in Winnipeg or Montreal or in the most torrid sections of the south, no complaints are ever heard of the electric failing to perform.

The convenience is due chiefly to the simplicity of operation since it permits any and all members of the family using the car. No time is wasted waiting
for an available chauffeur. Business men are rapidly coming to see this point, and since the enclosed body is now accepted as standard for city, town or suburban service, the number of electric cars used by business men is greater than ever. When a gas and electric car is standing in a garage the chances are the electric will be used four times out of five for the general service. This has been the observation of those who have been interested in making a selection, just as you are interested at present.

You will be making an investment the moment you purchase an electric automobile. This is true as the electric has longer life, the general body design does not change much and the indications are that for years to come there will be even fewer changes. Motor efficiency represents the highest stage of development and electric automobile motors are the utmost in this respect. The wheels as used on the present day cars are standard in accordance with automobile engineers' ideas, so there will be no changes necessary. If any tire improvements are made you will be able to use them on the present equipment. The chassis construction is standard, and a limited opportunity exists for future improvements.

The battery compartments are large enough to take the highest capacity batteries known. Battery improvements as made in batteries, the changes are there will be smaller in size and lower in weight so they can be easily installed in your car. Many people are prone to judge the electric automobile by the performance of cars built in years gone by. This is not fair to the electric automobile as produced in 1916, and if a suggestion is in order, let your investigation be broad and general. The electric vehicle salesmen can demonstrate to your satisfaction all of the arguments we have set forth.

C. R. J.—Battle Creek—What records are available from which one can gain data on operating costs on electric trucks? The Massachusetts Institute of Technology of Boston, Mass., have conducted a series of investigations through their Research Department, and have published from time to time bulletins setting forth comparative data on merchandise transportation. They endeavored to obtain this data from installations of such nature as to make comparisons possible, there are giving it fully to the general public. The number of electric trucks in service is increasing. They have just compiled some data showing there are over 30,000 electric trucks doing daily service. There are very few second-hand electric trucks offered for sale, thus indicating general satisfaction on the part of their owners. If there is any particular data desired, we shall be glad to answer you through this column.

Bacon.—El Paso, Texas.—By chance of circumstances we have come in possession of an electric automobile which has not been operated for some time. There is a name plate of Columbus on it, and there are 24 Ebonite jars in the battery.

What will the cost be to place it in running condition? The probabilities are the battery is entirely worn out, so it would be well to figure on a complete renewal, cost of which would approximate $165.00, you paying the freight on the old battery to the nearest battery depot. The condition of the tires must be taken into consideration. We would recommend your putting on new cord tires. The probabilities are size 32x3/5 would be needed and the cost would approximate $12.00. Some of the local garages in your city are in position to go over the machine mechanically and see that the brakes are adjusted and that the other parts are in safe condition. After spending this amount of money on the vehicle you will have an equipment that will render considerable service at a very low cost. The cost of operating the car would approximate $8 per month for current. You could obtain service in your own garage if you have one, by purchasing either a rectifier or a motor generator set.

P. J. D.—Referring to your answer in the June issue of Electric Vehicles, the Electric Light Company can give me 220-volt 50-cycle single phase A. C. My battery consists of 42 12½-plate plates.

For a battery of this size we would recommend a rotary charging set that would have a capacity of 30 amperes at least. There are on the market today sets which start the rate of charge about 50 or 60 amperes, and as the charge of the battery increases the rate automatically decreases or tapers. According to data given by these charging outfit manufacturers the battery can be charged in a most satisfactory manner with these sets, and in case of wanting to boost, your charging set has ample capacity. Their prices are in the neighborhood of $225 to $255, depending upon the installation work necessary.

A. R.—Springfield.—When our car was new it gave a speed of twenty miles per hour on the level. As stated in our first question, it only gives 17 miles per hour on top speed now.

The voltage of your battery has dropped and this causes the lower speed. Or else the commutator of the motor has blackened so you are not obtaining the proper efficiency thereon. The probabilities are the battery has lived its life, and renewal of the plates should give you the proper voltage, thus bringing up the speed. The manufacturers of the car maintain a service department and will gladly cooperate with you.

149,600 Registered in Ohio

W. H. Walker, head of the Ohio State automobile department, announces 149,500 registrations up to May 1st, as follows: Gasoline cars, 143,000; electric, 4,100; dealers' and manufacturers', 2,500.

Wipe off Your Shoes Before Entering

Kansas City has a new ordinance prohibiting any person driving a motor car or other vehicle, from tracking the pavements with mud. Any vehicle discovered with mud on its wheels is to be considered as evidence that the ordinance had been violated; though it is understood that officers are tacitly allowed to let the owner clean off the wheels before proceeding, exempt from arrest, if the vehicle is standing when found. The ordinance was passed to assist the street department in keeping the pavements clean, rather than from an aesthetic purpose to keep vehicles rendered unpresentable by coatings of mud on the wheels from marring the beauty of street scenes.

There is a movement on foot in New York State to have the Legislature impose a special tax on motor trucks and busses on the ground that these vehicles damage public highways. No doubt this kind of traffic gives a severer test to the bearing qualities of the highways than was anticipated at the time of the construction of many of the so-called good roads.
"Trade Conditions Are Such"

A LETTER recently received from a prospective advertiser—which means somebody the advertising department thinks should buy space, but who doesn’t do it—says “trade conditions are such that we have thought it best not to push the selling of the pleasure end of our business.”

It is our observation that trade conditions are always such if we permit them to be. The electric vehicle business is declared to be in a chaotic state. Just what is meant by that we have only a vague notion, but we suppose it means that customers are difficult and seem to prefer competitors’ goods, and occasional sales are not profitable enough to meet a continuous overhead expense.

In every industry in the world there is somebody who thinks the business is in a chaotic state. Conditions in the electric vehicle business are just as good as they are in any other. It has its problems and its disappointments, of course; so have all lines of effort. It has a growing field, increasing popularity and continuously greater advantages to offer its customers, which is more than most lines of business can command.

There are five factors to commercial success in any line: A good product, efficient production, consistent advertising, a live sales force and service. When all five of these factors are present, failure is almost impossible. The electric vehicle business has a good product—emphatically; if it lacks efficient production, that is the producer’s own fault and may still be remedied; and it has a fairly—but only fairly—live sales force. Its advertising, we regret to say, is far from consistent. It varies from nothing at all to spasmodic, high-priced pages in the Saturday Evening Post that flash once before their readers and are dead in a week or less. The steady, conservative kind of advertising that counts has been done by only one or two makers.

The gas car manufacturers have won their wide distribution by plunging into the business with bold and aggressive tactics. Commercial timidity will do just as much harm in the electric car business as it will in any other business.

Co-operative Advertising by Dealers

It is getting to be quite a common thing to find all the electric car dealers in a town combining forces in a newspaper advertising campaign. It is the best evidence we have seen that true co-operation actually exists in the electric car industry.

Three or four dealers working together can be pretty generous in buying advertising space without hurting any of them. The resultant splash of advertising has many times the effect on the eye of the reader that three or four small scattered advertisements would have. The “copy,” being concentrated upon the merits of all electrics, can present all the punch there is in the subject—which, as every electric enthusiast knows, is considerable, and the dealers, if they are as enterprising as the co-operative work indicates, can get still more co-
operation out of the local central station, thereby still further increasing the newspaper space used without raising the individual expense.

We commend this system of combination advertising to all dealers who have a few competitors and a central station in their town. The thing they are all advertising primarily is the electric, without regard for the make or the price. Let the salesmen fight out the merits of names after the prospects have responded to the appeal of the advertised argument. The sales efforts can be as competitive as the dealers care to make them; for the purpose of the salesman is to sell a car of a particular make. But the purpose of the advertising is to convince the public that an electric is more useful than a gas car for all their requirements, as well as more reliable, more economical and more satisfactory all around. The salesman wastes time in that educational task that can be performed just as well, or better, with printers' ink.

No electric car dealer can afford to take very large advertising space in the best newspapers, and keep consistently at it. Several together, of course, can afford to take space that not only will be big enough to attract attention, but will probably exceed the space occupied by any one gas car dealer. The effect produced is that of a large industry. It inspires confidence because it seems to show stability and prosperity.

And far from the least value of such buying of newspaper space is that it opens an opportunity to present in the reading pages of the same newspapers all the "trade notes" and descriptions of cars and trips that the dealers care to prepare.

**Flat Rate Charging for Garage Service**

ELECTRIC current at so much a kilowatt-hour is the direct substitute for gasoline at so much a gallon. No gas car garage that we have located includes a constantly filled gasoline tank in its flat rate boarding charge.

A regular charge, or flat rate, for anything that is consumed in irregular quantities is illogical and economically wrong. It is not only bad in theory, but unprofitable in practice. The garage customer who pays a flat rate for his electric and puts the car to little use is profitable to the garage man but extravagant to himself—and he soon finds it out. The customer who uses his car continuously just because he is enjoying a flat rate is a losing proposition for the garage man, and his losses must be made up out of the good nature of the other customers.

Boarding, washing, overhauling and oiling may reasonably be included under a flat rate because they average practically the same for all cars. But there the flat charge should stop. Juice costs money in direct ratio to the amount used, just like gasoline; and it should be sold the same way. There should be a reasonable profit for the garage man on every kilowatt hour of it that goes through his meters.

Garage owners on the average are poor bookkeepers and they don't know their own costs. The unlimited service flat rate is a pitfall specially designed for such people. It offers the easiest and most painless method known of separating the garage man from what little he has. The only time the flat rate does the garage any good is when its service has a monopoly of the territory and the people have got to have it, and the rate can be shoved away up. Competition cuts the profit off from it in a hurry.

The garage man prefers to boost the gas car, because he can sell the owner a constant stream of supplies—spark plugs and inner tubes and parts and gasoline—all at a reasonable and constant profit. The flat rate habit cuts out most of this revenue when he boards an electric. But there is no good reason why it should. There ought to be just as much profit to the garage man in a mile of electric current as there is in a mile of gas. There can be just as well as not, for the customers will not object. The fellow who runs his electric twelve hundred miles a month just "to get his money's worth" out of a flat garage rate will kick on a measured service, of course; but the businesslike garage owner will want to lose him anyway, or reform him.

We would like to see the flat rate abolished altogether by electric garages, so that every electric car owner would get just what he paid for, no more and no less, and every garage owner would make a profit out of the business commensurate with his attention to it and his value to the community.
Solid Tires for Rear Truck Wheels

Paper Presented at Semi-Annual Meeting, June 12-16, 1916, of Society of Automobile Engineers

RESEARCH and practice, covering a somewhat extended period, have brought to the author the conviction that the use of large single tires, rather than a pair of small units on rear truck wheels, while still comparatively new, has nevertheless proved a progressive development. In order to discuss the subject thoroughly a brief historical review of the solid tire industry will be enlightening.

The use of dual or twin truck-tire equipment was inaugurated during the early development of an infant industry. It was offered as the then most practicable way of meeting conditions, the exact severity of which were not thoroughly known. An accurate forecast of the variable operating conditions that followed the extension of the industry into all phases of commercial transportation was not then possible. Due to such extension, the service has become more severe along lines of greater loads, higher speed and increased zone of activity to the point of overbalancing such bettered conditions as improved roadways, more skilful operators, and improved suspension and design.

Early in the development of a solid tire that would satisfactorily meet the demands of commercial-truck service, three requisites were encountered. Listed in order of importance, these are: (1) Large carrying capacity; (2) permanency of attachment; and (3) freedom from tendency to skid.

The necessity for increased carrying-capacity soon appeared, and shortly tire manufacturers found no existing single-tire equipment adequate to meet practically and serviceably the new conditions. They at once started to develop suitable tire equipment, the result being that dual tires were recommended for all necessities above the range of single tire equipment. Later the practice was extended to rear wheels generally, because tires applied in dual form were in some manner calculated to equal in carrying capacity from two and one-half to three times that of one of the units of which they were composed. Just why this was so considered has never been satisfactorily explained. It must therefore be assumed that the original capacities, which are in effect today with no material change, were reasonably accurate. Practice and observation have confirmed the fairly general reliability of these schedules.

Intelligible service or performance data are scarce, however, and so we find existing capacity schedules considerably deviated from in a number of instances. All these practices should be harmonized and a new and correct schedule should be established and followed.

Permanency or stability of attachment will now be considered, with reference particularly to its influence on dual tires. The early type of tire was attached by circumferential wires or other clamping means to provide substantially a compression of the rubber tire, in turn bringing its base into direct and firm contact with the wheel rim. The friction between the wheel rim and tire base thus obtained was designed to exceed the driving torque. Most prominent of these types was that in which solid metal cross wires were embedded across the tire in such a manner that the ends were exposed. Circumferential wires were fitted over these ends under sufficient tension to draw the cross wires radially inward, thereby compressing the rubber underneath so as to secure and maintain a frictional contact between the tire and rim.

Then, as at present, the application was one depending upon frictional fit to perform properly its intended function. As this type of tire was increased in width it was found impossible to secure the same degree of friction over its entire base, owing to the upward spring that took place in the center of the longer cross bars, thus relieving the compression of the rubber under these bars. As a consequence the stability of attachment was reduced, resulting in circumferential creeping of the whole tire to a much greater extent than was true of those of narrower design. This movement resulted in rapid damage to the base and the tire was rendered useless prematurely, while its tread showed almost no wear in many cases. Inability to correct this weakness resulted in the conclusion that the design was not suitable for tires of greater than 4 or 5-in. width.

It was at this point that dual tires made their entry. Even triple applications were made in some cases.

Fig. 1—Relative Bearing Contact (2500 Lb. Load) for 3-in. Dual and 5-in. Single Tires.

While results were somewhat more satisfactory, much room was still left for improvement. No similarly fastened tire has ever been free from the weaknesses explained, particularly when used as equipment for driving wheels and when subject to varying and indifferent methods of application.

The third condition, namely that of tendency to skid, may be passed over with little discussion since this was wrongly considered as being wholly attributable to the design or character of tire. It is now generally recognized as being directly traceable to conditions of driving and braking.

NEW TYPE OF ATTACHMENT.

Early in 1909 a new tire designed to correct the
weaknesses of previous types was placed on the market. In general this type resembled similar tires used to some extent in continental Europe, although they were not advanced beyond the experimental stage. The American tire, commonly referred to as the "metal base" type, embodied some entirely new features of shape and construction, and stands today, with minor refinements, as representative of the most advanced and successful practice. With the development of this tire, together with efficient standardization and accuracy in wheels, we have a condition whereby correct application is practically assured in every case. The frictional fit is adequate under the most severe conditions to resist any tendency for movement of the tire in any direction, regardless of size, since adhesion of the metal base to the felloe band increases directly with the tire width. This fact accounts largely for the perfection of attachment of the rubber tread to a steel run or metal tire base, unattainable in any other known manner. The result is uniform and successful performance, as is amply evidenced by the results obtained. Weaknesses inherent in single tires of large size were overcome in this later type, so that such tires were at once brought into the field of practicability.

DUAL TIRES OVERRATED.

The practice of rating two tires when applied dually at from 25 to 50 percent more than the sum of capacities of the singles that make up the dual unit, is believed open to discussion, if not to direct criticism. No rule of theory or practice exists that will show such possibilities. It seems manifest, however, that dual tires are somewhat overrated, while singles may be somewhat underrated, according to existing schedules. This subject is under careful investigation. It is believed that a more logical schedule will be proposed in the near future. Such a schedule should in no case rate duals at more than the sum of the capacities of the single units employed. This would correspond to foreign methods, as well as be more nearly mechanically correct.

SINGLE TIRES TO REPLACE DUALS.

Since it is proposed that single tires of certain sizes replace dual tires of stated sizes, a comparison of carrying-capacity according to existing capacity schedules for the given sizes will follow. This comparison will indicate that the proposed single tires are not equal in capacity to the dual tires they are expected to replace. In order to explain this point Table I and Figs. 1, 2, and 3 have been prepared. In each case the data are the composite results of several experiments made under ideal and similar conditions. Table I shows clearly that in every case with equal loading the contact area of single tires exceeds that of the dual tires they are expected to replace, and that the load per square inch is more distributed over the contact area arrived at in every case reduced correspondingly with the increase in contact area. Obviously, this is in favor of the single equipment. Figs. 1, 2 and 3 show the area of contact, the shape of the area and the reduced width of tread. This reduction in width of tread ranges from 30 to 40 per cent and is of material importance.

EFFECTS OF OVERLOAD.

All materials have a well defined limit of capacity for distortion in varying directions. Rubber is no exception, but its capacities are truly remarkable; in a popular sense its most natural enemy in solid-tire service can be considered as overloading. The more definite term is limit of displacement, which means that limit beyond which displacement or distortion causes breakdown of the fibrous structure to a point from which it cannot recover. This condition is often plainly visible from a torn or split appearance, but it is also often unnoticeable to the casual observer. Upon close inspection, however, a condition can be seen that is the forerunner of ultimate breakdown.

FIG. 2—Relative Bearing Contact (350 Lb. Load) for 2½-In. Dual and 6-In. Single Tires.

Dual tires composed of small units do not give satisfactory service for the reason that neither unit is of itself sturdy enough to resist momentary imposition of the total wheel load, such as occurs for instance when traveling over rough road surfaces, excessively crowned or furrowed roads. A condition is readily conceivable in such cases, wherein one of the small units is carrying the entire wheel load during a large part of the time, the load being shifted back and forth from one unit to the other. In view of the fact that such conditions do exist, it remains to alter the tire design or equipment in such a manner as will best take care of the case. This can be accomplished by the adoption of large single units, thus concentrating the load upon a tire sufficiently sturdy to absorb distributable load inequalities. I would repeat that in the case of dual tires it is impossible to maintain an even load distribution on each small unit, and that the total load repeatedly and continuously being thrown from

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Table I: Load and Contact Area

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>36x3</td>
<td>Dual</td>
<td>2500</td>
<td>16.5</td>
<td>151.5</td>
</tr>
<tr>
<td>36x5</td>
<td>Single</td>
<td>2500</td>
<td>17.2</td>
<td>145.4</td>
</tr>
<tr>
<td>36x3½</td>
<td>Dual</td>
<td>3500</td>
<td>23.6</td>
<td>148.3</td>
</tr>
<tr>
<td>36x6</td>
<td>Single</td>
<td>3500</td>
<td>24.0</td>
<td>145.8</td>
</tr>
<tr>
<td>36x4</td>
<td>Dual</td>
<td>5000</td>
<td>26.9</td>
<td>185.8</td>
</tr>
<tr>
<td>36x7</td>
<td>Single</td>
<td>5000</td>
<td>31.5</td>
<td>158.7</td>
</tr>
</tbody>
</table>

*Corresponds to present schedule ratings for dual tires in sizes being compared.
ELECTRIC VEHICLES

JULY, 1916.

one to the other quickly results in rupture or other failure of either one of both of the units.

ADVANTAGES OF SINGLE TIRES.

Numerous advantages are gained through the substitution of 5, 6 and 7-in. single tires for 3, 3½ and 4-in. dual tires. Chief among these are:

1. Saving in tire cost ranging between 8 and 15 per cent.

2. Saving in wheel cost. The reduced wheel cost is attributable to the narrower felloe stock and wheel rim required, together with whatever other saving may be made in connection with wheel design. The same reasoning also applies to metal wheels.

3. Saving in cost of handling and applying one tire instead of two.

4. Saving in wheel, tire and rim weight, resulting in possible greater operating economy and relieving unsprung weight.

5. Larger tire that will adapt itself better to uneven road surfaces, compensate for excessive road crown, carrying its burden as a unit rather than alternately on one narrow tread and then on the other.


7. Better tracking with front wheels (an advantage when tracks must be broken).

8. Usually greater height of rubber tread, thus providing greater cushioning properties with consequently increased tire and vehicle life.

9. Decreased strain on axle and wheel bearings as a result of decreased leverage obtained by the narrower wheel tread.

10. Operating economies that will follow the use of large singles, if a deeper section than that commonly used be employed. The tire service in each case under observation has shown very material improvement.

LIMITATIONS OF SINGLE TIRES.

The question will quite naturally arise, "If single tires in the sizes quoted possess advantages over dual tires composed of small units, why does not the same reasoning apply to single tires of sufficient width to replace the largest dual tires?" Such practice may be possible, although developments to date have not been sufficiently conclusive in this respect to warrant the extension of the recommendation made beyond the ranges given. Perhaps it will be shown that a well defined limit exists, beyond which additional bulk cannot be successfully employed, from either a production or service standpoint, in a solid single tire. Pending results of further investigation and of experiments being conducted, it seems advisable to consider 7-in. tires as the limit of practicable single equipment.

CONCLUSION.

It is hoped that this paper will serve its definite purpose of converting truck builders and users to the advantages of adequate single tires over inadequate dual tires. Only ultimate end can then result to the future success of the whole industry. No truck manufacturer can dispute the fact that unserviceable accessories reflect to the detriment of his complete product. At best it can only be argued that the accessory manufacturer must stand back of his particular part; that adequate replacement or renewed burdens must fall upon him in case of failure. But what attitude does the user assume when his expectations of efficiency of a unit are not fulfilled in every essential? He criticizes not only the accessory that fails, but also the producer who allows inefficient accessories to become a part of his complete product. Continuous efficient operation is the condition desired and expected; adjustment service is only an unsatisfactory relief. After all, the user creates the demand and it is imperative that all of us see that he gets results. Such a course will favor expansion of the industry automatically and rapidly.

Battery Company Makes Addition

The Electric Storage Battery Company, Philadelphia, has plans prepared for a new "Exide" Battery Depot, which will be built at Seventeenth and Walnut streets, Kansas City, Mo. This building will be two stories, of concrete and brick construction with stone trimmings, and with large windows to provide a maximum of natural light. The building will be about 70 by 100 feet. The first floor will contain a sales office and battery depot, with provisions for the prompt replacement or repairs of storage batteries for gas-car starting, lighting and ignition and for electric-vehicle propulsion. The second floor will be used for storage and manufacturing purposes. In this depot will be constantly carried in stock a full line of batteries and parts for pleasure and commercial electric vehicles. In the photograph we show the excavations now under way at the Philadelphia manufacturing plant for the erection of Building No. 25, a large seven-story reinforced concrete building, which will immediately adjoin the new reinforced concrete building No. 22, and replace the building with a three monitor roof at the left of it.

All the ground about the factory is now owned by the company and being cleared of houses for the future developments.
Electric Vehicles in Shanghai

Typical Chinese Conditions Which Have to Be Met by Those Who Aspire to Sell the Orient

The little boy who expected to find his Chinaman the first time he ever dug a deep hole probably experienced keen disappointment when he learned that far off China was many thousands of miles beneath the point of his shovel; but distance means little or nothing today in this age of highly developed transportation and means of communication with all points of the earth. "Backward China" has become "progressive China" and has turned to the New World for the means to her end of improved commercial and civic conditions.

One of the most recent developments in Chinese trade with this country has been the increasing numbers of motor vehicles, both passenger and commercial, which China has been importing. Among these the electric vehicle is prominent and from all reports gives promise of becoming the predominant form of motor transportation, due to its inherent qualities of economy and simplicity of operation. Follows a report recently sent to the Electric Vehicle Section, National Electric Light Association, from the American Consul-General at Shanghai, which gives some interesting facts.

"The number of motor cars, trucks, motorcycles, etc., licensed by the International Municipality at Shanghai increased one hundred and eighteen in 1915, as follows:

<table>
<thead>
<tr>
<th>Class</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private motor cars</td>
<td>83</td>
</tr>
<tr>
<td>Public motor cars</td>
<td>3</td>
</tr>
<tr>
<td>Trade or demonstration cars</td>
<td>1</td>
</tr>
<tr>
<td>Trucks, lorries or vans</td>
<td>4</td>
</tr>
<tr>
<td>Motor cycles</td>
<td>27</td>
</tr>
</tbody>
</table>

"The number of motor cars licensed by the International Municipality is increasing from year to year as shown by the appended ten-year record:

<table>
<thead>
<tr>
<th>Years</th>
<th>Licenses issued</th>
<th>Increase over preceding year</th>
<th>Percentage increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>1906</td>
<td>64</td>
<td>32</td>
<td>50%</td>
</tr>
<tr>
<td>1907</td>
<td>96</td>
<td>23</td>
<td>25%</td>
</tr>
<tr>
<td>1908</td>
<td>119</td>
<td>15</td>
<td>11%</td>
</tr>
<tr>
<td>1909</td>
<td>134</td>
<td>17</td>
<td>13%</td>
</tr>
<tr>
<td>1910</td>
<td>151</td>
<td>17</td>
<td>13%</td>
</tr>
<tr>
<td>1911</td>
<td>217</td>
<td>66</td>
<td>43%</td>
</tr>
<tr>
<td>1912</td>
<td>268</td>
<td>51</td>
<td>20%</td>
</tr>
<tr>
<td>1913</td>
<td>342</td>
<td>74</td>
<td>21%</td>
</tr>
<tr>
<td>1914</td>
<td>443</td>
<td>101</td>
<td>23%</td>
</tr>
<tr>
<td>1915</td>
<td>539</td>
<td>96</td>
<td>23%</td>
</tr>
</tbody>
</table>

"At the present time (April, 1916) the number of passenger automobiles licensed in the International Settlement has reached 559. In addition to the above, licenses have been issued in the French Concession covering 148 passenger cars, making a total of 707 passenger automobiles licensed at Shanghai.

The customs statistics show that during the year 1914 two hundred and seventeen motor cars were imported into Shanghai. Of this number forty-six were shipped to other ports in China.

"During the year 1914 the Shanghai International Settlement Municipality issued nine licenses for trucks and thirteen during 1915. Excepting one truck each of five, four and two tons, the remaining were from three-quarters to one and one-half tons each. For the reason that the bodies of these trucks were built locally and in some cases passenger cars were converted into trucks, it is difficult to give the actual cost of these trucks.

"The taxes on motor vehicles are as follows:

<table>
<thead>
<tr>
<th>Class</th>
<th>Per Quarter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor cycles</td>
<td>$3.00</td>
</tr>
<tr>
<td>Private motor cars</td>
<td>0.60</td>
</tr>
<tr>
<td>Public motor cars</td>
<td>0.60</td>
</tr>
<tr>
<td>Motor vans and trucks</td>
<td>2.00</td>
</tr>
</tbody>
</table>

"The demand for motor cars after the war is expected to be normal and it is not anticipated that there will be any extraordinary demand for trucks, as the business houses that can use delivery vans are already supplied. At present, however, the shortage in ocean freight facilities tends to hamper the importation of trucks and motor cars of all types. All motors in use in this country are imported from abroad. In a few instances bodies are constructed by local coach builders.

"There are no regular automobile and truck publications in China, but the China Press, a daily paper published at Shanghai by the China National Press, Incorporated, devotes considerable space in their Sunday issue to automobile news.

"The introduction of a number of electric automobiles into Shanghai has created much interest and inquiry among wealthy Chinese who are desirous of purchasing cars of this type. While the inadequacy of the local electric power facilities was at first detrimental to entirely satisfactory operation of electrics, this has been remedied in the meantime and the cars now arriving are operated very satisfactorily. Wealthy Chinese, in many instances, are expressing a keen interest in electric cars and state that they intend to make purchases.

"Two of the electric motor cars at Shanghai are owned and operated by the Shanghai International Municipal Electricity Department.

"The electric trucks which have also been introduced are being operated satisfactorily. Some of the owners of motor trucks that are operated by gasoline complain that they are too expensive to operate considering the cheap cost of Chinese coolie labor.

"Electricity is commercially available at Shanghai for charging electric vehicle batteries, but so far no public garage has been equipped for charging vehicles. There is, however, no difficulty in individual vehicle users having their own charging outfit at their residences or other convenient places. These would consist either of mercury arc rectifiers or small motor generator sets. If sufficient inducement were offered the electricity department of the Shanghai Municipal Council would be prepared to hire out motor generator charging outfits at a small monthly rental, maintaining them in the same way as are the large number of power motors on hire. The current is alternating at fifty cycles per second; the voltage of the supply system is 200, and the amperage may be whatever is desired, while the cost per kilowatt hour is approximately two and one-fifth cents."
Players on Life's Checkerboard

In the Upper Corner Miss Edna Hibbard of Stop Thief Fame. Then Cleofonte Capistrano, the Musical Director of Chicago Grand Opera. In the Lower Right Norma Phillips, the Mutual Girl and Marguerite Silva of Golden Notes. All in Detroit Electrics.
Disabled Soldiers Use Electric Wheel Chairs

"In Paris," stated a nurse who had but recently left the French capital, "one sees now only cripples and widows and ambulances. It is a city of cripples. You see them everywhere—armless, legless, helpless!" But Science is marvelous and already the European countries with amazing resourcefulness are training their war cripples for new trades and industries, thus beginning the work of an economic and industrial reconstruction after the devastation of war has ceased. There is a certain irony in the fact that, while some of the most horrible and destructive instruments of warfare have been recent creations of science, the same force which has produced destruction will alleviate the suffering and hardship after the war is over, and will transform the war's human wreckage into "human salvage." Long after the great European holocaust has burnt itself out, the bitter reminders of its cruelty would be too many and too great to bear, were it not for the knowledge that Science will rebuild and renew much that it has destroyed.

In previous wars, many soldiers who had lost limbs in battle, or had become incapacitated for work were unable to earn their living by useful pursuits, and were doomed to live upon private charity or scanty pensions. There are the familiar tales of our own Civil War veterans who, unable to resume their old occupations, were forced into a life of inactivity, hateful to most, left alone with their memories, fingerling their medals and renewing their once active life in the oft-repeated tales of army life.

But the countries in the present conflict do not intend that their men shall return from the front to useless and inactive lives. Employment bureaus for war invalids have been formed in all the belligerent countries, and schools have been organized for the training of disabled men prevented from returning to their old employment, in new kinds of work which their physical disabilities do not affect. Modern science and the study of orthopedy have done much in teaching men how to make artificial limbs of remarkable mobility and efficacy. Surgical miracles are performed every day. Ribs are cut from patients, new jaws made, arms, legs and eyes amputated, and new ones substituted. The German army authorities supply free of charge to disabled soldiers, artificial limb supports, handles and other means for seizing tools. In the hospitals and the schools the maimed learn in a remarkably short time to manipulate these new devices and it is a common sight to find an armless man writing legible letters by means of a mechanical hand. They soon learn to dress and feed themselves and perform the little common tasks of daily life and before long they are able to take their place in the shops and factories of the country. Many of the men now employed in the munition plants have been disabled in the war, but due to the efficiency of the artificial devices, they are able to work about the plants with speed and accuracy.

One ingenious device which has been introduced into the German munition factories is a magnetic hand, or in other words, a magnet attached to an artificial arm which picks up nails and other pieces of metal. Various holding devices have been invented by which tools can be accurately handled. Tailoring, shoemaking, machine and ammunition manufacturing are being largely carried on in continental countries at war by those who have been maimed in battle. One of the greatest difficulties to overcome, however, will be the limited distances to which the disabled will be confined in walking. While the mobility of artificial legs is truly remarkable, it is not possible for one to walk very far. For most, the automobile will be impossible. Outside of commercial motors, the automobile abroad will be more of a luxury than ever before. The need, then, for a small single seated vehicle, which is inexpensive and simple to operate, is evident, and there is apparently one that meets the demands.

The electric wheel chair which Electric Vehicles has described in detail in a previous article, was a familiar sight at the Panama-Pacific Exposition last year and is used successfully at many of the sea-side resorts on the board walks. Sanitoriums, hospitals, health resorts and private individuals who are unable to walk great distances and prefer the freedom of directing their own chairs to the annoyance of being pushed by an attendant who has his own views about the direction he should take, use this little battery propelled chair as the best adapted mechanism for their needs. The manufacturers of electric wheel chairs abroad have therefore anticipated the demand there will be for a single passenger vehicle of this type and already it has gained considerable prominence in England.

The fact that it can be easily controlled by the occupant with the use of one hand, and needs no attendant, is a very great advantage. Able-bodied men will be needed for other more vital business than pushing invalids about in wheel chairs. One of these chairs costs but a small sum, equiped with a 1/2-horse power motor suspended between the steering and rear wheels. Current is supplied from a battery of 15 lead plate cells housed in three boxes beneath the seat. They are of 50 ampere hour capacity and provide sufficient energy for a run of thirty to forty miles per hour.

The controller is combined with the steering tiller and provides for five forward and an equal number of reverse speeds. Motion in the forward direction is obtained by turning the shielded controller handle over successive stops to the left, movement to the right reversing the direction of the chair. There is also a device which operates a brake on the rear wheels and when pressed back beyond a certain point, breaks the motor circuit. Since the speed never exceeds five miles per hour on the level, the chair can be stopped almost immediately, a powerful braking effect being secured by reversing the controller.

These chairs, while obviously not intended for rough roads and steep hill climbing, are nevertheless as ruggedly constructed as miniature trucks and will amply meet the need of one desiring independent locomotion within a reasonable radius. At the present time they are being welcomed with open arms by the hospital authorities for enabling the wounded soldiers and convalescents to drive about by themselves as soon as they have recovered sufficiently.

The characteristic simplicity of the electric vehicle is conspicuous in this wheel chair which permits operation by the uninitiated and makes it "fool-proof" even when operated by unskilled or wrongly inclined persons in crowded places, the prompt control protecting road rights and observing "Safety First."

With forty-two cars competing the Sociability Run and secret time contest for electric pleasure automobiles, held under the auspices of the New York Electric Vehicle Association, on May 19, was pronounced by all those who participated a decidedly enjoyable and successful event, as stated in the June Electric Vehicles.

The day was ideal for the run, which was from the Electric Garage at Central Park West and 62nd street, where the photographer caught a group of cars in the rear of the Century Theatre in front of the Electric Garage and the Detroit Electric service station, which adjoins it, to Riverside Drive, Van Cortlandt Park and then to the Siwanoy Club in Bronxville, a distance of 19 miles. The cars left the garage between 2:30 and 3 o'clock until the forty-two were gone, being driven by their pilots over a previously outlined course to the Siwanoy Club, where they arrived safely between 4 and 4:30.

Only ladies were entered in the secret time contest, which consisted of an attempt on the part of the contestants to cover the course, as nearly as possible, in a previously determined secret time. The prize was won by Mrs. W. H. Jacobus, of 790 Riverside Drive, who drove her brougham, in which were her daughter and a friend, over the course in one hour and 24 minutes, the secret time being one hour, 23 minutes and 30 seconds. At the Siwanoy Club, Mrs. Walter Neumuller, the hostess, poured tea. The average running time for all cars over the course was one hour, 23 minutes and 20 seconds, and the various makes entered were Baker, Rauch and Lang, Detroit, and Milburn.

Mrs. Olivia W. Smith, the chaperone of the New York Electric Vehicle Association, who had charge of the run, deserves the fullest credit for the admirable manner in which she conducted her part. The association was so well pleased with its first undertaking that it has planned a similar run for the coming fall months.

Among the cars entered were those of Mrs. E. L. Benedict, Mrs. Martin Carey, Mrs. Moses Dillon, Miss L. L. Dodds, Mrs. Paul Gerli, Miss I. M. Gibson, Mrs. M. P. Graham, Mrs. R. F. Greene, Mrs. Anton Hilbert, Mrs. George L. Hunter, Mrs. W. H. McAnliffe, Mrs. M. Mintzer, Mrs. Walter Neumuller, Mrs. John Reno, Mrs. J. Rode, Mrs. Otto Roethlisberger, Mrs. Florence Sonn, Mrs. Sidney W. Stern, Mrs. I. M. Taussig and Mrs. Margaret Maynard, also Dr. Howard Gillespie Myers, Dr. Ward Hoag, and Capt. C. R. De Aquino.
Fashions for Milady of the Electric

Exclusive New Fall Garment Shown for the First Time

Center: A handsome dress coat of black velour showing the yoke and fancy sleeves cut in one. The capuchin collar is edged with skunk opossum. Cuffs are of the opossum. Full lined with fancy stripe silk—Percival B. Palmer & Co., Chicago.

An attractive coat made of citron Bolivia cloth. Lined with fancy figured Jap silk. The large cape collar, novelty pockets and full graceful sweep make it an attractive street, dress or general utility coat. It is made in pima, brown, taupe, navy and black. Percival B. Palmer & Co., Chicago.

Forest green velour cloth is used in this double breasted semi-tailored suit. Wide self revers are shown on front. The choker collar and edging on cuffs are of seal. Flaring peplum is joined at waist line. Gored skirt has impressed pleats on front and full gathered back—Percival B. Palmer & Co., Chicago.

The lady with sparkling eyes is thinking of her fall or maybe it's her hat from Cha. A. Stevens Co., Chicago.
News of The Electric Vehicle Section, N.E.L.A.

Sectional Development Work, Reports of Committees and New Announcements

This department gives the record of all activities of the Electric Vehicle Section of the National Electric Light Association in all of its sections, as reported by A. Jackson Marshall, national secretary. Realizing the valuable co-operative development work which the association is doing, the publishers of ELECTRIC VEHICLES offer this exclusive section to association members and all electric vehicle interests in order that they may keep closely in touch with association matters.

The Thirty-ninth Convention of the National Electric Light Association held May 22 to 26 in Chicago was successful beyond all expectations, and for real constructive work accomplished will be a high mark for succeeding conventions to strive for.

The Electric Vehicle Section received its baptism at Chicago and for a newcomer collected unto itself a great deal of favorable recognition, which gave conclusive evidence that the Electric Vehicle Section would not only maintain an individuality, but would secure for the electric vehicle more favorable consideration than it was possible when operating as the Electric Vehicle Association of America, even though very valuable results were secured during the six years that the Electric Vehicle Association was active.

The Chicago Convention was attended by some five or six thousand delegates, most of whom were in one way or the other acquainted with the merits of the electric vehicle, and it is safe to predict that as a result of this knowledge, which has been conveyed to influential central station operators, that the electric vehicle enters a new and infinitely brighter era and with the combined co-operation of all interested parties, we will be able to report very definite and satisfactory progress to the Fortieth Convention.

A very prominent feature of the electrical exhibition, held in the Auditorium Theater coincident with the Convention, was the attractive and comprehensive exhibit of electric passenger and commercial vehicles displayed in the main lobby. Among these exhibiting were: The Anderson Electric Car Company, Beardsley Electric Company, General Vehicle Company, Milburn Wagon Company, Walker Vehicle Company and Ward Motor Vehicle Company. As a result of the success which the electric vehicle exhibits enjoyed, it is expected that electric vehicles will play an even more prominent part in succeeding annual conventions, and it would not surprise the writer if in time these exhibits would rival the great automobile shows, especially when the electric vehicle becomes more and more of a greater factor in city and suburban transportation.

The first session of the Electric Vehicle Section at the Convention was called to order at 2:30 p.m., Wednesday, May 24, with Chairman Walter H. Johnson presiding. While Chairman Johnson delivered his address the chair was filled by the Vice-Chairman E. S. Mansfield, who later on in the Convention was elected Chairman. Follows: Chairman Johnson's address:

"It is with a deep sense of gratification that I welcome you to the first Convention as the Electric Vehicle Section of the National Electric Light Association. When in the spring of 1910 it was decided by some of the leaders in the electric industry that it would be well to form the Electric Vehicle Association of America, the idea principally in mind was co-operation, that is, the co-operation of all those interests relating to the manufacture and use of electric storage battery cars of vehicles. The scope was broad and liberal in order to secure the membership not only of manufacturers of vehicles and central stations, but also manufacturers of batteries, tires, motors, controllers, etc., users, owners, students of transportation and employees of the member companies.

"Under the strong leadership of William H. Blood, Jr., Arthur Williams, Frank W. Smith, John F. Gilchrist and others, the Electric Vehicle Association established for itself a position in the electric world second to no branch of that industry, in so far as the dissemination of practical knowledge is concerned, within the functions of its particular field.

"Through the assiduous efforts of all concerned, a degree of co-operation was obtained between the central station, the manufacturer and allied electric vehicle interests which resulted in spreading the reputation and activities of the Association over a very wide sphere. Many local branches or sections were formed, and the annual conventions grew from one-day affairs to as much as three days of concentrated business effort. Particular efforts were made to interest central stations in the field for the sale of energy which has been created by the introduction of the electric vehicle. That these efforts were in a large measure successful, is evidenced by the forward strides made, in many localities of the country, in the way of establishing garages and service stations, encouraging the independent garages and agencies, and, in fact, the taking over of some of these agencies by the central station where it was found necessary.

"It was strongly felt by a great many of us that the organized work so successfully launched and developed could be better continued with an even greater and more co-ordinate promotion system, if affiliation with the National Electric Light Association could be successfully accomplished. You are all aware of what took place at the Sixth Convention of the Electric Vehicle Association, in 1915, and the exchange of views and numerous conferences between representatives of both associations, which finally led to an invitation from the National Electric Light Association for the Electric Vehicle Association to affiliate with it as a Section. Your chairman confidently believes that the consummation of this plan marks an epoch in the electric vehicle industry. This merger, the details of which have been laid before you in various ways and which are further outlined by Secretary Marshall in his report, gives all those interested in electric vehicle..."
development an opportunity to greatly extend the scope of that industry's operations and the sphere of its influence. Due to the manner in which affiliation has taken place, the continuance of the Electric Vehicle Association's identity has been provided through its establishment as a Section of the National Electric Light Association. We continue to have our individual staff of officers and committees, but in addition to that fact we now have the backing and the assistance which the older and larger association affords. The National Electric Light Association's monthly Bulletin now becomes our official organ, and a portion of each issue will be devoted to vehicle news and announcements.

"Your chairman is hopeful that the activities of local sections will not be abated, and it is a pleasure to observe that the Chicago Section, whose hospitality we are now enjoying, has set an example in the matter of activities which it is hoped other Sections will emulate.

"I wish to express my appreciation of the hard and faithful work which has been done since the last Convention by the officers and committees of this body. I wish particularly to commend and mention the work of our secretary, Mr. Marshall, for his management of our central office, the conduct of our routine business and the securing of so much valuable publicity in the trade and technical papers—to which journals we extend our heartiest thanks and appreciation.

"Just a word as to the future. We should now use our best efforts to increase the scope, the reputation and the general use of the electric vehicle. We now have a very much better opportunity of interesting central stations in the establishing of a broad, constructive electric vehicle policy. In order to bring about this result and during the coming year to make a long stride forward in electric vehicle development, I bespeak the same measure of co-operation for the incoming chairman, officers and committees from all of the members, that you have so generously given me and those who have worked with me during the past term."

At the close of Chairman Johnson's address a committee was appointed to superintend the printing and distribution of same.

Secretary A. Jackson Marshall then presented the secretary's report, abstracting the thirty-two-page printed report, which had been distributed to all members of the section. The secretary also covered in his report the reports of the activities of the Sections, 17 local chapters or sections located in as many states in this country and Canada. The secretary's report was regularly accepted, as were all the other reports presented at the Convention.

Frank W. Freauiff, chairman of the Constitutional Revision Committee, presented the revised constitution, which was unanimously accepted.

Chairman Joseph D. Israel of the Membership Committee next presented Report of the Membership Committee. He showed that while no organized effort had been made the past six or seven months to increase the section's membership, because the committee were waiting for some definite ruling as regards the status of the section under the new affiliation, yet a number of additional members were naturally attracted to the section on account of the character of the work which was successfully conducted. The membership as of October 1, 1915, was as follows:

C. S., 110; Active Mfrs., 27; Associate, 921; Auxiliary, 13; Press, 30; Total, 1,101.

The membership as of April 15, 1916, was as follows:

C. S., 110; Active Mfrs., 33; Associate, 951; Auxiliary, 7; Press, 27; Total, 1,128.

In the absence of Carl H. Reed, chairman of the Motion Picture Film Committee, Secretary Marshall read the very interesting printed report of this committee.

Harry Salvat then presented his paper, "Greater Garage Service," which brought forth considerable lively discussion. Mr. Salvat laid particular emphasis on the important part which the electric garage and charging station play in the successful exploitation and use of the electric vehicle, and soliciting greater consideration on the part of the manufacturers, whose side of the matter was presented at considerable length by Mr. Gail Reed, of the Walker Vehicle Company.

At the conclusion of Mr. Salvat's paper Chairman Johnson appointed the following nominating committee: Messrs. Joseph D. Israel, G. A. Freeman, Walter Neumnuller, P. D. Wagoner, Frank W. Smith, Chairman.

SECOND SESSION.
Thursday Morning, May 25.

The second session on Thursday morning opened with a report of the Traffic and Good Roads Committee, and in the absence of the Chairman A. H. Mauwaring, this report was presented by W. A. Mauwaring.

In the absence of Day Baker, chairman of the Insurance Committee, the report of this committee was presented by Secretary Marshall.

P. D. Wagoner, chairman of the Legislation Committee, then presented his committee's report. The value of the section keeping accurate record of all legislation likely to affect the electric vehicle industry was generally appreciated and Mr. Wagoner was unanimously thanked for his valuable work in this matter.

The admirable paper, "The Relation of Tires to Electric Vehicle Efficiency," by S. V. Norton, was then presented. Much valuable discussion followed the presentation of this paper, which probably represents the most comprehensive review of the tire situation relative to the electric vehicle that has been presented to date.

James H. McGraw, chairman of the Federal and Municipal Transportation Committee, followed with the excellent report of his committee. Mr. McGraw's report was really in the nature of a comprehensive review or paper dealing with the application of electric vehicle to all branches of federal and municipal transportation requirements.

"Industrial Truck Applications," by C. W. Squires, Jr., was then presented by the author, and very considerable stress was laid on the successful application of the industrial truck in many lines of industry, and the rapid headway which this form of electric truck was making.

F. E. Whitney unfortunately was unable to be present to present his very instructive paper, "Electric Truck Troubles and How to Eliminate Them," which was ably presented by J. R. Freeman.

THIRD AND CONCLUDING SESSION.
Thursday Afternoon, May 25.

The third and concluding session of the Electric Vehicle Section's convention was called to order at
ELECTRIC VEHICLES

2:30 p. m. on Thursday, May 25, and W. P. Kennedy, chairman of the Operating Records Committee, presented the joint report of the Operating Records Committee and the Garage and Rates Committee, of which latter committee George B. Foster, newly elected vice chairman of the Section, is chairman.

The joint report of these two committees contained valuable material, which will be extensively employed, and the committees were given a vote of thanks for their painstaking work.

Vice-Chairman of the Section E. S. Mansfield, chairman of the Central Station Co-operation Committee, and the Section's chairman-elect, followed with a presentation of his committee report, in which the need of co-operative effort between all branches of the industry was evidenced and a plan for real co-operation made.

H. A. Wagner, president-elect of the National Electric Light Association, participated in the discussion following presentation of Mr. Mansfield's committee report. Mr. Wagner further emphasized the desirability of the proper sort of constructive co-operation, and suggested that the electric vehicle industry consider that its successful life dated from the time of the Chicago convention, and urged that every one in the electrical industry would from such time on learn to appreciate the merits of the electric vehicle and assist in its introduction wherever and whenever possible.

Mr. Wagner advanced the suggestion that each central station this year purchase at least one electric vehicle, pointing out that if each of the five or six thousand central stations operating in this country put into effect such suggestion, that the electric vehicle manufacturers would enjoy an unusual prosperity, and as a result of this healthy condition, the electric vehicle would rapidly secure the general recognition which its qualifications merit. In order to lend impetus to the scheme of central stations purchasing, using and advocating the use of electric vehicles, Mr. Wagner stated that upon his return to Baltimore at the conclusion of the convention, he would authorize the Consolidated Gas, Electric Light and Power Company, of which he is president, to purchase 25 electric commercial vehicles. This evidence of practical and definite co-operation on the part of President-elect Wagner brought forth great enthusiasm and it was freely predicted that his action would have a very considerable influence in causing the other central stations to follow his excellent example.

At the conclusion of the invigorating and stimulating discussion on co-operation, P. D. Wagner presented his paper, "Battery Service: A Unit in a Comprehensive Plan for the Successful Exploitation of the Electric Vehicle." Following the reading of the instructive paper, Mr. Wagner also presented three or four letters from thoroughly satisfied users of the system which he was advocating in Spokane, Wash., and other cities.

The Electric Vehicle Section Convention was then honored with a very encouraging address by President E. W. Lloyd, who dwelt on the value of centralization of promotion effort in the electrical industry, and stating that the recent affiliation of the Electric Vehicle Association of America with the National Electric Light Association would unquestionably work out to the advantage of all concerned. Mr. Lloyd unqualifiedly stated his belief in the future of the electric vehicle and the recognition which it would receive from the central stations now that we were in a position to talk more directly to them. Mr. Lloyd's very striking and inspiring address was a fitting climax to a very successful convention.

Frank W. Smith, as chairman of the nominating committee, then presented the following nominations:

OFFICERS

Chairman, E. S. Mansfield, Edison Electric Illuminating Company of Boston, 39 Boylston street, Boston, Massachusetts.

Vice-Chairman, George B. Foster, Commonwealth Edison Company, 72 West Adams street, Chicago, Illinois.

Treasurer, H. M. Edwards, the New York Edison Company, Irving place and Fifteenth street, New York City.

Secretary, A. Jackson Marshall, 29 West Thirty-ninth street, New York City.

EXECUTIVE COMMITTEE


The election of these officers and members of the executive committee was unanimous.

Chairman-elect E. S. Mansfield was escorted to the chair and delivered an impromptu address:

"We do not know exactly what we are going to do, but we do want to tell you that we are enthusiastic for the electric vehicle. It has had its low points in the curve, it is true, but all industries that succeed finally, go up and down and if there is anything to them they succeed. I believe the electric vehicle is going to succeed. There has been a great deal of a sort of half-enthusiasm among a good many of the members. Let us all sound a note of enthusiasm. From now on let the manufacturer cut out the past. Let him date from now on the history of his electric vehicle success. Let the central station man take the key and open his heart and show people that he really has a place for the electric vehicle, because the central stations all have a place for the electric vehicles. They won't tell you gentlemen so, because they are afraid you will load them up with a hundred or two trucks.

"The only way and the best way in which you will get this large number of central stations back of you, enthusiastically pushing you, is to show the
energy and see that the electric vehicle get s all that it
deserves. If we will all get together in the next year
and put our shoulders to the wheel, in another year
we will begin to feel that we are achieving the results
we ought to achieve."

For those who are not fully conversant with the central
station industry, it might be interesting to ob-
serve that the chairman-elect, Edward S. Mansfield,
is superintendent of operating bureau accounts of
the Edison Electric Illuminating Company of Boston.
He was graduated from the electrical engineering de-
martment of the Massachusetts Institute of Technology in
1896. Joining the Boston Edison organization, he served
for a time as statistician in President Edgar's office,
but subsequently became head of the correspondence
division in charge of the real estate of the company,
and later head of the statistical division in charge of
the electric vehicle division. Here his work in electric
vehicle promotion was eminently successful, but owing
to the rapidly broadening scope of the operating
bureau it was necessary to create a new office of super-
intendent of operating bureau accounts, to which Mr.
Mansfield was appointed in 1913.

The paper, "Passenger Vehicle Problems and Activities," was then presented by E. P. Chalfant.
Mr. Chalfant's comprehensive paper was the result of
an extensive investigation and co-operation from a
number of interested qualified individuals, and pre-
sented many phases of electric vehicle development
in an interesting and instructive manner.

Frank W. Smith, a past-president of the Electric
Vehicle Association of America, in discussing Mr.
Chalfant's paper, complimented the author on the ex-
cellent manner in which he had handled the subject,
and Mr. Smith also brought out the fact that the Electric
Vehicle Association of America, originally con-
cieved and put into effect primarily through the efforts
of the central station interests, had been active for
more than six years, and that the central stations had
also contributed most of the money raised for the two
advertising campaigns conducted by the Electric
Vehicle Association of America, and that the central
stations were also willing several months ago to put
up some thirty-five or forty thousand dollars, pro-
duced a like amount was forthcoming from the manu-
facturers, to conduct a third co-operative advertising
campaign, but that the manufacturers had taken no
action in the matter.

W. P. Kennedy followed with the presentation of his
paper, "Central Station Promotion of Electric
Vehicles," citing a number of interesting examples of
how the electric vehicle would materially increase the
load of the central station, bringing out the fact that
as the electric vehicle load was essentially off-peak,
additional plant equipment would not be necessary.
Therefore, the business was of a highly profitable
nature, which would be sought by all central stations.

At the conclusion of Mr. Kennedy's paper, a motion,
offered by George Drake Smith, was passed, which
embodies a very sincere vote of thanks to the outgoing
officers for the efforts, and expressed the wish that the new officers receive the unqualified sup-
port of every member of the organization in furthering
its progress during the year.

Chairman Johnson, after voicing his appreciation,
brought the convention to a close exactly on scheduled
time—5:30 p. m.
MEETINGS

The custom of having regular luncheon meetings on Tuesday of each week has been followed. Many prominent speakers made addresses at this meeting—including those high in the organization of our own industry and those engaged in the legal, educational and engineering professions.

The average attendance has been about 25. This low number is accounted for by the fact that most of the members had to come several miles in order to be present at the meetings.

One joint meeting with the Chicago Branches of the American Institute of Electrical Engineers and the Western Society of Engineers was held on May 27—the subject being "Electric Vehicles." Four very interesting papers were presented and discussed.

MEMBERSHIP COMMITTEE

The Membership Committee, owing to unfortunate circumstances, were late in getting organized in their work with the result that the increase in membership is not as satisfactory as it might be. We have enrolled during the period October 1, 1915, to April 1, 1916, only 18 new members while we have had 14 resignations due to members leaving the community or changing their calling. This leaves a total membership of 125.

Respectfully submitted,

George B. Fostier, Chairman.
F. E. McColl, Secretary.

REPORT OF THE NEW ENGLAND SECTION

The New England Section of the Electric Vehicle Association of America has held four meetings during the year, all of which have been well attended.

The first meeting was held on October 13, it being the annual meeting of the Section. The officers made reports for the year passed and after naming new officers were elected:

Chairman—J. T. Day.
Vice-Chairman—Albert Weatherby.
Treasurer—L. E. Enslow.
Secretary—C. H. Mills.

The following are members of the Executive Committee:

E. S. Massefield
W. A. Slackford
H. E. Douggett
W. H. Hooper

During Electrical Prosperity Week a parade of electric commercial vehicles was held with over 100 vehicles of various sizes in line, representing 40 different industries. During that week a section meeting was held, which was addressed by Mr. S. G. Thompson of the Public Service Company of New Jersey. Mr. Thompson gave some interesting figures showing the results obtained by his company in an electric vehicle campaign then in progress.

At the next meeting Mr. John N. Cole, Secretary of the Boston Development Board, was the principal speaker and took as his subject, "Some Boston Business Embarques." Announcement was made of the satisfactory results obtained by the local express companies during the unusually heavy snowstorms of the winter.

The last meeting was held on April 11th and announcement was made of the consolidation of the Electric Vehicle Association with the N. E. L. A. and all riders were urged to continue their membership permanently in the national body.

Mr. George H. Hudson of the General Vehicle Company and Prof. Dagald C. Jackson from the Massachusetts Institute of Technology presented topics of interest to the industry.

In general the growth of the electric vehicle industry in New England has been very satisfactory during the year passed, although the greatest results have been obtained in Boston and vicinity. The American Express Company is adding 20 3½-ton vehicles to their present fleet, which will give them 70 in actual daily service on the streets of Boston.

The Battery Service System recently inaugurated has undoubtedly opened a field that has coverage up to 75 miles and 25 trucks of various sizes are in operation on this system. An advertising campaign has been started, which has developed many live prospects and transportation companies are looking to the electric vehicle to help relieve the congestion at the terminals, which has been unusually acute. The Merchants & Miners Company is particularly interested and is considering the advertising of a "flying fleet" of electric trucks to deliver goods from its own roof terminal to those of its customers.

Our statistician reports that there are registered in New England 1,153 electric passenger vehicles and 714 trucks. This is a very material gain over last year.

Respectfully submitted,

Charles H. Miles, Secretary.

REPORT OF THE PHILADELPHIA ELECTRIC VEHICLE SECTION

PERSONNEL OF OFFICERS AND EXECUTIVE COMMITTEE

OFFICERS

R. Louis Lloyd, Chairman, Philadelphia Electric Co.
A. W. Young, Vice-Chairman, Public Service Electric Co., Camden, N. J.
H. H. Dorr, Secretary, Baker & K. Co.

COMMITTEE

E. E. Whetstone, Commercial Truck Co. of America.
E. L. Hendricks, Philadelphia Storage Battery Co.
E. L. Reynolds, Electric Storage Battery Co.
W. A. Mantaining, Philadelphia Electric Co.

Since the election of officers last fall, two regular meetings have been held at which papers have been read as follows:

November 10th—"The Solution of the Transportation Problem by the Application of Electric Vehicles" (Illustrated), by Mr. F. E. Whitney, of the Commercial Truck Company of America.

January 12th—"The High-Power-Ability of Modern Electric Vehicles," by Mr. Joseph L. Tracy, Assistant Chief Engineer of the Electric Storage Battery Company.

Through the splendid co-operation of the Philadelphia Electric Company of this city and the Public Service Company of Camden, N. J., electric vehicle interests have been very materially advanced. Very truly yours,

H. H. Dorr, Secretary.

REPORT OF THE ST. LOUIS ELECTRIC VEHICLE SECTION

OFFICERS AND EXECUTIVE COMMITTEE

F. E. Stevens, Chairman, Stevens-Waverley Auto Co., 4422 Olive St.
F. E. Whitney, Vice-Chairman, Electric Vehicle & Storage Co., 531 Delaware Ave.
H. R. Marshall, Secretary, Electric Storage Battery Co., Federal Reserve Building.

We respectfully submit the following report covering the activities of the St. Louis Section during the past year.

The regular monthly meetings of the St. Louis Section have been held, these meetings being held on the first Wednesday of the month. Although no set programs have been followed, these meetings have developed a great deal of interesting information for all concerned.

The question of holding a joint advertising campaign was brought up during the fall and after going into the matter very thoroughly it was decided that a campaign of this character would be very advisable. Subscriptions were accordingly made by most of the members, there being a total fund of $1,655.00 raised for this purpose. Experts were hired to prepare the ads. and a series of twenty different advertisements were run during the period from December 14th to March 24th. These advertised the advantages of the electric vehicle and the results which have been obtained have indicated that the campaign was well worth while.

There are 28 members of the St. Louis Section at the present time. Respectfully submitted.

Frank E. Stevens, Chairman.
H. R. Marshall, Secretary.

REPORT OF THE TORONTO ELECTRIC VEHICLE SECTION

The Toronto Section regrets to report that its activities have been limited during the past year on account of the effects produced by the European War. Car companies throughout the country, with a population of only eight million, and consequently an enormous amount of new capital is constantly required to develop its almost unlimited resources. Needless to say, this capital is not at present available when Canada, as a Colony of the British Empire, is in the throes of an awful conflict. As a consequence the merchants and manufacturers cannot secure the needed money with which to make extensions or changes in their transportation equipment, and this condition of finances is reflected in a considerable decrease in the purchase of electric vehicles, both for commercial and pleasure purposes.

The competition of gasoline cars is becoming more strenuous every month on account of the increased manufacturing facilities, and resultant low production cost of gas trucks, which advantage has been brought about through the enormous orders for gasoline vehicles placed by the armed forces.

The increase in the value of horses, feed, cost of wagons, harness and stabling has resulted in a decided advance in the cost of maintaining the horse delivery system, and in the writer's opinion this should cause a much greater interest in light delivery electric. This is a field that should be developed, more especially as there are indications that the small gas car has reached its lowest price point that gasoline, oil and repairs must necessarily cost a great deal more than ever in the near future than at the present.

I am pleased to state that the Toronto Electric Light Company has recently purchased four (4) light delivery electric vehicles, with the use of which, it is believed, the appliance,
ELECTRIC VEHICLES

REPORT OF THE WESTERN NEW YORK SECTION

Officers

Henry J. Schneider, Chairman, Philadelphia Storage Battery Co., 405 Fernwood Ave., Rochester, N. Y.

L. M. Bauer, Vice-Chairman, Sager's Electric Station, 30 Carleton St., Rochester, N. Y.

W. S. Broen, Secretary, Rochester Railway & Electric Co., 34 Clinton Ave., Rochester, N. Y.

Since the organization of this Section on November 19, 1915, there have been held four regular meetings as follows:

December 3, 1915, informal talk on Salesmanship, by Mr. L. M. Browne, Vice-Chairman of the Section. Number present 5.

January meeting was held because of the auto show.


March 13, 1916, “Charging Apparatus and Methods,” by Mr. J. L. McCue, Vice-President, Lincoln Electric Company, Cleveland, Ohio. Twenty-eight present—10 members and 18 non-members.


An advertising campaign was inaugurated about the 1st of April, the plan of which is to insert in one of the local Sunday papers an advertisement calling attention to the merits of the electric pleasure car as a town car. The first ad. consisted of a half-page in the Democrat and Chronicle of April 2nd. Succeeding insertions commencing with April 9th, to consist of a quarter page each Sunday for about four weeks, or until the appropriation is used up. The money to finance this campaign was obtained by subscription from the local power company and five of the larger dealers in vehicles and batteries, and amounted in all to $312.00.

The May meeting will be held in Buffalo on the 8th and it is expected that a number of the Rochester members will drive to Buffalo in their electric cars for this meeting. The distance is about 70 miles.

The last meeting of the season will be held in Rochester on June 8th.

The local section is planning to publish a list of charging stations within a reasonable radius of Rochester so that owners wishing to take runs outside of the city may know where it is possible to get a charge if necessary.

The Rochester meetings of the section are held in the rooms of the Rochester Engineering Society.

Henry J. Schneider, Chairman.

W. S. Broen, Secretary.

The regular luncheon meeting of the Chicago Section took place Tuesday, June 20, at 12:30 p.m., at The Metropole, 2300 Michigan avenue. The chairman and vice-chairman were absent so Secretary McCall conducted the meeting. The report of nominating committee was read by the chairman, Mr. Milton.


Mr. Milton then went on to say that inasmuch as Mr. Ehrlich had to refuse on account of press of duties, he took great pleasure in nominating Carlyle Friedner for the office. The nomination was seconded and carried. After some informal discussion the meeting adjourned.

The meeting of June 27, 1916, after the election of officers, will be given over to the subject of improving the business and working conditions of the electric garages of Chicago. From developments started since our recent meeting on the same subject, there is considerable hope of good progress being made at this time. What is most necessary, is a good attendance of garage men. Mr. Christine will have some good ideas to present to us at this time.

War Creates Demand for Ohio Electrics

The Ohio Electric Car Company has just closed a contract with a large Scandinavian corporation for the sale of Ohio electric cars in Norway, Sweden and Denmark.

One of the members of this firm visited the Ohio factory in Toledo last week and gave very explicit instructions for the shipment of the first consignment of Ohio Electric cars, which on account of the regulations regarding the export of rubber goods to neutral European countries must be changed in many respects to conform to the requirements of the rubber trade agreements.

The cars must be shipped without tires, the rubber step pads must be replaced by some other material and even the corrugated rubber floor covering which is used in Ohio cars between the floor and the rug must be left out and something else used in its place.

Mr. Cantin, the representative of this newly appointed dealer, suggested that the imported rug which is used in the Ohio car might be sufficient covering for the floor which is made of matched material, but J. A. Kellam, sales manager of the Ohio Company, pointed out the value of this extra floor covering in keeping out the cold and after considering the fact that these enclosed cars are so often used in going to theaters, parties and the like, Mr. Cantin decided that some other material must be substituted which would serve as nearly as possible the purposes for which this rubber mat is used.

Mr. Cantin says that Norway, Sweden and Denmark have all prospered during the European war very much the same as this country and the demand for electric cars is increasing very rapidly in those countries.

Chicagos Electrics Open New Branch in Evanston

Salesrooms and service quarters for Chicago electricians in Evanston are now located at the Evanston Electric Garage, 1013 Davis street. The same decorative plans have been used in the new Evanston branch that have distinguished the Chicago electric salesrooms in Michigan avenue. The north shore territory is a strong electric car territory. With the new Edison models that are creating so much favorable interest in Chicago, it is expected that the business for Chicago electrics will rapidly mount along the north shore this year.
The Ohio Opens New Branch Salesroom in Toledo

For the benefit of prospective purchasers and local owners, the Ohio Electric Car Company, of Toledo, Ohio, has opened a downtown salesroom and service station at 1220 Madison avenue, of that city.

Toledo has always been an exceptionally good electric car market and Toledoans are very loyal to the local product, there being at present approximately four hundred Ohio electric's in use in that vicinity.

This branch salesroom is a new departure for the Ohio Electric Car Company, local sales and service having, in the past, been handled through local agencies, but appreciating that more direct contact with owners and prospective purchasers would result in greater satisfaction, the local branch was decided upon.

This is the third branch house established by the Ohio Electric Car Company in order to be in close touch with local conditions in the larger markets. J. M. McDowell, formerly of the Ohio Electric Sales Company, of Pittsburgh, will have charge of the new office.

Body Definitions

One of the most interesting reports presented on the recent summer cruise of the Society of Automobile Engineers, June 12-16, was to the electric vehicle men's minds that of the nomenclature division, which recommended among other things the following definitions for bodies which are to become standard:

Division XVIII—Body

Types of Bodies

Roadster—An open car seating two or three. It may have additional seats on running boards or in rear deck.

Coupelet—Seats two or three. It has a folding top and full-height doors with disappearing panels of glass.

Coupé—An inside operated, enclosed car seating two or three. A fourth seat facing backward is sometimes added.

Convertible Coupé—A roadster provided with a detachable coupe top.

Crested Leaf—An open car seating three or four. The rear seat is close to the divided front seat and entrance is only through doors in front of the front seat.

Touring Car—An open car seating four or more with direct entrance to toneau.

Salon Touring Car—A touring car with passage between front seats, with or without separate entrance to front seats.

Convertible Touring Car—A touring car with folding top and disappearing or removable glass sides.

Sedan—A closed car seating four or more in one compartment.

Convertible Sedan—A sedan touring car provided with a detachable sedan top.

Open Sedan—A sedan so constructed that the sides can be removed or stowed so as to leave the space entirely clear from the glass front to the back.

Limousine—A closed car seating three to five inside, with driver's seat outside, covered with a roof.

Open Limousine—A touring car with permanent standing top and disappearing or removable glass sides.

Brougham—A limousine having the driver's seat entirely inclosed.

Landaulet—A closed car with folding top, seats for three or more inside, and driver's seat outside.

Group 1—Floor-boards and dash

Floor-boards (horizontal)

Heel-boards (under seats)

Dash (separates engine compartment from driver's compartment)

Instrument board.

Groups 2, 3, 4—Body, upholstering, top.

Going Up?

With Everett T. Dale in Scranton, Pennsylvania, with a Detroit Electric, and George M. Cheschier in Minneapolis with his Milburn, we believe we could do anything in the way of climbing with an electric except riding up a straight vertical wall. The former took his electric half-charged and playfully romped up the far-famed hill that was all the same implied to even the marvelous hill climbing streamers of the old days, Giants Despair, near Wilkes-Barre. The electric proved a revelation to the local motorists, who scoffed at the possibility of its climbing to the summit of the mountain. Mr. Daly stopped and started at will and the car rode the road easily without jolts. On the other hand, Mr. Cheschier was not so strenuous but a great deal more spectacular. He picked out the long, steep steps of the Minneapolis Court House to amble up to the portico entrance, where he turned around and came down. Several Minneapolis newspaper men witnessed the performance in awe at the thought of a so-called lady's car doing such hoydenish things. Times are changing!

The Best Cartoon of the Day

Desiring to do their part in the country-wide movement, tending to both reduce the high cost of gasoline, also provide a most effective substitute for this (fast approaching luxury—gasoline—the West Penn Auto Company of Pittsburgh, Pennsylvania, dealers for the Detroit Electric, have offered their suggestion to the alarmed motoring public in one of the strongest and up-to-the-minute cartoons of the day. This cartoon was quite enthusiastically received and many of the industry on seeing it have written to the Penn Auto Company asking for cuts for reproduction. The space was paid for at advertising rates.
Snappy 1900 Model of Morris and Salom in Red and Black.

A Detroit Electric Proving Its Title to Be Called a Suburban Car on a Seventy-Mile Run.

A Massachusetts Firm Finds G. M. C. Electrics to Be Highly Satisfactory.

The Keystone Garage of Chicago Has Faith in Measured Service and Was Progressive Enough to Equip Its Charging Plant With Meters to Enable It to Charge Its Customers for What They Get. Result, Everybody's Satisfied.

Stories in Pictures of Electric Vehicle Practice and Progress.
Giving Service by Telephone

A Lesson for the Electric Car Interests by the Georgia Railway and Power Company

UNDER strict analysis, the telephone is a substitute for an original. So is the letter. The original of each is the personal conversation wherein those who engage each other are present actually, face to face.

Notwithstanding its great convenience, the telephone, being a substitute, does not include all the elements of its original. It is at a disadvantage.

In the first place, it is liable to intrude upon your attention at a moment when a personal caller would wait; and therefore one must be more than ordinarily careful to respond without show of impatience.

Secondly, the inquiry that comes by telephone is to be answered usually right then—unlike the answer that would go by mail, in a carefully considered and signed letter.

Again, because your telephone caller cannot see you and interpret your manner and expression, your voice alone must impress him with the sense of your courtesy.

Yet again, in exceptional cases, your telephone caller, feeling himself remote and impersonal, may be more direct in getting to his point than he would be if he were before you; he may be even rude. To guard against resentment under these circumstances is to prove the degree of your own self-control, the extent of your own courtesy.

The difficulties of serving by telephone make it important that we should render this service with extra care.

Serving by telephone is, of course, just one of the phases of a company's daily business. Nevertheless, it is an integral phase of that business, and as such it merits our attention and interest.

Serving by telephone has many aspects in our work.

There is the service rendered by our own switchboard operators in directing to the proper department or individual the caller who knows nothing of our organization.

There is the service rendered by the department or individual called by error, in seeing that the caller is transferred with dispatch and courteously to the other telephone where his or her mission can be given attention; or in accepting the caller's message and releasing the caller and transferring the message to the proper department.

There is the service of receiving graciously the information tendered by some friendly caller whose purpose is to aid us in a detail that may be or may not be interesting or important.

There is the service of arranging that when you are called but are out at the moment, you will be informed of the call when you return, so you may give it attention without necessitating its repetition.

There is the service among departments of quick response for the sake of greater efficiency.

There is the service, in emergencies, of protecting the department combating the emergency by answering in its behalf until its attention is free to resume its own serving by telephone.

There is the service of receiving and satisfying complaints.

In a business such as ours, not understood by the average member of the general public, it is inevitable that complaints will arise.

Our great work is in encouraging those complaints to be made to us, and in satisfying them.

A complaint voiced to someone outside the company gets nowhere, remedies nothing, leaves the complainant dissatisfied.

A complaint made to us is valid and effective. We can apply the remedy—and we're anxious to apply it. We can satisfy the complainant—and we're interested very much in doing nothing short of that.

Whether the complaint by telephone seems reasonable or unreasonable, its courteous reception by anyone in behalf of this company is vital to the company's interest. Its impartial investigation is essential, and full and satisfying report upon it to the person who made it must be given if we are to retain that public goodwill without which we cannot progress.

Complaints by telephone are prone to be incomplete unless we are careful to elicit by proper questioning the details that are needed. Get a clear understanding of the exact nature of the case, else you will be left at a disadvantage.

It is established by the experience of public utilities that the majority of complaints are due to misunderstanding.

We must not expect the person with the complaint to know those things which experience has made commonplace to us. We must not expect him to perceive the remedy that is so obvious to us. His difficulty may be an old story to us because we have known
scores of similar cases. But it is a new problem to him.

By no means is the complaint due invariably to misunderstanding, however. Very often it is real and founded on good reason.

Therefore we must bear in mind that every complaint that is to be received courteously—or, if the complainant is out of temper, impersonally at least—and is to be investigated with interest, and answered

tually. Dis courtesy toward a patron in any circumstances is a betrayal of the company’s interest. Dis courtesy toward a patron already ruffled or angered or suspicious or accusing under some inconvenience would be lamentable error, indeed.

But though it be possible for something to go wrong in the extensive business we do with so very many customers, it is quite impossible for that thing to stay wrong longer than it takes us to learn it and correct it.

Our business is not alone in giving the complainant the benefit of every doubt. Nor are public utilities as a class alone in that policy. All large businesses practice it.

There is the story of a women who bought a dress and changed her mind when she looked at it in her home. She sent her husband back with it to Green & Brown’s store, but he returned it by mistake to Black & White’s. When they demurred that they sold no dresses like that, he became indignant. Thereupon, without further protest, they paid him the refund he claimed. He discovered his mistake when he horrified his wife that evening with his report; and he has been apologizing ever since, says the story, to Black & White. The wisdom of the policy of satisfying complaints even if generous, concessions are exacted has won broad recognition.

We are interested in finding the real cause of every complaint, whether it be due to misunderstanding on the customer’s part or is justified by fact. In any event, our attitude is that by extending to us this opportunity for rendering service the customer has conferred a favor.

We do not evade complaints. On the contrary, we seek them and welcome them in order that we may erase them.

Remember these things when you are serving by telephone.

Strange as it may seem, the truth is actual that many people—perhaps some among our own number, even—are awkward and self-conscious in manner and speech when they talk over the telephone.

There is the matter of telephone etiquette, which consists of a few very simple suggestions evolved through years of effort to make telephone intercourse smooth any easy.

There are no more than suggestions, but the discerning man and woman observes them as any other accepted social code is observed.

For instance, there is the obligation incumbent upon each one of us to answer promptly the ring of our telephone. Our caller is waiting.

There is the suggestion that even though the bell has rung long and loudly and insistently, our caller is by no means responsible and would have good reason to feel a slight if we throw a gruff salutation into his ears.

The easy conversational style of telephone speech can be cultivated almost unconsciously. If it be distinct and a little more deliberate than ordinary speech, it is quite an asset.

On a private branch exchange, outside calls are received by the Company’s central operators first and then are connected with the proper telephone. Your caller, therefore, knows he has arrived by telephone within our building. Your salutation need not be more than a succinct statement—for instance, “Purchasing Department” or “Mr. So-and-So speaking.”

Telephone etiquette contemplates that the caller will introduce himself or herself as soon as you arrive at the telephone. But in the event this is overlooked, it behooves you to learn your caller’s identity as early as is convenient. This will insure against a situation wherein you have received a message from an unlocated source and are as confused by it as you would be by some urgent but unsigned letter.

It is best not to keep your caller waiting if you have some investigation to make before you can dispatch his business. The accepted course is to aces-
Chamber of Commerce Holds Meeting

At a record gathering of motor car manufacturers in connection with the annual meeting of the National Automobile Chamber of Commerce, Inc., Charles Clifton was again selected president of the organization.

On Wednesday the commercial vehicle makers in the N. A. C. C. held a commercial vehicle convention at which many standards were adopted furthering the plans for more efficient service to the buyers of trucks as well as of passenger cars.

The directors elected were John N. Willys, C. C. Hanch, R. D. Chapin, H. H. Rice, Waverly Electric; and J. Walter Drake, while at the organization meeting the following officers were unanimously elected:

President—Charles Clifton.
Vice-President—Wilfred C. Leland.
Second Vice-President—Hugh Chalmers, Gasoline Division.
Third Vice-President—Windsor T. White, Commercial Vehicle Division.
Fourth Vice-President—H. H. Rice, Waverly, Electric Vehicle Division.
Secretary—R. D. Chapin.
Treasurer—George Pope.
General Manager—Alfred Reeves.

The commercial vehicle convention decided that no truck show was necessary at this time, although the usual successful pleasure car shows will be held in both New York and Chicago. They decided against any change in the standardization of frame widths at this time.

For the protection of buyers of trucks, a standard definition for motor truck chassis, both gasoline and electric, was decided upon and the convention, together with the annual meeting, approved a form of service policy which is expected to supply even better service to the car owner.

Eight Cars of the Same Make in One Family

W. W. Barnett, the Denver representative of the Ohio Electric Car Company of Toledo, reports that H. M. Porter of that city has just purchased the eighth car of that make, a Model 12, for immediate delivery. Every one of the electrics purchased by the Porter family are in daily use. This fact is especially interesting when one considers that one of the cars owned was one of the earliest models manufactured by this company.

Although there are a number of cases on record where one family have owned a comparatively large number of one make of car, the Ohio Electric Car Company does not believe that there is another instance where as many as eight have been owned and every one of those eight giving satisfactory service.

This certainly shows that from a standpoint of consistent operation the electric car far outclasses the gasoline-driven car, as a car of this type is rarely used more than two years by the original owner.

Philadelphia Truck Men Hold Outing

The annual outing of the Philadelphia Motor Truck Association was held a June afternoon at the Mohican Club on the Delaware, above Camden. Forty automobiles conveyed the pleasure seekers from the head-quarters of the Philadelphia Automobile Trade Association, at Broad and Callowhill streets, to the scene of the outing. Throughout the afternoon and evening nearly 150 members of the trade devoted themselves to athletic sports, dining and fun-making in general.

A comprehensive program had been prepared by the entertainment committee, of which R. E. Chamberlain was chairman, in conjunction with Lee J. Eastman, president of the association.

Quoit pitching satisfied the older and more dignified members, but fun galore was afforded by such games as potato racing, foot racing, human jocky racing, tug of war contests, and baseball for the young athletic set.

A baseball game between the Eastman Brownies and the Graham Crackers resulted in a victory for the former by a score of 14 to 13. Judge Eugene C. Bonniwel and Edward Browning acted as umpires.

In the evening dinner was served in the clubhouse, George Graham presiding as toast master and presenting personally appropriate prizes to winners of all events of the day.

The summaries of the athletic events were as follows:

Potato Race—First, W. C. Weber; second, J. J. Bradburn; third, George Kreps.

Fat Men’s Race—First, O. M. Dolittle; second, R. E. Chamberlain; third, William Righter.

Jockey Race—First, Edward Roth and A. S. Smith; second, W. P. Duval and F. Rogers.

Wheelbarrow Race—First, O’Neil and Bland; second, Doolittle and Bradburn; third, Manning and Righter.

Tug-of-War—Won by team led by Gary List.

The Boston Employees of the B. F. Goodrich Company Are for Preparedness.

Dick and Company Get Efficiency With a Baker Electric.
Brevities of the Business

The Activities of the Electric Motor Car Field Told in Short Paragraphs

PERSONAL NOTES.

Carrier & Harlan, Philadelphia, Pa., have opened a branch store in West Philadelphia at 3322 Chestnut street under the supervision of C. W. Glose. The Philadelphia store is at 263 North Fifteenth street. They specialize in repairing and vulcanizing and also carry U. S. tires and other automobile accessories.

De War Bros., new Denver agents for the Detroit Electric, have just completed a new building for salesroom and service station at 740-751 Broadway.

Frank Mulkern, Milwaukee's millionaire newsboy and taxi operator, who has held the big Arcadia Building, Milwaukee, under lease for several years, is behind a project to transform it into a large downtown garage, such as Milwaukee has long needed. In this building was held the first motor show in Milwaukee, the Milwaukee Automobile Club having promoted the first exhibition in March, 1908, before the now largest exposition building in Milwaukee, namely, the old Dairy Palace.

Wm. B. Hanlon and J. R. Wardop have lost their infringement suit on their rain vizzor in the southern district of Ohio. J. K. Laird, formerly Kansas City adjuster of the B. F. Goodrich Co., is the new assistant manager of the Denver branch of that company, and C. L. Harding is new chief clerk.

J. M. McDowell, formerly connected with the Ohio Electric Sales Company, of Pittsburgh, has been placed in charge of the Ohio Electric Car Company's local office in Toledo. Having been interested in the sale and care of Ohio electric cars for the past four years, in a city where every prospect had to be shown that an electric was suitable for hilly localities, Mr. McDowell is very enthusiastic over the possibilities in Toledo, which are of far more importance to the promotion of electric cars than it was possible to show to him when he was formerly connected with the construction of Ohio electric; he is thoroughly capable of seeing that owners receive the very best of care and attention.

Jos. R. Power, well known in electric vehicle circles, has joined the selling organization of Chicago eleclric. Mr. Power will take over the management of the Walker Vehicle Company's Evanston branch, covering the north shore territory for Chicago electric. Mr. Power's long experience should prove valuable in developing Chicago electric business on the north shore.

On May 8 H. E. Dawson became contract agent for the Metropolitan Electric Company, Reading, Pennsylvania. For the past five years Mr. Dawson has been with the Edison Lamp Works of General Electric Company, Harrison, New Jersey, in advertising and general campaign work.

De War Brothers, 741-747 Broadway, Denver, have taken over the business of the Philadelphia Storage Battery Company. The company has closed its Denver factory branch at 1435 Cleveland place.

L. E. Stone is the manager of the new B. F. Goodrich Company factory branch at Burlington.

A. T. Clark, manager of the factory branch of the Anderson Electric Car Company, said that his company had an increase of 281 per cent in business in the Kansas City district the first five months of this year. There were forty-one cars sold in 1915, this period, and 164 this year. The interesting part of this record is that electric cars are going into the small towns, where previously salesmen had no idea they could sell—or it was considered a spooner.

J. E. Erickson has joined the sales organization of the Packard Electric Company of Warren, Ohio. Mr. Erickson's experience in the electrical field dates back to 1903, when he carried for the Edison Electric Illuminating Company of Boston. Mr. Erickson had specialized on motor-car power plants and central-station practice, which experience peculiarly adapts him for the duties associated with his new position.

George T. Bindbeutel has resigned as editor of Motor Print to become active in another field of endeavor. John Chapman Hilder is his successor. Mr. Bindbeutel has been editor of Motor Print since December, 1914.

R. C. Ritchie, formerly in charge of the office of the automobile department at the Dowd Company in the Westinghouse Electric & Manufacturing Company, in Chicago, Illinois, has been transferred to the main office at Pittsburgh, Pennsylvania. He is succeeded in the Chicago office by M. W. Hankes, who was formerly sales manager at Detroit.

Frank D. Law, Toronto, Ontario, is interested in promoting a new company to be known as the Ace Rubber Company. It will locate at Brampton, where a $30,000 factory is to be erected. Mr. Whyte has been appointed manager of the storage battery department of the Prest-O-Lite Company, Incorporated, of Indianapolis, Indiana. Prior to his coming with the Prest-O-Lite Company, Mr. Whyte served as electrical engineer for the Maxwell Motor Company of Detroit, Michigan, was at one time assistant chief engineer for the Scripps-Booth Company of Detroit, and has been prominently connected with other companies in the automobile industry. He is an active member of the Association of the Automobile and Electric industries in this country and abroad. Mr. Whyte has gained a wide experience with storage batteries that makes him eminently fitted for his new position. Before turning his attention to automobiles Mr. Whyte had much valuable experience with the battery industry in its application to central-station power plants and was closely connected with the electrical end of marine engineering.

De War Brothers, Denver, have bought Earle H. Frazier's garage at 741-747 Broadway, and have taken over the Detroit Electric agency for Denver and vicinity.

Thomas H. Biber has resigned as general sales manager of the Adams-Bagnall Electric Company, Cleveland, Ohio, and takes up immediately new duties as sales manager of the Luminous Unit Company, St. Louis, Missouri. His work with Adams-Bagnall sales organization will be continued.

C. A. Cotter, former chief adjuster of the St. Louis branch of the B. F. Goodrich Company, has just been placed in charge of its Denver branch, at 1422 Court place. H. E. White, his predecessor, has been moved to a similar position in Indianapolis.

H. Vanderbeck, chief engineer of the Timken Roller Bearing Company, Canton, Ohio, will sever his connection with that company in the near future. His successor has not yet been selected.

The Banner Tire & Supply Company, Cleveland, is the name of a new concern opened at 913 Schofield Building with an authorized capital of $250,000 to handle tires and automobile supplies.

The Western Auto Electric Company, Los Angeles, is now located in its new home on the corner of Pico and Hope streets, having moved the entire plant from the old location on West Pico at Olive street. The company has increased its business.

The Racine Auto Tire Sales Company, Milwaukee, has been incorporated with a capital stock of $10,000 by V. H. Bowersworth, Ray Everard, and William Kaumullner.

The Buckeye Tire Co., Cincinnati, Ohio, has been incorporated at $5,000 to deal in tires. The incorporators are R. S. Graves, R. R. Woolley, C. W. Shields, John Bleska, Stanley M. Lewis.

The B. F. Goodrich Tire Company, Akron, has opened a service station at 1412 North Third street, Harrisburg. The Harrisburg depot is in charge of W. F. Mower, who has had a number of years of experience in the business department of the Goodrich Company, J. R. Sauter, the sales representative in the Harrisburg district, has been connected with the Goodrich Company for the past twelve years.

The Directors of the Portable Tire Company of Barb- berton, Ohio, adopted a resolution calling for a meeting of stockholders on July 11 to consider a proposed increase from $20,000 to $100,000. A dividend of 30 cents on $1,500,000 of the increase be disposed of as common stock. If the increase is approved all stockholders will have the privilege of purchasing the increase in common at 105. It was announced that the company increased its business this year by 100 per cent over that of 1915.
Day Baker, vice-president, and F. R. Fink, sales manager, of the General Vehicle Company, of New York, were the honor guests at a very elaborate meeting of the Limberger Club of the Duquesne Light Company of Pittsburgh, held in the club rooms, last Friday, where a delicious dinner was served for which the guests received 95 degrees of membership. J. Frank Martin was toastmaster and spoke on “Brotherly Love.” F. Cheese Peterson made a special announcement for the Rubber or the Reorganization of the Limberger Club.” It was the sense of the meeting that General Electric Vehicles are fine trucks, and we hope that a sufficient number will be sold over the country to balance the expense appearance of the well-known and necessary business asset, the “saddle-sheet.”

Business Notes

The Electric Storage Battery Company, of Philadelphia, manufacturer of the “Exide” battery, the “Chloride Accumulator,” the “Tudor Accumulator,” and the “Ironclad Exide,” battery announces a change in the handling of its Pacific coast business, which took effect January 1. Due to changes in the organization of Pierson, Roeding & Co., who have acted as the Electric Storage Battery Company’s sales agents on the coast since 1910, the battery company has hereby contracted with Van Duzer & Co., of San Francisco, for that territory. The exide battery depot which will serve as the headquarters of the Pacific coast territory will be established in San Francisco. Two new 30-ton trailers will be kept there at all times, and where a large amount of stock is carried, will give Mr. Murphy a base of supplies that will insure prompt shipments of batteries and parts. The Electric Storage Battery Company’s business on the Pacific coast existing today will be consolidated into one factory in batteries for use in electric commercial and pleasure vehicles, mine locomotives, industrial trucks, for automobile starting and lighting service, and in other fields of storage battery application.

Western Auto Electric Company, 2057 Merced street, Fresno, Cal., has established a service station for storage batteries.

The Acme Electric Company, 8 E. Adler street, Walla Walla, Wash., has established a service station for storage batteries.

The Van Sicklen Speedometer Co., has started continuous production, and is manufacturing and assembling all parts in their Elgin, Ill., factory. These portions of the plant are now operated 24 hours per day.

The Fisk Rubber Co. of New York has opened offices at 11 Broadway, Bowling-Green building, New York, for the handling of its export trade.

Stockholders of the Perfection Spring Co., Chicago, have been notified that the company has been reorganized as a new company, the name being changed to the Franklin, 250 000 shares of Stock $1 par, $250,000 7 per cent preferred. Arrangements have been made to sell the new preferred to a syndicate; the common is offered to shareholders at par, the entire stock has been reorganized.

The company with these issues will have outstanding $1,000,000 preferred and $1,250,000 common, and will have all of its financing completed, having no obligations but current accounts.

The Western Tire & Garage Co., Farwell, Tex., will shortly open a plant for the manufacture of automobile tires and rubber accessories. The plant when opened will give employment to 50 men. The officers are: Judge J. D. Hamlin, president; C. A. Robeson, vice-president; M. M. Craig, secretary, and C. L. McCallan, treasurer.

The managers of the service branches of the Hyatt Roller Bearing Co. will gather at the general sales offices at Detroit, May 18-20, for their first annual convention.

The Stone-Dancy Motor Sales Co., Los Angeles, Cal., operates a service station and garage, a feature of which is a set of lock-stalls for the storage of privately owned touring cars. The keys to these lock-stalls are turned over to the patrons who know that their cars will not be tampered with and that they will not be backed into by other cars in the garage.

The Perkins-Campbell Company, manufacturer of the Campbell detachable upholstery and motor car accessories, is to establish a branch office, warehouse and salesroom in Chicago, Ill., and will open on the first of June. The building contains approximately 10,000 square feet of floor space. A shop is to be maintained where Campbell upholstery will be applied to cars.

Accessory jobbers met last week. Five important committee meetings were on the program of the National Association of Automobile Accessory Jobbers at its spring session, which was held May 11 and 12, at Hot Springs, Va. Re-
The demand for this "best built Electric in America" testifies to its superior workmanship, satisfactory service and enduring qualities.

Those well-informed people who select their every need with such unerring judgment are those who choose the Chicago Electric.

**Walker Vehicle Company**

Chicago Salesroom
2700 Michigan Avenue
Telephone Calumet 3000

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Volkcar Storage Batteries

Have been carefully built for twelve years under the direct supervision of John M. Volkhardt, Jr., who owns over 80 per cent of the stock of Volkcar Storage Battery Co.

These Batteries are endorsed and used by the leading manufacturers of Electric Vehicles.

**Volkcar Storage Battery Company**

2437-39 Michigan Avenue
CHICAGO, ILLINOIS

---

Complete 400 Ampere Vehicle Charging Apparatus For Sale

Motor Generator Set manufactured by Jas. Clark Jr. Electrical Co.

**Motor** A. C. 220 volts 190 ampere, 3 phase 60 cycle 75 H. P. 1150 R. P. M.

**Generator** D. C. 125 volts 400 ampere 1150 R. P. M.

One (1) Switchboard (General Electric) consisting of 1 direct current generator panel, 1 feeder panel, and 4 independent battery charging panels complete.

Eighteen (18) CR-211 Battery charging rheostats (General Electric) for charging 44 to 24 cells at 10 to 30 amperes.

Six (6) CR-211 Battery charging rheostats (General Electric) for charging 60 to 20 cells at 20 to 45 amperes.

Cost $1350 in first class condition now.

**SOUTHERN MOTORS CO.**

Incorporated

LOUISVILLE KENTUCKY
For Shopping—
For Small Families—
For Business Men

This Ohio Electric—comfortable, luxurious, light—carries five passengers when necessary

A wonderfully distinctive car, with body and fenders hammered by hand from aluminum. Note the graceful undulations of the perfect stream-line body.

Appeals especially to electric-car buyers whose requirements do not necessitate the use of a larger car; and to business men who appreciate luxury, beauty, ease and cleanliness without the expensive upkeep or unwieldiness of an enclosed gas car.

Exclusive Ohio magnetic control and magnetic brake—simple, efficient and proven by seven years of constant service.

Unquestionably the most appreciated electric car.

The Ohio Electric Car Co., 1503 W. Bancroft Street, Toledo, Ohio
Chicago Branch, 2634 Michigan Ave., Chicago, Ill.
Kansas City Branch, 3324 Main St., Kansas City, Mo.
While the cost of gasoline increases
the cost of electric current decreases

Detroit Electric

This is a moderate-priced
high quality all-year car

The cost of any car is not its
purchase price. The real cost
is its upkeep cost plus its
purchase price—the daily,
monthly, yearly cost for use.

And judged this way the
Detroit Electric is the lowest-
priced, good, all-year car.

With the price of gasoline
where it is today, the cost of
driving a gas car is from three
to four times greater than the
cost of driving the Detroit
Electric. Most motorists own-
ing gas cars are beginning to
find their gasoline expense a
big burden.

And there is no assurance
that the price of gasoline will
recede. While the cost of
electricity is not only very
low now but is certain to go
lower. But today the aver-
age monthly cost of power
for a Detroit Electric is only
about $7. That makes a
gasoline bill look ridiculous.

The big batteries of the
1916 Detroit Electric pro-
vide greater mileage—on
a single charge—than you
will require in an entire
day’s service. 98% of all
trips ordinarily undertaken
fall within its mileage
range. It carries you safe-
ly, comfortably, speedily,
luxuriously for 80 to 90
miles without need of re-
charging.

The conservative yet suf-
ficient maximum speed of
25 miles per hour is safe for
all city and suburban travel
—higher speed is destructive
and dangerous.

In repairs, replacements and
adjustments, the Detroit Elec-
tric saves 40% to 50% because
it is strongly and staunchly
constructed of finest quality
materials and has no delicate or
complicated parts to be jarred
out of adjustment or broken
by vibration or road shock.

Skilled mechanical service is
not needed for general care—for
the power plant is simple and does not
need constant adjustment. There is
but one moving part to it. Many
parts requiring lubrication are
equipped with self-lubricating bush-
ings—you need never even think of
them.

Our representations of Detroit
Electric performance are easily
proved by a practical road demon-
stration.

Remember the Detroit Electric is a quality car at a moderate price

Anderson Electric Car Company
Detroit Michigan
Branches at N. Y. City, Chicago and Kansas City
DETROIT ELECTRIC IN FRONT OF A HOME IN PONTIAC ON A ONE-CHARGE TRIP OUT OF DETROIT.
The Pedigreed Tire

Of noble lineage,—these Silvertowns!

Descended from the world’s most aristocratic family of Tires!

Directly from Palmer-Goodrich ancestors,— “Thread-Fabric” Speed Kings,—in the following order:

—The Goodrich “Palmer-Bicycle” Tire.—1892 to 1916.
—The Goodrich “Palmer-Aeroplane” Tire.—1911 to 1916.
—The Goodrich “Palmer-Web” Automobile Tire,—1906 to 1913.

In all this Breed of Tires the strain ran true,—each generation being distinguished for maximum Speed, Resilience, Far-Coasting, Power-saving and,—in the Motor field,—wonderful Fuel-saving.

But, “the Flower of the Flock” is the Silvertown Cord Tire.

In this alone has been developed the great strength of actual and individual CORDS,—as contrasted with “Threads.”

These giant Cords,—each capable of lifting a man’s weight,—are what now give the marvellous ENDURANCE, and multiplied Mileage, to that famous strain of fleet-winged Tires, bred up (through Goodrich perfecting of the “Palmer-principle”) to the SILVERTOWN CORD apex.

So, it comes to pass, that Motor-Cars when equipped with “Silvertown Cord” Tires have not only distinguished bearing, but also obtain about 17% increase in Net-Power from the same Motor.

This, with a Saving on Gasoline of about 25%, per mile, which soon pays for the higher cost of these bona-fide CORD Tires.

There is a luxurious sensation in riding over “Roads of Velvet,” on these highly-developed Tires that absorb all minor vibrations, super-cushioning each disturbing contact with ruts or obstacles on the road. Silvertown Cord Tires are not “plentiful!”—but can now be had through Goodrich Dealers and Goodrich Branches.

Silvertown Cord Tires

GOODRICH

Standard equipment on following cars:

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<th>Company</th>
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THE B. F. GOODRICH CO,
Akron, O.
80 PER CENT

THIS IS THE PROPORTION OF 1916 ELECTRIC PLEASURE CARS WHICH ARE EQUIPPED WITH

Philadelphia Diamond Grid Storage Batteries

THE REASONS—
GREATER MILEAGE
HIGHER SPEED
LONGER LIFE

WILL IT NOT BE TO YOUR ADVANTAGE TO SPECIFY A Philadelphia Diamond Grid Battery FOR YOUR CAR

11WMI 150 Ampere Hours

15WTXI 180 Ampere Hours

Send for Booklets W1 and WTXI

PHILADELPHIA STORAGE BATTERY CO.
ONTARIO AND C STS. PHILADELPHIA

DEPOTS AND AGENCIES
NEW YORK CHICAGO ST. LOUIS WASHINGTON BOSTON CLEVELAND ROCHESTER
PITTSBURG DENVER SALT LAKE CITY DETROIT CINCINNATI BUFFALO
MINNEAPOLIS KANSAS CITY, MO. TORONTO OAKLAND SAN FRANCISCO
SEATTLE LOS ANGELES SACRAMENTO PORTLAND, ORE
SIMPLIFIED economical Mercury Arc Rectifier for charging batteries ranging from 38 to 46 cells of lead or the equivalent in Edison, from 220 volts, 60 cycles.

This new G-E Rectifier is adaptable to either rapid or slow charging.

It is the ideal outfit for the private garage—charging the electric at home. It is easily operated by anyone who can run an electric car.

It occupies small floor space and requires no oil or grease.

It can be used with equal facility for charging batteries for light commercial cars.

The above points make a strong appeal to the owners of electric pleasure and about town business cars.

To the Central Station the G-E Mercury Arc Rectifier is always a good proposition for increasing the night load.

Send to our nearest office for further particulars.

The Moderate Priced

RECTIFIER

for charging electric vehicles
Cross Country Driving in an Electric

A Pleasure You May Have Missed

ALTHOUGH electric automobiles have come into general use, a great many people still lean toward the idea that the electric is essentially a city car, and that for country use it is unsuitable.

In order to disprove this theory, and to demonstrate the flexibility of the electric on all sorts of country roads and under the most difficult driving conditions, representatives of the Electric City Magazine, of Electric Vehicles, the trade journal of the electric automobile field, and of the Walker Vehicle Company, manufacturers of the "Chicago Electric," arranged a tour through northern Illinois to demonstrate that the electric car could go anywhere that a gasoline driven car could, and at the same time maintain a very fair average speed over the country roads.

The type of car used was the cabriolet, standard equipment, with a forty-two cell "Philadelphia" storage battery, and wire wheels with pneumatic tires. The batteries were put on a charge the evening prior to the day of the trip, and a full charge given.

There had been a heavy rain thirty-six hours previous to the day selected for the trip, so in some places the roads were in a somewhat soft condition. This did not interfere with the smooth running of the car, and the average rate of discharge of the battery on these roads was 35 amperes. On the macadam roads the pull did not go much over 30 amperes, and on many stretches it dropped to 25.

On the grades the amperage kept comparatively low, the pull of a grade of from 5 per cent to 10 per cent being only about 60 or 70 amperes, and on a grade of 20 per cent the reading was about 80 amperes. On grades of this nature the speed of the car was in the neighborhood of 12 miles per hour, and on the stretches of good road encountered the electric had little difficulty in maintaining a speed of between fifteen and twenty miles per hour on fourth speed. The bad roads were negotiated with care, so the average speed was comparatively low.

Unless excessively bad road conditions are encountered, there should be little difficulty with the average electric car in making about 100 miles a day, provided an hour's boost, or additional charge, can be obtained at the noon rest.

For a short day trip, however, the machine will make about seventy-five miles on a charge, the distance made on this test trip being seventy-three miles, and at the end of the run sufficient charge remained to carry the car several miles further. This performance is possible only with a cabriolet type, and will not apply to the heavier types of closed cars.

It might be well for those contemplating a country drive to ask friends who have tried the roads on some previous occasion their condition, and plan to avoid roads that tend to increase the ampere pull. With this consideration, and a careful driver, no trouble should be experienced in obtaining the maximum efficiency and power of the car.

In the test drive spoken of, the car was driven over several roads in exceptionally bad condition, much worse than will be encountered under actual average driving conditions, with a full load of passengers, and it stood up remarkably well, keeping well ahead of the accompanying gasoline car, which was following at a good speed.

In one instance, the electric was loaded to its capacity and driven over a stretch of the worst road found, On this road, and under the conditions mentioned, the pull was but little over that on an ordinary road, the easy running conditions of the car relieving most of the additional strain.

Endurance runs in electrics have been sponsored chiefly here.
by manufacturers, in most cases as a means of publicity, but with very gratifying results in every case; and sociability runs on the Pacific coast are quite a common thing.

Our cover this month may offer a suggestion to owners of electrics for a little country picnic, and for those who enjoy such affairs the thing is most practicable. There are hundreds of beautiful little groves and picnic places within twenty-five miles of the center of Chicago, and almost any city can boast ideal country sites for picnics and short runs within this distance. With the roads in average condition there is absolutely no reason why this trip cannot be made without any worry as to whether or not the charge will be sufficient, and in order to ease the minds of any skeptical drivers, the map on the accompanying page gives a number of garages in outlying towns about Chicago where there is charging equipment sufficient to take care of any pleasure electric.

Late last fall, during the period prior to the Electric Vehicle Association Convention in Cleveland, a “Chicago Electric” cabriolet, equipped with “Firestone Dual-Tread” (solid) tires, and a forty-two cell “Philadelphia” battery, made the trip from Chicago to Cleveland over the Lincoln Highway, a distance of 424 miles. They accomplished the trip in 28½ hours, an average speed of a little over fifteen miles per hour. This is rather remarkable, as fifty miles of the trip was made up of detours, over several roads that were almost impassable. In one instance a detour was necessary, on the road between La Porte and South Bend, of fifteen miles of the hardest possible combination of sand, clay and water that was up to the hubs a good part of the time. That this road was little used was emphasized by the fact that in the entire distance only one gasoline car was met.

A trip of this nature is not impossible to any owner of an electric, but at the present time the charging facilities are not invariably the best possible, and some difficulty might be experienced in obtaining a charge at some points if arrangements were not made for it beforehand.

In conclusion, the idea that the electric is not capable of a country tour should be discarded as not at all true of the modern vehicle. In nine cases out of ten the average country trip in a gas car is well under one hundred miles for a day and with a boost at noon an electric will cover that ground easily.

Of course, this item contemplates a car with battery in good condition. Some electric car owners make the great mistake of not giving the battery the care it should have, although garages catering to electrics are now generally particular about this. While a very old battery, that has been abused, is incapable of making the kind of trip suggested, the owner of an electric is missing much who does not employ it for at least occasional runs outside the city.

In this connection it may be said that Electric Vehicle continually hears of trips which average from 75 to 80 miles and better on one charge, which the owner has regarded as so common place that he has kept neither data nor had any photographs taken.

—Paul V. Hobart in “Electric City.”
Electric Car Charging Stations In Chicago

PUBLIC ELECTRIC GARAGES

NORTH SIDE

No. Name Address
1 Hayes Ave. Garage 6556 Sheridan Rd.
2 Hollywood Garage 5656 Broadway
3 Broadway Garage 5226 Broadway
4 Terminal Garage 4666 Broadway
5 Burnside Park Auto Station 4312 Clarendon
6 White Garage 3911 Clarendon
7 De Luxe Garage 3722 Broadway
8 Keystone Garage 316 Broadway
9 Lessing Garage 2064 Broadway
10 Lake View Garage 620 Dela Ave.
11 Sherman Garage 2715 N. Clark St.
12 Deming Garage 522 Deming Pl.
13 Hagedorn Garage 2165 N. Clark St.
14 Metropolitan Garage 2026 W. North Ave.
15 Lake Shore Auto Station 1312 N. Clark St.
16 North Shore Auto Station 1412 N. Clark St.
17 Clarendon Garage 2300 W. Division St.
18 Lincoln Auto Station 3308 Maple St.
19 Higbee Bros. Garage 908 Lincoln Parkway

CENTRAL

28 Central Service Garage 301 N. Halsted St.
29 McFarlane Co. 532 S. Canal St.
30 Fuy Livery Co. 435 Plymouth Ct.
31 Downtown Garage 720 Michigan Ave.

WEST SIDE

29 Parkside Garage 3423 W. Madison St.
30 Columbus Garage 3357 W. Madison St.
31 Halmen Garage 223 S. Halmen Pl.
32 Human Garage 3357 Colorado Ave.
33 Garfield Park Garages 400 Independence Blvd.

SOUTH SIDE

45 Carpenter Garage 3799 Indiana Ave.
46 Standard Auto Station 315 E. 35th St.
47 Walker Vehicle Co. 3732 W. 39th St.
48 Bon Ton Garage 4008 Michigan Ave.
49 Grand Boulevard 3995 Grand Blvd.
50 Adams Electric Garage 320 E. 43rd St.
51 Colonial Club Garage 4445 Blvd.
52 Patterson Garage 4510 Cottage Grove Ave.
53 Woodlawn Terrace Garage 4557 Woodlawn Ave.
54 Band Garage 418 E. 47th St.
55 Rudd's Garage 2121 E. 47th St.
57 Fashion Auto Station No. 1 760 W. 35th St.
58 Hyde Park Garage 5112 Lake Park Ave.
59 Fashion Auto Station No. 2 5150 Lake Park Ave.
60 33rd St. Auto Station 3100 E. 33rd St.
61 South Shore Garage 3561 Lake Park Ave.
62 Royal Garage 339 E. 35th St.
63 Winstead Garage 1169 E. 55th St.
65 Elite Garage 5021 Harper Ave.
66 Brye Mower Garage 2006 E. 71st St.
71 Fillie Auto Station 1716 E. 55th St.
Picnic Time Has Arrived
The Call of the Lemonade is Heard Throughout the Land

The moaning of the Chicago chicken salad as it is chased to its lair and the dying gasp of the wild-eyed watermelon will be heard above the soughing of the pines on August 10 at Ravinia Park. The raucous blat of the ballyhoo man yelping his wares will supplant the soft lingering echoes of the notes of grand opera. The waves in white caps of Lake Michigan will wave a friendly greeting from Neptune to the disciples of Jove as the clan of the Electric Club-Jovian League get together on their annual wild hunt for pleasure and food. From the time the electric sun dodgers and sellers of the electric signs shake their fist at the rising sun to the last hour of the day when the baying of the loop-hound of Chicago is heard o'er the waters the day will be full and complete. The chairman of the general picnic committee, W. R. Pinckard, of the Westinghouse Electric and Manufacturing Company, has seen to it that all members of the Electric Vehicle Section of the National Electrical Light Association will have a good time and appointed Mr. Kinney of the Electric Vehicle men to look after their interests.

Special trains on the Chicago & Northwestern Railway will be provided both going and coming with a baggage car full of souvenirs, and the band of the Chicago Telephone Company will furnish special music for the occasion. As usual there will be a very large number of races for the fattest man to the thinnest one, athletic and other contests for which an exceptionally large number of prizes are being donated by electrical interests of Chicago. These prizes in all likelihood will be more numerous and of still more valuable character than ever before. A Jovian grand prize automobile will be displayed and the winner's name announced. A number of new features in the entertainment line will be introduced.

Everyone in the electric vehicle field is agog with excitement, for all their friends in the allied fields will be hunting pleasure with a box of crackerjack as bait. The Chicago Electrical Contractors' Association, Chicago Electrical Credit Association, Chicago Section of the Electrical Supply Jobbers' Association, Chicago Section of the Illuminating Engineering Society and other organizations hit the trail with them. A great many will take the trip from Chicago in motor cars.

The trip out to the exclusive North Shore resort is a beautiful one and the splendidly wooded grounds of the park offer the best of opportunities to shade oneself from the sun. It will be a mammoth affair and everybody and his wife will attend, for it's a family affair. Are you going? These are the men who guarantee you a good time and are chairmen of the more important subcommittees: H. A. Mott, grounds and transportation; Fred M. Rosseland, program; Guy W. Lunn, games; J. D. A. Cross, prizes; Perry Boole, co-operation; A. R. Bone, music; W. R. Bonham, decorations; H. G. Hafner, tickets; J. N. Pierce, automobiles; W. E. Bischoff, police; C. W. Forbrich, finance; R. I. Phillips, refreshments; A. B. Hatch, dancing; Victor H. Tousley, reception.

These people enjoying their family picnic so heartily in this Detroit Electric have just taken a forty mile trip out of Detroit, Michigan, and intend to return home on one charge. Needless to say they did it. The coolness of the electric for hot sizzling July and August has more than proved its superiority over the gas car.
A Detroit Electric Picnic

When F. H. Roys, manager of the Detroit Electric Service Station at Cedar Rapids, Iowa, started out to plan for a big picnic July 15, few thought he could put it through except the redoubtable Lattner brothers, Paul and Joseph, of Lattner Brothers of that town. Well, the picnic came, was duly appreciated, and left a good impression. As to whether it was a success or not the eighteen Detroit cars shown in the above picture and the large crowd will amply testify. The spot selected was half way between Iowa City and Cedar Rapids, a distance of some fifty miles. The affair was run off so smoothly that quite a few wished another one this season. Cedar Rapids is quite an electric town and the picnic caused no end of talk. Congratulations are due Mr. Roys on his splendid showing.

Kansas City to Lawrence on One Charge

Mrs. C. F. Squires is the owner of a new Rauch and Lang electric, purchased in Kansas City. It is a five-passenger machine, well equipped and beautifully furnished, reports the Lawrence (Kansas) World. Mrs. Squires and the salesman, B. F. Anderson, drove it from Kansas City to Lawrence on one charge Thursday. They had no trouble with hills, and made the trip in a little less than four hours.

Twenty Tomans Per Pood

You don't know what this title means? Well, we will be fair, neither do we! All we can tell you it is the price now being paid for spirit of joy for your auto if you have no electric, and referred to as benzin—petrol—essence—benzina—or esencia if you are German, English, French, Italian or Spanish, or just plain "gas" if you are a neutral American. At least that is what our consul for the U. S. A. at Teheran, Persia, tells us he is now paying! Still we do not doubt it. It is easily worth fifty tomans per pood if the supply is scarce. You can easily imagine what a toman and a pood is when we tell you a foreign resident of Teheran took two trucks on a round trip to Enzeli and it cost him 775 tomans for the jaunt of 700 miles. Figure it out, it's easy.
—Now aren't you glad you own an electric?

Prettily Decorated Cars Win Prizes

The lower left view is that of the decorated car of Mrs. C. C. Colt, wife of the president of the Portland, Oregon, Chamber of Commerce, and driven by her in the floral parade during the far-famous Festival of Roses.

This Detroit electric car is the one which won a great deal of admiration at the Centennial celebration at Fort Armstrong at Davenport, Iowa. It was the source of many compliments received by the Bashaw Jay Company, who entered it in the parade.
Picnic Time Has Arrived
The Call of the Lemnade is Heard Throughout the Land

Railway will be provided both going and coming with a baggage car full of souvenirs, and the band of the Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish special Chicago Telephone Company will furnish.

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Mrs. C. F. Squires is the owner of a new Rauch and Lang electric purchased in Kansas City. It is a four-passenger machine, well equipped and beautifully furnished, and is the pride of Mrs. Squires and her friends. Mr. Squires, the salesman, drove it from Kansas City to Lawrence on one charge Thursday. They made a one and a half hour's trip, and the battery was working like a charm. They were very pleased with the electric car, and said they would not have a gas car if they could. They are full of praise for the electric car, and are very much pleased with it.

Twenty Tomans Per Pood
You don't know what this title means? Well, we will be fair, neither do we! All we can tell you is it is the price now being paid for spirit of joy for your auto if you have no electric, and referred to as benzine—petrol—essence—benzin—or essence if you are German, English, French, Italian or Spanish, or just plain "gas" if you are a neutral American. At least that is what we consult for the U. S. A. at Teheran, Persia, tells us he is now paying! Still we do not doubt it. It is easily worth fifty tomans per pood if the supply is scarce. You can easily imagine what a tonum and a pood is when we tell you a foreign resident of Persia took two trucks on a round trip to Enzeli and it cost him 775 tomans for the paint of 700 miles. Figure it out, it's easy.

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Theory of the Ohio Magnetic Control Very Simple

Among the many devices responsible for the popularity of the Ohio electric, probably the most important is the magnetic control as applied to this make of car.

This type of control is neither new nor complicated as many believe, in fact the very same principle is used on practically all modern electrical machinery. It is employed wherever quick and positive action is necessary, and the fact that it is used on subway and elevated trains, electric locomotives, elevators in the tallest buildings, and gun turrets on battleships proves that from a standpoint of reliability it has survived the acid test of service.

The theory of this control, as applied to this car, is very simple. A series of six electric magnets located in a receptacle under the rear seat of the car operates six different contacts, one for each controller speed, one for the magnetic or electric brake, and one to reverse the fields of the motor, so that the car can be driven backwards. These contacts are insulated from the magnets, but are so connected that each opens and closes a circuit between the battery and motor.

These magnets are operated by a master controller which in the Ohio electric takes the place of the old style lever used with the drum control. This master controller, made to fit the hand and placed in a convenient position, consists simply of a series of contacts each of which when closed operate its respective magnet, which in turn completes a circuit between the battery and motor. These contacts are so arranged that the magnets can only be operated in order, that is, the first speed, then second, etc.

The current used by this type of control is not excessive and does not materially affect the mileage given by the car. The amount used by the Ohio Magnetic Control is less than one-fifth of one ampere, so small that as to be negligible.

With this type of control, the arc, so characteristic of the sliding or finger type, is entirely eliminated. Each contact in the Ohio control is made or broken instantaneously. There are no springs that assist in making or breaking this circuit, the weight of contact alone being more than sufficient to cause this as soon as it is released by the magnet.

The magnetic brake used on these cars, operated by simply pressing a button on the master controller, has absolutely no connection with the battery. In using this brake the motor is operated as a generator and the resistance caused by the current generated is sufficient to retard the motion of the car. This can be increased, or decreased by varying the resistance through which this current must pass. As this resistance is applied to both the rear wheels equally, the possibility of skidding on slippery pavements is eliminated. This brake can be used in places where the application of the foot brakes would stop either one of the rear wheels entirely causing the car to skid.

It is impossible to accidentally go from forward into a reverse speed—it is impossible for more than one speed contact to come in at a given time, all the rest being automatically locked out—it is impossible to lock the controller, or apply the magnetic brake while the power is on—it is impossible to start the car until everything is as it should be, thereby eliminating the possibility of such inconveniences as driving with the brake applied, etc., and best of all an Ohio car will not start, even though the controller is turned in a driving position, if the emergency brake is on.

If You Cannot Boost Electrics, Hoist

During the week of June 12, there was a big celebration at the Massachusetts Institute of Technology dedicating their beautiful new buildings. Various types of exhibitions were on display in these new buildings. One of the engineers suggested that an electric car exhibit be made, therefore, it was planned to display an old runabout Waverley and a new Detroit Electric, one of them to be marked "1904," and the other "1916." The contrast naturally was very strong and tended to strongly emphasize the developments which had been made during the past number of years in electric cars.

The problem of getting the cars into the building was a big one, as the doors and elevators were not large enough to take in the cars. The first intention was to lift the car on a traveling crane a couple of stories and then run them up a short flight of stairs to the exhibition space. It was found impossible to do this, as the stairs which the car would have to climb were neither heavy enough nor wide enough to allow the cars to pass.

The superintendent of construction at the new building looked things over very carefully and finally found a way. In the rear of one of the buildings, that was unfinished, a derrick with a capacity in excess of seven tons had not yet been put out of commission. It was therefore decided to connect the Detroit Electric Car with the derrick and raise it up through the air to the top of the building and then let it down very close to where our display space was to be.

This work, although it appeared a little difficult, worked out in fine shape. The car was gotten into place with but very little trouble and is now on display, causing a great deal of favorable comment.

Many people who have looked at this car have been surprised at the advancement in electrics during the last twelve years.
Electric Truck Troubles and Their Elimination

A Review of the Faults and Improvements Made in the Past—Convention Paper

BY F. E. WHITNEY

I N considering the subject assigned to me, the question has arisen in my mind as to whether the thought given to the subject by the committee to bring out the troubles encountered by numerous designers and manufacturers in arriving at the present state of development of the industry, or whether this topic should be considered solely from the point of view of a purchaser of electric vehicles today and attempt to cover the means used by the men having in charge the operation of these vehicles in keeping them in daily service.

The development of the electric vehicle from crude, clumsy, expensive machines to the present efficient, durable and economical production has been marked by continued, steady and rational progress with little of the spectacular, but the continued indication that this type of power-driven vehicle is ultimately destined to replace horses for city transportation.

As in every line of mechanical development, troubles have been encountered, and some of the difficulties designed engineers consider for the time being, they have, nevertheless, been met and overcome, with the result that the electric vehicle as produced today by a number of well-known manufacturers is a highly developed mechanism, capable of doing hard work under severe conditions and, if properly applied, effecting for the user considerable economy in the transportation of his merchandise as compared with any other type of vehicle, either horse-drawn or power-driven.

In view of my association with the fraternity of manufacturers, it would hardly seem appropriate to bring to light too many of our family skeletons, and in view of the honest endeavor expressed by designers as to the merits or demerits of various types of construction, I feel that an attempt to draw too close a comparison would be getting me on to rather dangerous ground.

There are, however, a number of the items in the general development of electric vehicles which have enabled all of the manufacturers to benefit and produce a better article, which will be of interest, and in order to do this, I will attempt to bring out points in connection with the elements that go to make up the complete vehicle—namely—batteries, tires, motors, controllers, wiring, wheels, springs, bearings, etc., where troubles have been met and improvements made, enabling the manufacturer to reduce the weight, increase mileage range, reduce power consumption and reduce maintenance cost.

One item in the make-up of an electric vehicle which raises a question in the minds of the uninstructed is the question of the care and upkeep cost of the battery, as well as the question of whether or not the truck will be stranded, out of power, and in consequence, the chances are, the minds of the public is the result of difficulties experienced by the small user principally, in the care of his vehicle, due to lack of expert knowledge and to frailty on the part of the battery.

There has also been difficulty due to lack of standardization, in that an owner having batteries of different makes has found it necessary to use different sizes and shapes of battery jars for batteries having the same number of plates and rated capacity. These difficulties have largely been overcome by radical improvements in the general make-up of the battery, and I understand that real progress has been made towards standardization of battery jars that will greatly reduce the cost of standard jars.

At the present time a number of manufacturers of lead acid batteries will guarantee their battery to the user that it will not be necessary to dismantle his battery until the plates are exhausted and assuring a sufficient life at the time of purchase, and it is hoped that this will result in the battery cost well within reasonable limits.

Improvements have also been made in the nickel-alkali battery, so that today a user can easily select a battery suited to his needs and be able to secure reliable service. It should also be noted that batteries are now generally connected permanently in series instead of being split up in series and parallel, this being a decided improvement from this practice brought about by an occasional cell being missing or an open circuit in one section of the battery causing unequal discharge and other difficulties resulting from different parts of the battery being brought to different voltage. The greatest benefit in battery development has been the reduction in weight, which has been accomplished by practically all of the battery manufacturers who supply electric vehicles.

There has also been considerable development in the means to prevent sloppage of electrolyte and to enable the garage man to make easy flush the plates. In effecting this, the driving plates have been devised which are a definite advantage in keeping the battery in good condition.

In referring to the battery, I feel that reference should be made to a plan that is meeting with popular favor, and in the opinion of the writer, will overcome the largest handicap to the satisfactory adoption of electric vehicles, namely, a form of service system whereby the user can secure from either a garage, central station, or representative of the vehicle company or battery company, an agreement to maintain his battery on a definite upkeep basis. From all reports this is meeting with favor wherever it has been adopted.

Ampere Hour Meters—One of the principal difficulties a few years ago was the fact that the driver had no information as to the state of charge or discharge of his battery. Some trucks were equipped with volt and ammeters, but such delicate instruments were not dependable for truck work and were practical impossibilities.

The development of the ammeter hour meter has been one of the biggest single items of benefit to the electric vehicle user, as it is reasonably dependable and furnishes the driver with sufficient information to enable him to get maximum work out of his vehicle. It is also of great assistance to the garage man in charging the battery.

Tires—A few years since whenever a person wished to change from one make of tire to another it was necessary to have his wheels changed over to conform to the dimensions required for the particular type of tire to be used. The standard wheel dimensions which have been adopted by the Society of Automobile Engineers, have solved this difficulty, and now any make of tire can be applied to the wheels now being furnished, resulting not only in a distinct advantage to the owner but also enabling the manufacturer to carry in stock a reasonable quantity of wheels which can be used for any make of tire.

Less than ten years ago the best guarantee on truck tires that could be secured from any tire manufacturer was a life of ninety days, whereas today practically all of the standard makers will guarantee tires for electric trucks for 8,000 to 10,000 miles over a period of eighteen months.

There has also been a distinct improvement in compounding the tire rubber, for example, enabling us to get from 15 per cent to 25 per cent more mileage on one charge of the battery than was possible with some of the earlier makes of tires.

An instrument for checking tire efficiency is now in general use, enabling the purchaser to know approximately what he is getting before putting the tire in service and thus avoiding the difficulty of reduced mileage and increased current consumption brought about by inefficient wheels.

Motors—The earlier motors were patterned directly from the street railway motors in use at that time, but due to the more exacting requirements on account of small gearing and closer limits required, considerable difficulty was experienced with the motors with plain bearings lubricated with grease boxes. The trouble was principally felt on gear drive trucks which were in vogue at that time. The wear of the bearings would allow the gears to separate far enough to cause rapid wear and frequent breakage, with the consequent trouble of teeth breaking off and lodging between the gears, bending shafts and doing other damage. With the adoption of ball bearings these troubles were eliminated.

I would also call attention in passing to the greatly reduced motor trouble brought about by undercutting the mica in the commutator. In some cases this type of commutation is as necessary to sandpaper the commutators daily, as it was to charge the battery; the result being very short life to the commutators and brushes—say nothing of low efficiency and high cost of upkeep. The commutators in the motors that are being produced today will probably outlast the truck and the brushes usually give from two to three years' life.

Controllers—In the earlier type of controllers in which the circuit was broken at each step, it is not surprising that all kinds of mechanical troubles were present. The advent of the continuous torque design, resulting in smooth acceleration, was a great advance. It has been found that the use of replaceable wear parts, making repairs to controllers a simple job easy.
done by the driver and overcoming a frequent cause of tie-up and delay.

The old type step by step controller required as constant attention as the commutators, due to arcing and burning at practically every point. As referred to under the heading "Battery," it is generally advantageous to arrange the batteries permanently in series instead of making series parallel combinations.

Wiring—Along with the improvement in controller design, came improvement in the work of installing the wiring. Practically all manufacturers today use conduit throughout, and wiring installed in this way is practically as permanent as any other part of the vehicle, and in the rare event of wiring trouble developing, it can be easily located and readily remedied.

Wheels—In the early days the old Sarven wheel was used, but these were replaced by the artillery type, which is lighter, and allows the maintenance man some opportunity of tightening the hubs, which was impossible with the older type.

Bearings—The use of ball and roller bearings has been universally adopted, making it unnecessary to remove the wheels for frequent greasing, as was the case previously, and at the same time, reducing the power required to drive the vehicle.

Springs—Spring trouble has been practically eliminated by the adoption of alloy steel in place of the old carbon steel wagon springs, and at the same time, greatly improved by advanced methods in the art of heat-treatment which has developed rapidly within the last few years. Trouble has been further reduced by the use of eyes formed at ends of one or two top plates attached by links instead of the old flat form of construction.

Several schemes are in use to prevent shifting of plates such as ribbed ends of plates and frequent breakage of plates—center is removed by use of two plates in center instead of one hole and center bolt. Rebound clips are also in general use greatly reducing breakage of top plates.

Frequent breakage of spring bolts has been eliminated by the use of hardened bolts and the use of a bayonet or eyes of the springs, still further reducing the wear and consequent trouble.

Lights—A small item and one that has caused the user considerable loss. As pointed out by the manufacturer, the impression of keeping the lights always in proper condition. This item is frequently neglected due to the fact that the lights are used such a small percentage of the time. The old Edison base, or more properly speaking the "Medium Screw" base, has been almost universally used, but has caused trouble on account of the bulbs easily shaking out of the sockets and then rattling around and becoming broken. The usual type of socket has not been generally satisfactory for vehicle work due to the number of parts which shake loose in service. The small bayonet base lamp, as is being generally used on gasoline pleasure cars is coming into more general use. It is felt that the opinion of the writer, is not the proper lamp for truck work where vibration is so much less than on pleasure cars. The current practice on pleasure vehicles and the vibration resulting from operation on solid tires is very much more severe.

For the most part the opinion that a lamp using the Ediswan form of bayonet base lamp, is exposed to a different amount of breakage, and would be more suitable. At the present time the difficulty being that although the lamps could readily be procured, there are no sockets of this type on the market.

Warning Signals—Bells have been most generally used on electric trucks, but are also a small item which has been of considerable cost in keeping in proper repair.

A number of users are beginning to abandon the bell and use instead mechanical signals, which are lower in first cost and are more dependable. This has not met with general favor as there seems to be a feeling on the part of some manufacturers and users that the bell is a distinctive mark, so to speak, of the electric vehicle and they apparently cling to it as a matter of tradition.

Miscellaneous Parts—in practically all parts of the vehicle that can be readily procured by manufacturers are now making these parts as renewable so that instead of the repair man being required to drill and ream worn holes and bush them, the renewable parts are driven out and readily replaced with new ones. Numerous parts, such as springs, are being stamped and of alloy steel being largely used in gearing and other parts. More attention is being given to parts exposed to grit and dust to prevent its getting in and causing damage.

I believe the development of the various improvements has been that electric trucks as they are now on the market, with anything like reasonable attention, can be depended upon for long life at low maintenance cost.

The early part of my paper I touched on the advantages derived from a battery service system. I feel, however, that if such a system is confined to the battery alone, the work is only partly done. The user of one or two trucks does not usually have a competent mechanic, and where electric trucks are sold to private persons, horses, there is generally arranged for the batteries permanently in series instead of making series parallel combinations.

A number of companies have been experimenting with various systems of service, combining their efforts to battery maintenance or rental, while others are endeavoring to cover not only the battery maintenance but also chassis, body, tires, including painting and current in such a way that the adoption of electric trucks for general use will be brought about by the development of something of this kind.

The company with which I am connected has experimented to some extent in connection with their Maintenance Department in Philadelphia by using various helps to insure to the customer continued use of his vehicle, with results exceedingly satisfactory to the user as well as to the company.

The experiment was first tried out by furnishing to the user spare wheels and batteries on a rental basis for such a time as necessary for the user to have his parts repaired. The charge for these parts has been arranged to be such as to cover not only current and garaging but all work and material necessary to keep the battery up to the proper standard of capacity, making all repairs and replacements to chassis, repairs to the body (including re-painting instead of renewed of tires and, in fact, every item of expense with the exception of licenses, and accident and liability insurance.

In every case where this has been tried, and I might add that in several cases the user has returned to whether he or not to discard electric vehicles, they have become not only satisfied, but enthusiastic, and our feeling is that the experiment so far conducted will lead to the adoption of some system of this kind that will be the greatest step towards selling electric vehicles that so far has been developed.

In a great many cases there are good reasons why it is not satisfactory or feasible for the user to send his truck to a garage every night, and in order to meet this difficulty we have made some experiments with the idea of maintaining the vehicle while stored and the battery charged on the customer's premises, and it is evident that it is possible to do this by including the cost of wheel and tire renewal of tires and, in fact, every item of expense with the exception of licenses, and accident and liability insurance.

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A maintenance system of this type will, of course, be of advantage principally to those people who operate fleets of trucks which are usually sufficiently well equipped to take advantage of numerous economies under the direction of capable men, thus avoiding the troubles which at the present time stand in the way of the small user of electric trucks.

A profit-sharing plan has been adopted by the management of the Lee Electric Truck Co. Under the terms of this plan the important employees of the company will receive the benefit of a certain percentage which is to be taken from the net earnings over and above the $300,000 required for the payment of the present dividend on the capital stock. The plan provides for the distribution of the bonuses to the employees who are beneficiaries in proportion to the salaries received.
Electrifying News of Fire Apparatus

Considerable Progress Being Made in Converting Horse-Drawn Equipment to the Modern Way

In no transportation problem is the inadequacy of the horse more forcibly emphasized than in the fire department service, where the faithful, spectacular, but uneconomic horse is rapidly being replaced by the efficient and dependable mechanically operated equipment. There is considerable sentiment associated with the plunging, well-groomed fire horse, but the fast moving motor apparatus not only excites the admiration of the public, but accomplishes speedily the purpose for which fire equipment is primarily designed. Because of the great demand for horses since the outbreak of the European war, and the present needs in this country, just now increased by the Mexican situation, the American market for the higher breed of horses suitable for a fire department has been fairly exhausted. The scarcity has, of course, caused a tremendous advance in the cost of the best grade of horses, and as this condition is likely to become more acute before it is improved, the question of a substitute naturally arises.

It is interesting to note that a number of municipalities have converted its old horse-drawn equipment to the best type of motorized fire apparatus—the electric. It was found that with very little expense the simple electrical mechanism could be substituted for the fire horse, which, through years of faithful service has endeared himself to the public. The service rendered by electrically propelled fire apparatus proves itself of a very much higher order than that previously used. It not only eliminates the insanitary features associated with the horse in the station house, and likewise on the street, but reduces the fire hazard, which is also rather enhanced with the use of the gasoline car. It is important to realize that the remarkable simplicity of the electric fire apparatus enables the drivers of the old horse-drawn vehicle to become rapidly familiar with this new equipment. It is therefore unnecessary to employ the services of an expert mechanician, as is usually the case with other motor types. In the event that the regular driver is not available, any member can drive the electric apparatus, which is speedily, safely and easily negotiated, even through congested traffic. It is also of considerable importance that the electric gets under way from the station quicker than either horse or gasoline car, and when compelled to remain for a long period at a fire there is no suffering from exposure, nor freezing of the radiator. When the electric apparatus is returned to the station it merely requires ordinary washing, and charging—minus the careful attention that has to be bestowed upon the horse, or the numerous parts of the gasoline car, in order that it may be quickly available for the next fire. The high average speed maintained by the electric is attributable not only to its high running speed, but to its ability to stop and to accelerate faster than other types of motor vehicles, thereby eliminating bursts of excessive speed in an effort to compensate the loss of time in starting and stopping. The more even and constant speed is of advantage in protection of pedestrians and other vehicles, and because the electric is always under the absolute control of the operator less injury is apt to happen to the apparatus itself. Although the operating cost of the average fire apparatus is not such a vital point, it is well to bear in mind that while the cost of gasoline and grain continues to soar, the cost of electricity is constantly decreasing. Thus it is evident that the electric not only possesses all the advantages of other forms of equipment, but a number of important features peculiar to this modern form of locomotion. These advantages are rapidly being appreciated, and it is therefore not surprising that many municipalities are electrifying their equipment.

One of the recent examples of wholesale conversion is that of Camden, New Jersey, where the entire equipment has been modernized with results far in advance of expectations. There was recently held in this city the first parade of converted electric fire apparatus, which created no little favorable comment from the public and experts from other fire departments that witnessed it. A remarkable demonstration of electrically driven fire apparatus was given recently in the hill climbing test in Paterson, New Jersey, and all previous records for gas and horse-drawn vehicles were considerably lowered.

The Rapidly Disappearing Horse Drawn Engine.

New Electrically Driven Engine Showing Stability.
Detroit Vacation Memories

Top, Left—Detroit Electric on a Trip from Detroit to Grosse Isle and Return on One Charge at Grosse Isle. Right—A Similar Trip to the Auto Club. Center, Left—Passing Through the Woods on the Way to Plymouth and Return. Right—Another View of the Same Trip Going Back to Detroit. Lower Illustration—Headed for Detroit Over the Long Bridge.
The Value of Advertising Your Electric
Some Hints From a Successful Dealer—George C. Bader of Louisville

Our business needs more than one advertising campaign. Spasmodic advertising looses in comparison with the results of steady, persistent and optimistic messages. It is not always the quantity of space as much as the force of the message that challenges and holds attention.

The Ohio Electric possesses a great deal of individuality. We have enhanced this in Louisville by planning the details of each successive car sold so as to give us no two jobs that look exactly alike. Electric car buyers are individuals of taste, who have a right to expect modishness in their equipages. There are so many effective colors beside blue and black which, when properly combined with the new fabrics used for interior, lend a distinction formerly undreamed of.

These new colors are robbing the blacks and blues of their power to hide the new cars sold, and serve to attract more attention to the electric car.

The moving picture is virgin soil for the electric car. Let us all make greater efforts along this line. Get your electric car out on the job when pictures are being filmed. lend a car, rent a car, or sell them one, but get it into the picture. I can positively credit one Ohio sale to the use of an Ohio Electric in a local moving picture film. The gas car men are on the job and they certainly are not helping the sale of electrics intentionally.

At this time when the future of the electric car looms so large let us hammer our message home. We are too few to fight one another. We can develop enough business for us all.

Let us compete and fight but let us not be mistaken as to the enemy. The gas car industry is powerfully organized. They however know who now is and who is destined to become a far greater contender for business.

The recent development of the Milburn electric certainly affords us an effective weapon against certain classes of gas cars, while the new Milburn town car is right now effectively challenging in a field from which we were formerly entirely excluded.

What the average individual does not know about electric cars such as are being produced now must be told him in some way.

Let us not hide the light we have from him who would do business with us if he but knew what the electric car is capable of today.

We should fill this publication with such advertising and selling punch that it would become the school for us all and the advance agent for new business.

Advertise!

[George G. Bader, who is one of the energetic, far-sighted men of the electric vehicle business at Louisville, Kentucky, handling the Milburn and Ohio, has made a big success in his chosen field and for that reason his letter should be read with careful attention. The suggestions he gives are worth following and on the next page we give a few illustrations from a similar booklet to that mentioned gotten out by the Chicago Baker-R & L dealer who has found it to pay real dividends]
An Interesting Booklet

The fairly recent formation of the Rauch & Lang-Baker Company of Chicago and its rapid growth has necessitated the publication of a distinctive and clear-cut little booklet outlining its policies and giving the organization’s personnel.

The present company is the successor of the Paul Frank Company and occupies the same building as before at 2349 Michigan avenue, which is illustrated here. The other view shows the interior of the repair department where some ten thousand dollars worth of equipment safeguards the entire repair of the two makes of cars.

Paul Frank, the president, was formerly superintendent of the Detroit Electric company, and branch manager of the Woods Electric in St. Louis, and more recently the president of the Paul Frank company of Chicago. Ray S. Deering, vice-president and general manager, has been associated with Mr. Frank in an executive capacity, and as a member of the firm has had a great deal to do with its phenomenal growth. Mr. Deering stated that the firm was doing a heavy business and unable to keep up with the supply of electrics. In second-hand and rebuilt cars there was a strong demand, which in order to allay, cars were sold before reaching the finishing and varnish rooms. Prices were higher than usual, due to the fact that the company was replacing all worn-out equipment with modern 1916 stuff, making a job look as up-to-date as was possible. Among other officers we find L. I. Phelps, sales manager, has been sales manager of the Ranch & Lang Electric department of the McDuffee Automobile Company for five years. He is prominently identified with the new company and has charge of the sales.

Ralph Penn, who has represented Rauch & Lang and Baker electrics in Chicago for a number of years, will continue to be associated with this company.

Foremen, mechanics, and electricians have all been carefully selected for their ability and dependability.

The booklet takes very well and the example should be emulated by local sales companies for boosting business. It gives one a more secure feeling in dealing with an organization when one knows with whom one is dealing.

How often have you motored beyond this territory?

Is the question asked by the Columbus, Ohio, dealers in electrics in a half page spread from which the above illustration has been taken. They have run a series of half page advertisements for some time dealing with the electric as a general proposition, not boosting any particular make of car. It was the success of this campaign which actuated us and resulted in last month’s editorial on co-operative advertising. The dealers all share alike and lend all electrics. The copy is all very pertinent and timely. Any one who has ever been in Columbus can easily realize the punch in the above map. Very few trips have ever been taken during the season outside of the territory outlined above. The result is the copy pulls and many actual sales result. The big steady splash of copy results in added interest and a great many news stories in the reader columns that would not ordinarily get past! What are the dealers in your section doing at present.

Interior of the Ranch and Lang-Baker Service Shop.

Facade of the Ranch and Lang Baker Company Building.
The Unimportance of Touring Ability

The man who contemplates the purchase of his first car naturally has only a theoretical idea of its abilities. Almost always he expects to do a great deal of touring. He knows that gasoline may be had almost anywhere, that passable roads extend in every direction without limit, and that driving through the country is lots of fun. He figures a day of twelve hours will let him cover at least two hundred and fifty miles. If he is particularly enthusiastic he buys a road map and lays out a circle upon it whose radius is a hundred miles or so, and then studies with much delight the number of one day trips that are possible from his home. Being unfamiliar with driving a car and believing that the engine does all the work, he cannot see any reason why he should not keep on traveling as long as he is awake.

The experienced driver knows that touring is a hardship. He knows that a two hundred-mile country trip, or even a hundred-mile, is not to be undertaken unless the reward in pleasure or business is great enough to pay for the fatigue and the strain and the certain degree of discomfort. Some people, of course, enjoy hardship. If they did not, few would go camping, or hunting, or mountaineering. But they are really in the minority—very much so. The new driver expects to tour a great deal because he does not know there is any hardships in it, and, in fact, believes the contrary.

So owning the first car is a disillusionment in that respect. The owner gets as much enjoyment out of it as he expected, and so is not disappointed; but he does not get it in the way he expected. While its traveling advantages diminish with experience, in its social advantages, its solving of local transportation problems, its annihilation of ennui, it goes beyond his expectations. He knew it would do those things, of course, but their importance in his mind was overshadowed by his dream of long distances—a dream that soon blows up painlessly but effectively.

Students of automobilizing know that touring is a delusion; that of the millions of cars now running in this country, only a few thousand ever take trips over a hundred miles in length. The average car owner may not know it, because he imagines that others tour if he does not. But it is a safe bet that over half the cars in existence could be restricted to seventy-five miles a day and their drivers would never know the difference or be conscious of any restriction.

All men like travel. They want a car in which they can travel. They give up the idea only after they have tried it and found out that it is harder than it looks, and far from ideal for the driver. Until they attain that degree of wisdom, they will select gas cars because there is no limit to a gas car’s radius. By the time they have learned the fallacy of the promiscuous touring idea, they have learned other ways of enjoying the car, and are satisfied.

Men would buy electric cars for their own use more readily if it were possible to convince them in advance that the gas car’s claim to superior mileage rests upon a false hypothesis, just as does also the gas car’s claim to superior speed. Buyers are already beginning
to recognize that the ability to do seventy miles an hour is of no possible use to them, and does not add a cent to the car's value. They will learn in time that the ability to cover unlimited distances has little more utility.

Ninety-nine one-hundredths of a car's usefulness lies within a radius of less than thirty-five miles. That is not an argument; it is a proven fact. Eighty cars out of every hundred never do more than seventy miles during any one day after their drivers have experimented with long trips and given them up. Eighty per cent of the work done by gasoline passenger cars could be done better by electrics, and more economically.

Of course it is the other twenty per cent of gas car performance that is the more spectacular, and therefore the more impressive to the prospective buyer. The things a gas car can do, but seldom does, are the things a brand new driver thinks he wants to do, and the things an electric will not do. By the time he finds out he was mistaken in his desires, he already owns a gas car, and is apt to continue along the line he has started.

Educating the car-buying public to the facts about long distance touring would tend greatly to increase the sale of electrics. Such propaganda may be a little difficult, and rather discouraging as to immediate effects, but we would like to see the clever publicity men of the electric vehicle industry work the subject a little harder in the newspapers.

**Summer Comfort in a Cool Car**

These are the days of the dog star, and electric passenger car men seem prone to the opinion that there is nothing doing. Being full-sized men, they do not actually quit work and lie down on the job; they keep right on hunting prospects and striving for orders. But the idea is there just the same, among a considerable number of salesmen and dealers.

There is no manner of excuse for the thought, and no accounting for its source, unless it sprang from the notion that the closed body electric must be a winter car because the open body gas car is a summer vehicle.

Now the fact is that as a summer feature the gas car is a good deal of a joke. The back seat of a seven passenger touring model is all right while the car is going, though when it is standing with the engine running the ascending wave of heat from the exhaust is quite likely to be perceptible. But standing or going, the front seat of any gas car is simply an oven on wheels. A late issue of Motor Age, a highly respected gas car journal, pictures editorially a fat man sitting beside the driver, mopping his face with his left hand and holding the door open with his right, and goes on to say:

"The point is that the modern car of almost every make, whether it sells for $400 or $3,000, has a fireless-cooking front seat in the summer months. Would the engineers who design those cars go to bed on a hot, sultry night with a gas stove going full blast beside them? Then why should they impose such a similar inconvenience upon the car purchasers? The conditions are very much alike."

We are so familiar with this truth that we take its necessity for granted, like the gasoline smell and the gear-shifting lever. And in the gas car it probably is a necessity. Front seat sanitation is more easily discussed than accomplished, so long as the engine is located just ahead of the seat.

The electric, of course, is the only cold car. Its temperature is absolutely normal. It does not rise a single degree under any conditions of proper use, and indeed the interior of its body is considerably cooler than the street because it is protected from the sun and cooled by the current of air through it. That is why a lady driving an electric always looks, and is, so comfortable, no matter what the thermometer may report.

To people who own electrics, that also is a matter of course, and seldom mentioned. So very likely there are a good many prospective purchasers of cars who do not know it. There are lots of things about electricity that people in general have not found out. The thing is foolishly simple, like so many other facts that nobody knows, that some salesmen may not think to mention it.

Electricity and water power are the only prime movers that are fit to drive machinery in the presence of comfort-seeking human beings; and an automobile driven by water power cannot be made.
The Romance of Rubber

From the Plantations of Brazil and the Malay Peninsula to Akron, Ohio

BY A. F. CONNOLLY

Although its wonderful variety of uses were not then known, its value was to an extent appreciated and the "Black Gold" was eagerly searched for by the early explorers.

From the time Columbus first skirted the shores of South America (1498) the eyes of Europe have always turned greedily westward for treasure, but the gold-laden galleons which used to ply the Spanish Main never bore the wealth that the modern freighter carries away from Para in rubber.

Following the American Revolution of 1776, Yankee ships brought from South America many rubber pouches and shoes of native manufacture but these curios aroused but little interest until Mackintosh invented waterproof garments. Endeavoring to overcome the stickiness of the rubber with which he had covered a couple of pieces of cloth he suddenly thought to lay the sticky sides together—and thus was born the forefather of the handsome rainproof coats worn all over the world today. This brings us up to a young chemist working with one of the companies later formed to make mackintosh coats—a man destined to occupy one of the highest niches in the Hall of Rubber Faine—Charles Good-year. Appreciating the varied possibilities of the element he was always experimenting to overcome its shortcomings. Rubber articles in those days were very susceptible to heat and cold—were heavy and shapeless—and did not wear well. One day Goodyear accidentally dropped a mixture of sulphur and rubber on the stove and in removing it noted that a chemical change had taken place. The rubber was more elastic, less sticky, easier to handle. A little more experimenting and the
secret was out—he had discovered vulcanization. This process merely consists in mixing a quantity of sulphur with rubber and subjecting it to heat—in other words curing it. Without it rubber products, as we know them today, would not be possible. And why does sulphur act thus? Because it is the nature of the beast, that's all. Rubber and sulphur unite in some way, the details of which are not known to the chemist. How curious that the fundamental process which makes rubber of such wonderful use is shrouded in mystery. Goodyear's great discovery is deeply appreciated and his name is perpetuated in the corporate titles of numerous rubber companies.

More than three hundred tropical trees, shrubs and vines yield a liquid which contains rubber, but only a few are commercially important. The hevea of Brazil, and the Malay Peninsula produces the best.

When the trees are tapped they yield a milky secretion known as latex. Rubber is dried-up or coagulated latex. Up-river fine Para from Brazil is probably the finest rubber the world produces. The trees grow wild, and away off in the upper fastnesses of the great Amazon basin,—a region as large as the United States.

The rubber gatherer or seringueiro, must penetrate deep into the dank tropical jungle to obtain the precious latex and the hardships he sometimes undergoes are frightful.

The climate of the up-river country is invariably fatal to Americans and the mortality among the natives themselves is very high. They must work during the dry season only, for the rains which continue from December to May cause enormous floods over thousands of miles of territory as the Amazon and its numerous tributaries overflow their banks. Tapping methods in South America are crude and often damage the trees considerably. The seringueiro makes an oblique upward incision with a sharp axe, through which the latex slowly oozes. A cup is then placed beneath to catch it. A number of incisions are made in the same tree. While proper tapping apparently does not harm a tree, the rough practices of the Amazon district undoubtedly are damaging. Uneven furrows or swellings arise under the backs of the tapper's axe—ensuing tappings are difficult and the tree's life is certainly shortened. Next the latex is collected and poured by the seringueiro on a paddle or stick held over a hot fire. The stick is rotated as the pouring continues and the latex hardens or coagulates into a big rough ball attached to a stick. The ball is called a "biscuit" and its average weight is about thirty pounds.

The biscuit naturally bears the strong, but not unpleasant odor of smoke, and in fact it is claimed that the excellent quality of Para rubber is due more to the method of coagulation than to quality of the latex. The smoke from the palm nut fire seems to possess valuable antiseptic and other properties due to the presence of creosote, etc., and also seems to have the faculty of dis-
ELECTRIC VEHICLES

From the collection of the United States government, a number of diagonal channels are cut, all converging into one larger vertical channel, which receives the entire flow. This method claims maximum flow at regular intervals from a given area of the tree's surface and with minimum damage to the tree.

Plantation rubber was at last a reality. The trees were carefully tended, the rubber is easily brought to point of embarkation and it is easy to see why over half the rubber needs of the world are now supplied from this source alone.

The herring-bone method of tapping is employed, i.e., a number of diagonal channels are cut, all converging into one larger vertical channel, which receives the entire flow. This method claims maximum flow at regular intervals from a given area of the tree's surface and with minimum damage to the tree.

Plantation rubber is not smoked but is acid cured and comes in clean translucent sheets practically ready for use. Of the other grades the Guayule is probably the most interesting. This is a shrub which grows in Mexico and the American border states and yields a heavy tarry substance about 60 per cent rubber of fair quality.

When the biscuits are received at the factory they are put into vats of hot water to soften; then they pass to the breakers—powerful machines which crush the lumps between large corrugated rollers.

Next they go to the washing and sheet machines. Here all dirt and grit are removed and in the latter process the rubber is rolled into thin porous sheets with the least possible surface exposed to the air, as moisture has a deleterious effect. Finally they pass to the drying room where all dampness is removed.

The gigantic mill room of the Goodrich factory far surpasses in size anything of its kind in the world. The great rollers grasp the sheets as they come from the drying room and roll them backward and forward until the rubber has taken on a soft, tacky consistency. Then the necessary sulphur is added for vulcanization, to-
gether with other ingredients, according to the kind of product desired. Right here it is essential that you know something of the wonderful Goodrich development department.

Few people realize the tremendous importance of the chemist in the rubber business. Pure rubber, merely vulcanized, would never do—it would be too soft, two yielding, too easily worn out. So the chemist compounds. He mixes certain chemicals to either toughen or stiffen or make more pliable the rubber—according to the product.

You could not, for example, use the same compound in a water bottle that you would in a tire—they are intended for different purposes.

Why is it one brand of tires will give wonderful satisfaction while another, under the same conditions, will fall down completely? You cut them open—to all appearances they are made about the same. The secret is in the compounding of the materials. That’s why quality has a wonderful, real, understandable meaning. We have in our development some of the keenest minds the rubber world affords and they are backed up by forty-seven years of cumulative knowledge. And they are leaders—not imitators. Take automobile tires—many an important improvement in this line in the last twenty years had its inception in the laboratories of the company. These laboratories are wonderfully equipped—they are really a miniature factory. And the products they turn out have been tested to a degree that would astonish the layman. We always produce to test—not to theory. Any new product that comes from the factory is new only to you. The factory knows it—it has proven it—and stakes their reputation that it is right.

We have often been asked about color in rubber. Now, some colors mean a lot while others are for ornamentation only. Why, for instance, is our new “Bare-foot” rubber tread auto tire black?
be on the line of strain in driving or braking the wheel. We aim to keep the number of these strips down to absolute minimum as the more plies you pile on the more friction and consequent heat will be developed and the sooner your tire will go to pieces. And you will have less resiliency and your tire will lumber along, grinding away its tread and eating up vast quantities of gasoline or battery power. After the bead is attached the tread or sole of the wonderful black "Barefoot" is applied. We call this a "Barefoot" tread because of its remarkable texture. It is not stiff like some treads but yielding and sinewy. It literally clings to a surface, just like your barefoot—it doesn't grind over it. Strain on the inner tire body is lessened—friction is reduced—and the tire gets to live its whole life. Besides, the "Barefoot" tread is harder to cut—more difficult to puncture. Next follows the difficult process of vulcanization or curing;

Under-cure will leave the rubber too soft—over-cure makes it too brittle. Goodrich has reduced this process to a science. The big advantage of our unit molded-cure is that the tire is fused at one time, and the molded parts are fused together into one uniform whole. Other methods which cure different sections at different times allow unequally cured portions in the same tire which naturally work against each other—create more heat—and the tire wears out before its time.

The Goodrich Silvertown Cord tire is constructed along an entirely different principle. Instead of fabric layers the carcass consists of two layers rubber-covered, rubber-impregnated cable cords, each layer laid at a long angle to the other. This construction assures not only tremendous strength, but unusual resiliency. Every cord shares strain and weight with its fellow—there is even tension throughout the tire and inner heat is greatly reduced. Last year over the great Speedways every race of importance, from the Indianapolis classic to the Sheepshead Bay event, was won on Silvertowns. The racing fraternity will use nothing else. They proved that it will give them more speed, greater mileage and more safety than any other tire made. And in extended touring on electrics and in general service the Silvertown shows its all around superiority. It will save as high as 25 per cent in fuel, start quicker, give more speed, it is immune from stone bruises and can be, due to its simple two ply construction, easily and successfully repaired. We fully control the Silvertown process of manufacture—not another tire in America is made like it.

Try to imagine what would happen if by some peculiar circumstance every bit of rubber that insulates the wires would suddenly disappear. What a "reign of terror." Telephone and telegraph out of commission, fires bursting out in a thousand places, and trains wrecked due to signals grounded. One seldom thinks of auto manufacturers as large buyers of insulated wire, but every twenty-four hours they consume tons of it for lighting and ignition.

In 1907 Goodrich produced the first American steel base type of solid truck tire, and this type has since then been pre-eminent—the accepted standard—illustrated all along the line. The tread is a marvel of compounding skill, offering greatest resistance to wear and abrasive action of every kind of road surface. The steel base bears dovetailed grooves on the upper surface holding inseparably the hard rubber sub-base. An irregular wave-line of hard-rubber increases by 10 per cent area of contact between rubber sub-base and tread, while the duplex curve contour of tread allows for full compression under load to conform to every form of road irregularity and prevents chipping.

From Brazil to Akron is a long and arduous journey—but we trust you have found it worth the taking. And we hope, too, that your trip with us from the Far East to the rubber center of the world has been interesting and instructive. This little peep into the great Goodrich factories has shown you that more than rubber knowledge enters into the making of Goodrich goods. The big factor is the practice of making everything we turn out represent our very best efforts, and to continually build to that standard. We are building for the future as we have built in the past.

Ohio Electric Makes Hard Trip

A very interesting trip was made recently by Mr. Widman of the Ohio Electric Car Company from Toledo to Detroit and return.

The trip was made under the most adverse conditions. The direct route between the two cities, poor at the best, as anyone who has made this trip will testify, had been made nearly impassable by continual rains. The mud and sand on this road seemed to have no bottom and it is rarely used except by those who do so without regard to advice to the contrary.

The car driven by Mr. Widman negotiated these roads without difficulty, passing a number of gasoline driven vehicles, hopelessly stalled. While speed records could not be made under these conditions, the car went into Detroit under its own power, having pulled through mud and sand that was considered impossible by many tourists.

The motor car used was a standard model 12 Ohio car equipped with a 30 cell, 13 plate Hyacap battery, made the return trip through Ypsilanti in five and one-half hours actual running, an average speed of approximately 18 miles per hour. The car had gone 94 miles on the charge given it in Detroit when it arrived in Toledo.

Trips of this nature, many of which have been made in all parts of the country by other makes of cars as well, should serve to disapprove the theory that an electric is a town car and unsuitable for other purposes. While not a touring car, yet it fulfills every other demand for a conveyance even better than its gasoline competitor.

Galvanometer Design

Galvanometers are instruments for the detection or measurement of small electric currents or small voltages and are much used in various kinds of electrical testing. The user of such an instrument is concerned with its sensitivity either to current or to voltages, its period, etc.; that is, he is concerned with its performance or operation constants. These necessarily depend upon the intrinsic or construction constants.

The relations between these two sets of constants are of importance to the maker, since they may be made to serve as a basis for predetermining values for the intrinsic constants such as will give previously selected or specified values for the operation constants. These matters are discussed and illustrated by concrete examples in a paper just published by the Bureau of Standards, Department of Commerce. Copies of the paper, Scientific Paper No. 273, may be had on request addressed to the Director, Bureau of Standards, Washington, D. C.
A MEETING of the Electric Vehicle Committee of the Incorporated Municipal Electrical Association was held in London on the 16th of June, 1916, A. C. Cramp presiding in the absence of R. A. Chattcock.

It was announced that, for the present year, the following had been nominated by their respective associations to act as their representatives on the committee:


The Tramway & Light Railways Association—W. T. Robson, General Manager, Corporation Tramways, Southampton.

The Incorporated Association of Electric Power Companies—J. S. Highfield, Chief Engineer, Metropolitan Electric Supply Co.

It was decided to issue an invitation to the Royal Automobile Club of Great Britain to nominate a representative. This club had been invited to arrange representation at the inception of the committee's existence, but at that time had declined.

Arrangements were decided upon with a view to further increasing the circulation of The Electric Vehicle quarterly, London, the subscribers for which, at the present time, number upwards of 2,000.

It was decided to inquire from the electric supply undertakings as to whether they could make use of a poster if the committee had one printed.

The matter of a standard insurance policy for electric vehicles was again under discussion. Further consideration was deferred until the next meeting.

A sub-committee consisting of E. S. Shrapnell-Smith, E. W. Curtis and the Hon. Secretary was appointed to draft a letter to the B. O. T. with a view to getting electric commercial vehicles excluded from any declaration that might be made prohibiting the import of foreign-made commercial motor vehicles.

The committee's attention had been drawn to the fact that industrial electric trucks imported into the country are not being provided with the standard charging plug. The committee is unanimously of the opinion that these trucks ought to be provided with the standard fitting and the secretary has been instructed to write to the manufacturers to this effect.

Arrangements for charging electric vehicles at Rugby were under consideration and the secretary was instructed to write to the Urban District Council asking whether they would make arrangements for facilitating the work being done for any vehicles passing through the town.

The date of the next meeting was fixed for Friday, the 28th of July, at 2:45 p.m.

Five meetings of the committee have been held, all of them in London. The committee elected the following as its officers for the year:

Chairman, R. A. Chattcock; Hon. Secretary, F. Ayton; Hon. Treasurer, J. Christie; Chairman of the technical sub-committee, R. A. Chattcock; Acting Hon. Secretary of the technical sub-committee, J. Christie; Chairman of the commercial sub-committee, A. H. Seabrook; Hon. Editor of the Electric Vehicle, A. H. Seabrook.

The Secretary of the association, Mr. McArthur Butler, attends the meetings of the committee officially on behalf of the association, and the committee are indebted to him for many valuable assistance. The work of the committee during the period dealt with by this report has covered the following:

Standard Charging Plug and Receptacle.—This design, so far as the dimensions of the contacts are concerned, has now been adopted as a standard by the British Engineering Standards Committee and the specification of same has been published and can be obtained from the secretary of that committee, 28 Victoria street, Westminster, S.W.

The committee has been in communication with representative electrical engineers in our colonies with a view to the British electric vehicle standards being adopted throughout the British Empire.

Tire and Road Wear Research Committee of the Motor Manufacturers and Traders Society.—The committee received an invitation during the year to elect a representative to sit on this committee, and the invitation was accepted. The committee place on record their appreciation of the courtesy of the society in inviting their co-operation in this important work.

Financial Support.—The committee are again deeply indebted to municipalities, electric supply companies, manufacturing firms and others for financial assistance (£141. 17s.) given during this year.

Accounts.—Attached to the report was the audited statement of accounts and balance sheet.

During the year the following additional bodies have become represented on the committee:

Garage Proprietors, Institution of Municipal and County Engineers, Municipal Tramways Association, Light Railways and Tramways Association, British Electrical Federation (Ltd.).

It is satisfactory to note that many new vehicles have been put into commission during the year so that at the present time the estimate of vehicles in use in the United Kingdom is in the neighborhood of about 680. This number includes 48 electric warehouse or works trucks, the use of which is likely to considerably extend in the near future. It is noteworthy that 33 municipalities operate between them, or have on order, 78 vehicles. The total number of vehicles quoted above shows an increase during the 12 months of 197 vehicles.

The committee take the opportunity of expressing their thanks to the Hon. Secretary, Mr. F. Ayton, for the very able and efficient manner in which he has handled the work of the committee.

The recent order of the secretary of state prescribes the use of three lamps on vehicles, two in front (white), and one at the rear (red).

The number of accidents that have happened in the past clearly shows the necessity for this order, but the commissioner of police of the metropolis has hesitated to press it unduly on account of the difficulty that has been experienced in obtaining the necessary number of lamps. He is now satisfied, however,
that this difficulty exists no longer, and that suitable lamps can be easily obtained. There is no excuse, therefore, for the use after dark of vehicles unprovided with the necessary lamps, and from June 1 next the police will be instructed to enforce the law in all cases where a contravention is observed.

The Midland Railway Co. is making an experiment in the use of electrically-operated drays for delivering goods in the outlying districts of Sheffield. At present three storage battery vehicles are being used, and are giving every satisfaction, states The Electrician.

One vehicle carries goods to the Firth Park and Pitsmoor district; another to Crookes and Walkley; and the third to Ecclesall, Fulwood and Ranmoor. The great advantage of the vehicles is that they cover the preliminary part of the journey very quickly, and get into the delivery area in much less time than a horse and dray would take. The chassis of the vehicles are American, but the railway company built the bodies of the drays themselves.

RAILLESS TROLLEY BATTERY VEHICLE AT BRADFORD

A new motor wagon has recently been designed by Mr. C. J. Spencer, general manager of the Bradford City trams, so The Electrician reports, for the conveyance of goods in connection with the ordinary passenger tramway service, and was given a trial on the 8th inst., when it was found to give very satisfactory results. The new vehicle is quite simple in design, but very adaptive to the purposes to which it is to be put. Mr. Spencer has built upon the chassis of an old trackless trolley car a long, broad lorry, similar in shape and dimensions to the motor lorries which are now so common. There is the marked difference, however, that, instead of using petrol, the wagon is run by means of the tramway overhead trolley lines; but, as the wagon is also equipped with accumulators, it can also be run independently of the tramway system. The chairman of the Bradford Tramways Committee (Mr. Enoch Priestley), and several other interested persons, witnessed the test of the vehicle on the 8th inst. A load of 2 tons was put on the wagon at Thornbury, and with this it made a satisfactory journey to Wibsey.

The equipment of the chassis of the railless trolley battery vehicle is identical with the ordinary railless trolley chassis as used on the Bradford trams—that is to say, two 20 hp. motors with ordinary series-parallel control—and will, therefore, operate on a 500-volt circuit. The earthing device is an extension of the steering arm of the vehicle bearing on the track by the medium of a cast-iron block, and at the same time automatically steering the vehicle. This device, which has been used with considerable success for some time in connection with the ordinary trackless trolley cars when taking them over the tramway routes to the depot at Bradford, was designed by the general manager of the Rotherham tramways, Mr. E. Cross.

The accumulators employed are of the Edison type (120 cells), giving a normal voltage of 150. As shown by the illustration, they are carried under the floor of the wagon. The inductors-coupling to the ordinary 500-volt motors, the only difference being that the motor with battery supply runs correspondingly slower—that is, pro rata to the voltage. As the torque of a series motor is proportional to some power of the current passing through the windings, the vehicle is capable of climbing steep gradients, but at a speed corresponding to the low voltage. Whilst the vehicle is running on the 500-volt circuit, the batteries may be in series with the motors, thus charging them whilst the car is in trolley service. The battery is capable of running the vehicle about 10 miles.

The change-over from battery to overhead wire is merely a question of throwing over a switch, the putting of the trolley on the wire and the earth connector on to the steering gear.

THE BATTERY VEHICLE IN MUNICIPAL SERVICE.

The credit for the revival of the electric battery vehicle business in this country must be given to a small group of individuals representative of the electricity supply and the manufacturing interests. The co-operation of these few enthusiasts, who got together as recently as three years ago, has resulted in the formation of the Electric Vehicle Committee and in the increase of the number of vehicles in service by more than 300 per cent. Up to the time when war broke out the business was making steady progress outside the sphere of operations represented by the purely municipal transport utilities. The war forced the attention of vehicle users upon some form of power wagon, and with the commandeering of horses and a large number of petrol vehicles, the choice became gradually narrowed to the battery operated machine.

At a time when municipal electrical engineers are meeting together for their annual convention it will be appropriate briefly to comment upon the work which has been done by municipal electrical engineers and by tramways managers, cleansing superintendents and city surveyors in putting battery electric into active service. So far as the electrical engineers themselves are concerned, there is always a considerable amount of transport work to be done round and about the system which would justify the employment of a convertible electric, that is, a vehicle upon which a van or passenger body may be used at will. In large areas a fleet of electric cars can be economically used, as has been demonstrated by W. W. Lackie, of the Glasgow Corporation electricity department. Apart from the service which these handy vehicles render, they represent a constant advertisement both for the lines and for the electricity undertaking. This has also been proved in the case of Glasgow, where a number of electric cars have been purchased by several of the important trading organizations in that city.

There are not a few electricity undertakings in which the generating station is awkwardly placed in respect to the local railway system, and maybe the canal facilities in the neighborhood. This location will involve the carting of the coal, and A. H. Shaw, of Ilford, has successfully demonstrated that a 4 to 5-ton battery vehicle can be more economically employed for this class of haulage than any other type of power wagon. Now that vehicles are scarce and labor is difficult to obtain and high-priced, it would appear that the battery lorry is a necessity in which every station engineer who can put the machine to good use should invest.

The public cleansing and sanitary departments have also been awakened, particularly since the war, to the merits of the battery-driven dust-collecting van. Without wishing to single out any individual for special praise in this regard, we may mention the name of W. H. L. Watson, of Edison Accumulators, who has steadily worked on this proposition and has been able to show almost remarkable results. The prejudice of a certain type of municipal official against innovations of any kind is traditional, but even this case-hardness would appear to
have been pieced, and the battery dustvan has proved its capacity in trials with other forms of haulage. The past year has witnessed a friendly attitude on the part of the Local Government Board towards the purchase of these vehicles. Tests have abundantly proved that they save their cost within a given time, that they do the work more effectively than was possible by previous methods, and that they have established a new standard in the field of dust collection, which is more desirable from a public point of view, and certainly more hygienic. The battery tipping wagon is essentially something different from the horse-drawn vehicle, particularly in the design of its body. Tipping can be undertaken from the kerb without the necessity for mounting steps, and an improved type of top cover can be employed which minimizes the indiscriminate scattering of dust and dirt, and the body of the dust van is also more weatherproof. It has also been shown that this work can be done with greater expedition, and that in itself is a most desirable thing, because the collection and disposal of towns' refuse is one of those matters which the public has got to put up with.

The battery bus has been running in Southend, South Shields and York, and tramway managers who have introduced these vehicles speak highly of their capabilities. Similarly, they have come to appreciate the merits of battery-driven tower and repair wagons, a form of vehicle which it seems only logical to employ on an undertaking so essentially electrical. Indeed, petrol-operated vehicles of any kind seem to us to be entirely out of place where electricity is concerned. A type of public vehicle which is also worthy of reference is the battery-driven ambulance. Here, again unless the local conditions are essentially suited to the non-electric vehicle, we regard the battery-operated machine as the only logical one for ambulance work. In many districts the local medical board is essentially municipal, and the electric ambulance may, therefore, be regarded as a very desirable municipal vehicle.

We will not labor the matter by detailing the numerous examples of the employment of battery-operated fire engines, fire escapes, etc. Many of these machines form a vital section of the fire-fighting departments of the metropolis, and fire brigade superintendents who have had them in use speak highly of their efficiency and reliability.

Moving House hold Goods by Electricity

Benjamin Franklin, the original electric man, once said that three removes are as bad as a fire, but now that moving has been reduced to a science the housewife, if she carefully selects a competent concern, need not be unduly apprehensive as to the condition of her goods on their arrival at their new destination. There are, of course, some irresponsible movers whose handling of valuable furniture and other household goods causes the majority of good movers to suffer, but fortunately most concerns today regard the trust imposed upon it as an obligation which it must endeavor to satisfactorily discharge, and it is always on the lookout for improvements that may be effective in its service.

Until a few years ago, for example, all the furniture in cities and suburbs was transported through the medium of comparatively slow and expensive horse-drawn vans. As a natural evolution, progressive moving concerns availed themselves of motorized equipment as soon as the efficiency of this method was appreciated. It is not uncommon today to observe in the advertising of moving firms the statement that it utilizes the modern motor truck with its many advantages over the old style horse-drawn vehicle. However, it should be real-

ized that—although the motor car in many respects is superior to the horse-drawn van in this class of service, there are certain characteristics involved in horse vehicular transportation which motorized equipment should effectively embrace to be thoroughly satisfactory.

Speed is an admirable quality for certain classes of transportation, but it is not necessarily something to strive for in the conveyance of fragile, easily scarred household goods. It is in this important phase of the service that the electric vehicle stands supreme, for although the average speed maintained by an electric is considerably in excess of that secureable through the medium of the horse, yet the fixed maximum speed absolutely prevents excessive speeding which is so destructive in this service. Furthermore, the electric is entirely devoid of all fire risk, for there are no inflammable fluids associated with its propulsion. The simplicity of its operation enable responsible experienced moving men who are not qualified mechanicians to operate the electric with even greater ease than driving a team of horses. Thus, the old timers who understand the art of moving can utilize their experience in conveying well packed goods at rational speeds. No matter how great the desire to race which always results in the goods being badly shaken up, and sometimes in their actually losing their identity, the speed of the electric cannot be increased beyond the manufacturers' rating which has been intelligently determined. The expense involved in moving with the modern electric van costs no more than when less satisfactory means are employed. Because of the lower operating cost of the electric and its longer period of successful usage, the mover is able to give the best service with no increase in price. The weather never prevents the electric from making prompt deliveries, and the liability of breakdowns is less than in the case of gasoline motive power. The battery capacity of the electric vehicle used for this work has at all times proved adequate, and the low operating cost and upkeep of this type of van are now being accentuated by the soaring cost of gasoline and horse feed.

Many of the largest and most successful storage warehouses and moving concerns use electric vehicle equipment exclusively. The housewife who avails herself of the unusually high grade service rendered by these companies knows her goods will arrive safely.

The Magnetic vs. the Centrifugal Speedometer

A Discussion of Merits and Demerits of the Different Types

BY HENRY S. CARHART

The problem in designing a speedometer is to convert the continuous rotation of a flexible shaft into the one-way deflection of an indicating dial; in addition, this conversion must be effected in such a manner that the deflection at any instant shall be proportional to the speed with which the shaft rotates.

It is clear that there can be no continuous mechanical gearing to affect the transfer, for while the shaft goes round and round, the dial turns against a retractile or biasing spring until a balance depending upon the speed is established. The dial then remains stationary until the speed of the shaft changes.

Two of the three principles in use for the transfer of the motion of the shaft to the indicating dial, are centrifugal force and magnetic induction. In the centrifugal instrument the rotating mass must change its position relative to the shaft in obedience to the centrifugal force acting on it; this motion must be transmitted by complex mechanism to the indicating hand sweeping over the dial. The mechanism includes levers, springs, rings, and cams, and the transmission is indirect and circuitous.

In the magnetic type of instrument, the rotation of the magnet by the shaft induces electric currents in the disk or cylinder of the indicating member, and by a well known law the disk or cylinder is flexibly dragged around after the magnet. The disk or cylinder would rotate continuously with the shaft were it not held back by a biasing spring. This device may be described as a magnetic gearing or friction drive directly converting a rotation into a one-way deflection by means of the withholding spring.

There are several evident advantages in favor of the magnetic instrument:

First—Its simplicity of design and construction. It contains only one rotating member, one deflection indicator, and one spring, as compared with the multiplicity of springs, levers, and cams of the centrifugal type. The various members of the centrifugal system are held in contact by springs with sliding friction; hence the liability to change in tension with age and use, with a consequent derangement of the indications.

Second—The torque on the indicating member of the magnetic speedometer is strictly proportional to the speed. The rotations of the shaft are directly and immediately convertible into a deflection of the disk or cylinder with its indicating hand or scale. On the other hand, it is a well known law that centrifugal force varies as the square of the speed of rotation. Further, the motion of the rotating mass in obedience to the centrifugal force acting on it increases the radius of rotation and thus further augments the acting centrifugal force above the square of the speed. Again, a resolution of this force into an effective and non-effective component further complicates the transmission, so that an open scale of approximately equal parts is obtained only by the use of an irregular cam at the end of the series of springs and levers.

Third—in permanency of calibration the magnetic speedometer is superior to the centrifugal. The experience of twenty-five years and of thousands of electricians with the Weston direct current ammeters and voltmeters shows without any question that permanent magnets, properly aged, retain their magnetic strength to a most remarkable degree. The degree in
the accuracy of reading of electrical measuring instruments is much in excess of that needed in speedometers; and yet the magnets of the former are so permanent as to leave almost nothing to be desired.

On the other hand, it is well known among engineers that “tachometers” which measure speed of rotation by direct application to the shaft of a machine, are not reliable to anything like the degree obtaining with electrical measuring instruments. Tachometers must be frequently checked to be at all dependable. They work on the centrifugal principle, and differ from speedometers only in certain details of arrangement. All mechanical engineers know that the centrifugal steam engine governor has long since been displaced by more sensitive and dependable devices.

Fourth—The simplicity of construction and the small number of parts and bearings in the magnetic speedometer justify the conclusion that its durability is superior to that of the other type. There is nothing to wear out in the indicating section of the magnetic instrument, and the shaft carrying the magnet suffers no more from use than the corresponding member of the centrifugal type. The multiplicity of contacts and springs in the latter offer many more chances for wear and depreciation.

Electric Delivery Truck Pay-for-What-You-Get-Plan

The Service Garage Company, 122 Fourteenth avenue, Columbus, Ohio, under the management of E. W. Penton and D. W. Dean, is at present working on a plan which is expected to revolutionize truck delivery in that section and save money for the man with a delivery problem.

Under this plan they propose to guarantee the cost per mile of an electric light delivery truck equipment. They are at present making arrangements with the manufacturers and expect to have the truck for sale within a short time. Meanwhile they are presenting the plan to different Columbus business houses.

This truck will adapt itself readily to each specific delivery problem. The first cost will be low and the cost of operation will be approximately one-half the cost of operating delivery equipment now in use here. It is especially designed for stores, laundries, bakers and dairies.

The Service Garage Company proposes to keep all batteries charged and keep the trucks in condition at a cost per mile which they will guarantee. Their plan has met with much popularity wherever it has been presented and it looks as if it will go big in Columbus. The thing they are trying to drive home in their prospective’s’ minds is that after the initial cost you pay for the number of miles traveled, no more, no less.

Agents are being sought by the Bureau of Foreign and Domestic Commerce to study and report on markets in South America for construction material and machinery, fancy groceries, furniture, glass and glassware, jewelry and silverware, motor vehicles, paper and printing supplies, railway supplies, and stationery and office supplies. In the Far East, Africa, and Australia a study will be made of the markets for boots and shoes, electrical goods, motor vehicles, and railway supplies. One agent is also sought to look into possibilities for American commercial and industrial investments in South America and another to make a similar study in the Far East.

New Ohio Quarters

Realizing the value of an attractive show room and incidentally its overhead expense, E. C. Scheffler, the new manager of the Chicago Branch of the Ohio Electric Car Company, has his new premises, 2634 Michigan avenue, working for him day and night. The brilliantly lighted interior shows off the new Ohio car to splendid advantage at night and makes an attractive picture bound to arrest one’s attention even among the well lighted show rooms of automobile row.

The new location has the advantage of two windows exposures. The salesrooms are large and airy, painted in a cheerful cream tint. The service department in the rear is large and commodious.
This department gives the record of all activities of the Electric Vehicle Section of the National Electric Light Association in all of its sections, as reported by A. Jackson.

Realizing the valuable co-operative development work which the association is doing, the publishers of ELECTRIC VEHICLES offer this exclusive section to association members and all electric vehicle interests in order that they may keep closely in touch with association matters.

CHAIRMAN MANSFIELD, who has always been a great believer in and booster of the electric vehicle, has been making a careful study of the problems confronting the section, and called a meeting of the Executive Committee, Thursday, July 6th, at 2 p.m., in the board room, eighth floor, 29 West Thirty-ninth street, New York City, where a program for the year was outlined and the machinery organized to carry out promotional and educational work. Chairman Mansfield, by calling a meeting of the Executive Committee thus early in his administration, will probably be able to get the work actively under way even during the summer months, so that by the early fall everything will be running smoothly and at high speed.

It is felt that the electric vehicle now has a wonderful opportunity of securing the valuable support of the central station industry, and no time will be lost in taking advantage of same.

MEMBERSHIP—JUNE 28, 1916.

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In the next review we will probably be able to report more definitely on activities and accomplishments. It is felt that Chairman Mansfield has outlined an inspiring program which will attract the hearty support of every member of the Electric Vehicle Section.

"After considerable discussion, Vice Chairman George B. Foster moved 'That in such cities as the membership is sufficiently large and enthusiastic, a separate organization of electric vehicle interests, to be known as the local Electric Vehicle Section, may be maintained at the request of the local members.' This motion was unanimously adopted.

"In cities where the local membership is not sufficiently large or enthusiastic, or where they feel that greater results may be obtained through affiliation with the Local Company Section of the National Electric Light Association, then it is suggested that an effort be made to have created in the Local Company Section an Electric Vehicle Division or Electric Vehicle Committee, which shall take the place of the separate and distinct local Electric Vehicle Section."

"It was generally appreciated that much extremely valuable work could be effectively conducted by local electric vehicle interests, and the members identified with the existing local sections are to be urged to extend their efforts so that the successful exploitation work of headquarters may be supplemented along practical and intensified lines of activity."

This resolution should call for the hearty recommendation of every section whether E. V. A. or company section of the National Electric Light Association.

In opening the Chicago meeting June 20th the secretary presented the regrets of Mr. Foster, who was unable to be present on account of business. The announcement of the report of the Nominating Committee had been made with the regular meeting announcement and as some conditions had arisen since making the same, Mr. T. Milton, chairman of said committee, was called upon to furnish an explanation. This was to the effect that Mr. Howard Ehrlich, who had been previously recommended for the position of secretary and treasurer, had since reconsidered same, due to being very busy with his own work, had declined with regret, his inability of accepting, should he be elected. He wished it to be made known, however, that he was not a "quitter," but that he was forced to decline the honor on account of circumstances over which he had no control. Mr. Milton went on to say that the committee had looked over the field again and decided to recommend Mr. Carlyle Fiedler. Whereupon Mr. Milton made the motion before the meeting that we nominate Mr. Carlyle Fiedler for the position of secretary and treasurer. This motion was seconded and carried unanimously.

Mr. Fiedler being present was urged for a few remarks and responded with a short talk, thanking the members for the honor they had just conferred upon him.

Various subjects of more or less importance were discussed and then the chairman calling upon suggestions for the best way to spend our usual annual outing event, Mr. W. J. McDowell suggested that we unite, if possible, with the Electric Club Jovian League and go with them at their regular event some time in August. Mr. D. M. Simpson suggested as the next best that we take a day off and spend it at home.

The chairman said he would refer these various desires to Mr. Foster, in order that a committee could be gotten together and get started on this proposition at once.

There being no further business the meeting was adjourned early.

The meeting of the Chicago section on June 27 at the Hotel Metropole went down in history. It accomplished more good and did more real work than any other held. Before the usual lunch George B. Foster, the chairman, invited the 47 members present to be guests of the Commonwealth Edison Company. This was received with cheers. Robert Bland then accepted for those present and thanked the donor in a few well chosen words. Secretary McCall then announced the new members secured:
The Ohio Electric Car Company.
Schillo Motor Sales Company.
W. T. Christine, Garage Efficiency.

George B. Foster, chairman, stated it had been the custom to elect officers at the annual meeting which formerly had been held in October. Owing to the change in the fiscal year of the organization such an election would come in the middle of the year, for which reason it had been decided to change the date of election.

The nominating committee reported the following:

George B. Foster, Commonwealth Edison Company, for chairman.
W. F. Bauer, Edison Storage Battery Company, for vice-chairman.
Carlyle Fliedner, Electric Vehicles, for secretary.

The report was unanimously adopted.

The chair paid retiring Secretary F. E. McCall a well earned tribute in appreciation of the excellent service rendered for a number of years, saying: "It has been an arduous job and has been well done."

After thanking the members for the officers, Mr. Foster stated: "This meeting was called to give consideration to the relations between manufacturers of electric vehicles and accessories and the owners of garages. It is a big subject. When the matter was presented at our national convention in May your officers probably could do nothing which would be of greater value to this section than to take up these differences and help to iron them out and get together on a better basis and pull together instead of pulling sideways.

"A committee was appointed to look over the matter and then take up the several points and analyze them, to talk with the different parties at interest in these matters to see if a middle course could be adopted and accepted which would relieve the situation. The report of that committee was handed to me this noon as I sat here, so I have not had opportunity to read it, but I am sure the report will cover the subject and I am sure the work has been well done.

Gail Reed was asked to present the complete report. After it had been read and accepted on Mr. Reed's motion and Mr. Adams' second, it was decided to consider the report section by section.

GARAGE POLICIES OF THE CHICAGO ELECTRIC VEHICLE SECTION N. E. L. A.

The following recommendations are offered by the special committee on garages for the full consideration of the Chicago section membership as offering a reasonable, fair and logical working basis towards bringing about more satisfactory conditions to the manufacturers of electric vehicles, batteries, tires and the operators of electric garages engaged in the sale, equipment and care of electric vehicles in Chicago and vicinity.

The dealers in electric vehicles and batteries are willing to support policies along these lines provided the garage operators agree to support the measures applying to them in this program.

OUTLINE OF POLICIES WHICH THE GARAGEMEN ARE ASKED TO SUPPORT.

Cost System—The representative garages to be willing to make the proper start in placing their business on a fundamentally sound basis by installing an adequate cost system through the medium of which they will be able to gain the proper knowledge of their business and its cost so the necessary aid can be given by the association. This plan will enable them to determine exactly what their service costs and the returns this service is bringing.

The Chicago Electric Vehicle Section of the N. E. L. A. has already offered a solution for installation of a cost system.

In support of this section Mr. Reed pointed out that relatively few of the garage operators appreciated the value of a cost system and that many of them did not know anything about what it cost them to conduct their business.

Mr. Nichols stated the value of an accounting system is not too easily determined. We have one and know something about it. I want to say this: You can go into accounting so deep that the cost of cost accounting will eat up all your profits.

Mr. Salvat moved the adoption of the cost system. Seconded.

STICKERS FOR PRICES

Mr. Bland—Out at Rockford (III.) the garagemen have installed cost systems and the result is that price cutting is dead. There is only one exception and I believe that fellow has no cost system. Whenever the cost system has been tried, by any community, section or individual, it has made those who use it sticklers for price.

Probably I have visited as many garages as anyone here. I have been pretty thoroughly over the south side garages of Chicago and there is not over 2 per cent that have cost systems, about 2 per cent that know what it is costing them per car for space. The majority do not take out the openings, office, wash rack, repair shop, etc., and consequently do not know what rent they have to pay for the space a car occupies.

If you can show me how a man can do a profitable business and not know anything more about his business than that, you can show me more than I have been able to learn myself. Every electric garageman in Chicago is losing money if he will be honest with himself and figure it out on the right lines.

We should know absolutely what space is costing us per car. It is actually costing $6 to $8 for space to garage a car and when the owner goes away, winter weather, we take what they call overhead storage at $5 per month, that is we are selling something that costs us $6 to $8 for $5. Are we making money. We surely are not. I am absolutely in favor of that and hope it prevails.

Mr. Simpson told a story of a garageman whose business had grown down town to buy a $50 cash register. Before he left the store he had paid $450 for one and it was money well invested. There was a system of keeping records that went with the cash register and when he went into the subject he found he was losing money in some departments and made more money than he knew about in others.

Mr. Nichols—Question: Mr. Halbert asked if the system of cost accounting under discussion was for exclusively electric garages or if it could be used by combination garages.

Mr. Foster stated the offer was open also to combination garages.

Measured Service—To give full consideration to placing their business on a paying basis in every department by revising the present flat rate or by substituting for it, measured service throughout. To recognize the uniformity to everyone concerned in the flat rate now in vogue.

In the course of the discussion which followed it was pointed out that the car owner who was getting $60 worth of service for $35 or $40 would leave the garage where measured service was given and give his car to the keeping of the flat rate garage. That statement brought the response that the flat rate garage would go broke if filled with the long runners while the measured service garage could make money on either the light runners or heavy runners.

Mr. Nichols stated no one was kicking on the cost of current, stating that an eleven plate, forty cell battery fully discharged could be raised to fully charged condition in 17 K. W. hours, which, at 2½ cents would cost 42 cents. "That is the maximum cost. We have
no cars in our garage whose owners run the batteries out every day," he said.

Mr. Salvat—I have a gasoline garage where everything is on a measured service basis. We get $15 a month for light storage and charge our customers for everything else they get. It is a pleasure to do business with those people.

Where we are getting $25 for straight service, no matter what we do for them, we never do enough, in their estimation. For $25 we clean and wash a seventeen-year-old, rusting car.

I like measured service, but the electric car owners are so accustomed to getting something for nothing that I think they would kick.

It looks like we were paying $1.11 for garaging electric cars. Rent is about 40 cents, charging, according to Mr. Nichols, 42 cents, that is 82 cents for the two items. The cost of hiking on some cars is at least 40 cents a day, so where do we get off at $35 a month?"

Mr. Halbert stated he had used the system and only lost one customer by its adoption, and one washer, one polisher and a floorman washed an average of 10 cars a night in a 58-car garage.

Mr. Nichols stated that he handled the electric end of the firm’s business and that the profits on electric cars were greater than those on gas cars. He explained that the electrics were housed on the second floor and that the cost of operating the elevator was charged to his department. Rent is split on a fifty-fifty basis.

After a further discussion this section was adopted on motion. Mr. Nichols voted against it.

This section (Standard of Service) was read and adopted without discussion on Mr. Nichols’ motion.

Standard of Service—To establish an adequate standard of service which shall cover the most important service requirements of electric cars, batteries, etc., with the understanding that such standard must be lived up to in order that they may obtain the support of the association membership. This standard of service to be determined by a representative body of men covering all interests at stake. Printed copies of the standard of service to be distributed throughout the association. Members only of all garages to this standard will receive the recommendation of the association members.

All association garages doing repair work of any nature to be carried on in cooperation with the dealers. For example, if they get hung up on a certain job they’ll call on the dealers’ service department for assistance or advice and not take a chance on going ahead with a piece of work with which they may not be entirely familiar. In a general way it means every means possible to keep all troubles pertaining to batteries and repairs of any nature, between themselves and the dealer.

Section 4 also was adopted on motion of Mr. Salvat and Nichols.

General—The electric garage to use every possible means towards promoting the sale and use of electric cars and as a means to this end, to report to the secretary of the association, all leads or possible prospects to these names can be distributed impartially to all garages. The garages to openly talk up the advantages of the electric car and to make all customers feel that the electric is the only vehicle. In other words, the garage men to take a positive instead of a passive stand and to come out openly and strongly for the electric vehicle. The garage men to promote the association work and its benefits among themselves to keep up the enthusiasm and interest which will add members and strength to the cause.

Motion by Adams, seconded, carried.

General—The dealers will support in the heartiest manner all Electric Vehicle Section garages in preference to all others; and in every way encourage those garages in advance to all persons with whom they deal. Any similar notice be given in writing, if possible, to all electric car purchasers. Names of car purchasers to be given the secretary of the association so advance notice can be impartially distributed to all association garages.

Notice also to be mailed exploiting the Electric Vehicle Section parking system to all purchasers letting them know the great value of this service and the fact that it can be obtained only through members of garages. All present owners of electric vehicles to be notified by the respective dealers, recommending association garage service; making it plain that the dealers are openly supporting association garages above all others and telling them why.

Batteries—On repairs, where batteries are sold on a guarantee basis, which guarantee can be issued by the garage operator, all adjustments on such guarantees are to be made to the owner based on the regular retail price of the battery. Such adjustment to be allowed to be made by the garage man, battery manufacturer or dealer. Regular prices on batteries established by the battery manufacturer are not to be cut.

Speaking to this subject, Mr. Bland said that the battery manufacturer should know, better than anyone else, the number of miles contained in the batteries he produces. He said he was not for the guarantee of the car manufacturer and thought excessive mileage guarantees were killing the business. This provoked quite a heated and personal discussion. Mr. Bland’s motion to adopt was carried unanimously.

The remaining recommendations were adopted without discussion.

Tires—Whether cushion or pneumatic, to be sold at regulation retail price on which shall be given standard guarantees only, which same guarantees can be used by garage man or dealer.

Discounts—So near as possible, discounts on repair parts to be given only to association garage members. Where exclusive discounts are not possible, preferential discount to be given wherever reasonable, to association garage members.

Inspection Service—While inspection service will be continued, this will be carried on not only as an aid to the promotion of the use of electric vehicles by keeping them in A1 running shape, but as an assistance to the garages in raising their standard of service by giving notice to the garage first on any matters needing attention on the car, not due to general wear, tear, or accident. In other words, any service the car requires due to lack of proper care, will be called to the attention of the garage first. If the garage fails to honor this notice by correcting the trouble, then only will the owner of the car be notified.

On such repair work as is done by the public garages, the dealers agree to furnish expert advice at all times on the care and repairing of cars. Furthermore, if a garage requires the special services of an expert from the dealer on any case, that the dealer will agree to furnish such experienced repair men on the particular case to be handled, and the guarantees are to be given the understanding that the garage man will pay a reasonable amount for the time consumed.

Mr. Bland proposed a vote of thanks for the committee, which was given with a will.

The members of the committee are:

Chairman—Gail Reed, Walker Vehicle Company.

D. E. Whipple, Anderson Electric Car Company.

Harry Salvat, Fashion Automobile Station.

T. Milton

The committee was continued in office until the next regular meeting.

The chair then requested all those present to sign the agreement with the understanding that they as individuals or firms were not violating any city, state or federal government laws. All present representing interested parties signed.

The meeting disbanded about four o'clock, everyone agreeing we were on the right track.

CONSTITUTION AND BY-LAWS, ELECTRIC VEHICLE SECTION, NATIONAL ELECTRIC LIGHT ASSOCIATION

ARTICLE I—NAME

Section 1. The name shall be the Electric Vehicle Section of the National Electric Light Association.

ARTICLE II—OBJECTS

Section 1. The object of the Electric Vehicle Section shall
ELECTRIC VEHICLES

Section 1. The Electric Vehicle Section is a national special section of the National Electric Light Association, organized in accordance with the provisions of Sections 1, 2, and 4 of Article XVI of the constitution of the National Electric Light Association.

Section 4—MEMBERSHIP

Section 1. Membership in this section shall be of four classes: Active, Auxiliary, Press, and Associate.

Section 4. Auxiliary members shall be corporations, firms or individuals engaged in the manufacture and sale of electric vehicles, electric vehicle batteries, electric motors or tires, and corporations or individuals engaged in the sale of electrical holding companies, any of whose subsidiaries may be engaged in the sale of electrical energy. Each active member shall designate one individual who shall act as official representative. He shall have the right to vote and to hold elective office.

Section 3. Auxiliary members shall be corporations, firms or individuals engaged in the manufacture or sale of electric vehicle accessories. Auxiliary members shall be entitled to all the privileges of active members of the section except the right to vote. Each auxiliary member may designate one individual who may act as official representative.

Section 6. No person not a member of the National Electric Light Association shall be eligible to membership in this section. APPLICATIONS FOR MEMBERSHIP

Section 1. Applications for membership shall be made in writing by the applicants and endorsed by at least two members in good standing and presented to the executive committee. Election to membership shall be by a majority vote of the executive committee.

Section 2. A member may resign from the association by a written communication to the executive committee, and resignations shall be accepted by the executive committee upon payment of dues and other indebtedness.

Section 1. An entrance fee, payable on admission to the section, may be fixed.

Section 2. Until June 30, 1917, or thereafter, the dues of active members engaged in the manufacture and sale of electric vehicles and electric vehicle batteries doing an annual gross business under $50,000,000 shall be $100.00; an annual gross business between $50,000,000 and $75,000,000, $150.00 per annum; and an annual gross business over $75,000,000, $200.00 per annum.

Sections 5. The dues of active members engaged in the sale of electrical energy, in territories of less than 50,000 shall be $10.00 per annum; in territories from 50,000 and under 100,000 shall be $20.00 per annum; in territories between 100,000 and 200,000 shall be $40.00 per annum; in territories between 200,000 and 400,000 shall be $60.00 per annum; in territories from 400,000 to 500,000 shall be $75.00 per annum; in territories between 500,000 and 1,000,000 shall be $150.00 per annum; and in territories over 1,000,000 shall be $350.00 per annum. The dues of holding companies shall be $150.00 per annum. The dues of active members engaged in the manufacture and sale of electric vehicle motors and accessories shall be $100.00 per annum. The dues of active members shall be payable in advance in two installments, one-half on October first and one-half on April first of each year.

Section 4. The dues of press members shall be $10.00 per annum, payable in advance on October first of each year.

Section 5. The dues of associate members shall be $50.00 per annum, payable in advance on October first of each year.

Section 6. Any member in arrears for sixty days may be suspended from all privileges of membership, but may be reinstated when all outstanding dues have been paid. In the event an applicant shall be elected after April first, the dues for the remainder of the fiscal year shall be one-half the annual fee.

ARTICLE VII—OFFICERS

Section 1. The officers of this section shall be a chairman, a vice-chairman, a secretary, and a treasurer. The secretary and treasurer may be one person. Officers shall be elected at each annual meeting and shall hold office for one year or until their successors are elected, whichever period is longer. Vacancies may be filled by the chairman, the vice-chairman, or the committee, as the case may require.

Section 2. The chairman of the section shall ex-officio be a member of the executive committee of the association and shall retain such membership as long as he is such chairman.

Section 3. The executive committee of this section shall consist of the chairman, the vice-chairman, the secretary and treasurer, and associate vice-chairmen equal in number to the members of the executive committee of the association, but not less than twelve. All of whom shall be duly accredited representatives of active members. At the first annual meeting of the section for members of the executive committee shall be elected to hold office for three years, four for two years and four for one year and, thereafter, at each annual meeting, four members shall be elected to serve for the term of three years or until their successors are elected, whichever period is longer. Vacancies may be filled by the chairman, the vice-chairman, or the committee, as the case may require.

Section 4. The chairman of the section shall preside at all meetings of the section or of its executive committee. The chairman shall, with the approval of the executive committee of this section, name such committees as may seem desirable, and shall appoint all of the members thereof. The terms of all committee members shall terminate at the same time as that of the terms of the officers unless sooner by law or by the executive committee in the absence or disability of the chairman, the vice-chairman shall exercise the authority and perform the duties of the chairman.

Section 5. The treasurer shall receive and keep safely all monies of the section, keep correct account of the same, and pay all bills approved by the executive committee. He shall make a quarterly report to the executive committee and an annual report to be submitted at the annual meeting of the section, and, at the executive committee's discretion, he shall give a bond in such a sum and with such securities as the executive committee shall prescribe.

Section 6. The secretary shall keep the minutes of all the proceedings of the section or of its executive committee, shall give notice of all meetings, keep a record of the membership, file reports in writing of the activities of this section with the secretary of the National Electric Light Association, as required by Section 2, Article XVII, of the constitution of the National Electric Light Association, and perform such other duties as may be assigned to him by the executive committee.

ARTICLE VIII—SECTIONS

Section 1. Local sections of the Electric Vehicle Section may be organized in any state or locality where a membership of fifteen shall petition the executive committee for right to organize such local section, following which the same shall be granted to the constitution of the Electric Vehicle Section, but may also make special rules and regulations for its government as the members may elect, subject, however, to the approval of the executive committee.

Section 2. No local section shall incur any expense chargeable to the Electric Vehicle Section without first petitioning the executive committee and receiving its approval therefor.

Section 3. Each local section shall forward to the national office, copies of papers and discussions presented at their meetings, which shall be available for use of the Electric Vehicle Section by the executive committee or by other local sections.

ARTICLE IX—ELECTIONS

Section 1. The executive committee shall select a nominating committee consisting of five duly accredited representatives of active members, and the chairman shall announce the names of the members of said committee in the first session of the annual meeting of the section. Said committee shall at a subsequent session of the section be given the names of those recommended by it for the offices to be filled.

Section 2. Any duly accredited representative of an active
Electric Car Licenses

The present time as yet has not brought national registration and the abolition of state variations in tags, requirements, licenses, and fees, and a short review of the automobile license laws may be of value.

On January 1, 1916, all but two states, South Carolina and Texas, and the District of Columbia, had made provisions for some form of periodical state registration according to circular 59 of the Department of Agriculture. Mississippi requires county licenses and in Minnesota all vehicles are registered by three-year periods.

In Alabama it cost one $12.50 for an electric car license, in Arizona $5, while Arkansas charges everyone $10. In California, Delaware, Illinois, Kansas, Maine, Maryland, Massachusetts, New York, North Carolina, Pennsylvania, Rhode Island, Virginia and Wisconsin, the state will charge you $5 for your license.

In Mississippi the women get a bargain at $4.80 and in Georgia before driving you must separate yourself from $4.00, while in New Jersey it will be $4.50. For $3.00 they will let you off in Indiana, Nebraska, Nevada, North Dakota, Ohio, Oregon, South Dakota and Washington.

In the states of Idaho and Iowa they believe all electric car owners are plutocrats and so impose a $15.00 fee on them. New Hampshire and Utah believe it worth $10.00 to get electric satisfaction.

Connecticut charges one on a horsepower basis at 50 cents per horse, as does Louisiana, but only at 25 cents per, and a $5.00 minimum. Michigan, to be different, charges $1.00 for each horsepower and then slaps on 25 cents for each pound weight. If your motor can develop or is rated at 5 hp. and your car weighs 3,200 pounds it will cost 5 plus 8 dollars or $13.00, which is a fairly steep tax, for on a second hand car it is nearly one per cent. In Oklahoma and Vermont they realize a car depreciates as it grows old and lower the tax correspondingly from year to year. Oklahoma charges 50 cents per hp. the first and graduates it 10 cents a year with a minimum of 20 cents per hp. In Vermont they grade from $1.00 per hp. for the first year’s registration with a reduction of 25 cents until the 50-cent minimum limit is reached.

In New Mexico, the District of Columbia, Missouri and Montana, $2.00 will give you your tag, while they do it for $1.30 in Minnesota. You can still beat them lower by going to Texas and get one for fifty cents. From fifty cents to $15.00 is rather a discrepancy, either the State of Texas is losing money or the States of Idaho and Iowa are determined to crush out electrics arbitrarily with a tax that is only equalled by the present heavy war taxes on cars in Europe. With our present national highway bill providing for millions of dollars for federal aid state highways as a starter, no doubt some equitable interstate or national license law could be realized for the benefit of all concerned and a more even distribution of the burden of road maintenances secured.

Garagemen Are Responsible

The municipal court in Columbus, O., has held that a garage man is responsible for any damage done to a car by an employee. The case arose over a suit that was brought by a car owner against a garage keeper for damages sustained by a car when it was driven by an employee of the garage.
Fashions for Milady of the Electric

Exclusive New Fall Garments Shown for the First Time

Center, a handsome dress coat of black velour showing the gray muffin collar and cuff. To the left we have an evening or dress coat, while on the right a good example of saucy mixtures.—Percival B. Palmer & Co., Chicago.
The Axles Underneath Your Car

Some Things About their Manufacture and Design

As you speed downtown in your electric, or ride through the parks in an electric after having ridden in a gas car, you are impressed with one thing—the absence of all noise. You seldom have ever thought of it until then and then dismiss it from your thoughts with a sigh of satisfaction as you sink into the cushions. Suppose we then go through the car and see how we obtain this silence.

You have no noisy exhaust, no noisy battery, your hoods are well fastened down, there is no exhaust pipes or mufflers to rattle and throb, no light, flimsy supports for our transmission case to groan and wail, and we have only one set of gears to cause any noise, which they considerably refuse to do after searching through our whole car. Let us then find out what we may of their construction and if possible take a trip through the factory making them.

Here in one corner we see the complete axles in the stockroom, both front and rear. They are the parts that represent safety to you, and your family in your electric. Your battery may run down—it is inconvenient but you can walk. Your springs may break a leaf and you may still go on. Your body may squeak and squeal but it is merely irritating to the ear. But if your axle breaks it may mean death, or if your brakes fail to work at the crucial moment you may go headlong into a car ahead or into a street car at a crossing. It therefore pays to know something about car parts.

Here we see after entering the shops proper blocks of machines with whirling exposed gears and slapping belts. It is seldom we find anything resembling our quiet electric, for the shops are still few that have adopted unit electric motor drive. The raw material is being converted into gears for our axles.

Years of research and experimental work have enabled the makers to determine and select just those materials whose combination affords the lowest coefficient of friction, together with the most durable qualities so essential for the satisfactory running of a really successful worm gear. Before machining, all raw material is carefully inspected, undergoing a thorough examination in order to ensure a uniformity of quality.

In order to get perfect concentricity and uniformity of size, the axle gears, in this case a worm gear, similar to that shown in Figure 1, is ground on the outside diameters of the threads and journals. This operation is performed on precision machines, and when it is remembered that the accuracy of cutting the worm threads depends upon the relative concentricity of the two ends of the worm shaft, it will be realized that grinding before hardening, far from being a superfluous operation, is absolutely essential for the attainment of a high standard of production.

The rotary worm cutter at first sight appears to be quite straightforward, with its contour made to correspond with the space of the worm thread. Such, however, is far from being the case, as its actual contour is of a complicated mathematical character, and cannot even be ascertained on the draughting board without a great amount of labor. They have consequently devised and patented a most simple method of automatically generating the required shape, entirely dispensing with contour scribings, photographic reproductions or elaborate calculations.

As the rotary cutter must be made circular in shape, and as a circle and a spiral cannot coincide, it is obvious that the contour of the circular cutter cannot coincide with the thread space of the spiral worm. Thus actual cutting does not take place, as one would naturally expect, on the plane joining the axes of the cutter spindle and worm shaft, but on either side of this plane, where the straight circular shape of the rotary cutter interferes with the spiral action of the worm thread.

It is a simple matter to reproduce a normal section of the thread space of a worm on the draughting board, but a commercial impossibility to calculate or draw the correct shape of cutter that will form this space. Fortunately this intricate problem is of no importance or hindrance to the manufacturers of Timken-David Brown worms, whose plant we are visiting, for its patent method of generating the exact shape requisite for the cutter, to suit a given worm, is the essence of simplicity, economy and accuracy.

In its system of generation a straight-edged tool is set at an angle corresponding with the pressure an-
gle of the worm to be cut, and is then made to traverse in a spiral path, corresponding exactly with the spiral of the worm under construction. As this tool is mounted and driven in the milling machine in the same position and manner as the worm which has to be cut, its straight edge will accurately represent one side of a worm thread. A soft blank is then mounted on the cutter spindle in place of the usual cutter, and fed forward until it reaches the full cutting depth. When the machine is set in motion the generating tool will then generate on the blank the correct contour which the cutter must possess, the shape varying according to the diameter, pitch, pressure angle and lead of the worm. From this blank a gauge is made to which the worm cutter is turned and machine relieved in the usual manner.

The entire department manufacturing worms is composed of machines made by David Brown and Sons, Limited, of Huddersfield, England.

The products, both the worm and the gear, are checked after every operation to eliminate all errors and to gain as perfect silence as possible when in operation. Many devices are used for determination of error which are magnifiers of faults, enabling the slightest discrepancy to appear from 250 to 500 times bigger than it actually is on a predetermined and calibrated scale.

After milling, the worm undergoes a most rigorous inspection; the threads are examined for their size, thickness, depth and contour, and the whole for its concentricity, indexing and lead.

The illustration below shows a bench instrument for measuring the relative thickness of the worm teeth. The worm to be measured is placed upon two rollers; a third roller is then placed above and the overall distance measured on the clock indicator, which can be read to a tenth of a thousandth. This instrument is set in the first place to a master worm, and all others to the same specification are made to give the same reading, so that all are interchangeable. A variation of four thousandths on the clock indicates an error of less than a thousandth on the tooth thickness.

The illustration, Fig. . . . , shows our method of testing a worm for accuracy of pressure angle. The instrument is mounted on the D. B. S. patent worm gear testing machine, and consists of a protractor which can be adjusted for height on a vertical column. The knife edge of the protractor is placed along the side of the thread, whose angle is thus shown on the scale, and can be read to plus or minus a few minutes.

The machine itself has been designed to enable them to test all of the various operations performed on both the worm and the wheel. These can be tested separately as individual units, or in combination, when mounted together at the specified center distance.

The gears after blanking, as the preliminary cutting is called, whether worm or bevel, are case hardened by packing in a mixture of special compound and placed in an iron box in a furnace and heated until the surface has absorbed enough carbon to become hard and tough. They are then taken out in the course of time after slow cooling and ground to exact size, then are again inspected and go to the burnishing room, where they are polished and the fine little steel feather edges are smoothed down. The worm and the gear are then brought together and tested both in a machine for clearance, but inspected by eye for mistakes that might have been glossed over. Whether bevel, helical or worm, the same core is used in manufacture.

They are then ready for assembling into rear axles. Next the differential is fastened to the worm gear and supported in the casing by Timken taper cone bearings on each side, while the worm pinion itself is supported
by two smaller Timken bearings in the upper part of the center axle casings. This casing is usually connected each side to steel sleeves which are drawn from a solid piece of steel and on their extremities carry the wheels, which are supported by two sets of bearings set end to end. These take the vertical shock and also the transverse horizontal component of the shock due to turning a corner or skidding. This is generally known as thrust.

The type of rear axle most generally used is that known as the full-floating type similar to that described in this article. The axle shaft, the only rotating part, is fixed so that on removing the rear hub cap it may be lifted out and the car is still safe and sound and the wheels will not come off. It merely fits into the differential at one end in a square hole and driving jaws fasten it to the wheel hub plate at the other. The casing or housing supports the springs and wheels and takes all stresses and strains due to bending from any causes.

The wheels carry the brake drums against which the brake shoes work. Your electric may have either internal expanding brakes, or external expanding bands, or perhaps both, but in any case there are times in driving a car when one has to jam on the brakes and bring the car to a sudden stop.

At the bottom of a steep hill, at a crowded crossing, at a railroad track, the brakes must act—and act quickly.

Your comfort and the life of your car demand that these sudden halts be made without the jerking, jarring and chattering of a brake that clamps down too quickly. These internal and external brakes are so designed that power is applied very quickly at the start and then, as friction begins, more slowly; but as the movement of the brake-band becomes slower it exerts more and more powerful pressure.

Thus the car is brought to a full stop without jolting, and yet in the shortest possible distance.

The pressure, from the first second of applying the brakes till the car is stopped, is distributed with perfect evenness over the whole surface of the brake-drum.

There is no skewing or uneven pressure and wear on the brake-bands.

The flanged portion of the brake-drum rotates between two brake-bands, and when the levers are pulled they contract the external band or expand the internal one as the case may be.

The surfaces of the brake-drum are accurately finished in order that the brake-bands or "shoes" may take hold with equal force at every point.

Even the brake-lining is inspected and tested and must not vary in its dimensions more than a thousandth of an inch.

The largest single piece front axle is the "I" beam, forked at each end to carry the steering-knuckles.

This is forged by enormous steam hammers from a single piece of special-formula steel. One of the most interesting sights at the Timken-Detroit factory is the immense forge-building, with its rows of steam hammers, the tops of which are almost lost to view in the clouds of smoke and steam which hover under the roof.

From furnaces near the steam hammers workmen take the glowing-hot parts of steel and hold them with great tongs on the dies. Deft manipulations of lever and throttle-valve cause the hammer to descend with a light blow or a heavy pound at the will of the operator, until from a plain bar of steel there develops the I-Beam of just the right length, thickness and shape. Several heatings and hammerings are necessary for the making of each beam.

In the same way the axle-ends are made, and the yokes, steering-knuckles, steering-arms and many other parts.

The rough forgings must be machined, holes drilled and reamed and then the other operations performed to make them into the finished product.

In milling the ends of the I-Beam and in drilling and reaming the holes in these ends for holding hardened bushes that carry the long steering-knuckle pins, the distances between the surfaces and from cen-

![Fig. 6.](image-url)
ELECTRIC VEHICLES

Vol. IX, No. 2.

TER to center of holes must be exactly right and uniform in every axle.

This is merely one of the dozens of instances where specially-designed machines are utilized in the Timken-Detroit plant to secure an accuracy impossible without them.

When the I-Beam forging is completely machined it receives a special heat-treatment which develops in the steel wonderful power to resist bending and twisting stresses and shocks.

Every part in the front end must stand up under heavy stresses. Take the little ball on the end of the steering-arm, for example. Small as it is, it gets all the pound and vibration.

Whenever the motor car changes direction, the steering-arm swings back and forth and the ball turns in the socket of the steering connection.

To work perfectly in every position of the arm the ball must be a true sphere. Otherwise in some one position there would be a slight looseness; and vibration would start the ball pounding in its socket.

A little pound will bring more looseness—the extra play would bring more pound. And the trouble would increase more and more rapidly.

When it reached the point where wheels no longer respond to the flash of the driver's thought—it would mean danger.

But if the sphere is perfect there is no looseness at any point and no chance for a pound to begin. The connection starts out right for every position and remains right all the time.

Note in the picture on page — the spindle of the steering-knuckle. On these spindles is concentrated all the weight carried by the front axle. To the spindles come directly all the jars and vibration of travel.

Right here is the one point, above all others in the entire car, where dependable material, design and construction are vitally essential to life and safety.

Note the gradual slope of the spindle from larger diameter at its inner end to smaller diameter at its outer end. No sharp curves or shoulders is a fixed principle of first-class design, because it is at sharp shoulders that breaks are most likely to occur.

The cross-rod, too, is attached in the same way to the steering-arm. The widely separated bearings at the wide yoke make for greatest strength and safety.

In both steering-knuckle and cross-rod the pins turn in hardened and ground steel bushings (not bronze), which hold wear down to a minimum and can be quickly and cheaply replaced when wear does occur.

You have noticed the casters on a bureau or bed. The little wheel touches the floor at a point to the rear of the caster's vertical axis.

Because of this the wheel trails and does not tend to change the direction of motion of the bed. Steering the bed in any direction is done with scarcely any effort, somewhat different and more effective than that of a bedcaster.

The principle is the one long used in the front wheel of a bicycle. The axle is mounted so that it tilts slightly forward at the bottom. As in a bicycle, straight lines passing through the steering-heads, or the pins of the steering-knuckles, meet the ground a little in advance of the points of contact with the front wheels so that each wheel really trails behind its steering-axis.

That is why the bicyclist can steer without using his hands.

This particular method of effecting caster-steering brings another and a very great advantage to the driver of a car.

It would require considerable technical talk to explain what can be easily seen by examining a bicycle. Turning the wheels to the right or left actually raises slightly the body of the car; thus the weight of the vehicle tends to bring the wheels back to the straight fore-and-aft position.

This gives you added security, for, if your steering-gear should break or escape your control, the very weight of your car will tend to keep it on its course.

Brisk Foreign Demand for Ohio's

In commenting on certain recently appointed foreign dealers H. H. Grand, secretary and treasurer of the Ohio Electric Car Company, stated that the company's product was represented in every country and continent except Australia. An investigation is now being made of the sales possibility in that continent. There are over thirty cities of populations upward of ten thousand people and electric automobiles could be used just as advantageously in cities like Melbourne and Sidney as in American towns.

The last foreign shipment was to Bombay, India.

An Electric Vehicle in Panama

An electric vehicle for use by a business concern in Panama has been furnished from this country by the Ward Motor Vehicle Co. of Mount Vernon, N. Y., and is said to be the first one of the sort to be placed in use in that country.
Electric Vehicles' Question Box
A Service Department for All Readers

There are many owners or prospective owners of electric automobiles desiring questions answered and information of an unbiased nature. Electric Vehicles, through these pages, will endeavor to answer questions of any nature pertaining to the electric automobile, its care and operation. The answers will be given as fully as possible and based upon our interpretation of the questions. We assume no responsibility as to results. Our position is merely to help all to the end of securing the very best results from electric automobiles, therefore correspondence is invited.

T. N. T., Chicago—Your answers to A. W. N. in the June issue leads me to ask if hydrometer readings were not variable due to the weather?

No, the variation is due only to the temperature which affects the density of the solution.

In order that specific gravity readings may be of real use they should be corrected to the standard temperature of 80°F. The correction may be readily made from the table below. Example: Suppose the reading on a cell, in which the temperature of the electrolyte is 100, is 1.286, the corrected figure is found by following along the same line to the left to the column headed 80°F, which will be found that the figure is 1.275.

We show herewith an illustration of a hydrometer as used on a cell reading.

G. L. B., Newton—What should the air pressure be in my car's tires? They are 34 x 4½ Silvertown Cord. What is the effect if pressure recommended is not maintained?

The manufacturers say a 34 x 4½ tire should be held at 70 to 75 pounds air pressure. Where a low air pressure is maintained the chances of injuring the walls of the casing are increased. The current consumption is greater when the air pressure is low, as the tire spreads and a greater area is in contact with the road surface. When tires are inflated to different degrees of pressure, a car will be inclined to steer hard, particularly this is true in the case of the front tires.

<table>
<thead>
<tr>
<th>TABLE OF HYDROMETER CORRECTIONS.</th>
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<tbody>
<tr>
<td>50°F</td>
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<td>1.312</td>
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Wright, Alpena.—I have placed an order for a new — Electric. A family (friends and neighbors) want to buy my old electric, but I hesitate recommending it, fearing some unforeseen condition might arise which might cause a breach in our friendship. What course do you suggest that I pursue?

No doubt your friends have known of your car and its performance during the time you have owned and used it. The probabilities are, you have told them from time to time as to what the operation expenses amount to per month. They know whether or not you have abused the car. They can see as to the car's condition as far as upholstery and paint condition is concerned. They know when you last renewed your tires and batteries and you can tell them what new tires and a battery renewal will cost when same are needed.

The probabilities are your friends want the car because they think it will serve and prove economical, therefore, do not believe you should hesitate selling to them, unless you know the car to be in a condition other than it looks.
De Acres, Little Rock.—Does an electric motor lose any in efficiency as it ages?

Age does not affect the motor of an electric automobile. By keeping the commutator clean, the bearings adjusted and lubricated, the brushes renewed, and wire terminals tight, no trouble or changes in efficiency should arise.

C. J. C., Fort Worth.—I am in need of another automobile, and am thinking of an electric. What can you tell of the probable operating cost of a 5-passenger brougham?

The general reputation of the electric automobile permits us to say, that wherever employed they have proven most economical. To submit operating cost figures of a comparable nature is not possible since families as a rule do not keep itemized accounts of expenses. However, data in quantities is available from which conclusions may be drawn.

In considering the matter, two methods of keeping the car must be outlined. First, where the car is maintained in a private garage, a private charging set is installed and all the care is given by the family or the man about the premises, if one is employed, and repairs and adjustments are made by a local garage.

Second, when a public garage is dependent upon entirely, said garage rendering full service as to storing, washing, oiling, delivering, charging and making of repairs.

Naturally the expenses per month or per year on a car kept under the first plan averages much lower. This was true in the horse drawn vehicle days and is true with gasoline cars, and the expenses vary in proportion to the car’s use.

We have figures from one party whose total expense for three years averaged $18.00 per month. This included current for charging, tire upkeep, mechanical repairs, varnishing, incidental battery expense and sundry items. Another party reports $27.00 per month as his average for six years, and another gives $32 per month as his average. Another family tells of a $16 per month average, for a period of four years.

When one stops to consider the fact that feed only for one horse costs about $15.50 per month and other items bring his total cost to $22 to $26 per month, some real idea may be gained as to the real economy of the modern electric.

Under the second plan a fixed charge of $32 to $38 per month is made for the service and the tire, battery and paints expenses are extra. This service, however, is very high grade and comparable to the upkeep of a team and brougham or a gasoline limousine.

In the July issue of Electric Vehicles, on page 13, under the heading of G. B., Savannah, information is given which replies in part to your question.

Electric taxicabs cost less per hour to operate than those of the gasoline type and in their case data of a comparable nature is at hand.

C. A. L., Stockton.—In climbing hills with an electric automobile, which “speed” on the controller is best to use?

If your car was made within the last 4 or 5 years use your highest speed or last notch. The quicker the hill is negotiated the less is the amount of current drawn from the battery.

Crandall, Kokomo.—Does giving a battery a “hurry up” charge injure it?

“Boosting” a battery at a high rate does not harm just so long as the battery temperature does not rise above 100° to 105° Fah. or the gasing does not become too heavy.

Chinese Field for Electric Vehicles

No electric vehicles are now in use at Mukden, but a line of cheap vehicles, if properly introduced and well represented, would meet with a fair degree of success. Once a few were introduced, the way would be opened for further sales, is the opinion of Consul General Heinzelman of that city.

The main streets of Mukden are macadamized, as well as the two main roads leading to the South Manchuria Railway station, about 2 miles from the city. Owing to the heavy traffic, these thoroughfares are constantly out of repair, the chief damage resulting from the native two-wheeled carts. Probably the only fields in which electric vehicles could be successfully used here at present are the truck and passenger services. The Chinese Government maintains an electric-light plant here. A list of firms which would be interested in electric vehicles in the Mukden district may be obtained from the U.S. Bureau of Foreign and Domestic Commerce or its district offices. Refer to file No. 7949.

Eighty Miles of Mountain Climbing

A statement to the effect that the modern electric is a really practical car for touring through mountainous regions and rugged foothills is bound to excite unusual comment.

This statement in regard to the Millburn product comes from C. W. Trautman, who has had nine years of experience in the electric car business. Leaving the historic city of Hartford, Conn., one morning a few days ago, he drove in a Millburn Model 22 brougham to Manchester and Windsor, Conn., and then on to Springfield, Mass., where he spent a few hours. From Springfield he went to Holyoke and then on to Northampton. His total mileage for the entire trip, which was made on a single charge, was 79.8 miles.

To use Mr. Trautman’s own words, “the car never hesitated once and the trip was wonderful. I doubt very much if any other electric could equal the run under the same conditions,” he said. In the Berkshire district and especially from Springfield to Northampton, a distance of 19 miles, a great many steep grades were encountered, any one of which would have been a severe test for gasoline cars, it was said.

“We are continually receiving compliments with reference to its efficiency for touring purposes, but we were especially pleased with the letter from Mr. Trautman because of the hilly nature of the district where his trip was taken.”

Planning a Series of Trips

The Memphis subbranch of the Anderson Electric Car Company, manufacturers of the Detroit Electric, through their local agent, A. P. Clark, announces a series of country trips to take place within the next few weeks with the object of demonstrating that electrics are durable in long-distance runs.

“We intend to prove, conclusively, by these runs, that the electric is as good on cross-country trips as it is for city travel,” said Mr. Clark, “and thereby overcome the prejudice that has long endured, especially in the South.
PERSONAL NOTES.

The M. & M. Company, of Cleveland, Ohio, recently closed two large deals in the purchase of the entire business and stock of the Wright Wrench Co., of Canton, Ohio, and the Sprague-Waldo Manufacturing Company, Detroit, Mich. The former company makes wrenches and other tools, while the latter concern manufactures lamps. The Edison Storage Battery Company has established a new sales office at New Orleans and has appointed C. A. Luckey as resident manager.

Mr. Luckey is a graduate of Franklin Military Academy, Franklin, N. Y., 1899, and Bliss Electrical School, Washington, D. C., 1900-1901. He was connected with the Western Electric Company, New York City, during 1901-02, leaving there to go with the Safety Car Heating and Lighting Company, where he remained until 1911, spending the first four years in its electrical laboratory and then going to the Chicago branch.

In 1911 Mr. Luckey was with the Railway Utility Company, Chicago. In 1912 he joined the sales force of the Edison Storage Battery Company, Orange, N. J., and was attached to the sales office in Chicago, where he has been until his present appointment.

Mr. Luckey's new address will be Edison Storage Battery Supply Company, 201 Baronne street, New Orleans, La.

J. Harry Pieper, engineer of the department of illumination and electric vehicles of the Southern California Edison Company, died on Tuesday, July 11. Mr. Pieper was undoubtedly one of the most conspicuous and best beloved of the electrical men on the Coast. He gave himself unreservedly to the service of his company and his fellows in the industry, and his death will come as a shock to a host of friends and acquaintances. Mr. Pieper had taken a prominent part in the development of things electrical, was one of the organizers of the Southern California Section of the National Electric Light Association, a member of many other engineering, scientific and, civic organizations, a past president of the Jovian Electric League and past president of the Advertising Club of Los Angeles.

Paul V. Hobart, formerly of the Hearst newspaper forces, and lately assistant editor to Mr. Seymour on the Electric City Magazine at Chicago, has resigned to accept the editorship of the Stewart-Warner Speedometer Corporation at Chicago. Mr. Hobart will have full charge, and his many friends will be glad to hear of his advancement.

Mr. Hobart's experience both as a salesman and practical automobile man should stand him in good stead in his work among the users of the Stewart Warner accessories, which the Lever will reach.

Richardson's Brothers Motor Supply Company have taken the Ventura, California, service station for Willard Storage Batteries. Their location is at Chestnut and Santa Clara streets.

C. F. Ball and J. E. Ball of Springfield, Illinois, have opened a garage at 327-329 North Sixth street and will specialize in electric and battery work. Accessories will also be carried.

H. Vanderbeck, chief engineer of the Timken Roller Bearing Company, Canton, Ohio, has severed his connection. His successor has not been appointed.

W. M. Nones was elected president and treasurer of the Norman Company of America at the annual meeting of the company at its headquarters in New York City. Prior to this Mr. Nones was secretary-treasurer, as well as general manager of the company. In this new position he will continue to direct the general management of the company, which has grown from a small import business to a commanding position among the American manufacturers of ball, roller, thrust and combination bearings.

A. J. Adams, formerly an engineer with the General Electric Company, has opened a repair shop at Lafayette and Lazell streets, Columbus, Ohio, under the name of the Adams Auto Electric Service Company. He will specialize on the repair of electric systems on automobiles.

The Ward Leonard Electric Company has moved into its new building, Mount Vernon, N. Y. The need of more space for labor operations was the reason for the company moving from Bronxville. The floor space has been increased approximately 50 per cent.

A few changes have recently been made in the organization of the Chicago branch of the Anderson Electric Car Company. D. E. Whipple remains general manager, J. P. O'Brien will be his assistant. B. E. Adams is now the general salesman, with George Veeder the Chicago salesman and C. W. Long the traveling salesman.

Edison Storage Battery Company, Orange, N. J., has issued a 32-page booklet, "On the Firing Line with Battery Bill," which is a collection of illustrated letters supposed to have been written home from the "road," by W. Alkaline Battery, this company's unique salesman, telling of his experiences in selling Edison batteries to President X and other officers and men down the line of the X, Y & Z Railroad. Written in a humorous style, the booklet is a departure from "ordinary" advertising and contains a large fund of valuable battery information.

The Anderson Electric Car Co., will hold a sales convention in Detroit, August 21, 22, 23. All their dealers and salesmen in the United States will attend.

J. E. Erickson has joined the sales organization of the Packard Electric Company, Warren, Ohio, and will cover the territory formerly in charge of Benjamin Smith, who retires. Mr. Erickson's experience in the electrical field dates back to 1903, when he entered the employ of the Boston-Edison Company. He next entered the engineering department of the Condit Electric Manufacturing Company of Boston. After that he was transferred to Chicago as agent for the company. Two years later he took charge of the Cleveland office of the company and then resigned to go with the Cleveland office of the Western Electric Company, from which position he comes to the Packard Electric Company.

H. H. Replogle has been made manager of sales for the Marathon Tire and Rubber Company, and now makes his headquarters at the home office in Cuyahoga Falls, Ohio. He was formerly manager of the company's branch in Omaha, Neb., where he has been succeeded by G. R. Howell, who has been representing the company in Iowa.
The demand for this “best built Electric in America” testifies to its superior workmanship, satisfactory service and enduring qualities.

Those well-informed people who select their every need with such unerringly judgment are those who choose the Chicago Electric.

Walker Vehicle Company
CHICAGO

Chicago Salesroom
2700 Michigan Avenue
Telephone Calumet 3000

Evanston Branch
1017 Davis Street
Telephone Evanston 481

Volkcar
Storage Batteries
Are Installed by the Largest
Electric Car Manufacturers
in the World, in their Cars
Sold in Chicago
and Suburbs
For Further Information
Ask the Users
or
Volkcar Storage Battery Company
2437-39 Michigan Avenue
CHICAGO, ILLINOIS

A Subscription to Electric Vehicles Helps to Solve Your Selling Problems

Send along the name of your prospect, and with the first copy of ELECTRIC VEHICLES will be sent a card telling that it comes from you and will be a visitor for a year, a monthly reminder of your good will and friendly interest.

If you have one prospect the cost will be one dollar and fifty cents.

One lucky dealer with twenty prospects sent his entire list.

He sold sixteen of them!

Electricity Magazine Corporation
MONADNOCK BUILDING
CHICAGO, ILL.
Unquestionably the finest specimen of the coachmaker's art ever produced.

A combination of good taste, elegance and individuality—designed and built to supply a discriminating demand only.

A car that when seen on the boulevards or where society congregates does not remind you of any other.

THE OHIO ELECTRIC CAR CO.

TOLEDO, OHIO

Chicago Branch, 2634 Michigan Ave., Chicago, Ill.
Kansas City Branch, 3324 Main St., Kansas City, Mo.
While the cost of gasoline increases the cost of electric current decreases

Detroit Electric

Men are turning to the Detroit Electric

In these days of excessive gasoline prices more and more men are awaking to the extravagance of the gasoline-powered automobile. They are turning to such cars as the Detroit Electric with its low current cost as the logical and practical motor car.

They have found that the same mileage per month with a Detroit Electric costs only one-third as much as with a gas car. Cost of current for battery charging is now about $7 per month and will be lower before long.

In years past most men believed their ideal to be a big, heavy motor car with super-speed.

But the reign of such cars is past. And now the quality most highly prized is smoothness of power-flow—with of course sane speed. So naturally more and more men are coming to such a car as the Detroit Electric.

They do this because the Detroit Electric is smooth-running and flexible. It is free from vibration and economical on tires. It avoids changing gears in slow-moving traffic or in mounting steep grades. Its general appearance is conservative and high class.

To these qualities the Detroit Electric adds another that is of paramount importance today—operative economy. So well is the Detroit Electric built that in the matter of repairs, replacements and adjustments it saves 30 to 50%.

The strong claims for Detroit Electric performance are easily proved by a practical road demonstration.

Remember the Detroit Electric is a quality car at a moderate price

Anderson Electric Car Company
Detroit Michigan
Branches at New York City, Chicago and Kansas City.
The Greatest Electric Success Ever Known

The electric is more popular now than ever before—and this newest Milburn—a larger, roomier Milburn—is sweeping everything before it.

For almost every service now demanded of automobiles the Electric serves best.

And the lightness, speed, ease of control and great mileage per charge, of this newest Milburn, make it pre-eminently the car to own.

No other Electric is anywhere near so light.

Established 1848

THE MILBURN WAGON COMPANY

Automobile Division

Toledo, Ohio

DEALERS—The great success of the Milburn makes it the profitable electric for you to handle. If we are not represented in your city write us at once—we'll show you a money making proposition

No other car of any kind is anywhere near so easy to handle.
No other car is so inexpensive to operate.
No other car has such an air of elegance.
And with all its advantages it is by far the lowest priced Electric—there is nothing to be had within $500 of its price.
There are Milburn dealers in all principal cities—see the nearest one.
Write for catalogue—and for nearest dealer's name and address if desired.
G. L. B. Batteries are the composite of all the good points of all standards in battery construction.

That is why they are in demand by electric car users who by experience know that new battery designs are not safe investments.

Instead of experimenting on freak, radical, battery construction, the G. L. B. Company puts its effort and money in improving the standards.

That is why the G. L. B. Batteries stand the test of time, the requirements of mileage and eliminate worry for the seller, dealer and user.

When your car is equipped with a G. L. B. Battery you know you will reach your destination.

The "Titan" plates make you doubly secure.

Not only does the G. L. B. battery propel electric cars, but it is in use on all kinds of gas cars, it lights trains as well as country homes.

The G. L. B. trademark is the hall mark of everything good in the battery line. You can buy on the trade mark without further investigation.

The battery is the most important part of the electric pleasure car and truck.

Always demand a G. L. B. when purchasing an electric vehicle. When you have trouble with another make of battery, try the G. L. B.
A New Battery Charging Set

This new motor-generator set for charging lighting and ignition batteries is complete with switchboard control and instruments. The very little space occupied by these sets appeals to garages and to car owners with limited accommodation. The 250 watt set for instance is only 18"x10½"x21" overall. Another big appeal is the variety and number of batteries that can be charged at the same time. By simply turning the control handle the following combinations are possible:

<table>
<thead>
<tr>
<th>Charging One 6V. Battery.</th>
<th>Charging One 6V. and one 12 V. Battery.</th>
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<tbody>
<tr>
<td>&quot; 12V. &quot;</td>
<td>&quot; Two 6V. Batteries.</td>
</tr>
<tr>
<td>&quot; 18V. &quot;</td>
<td>&quot; Three 6V. Batteries.</td>
</tr>
<tr>
<td>&quot; 24V. &quot;</td>
<td>&quot; Two 6V. and one 12 V. Battery.</td>
</tr>
<tr>
<td>&quot; Two 6V. Batteries.</td>
<td>&quot; Four 6V. Batteries.</td>
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<tr>
<td>&quot; 12V. &quot;</td>
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During the coming winter months lighting and ignition batteries need more frequent boosting to overcome the effects of cold weather on engine and batteries and the insufficient charging of batteries through the generator because of short runs.

There is not only a good profit in the sale of these sets but worth-while income in the sale of current in the late hours of the night, when charging is done. Co-operate with our local offices and the salesmen of automobile supply houses. Making a profit in "dead" night hours is good business for you. Send for descriptive folders and literature on Fort Wayne Motor Generator Sets.

General Electric Company

For Home Charging

For Michigan business refer to General Electric Company of Michigan, Detroit.

For Texas, Oklahoma and Arizona business refer to Southwest General Electric Company (formerly Hobson Electric Co.), Dallas, El Paso, Houston and Oklahoma City. For Canadian business refer to Canadian General Electric Company, Ltd., Toronto, Ont.
The Anderson Electric Car Company, of Detroit, Mich., builder of the Detroit Electric, has made the first 1917 trade announcement, sensational in its character because it cuts the price of a Detroit $500 under the lowest price model heretofore built as standard by the company.

Model 68, which the company lists at $1,775, as against the 1916 price of $2,275, is a three-passenger cabriolet, with all the features for which the Detroit is noted. The cut in price has been made without affecting the quality or durability of the car in any manner, the only reservation of the company being that the car must be purchased "as is," meaning that the purchaser has no choice as to upholstery.

In considering a cut of practically 25 per cent from the former list price of the car the company officials decided that they could stand the heavy reduction in cost to the user provided all cars could be sold from stock without extra labor in changing upholstery styles and in making minor changes, so often demanded by users.

Model 68 will be run through the factory in very large lots and the run will continue until the demand, which is approximated at several thousand for the coming season, is absolutely supplied. Beginning about November 1, it is expected that deliveries will be made without delay in order to satisfy the demands of persons who realize that the electric is the only car able to stand up and be ready for constant use under the rigors of the winter.

The new model has a wheel-base of 100 inches and will be equipped with Houk wire wheels only. The tread is 56 inches, the standard, and the battery is a 42-cell 13-plate. Either Goodyear or Goodrich cord pneumatic tires (33x4½ inches, will be supplied. The weight is 3,100 pounds.

The body decoration will be of deep blue with a light blue stripe with the color of the wheels optional, white, cream, red or blue.

Whipcord only will be used in the upholstery, with a choice of No. 87 or No. 88 cloths in the 1917 sample book.

A maximum speed of from 22 to 23 miles an hour is guaranteed with a touring radius from 60 to 90 miles.

The body has all the features of the higher priced Detroit Electric. In summer weather the windows may be lowered, affording all the pleasures of an open car, with plenty of ventilation but with an aluminum air cushion top, which prevents heat penetration as in a solid top. In cold and inclement weather the windows may be raised, affording complete protection against either rain or snow. The door windows are sashless and may be raised or lowered by a patent window lifter. The tops of the doors are provided with rain drop protectors.

Three persons may ride comfortably on the rear seat, which is 49 inches wide, with a depth of 18 inches. A fourth person may occupy the revolving chair in the front right corner. An upholstered package box occupies the left front corner. This also may be utilized as a seat, making the cabriolet a comfortable five-passenger car.

The depth from the front to the rear windows is 63½ inches and from the top of the cushion to the roof is 40 inches, with door openings of 24 inches. The over-all measurements are height, 72 inches; width, 67 inches, length, 144 inches.
In making the large cut in price, the Anderson Electric Car Company feels that it has placed the Detroit Electric in the class of "popular automobiles" and through the marketing of Model 68 has eliminated for all time, the charge that the electric is essentially "the rich man's car."

The higher priced models with all the luxurious trimmings and fixings will be manufactured for the purpose of catering to the wishes of the more fastidious and to supply the wants of the persons who demand "something different" in the design and interior fittings of electric automobiles.

It is the contention of the Anderson Electric Car Company that the $1,775 Detroit Electric is within the financial means of practically every man who has an income of $3,000 a year or more, which increases the list of prospective purchasers to enormous figures.

In discussing this phase of the situation it was pointed out that the $1,775 Detroit Electric, from a purely financial standpoint, is a much more economical purchase than gas cars which list up to $1,300, notwithstanding the $475 extra outlay on the initial purchase. This extra $475 will be saved in the difference in upkeep between the electric and the gas car, the former simply needing recharging and a small charge off for wear on tires while the expense on the gas car consists of gasoline and oil expense and a very heavy tire depreciation, besides constant repairs on the lower priced gas cars. The repairs are too numerous to enumerate but it is an acknowledged fact that many of the low priced gas cars wear so badly during their first season in use that they only are fit for the junk heap in the second season.

The cut in price on Model 68 is considered remarkable in the face of the rapidly increasing cost of materials, one of the largest factors of which is aluminum, of which the Anderson Electric Car Company is a larger user than any other organization in the entire automobile field.

The announcement of the $1,775 price also comes as a surprise in view of the fact that on June 7 last the Anderson Electric Car Company announced an increase in price of $100, boosting the price of its $2,175 model to $2,275.

Some time ago the Anderson Electric Car Company marketed a car listing at $1,975, but withdrew the model from the market after a short time. This was necessary until the factory could purchase in immense quantities, which it has been able to do within the last few weeks.

W. D. Anderson, president of the company, has announced that within the last few months the company has purchased material to the value of approximately $1,500,000, nearly all of which has been delivered and nearly all of which, it is anticipated, will be put in Model 68.

Where He Found It

An enterprising motor car dealer was paying his fourth visit to the store of his non-advertising competitor, and on each occasion he had remained two hours apparently doing nothing, not even noticing the cars. Finally the head of the garage and salesrooms he was visiting approached him to demand the reason for his visits.

"I hope you won't mind," said the visitor. "My doctor prescribed absolute quiet for two hours after lunch each day, and so I came here."

A. I. E. E. Standards for Electric-Vehicle Motors

The following additions to the Standardization Rules of the American Institute of Electrical Engineers were recently approved by that Society. Sections 835 to 839 will be inserted in the A. I. E. E. Standardization Rules under the heading Electric Locomotives.

283. Nominal Ratings. For railway motors and sometimes for railway substation machinery, certain nominal ratings are employed. Nominal ratings for automobile propulsion motors and generators are not recommended. See Section 837.

RATING OF AUTOMOBILE PROPULSION MOTORS AND GENERATORS

(Road Vehicles)

835. Continuous Rating. Automobile propulsion motors and generators shall be given a continuous rating, expressed in kilowatts output available at the shaft at specified speed. The machines shall be able to operate continuously at their rated outputs without exceeding any of the limitations referred to in Section 260. (This section gives various factors, such as operating temperatures, mechanical and electrical strength, commutation and efficiency, for which the Institute has established limitations governing the specifications for electrical machinery.)

836. Short-Time Rating. Owing to the variety of services which road vehicles are called upon to perform, no single standard period for short-time ratings is recommended.

837. Nominal Rating. No special nominal rating is required for automobile propulsion motors or generators.

838. Temperature Rises. Owing to space limitations and the cost of carrying dead weight on automobiles, it is considered good practice to operate the propulsion machinery at higher temperatures than would be advisable in stationary machines. The rating of automobile motors and generators shall be based upon temperature rise, on a stand test and with motor covers arranged as in service, 15 deg. C. by thermometer or 25 deg. by resistance, above those of Section 379. (This section gives permissible temperatures for a number of different operating conditions.)

839. Efficiency and Losses. Unless otherwise specified the efficiency of automobile propulsion machines shall be based upon the output at the shaft, using conventional losses as tabulated in Section 440. (Gives a list of load and no-load losses for direct-current commutating motors and generators.) When such machines are of low voltage, the great influence of brush-contact losses on the efficiency requires that these losses be determined experimentally for the type of brush used.

Exportations Barred from France

The French government has just followed and bettered the example of the English government by totally barring all importations of motor cars either complete or chassis with or without motors. No official explanation has been made of this sudden change of heart but it is said to be the preliminaries to a possible peace, to enable the French manufacturers to take care of the market when the time comes. It is thought, however, that Officials will say it was necessary to secure more space in vessels for munitions, when bound for France,
The Remarkable Performance of Electric Trucks

The Advantages of Four Wheel Independent Motor Drive in Climbing Hills and Running Through Snow

The use of the electric vehicle until the last five years has been largely restricted to cities where the road conditions are in general good as compared with the country districts. Furthermore, until recently, electric vehicles have not been used to any great extent in hilly cities, and they still find their greatest field of usefulness in cities which are fairly flat such as New York, Chicago, Philadelphia and Cleveland.

Those who have made a study of the conditions recognize that the limited mileage of the electric and the difficulty of getting a charge as compared with the ease with which gasoline can be obtained, make the electric primarily a car for city and suburban service. Furthermore the slow speeds of the heavy truck on hills is sometimes a valid objection to its use.*

The public however only sees that the electric vehicle is not generally used where roads are bad or where hills are steep and it is not unnatural that the popular conclusion should be, that the electric is no hill climber and cannot successfully run over bad roads. Now this is all wrong. It should be frankly admitted that bad roads cut down the mileage of the electric vehicle and that steep hills reduce its speed, but it can be confidently asserted, and it is the design of this article to show, that a properly designed electric can climb hills and run through mud, sand and snow which would stall any gas car short of a powerful tractor.

A rather amusing incident illustrates the popular misconception of the relative merits of gasoline and electric vehicles as hill climbers.

The driver of a four-wheel drive C. T. electric owned by Reeves, Parvin & Company of Philadelphia was approaching a hill (of about 17 per cent grade) when he was hailed by the driver of a powerful high priced gasoline truck of a widely advertised make with the remark that he had been trying unsuccessfully for two hours to negotiate that hill and it was therefore useless for the electric to attempt it. The driver of the electric, somewhat piqued by the slur on his vehicle, offered to pull the gas car up the hill. After some of that conversation in which truck drivers are supposed to be particularly proficient, a rope was produced and the electric towed the other car up the hill. The electric truck had a rated capacity of 5 tons, but was at this time carrying 7 tons or a 40 per cent overload.

In this connection it is interesting to note that the total rated motor capacity of this electric vehicle was 7 H. P., while that of the gas car was not far short of 50 H. P.

In the August issue of Electric Vehicles mention was made of the record of electrically propelled fire apparatus in a hill climbing contest at Paterson, N. J.

The tests were made on "Temple Hill" which has a grade of 18.23%. In addition to the grade the apparatus was further handicapped by the pavement of cobblestones which afforded very poor traction. Two pieces of four-wheel drive electrically propelled fire apparatus manufactured at Philadelphia by the Commercial Truck Co. of America, starting from a standstill at the foot of the hill ascended the grade in 1 minute and 13 seconds and 1 minute and 19 seconds respectively. The best previous record for this hill, 1 minute and 40 seconds, was made by a gasoline driven machine.

In addition to the above test this apparatus reduced the record time for another hill in Paterson, also over 18 per cent grade, from 2 minutes to 1 minute 14½ seconds.

Still another test was made. This consisted in bringing the apparatus to a dead stop on "Temple Hill" and then running on to the top. In this connection the following remarks of the chairman of the committee in charge of the tests is interesting:

"We consider this a remarkable feat, and one which it would be impossible to duplicate with any other motor driven apparatus with which we are familiar, especially in view of the ease and promptness with which the wagon started from a dead stop, and the speed which is quickly

*High speed in trucks engaged in carrying stuff of loose and coarse nature, such as crush stone, brick, coal, rough castings and the like, has proved so wearing and conducive of rapid depreciation that all the high grade gas trucks are fitting governors to limit the speed to 12 miles per hour or 20.

The Theo. Fishenhauser Truck Plugging Right Along in the Drift.

Electric Ascending a 17 Per Cent Grade Covered with Snow.
accelerated to in spite of the tremendous grade."

Another remarkable hill climbing performance is shown in the accompanying illustration. A five ton C. T. electric truck owned by the Bernheimer & Schwartz Pilsner Brewing Co. was tested on the 35 per cent grade back of its brewery in New York City. The truck, loaded to capacity, started from a standstill at the foot of the grade and easily made the ascent. No tire chains were used. A number of prominent makes of gasoline trucks have tried unsuccessfully to duplicate this performance.

In 1914 the City of Philadelphia was visited by a severe blizzard, the worst part of which occurred from about the middle of February through the first week in March.

From February 22 to March 8, 1914, the Curtis Publishing Co. had what was up until that time the biggest two weeks in its history. It was then doing all of its hauling with nine C. T. electric trucks which had been purchased to handle a maximum of 400 tons per day. During these two weeks of heavy snow they averaged 485 tons per day and on March 2, when the blizzard reached its highest point, they handled 462 tons.

From February 13 to March 8, 1914, in the midst of the blizzard, the Theodore Finkenauer Brewing Co. using an equipment of C. T. electrics made all its deliveries on schedule, not only carrying full loads but many overloads as high as 35 per cent over rated capacity. No tire chains were used.

This blizzard furnished many other instances of the superiority of the electric over horse drawn or gasoline propelled vehicles. The Philadelphia North American found its regular equipment entirely inadequate and was only enabled to make its deliveries by borrowing electrics; the Philadelphia fire department and a prominent brewer tell of using electrics to tow other apparatus stuck in the snow; etc.

These performances may be principally attributed to two causes:

First: The great torque which the electric motor is capable of delivering.

Second: The well known flexibility of the electric drive which permits of applying a separate motor to each wheel. All of the electric vehicles mentioned in this article were so designed. By this arrangement each wheel constitutes an independent propelling unit and if one wheel slips the traction of the others is not thereby reduced. It is manifestly impractical to apply a separate engine to each wheel of a gasoline car and the attempts to obtain the same results by means of specially designed differentials have not, so far, offered such results as to warrant a prophesy that the gas car can ever hope successfully to compete with a well designed electric in hill climbing or pulling through heavy snow or sand.

**Milburn Forced to Add New Building**

The Milburn Wagon Company, of Toledo, Ohio, builders of the Milburn Electric, in order to handle an ever increasing trade, has leased the large plant formerly occupied by The Toledo Bending Company in Toledo, and will use it as a branch factory. The Milburn Company is already transferring its business wagon department to the new branch and it will also use its new quarters for the building of custom made automobile bodies. Thoroughly modern mechanical equipment is being installed in this new plant and the branch will, it is stated, be under the general management of Emil J. Seeman, who for forty years has been intimately connected with the affairs of the Milburn Wagon Company.

The rapid expansion of the electric vehicle department of the Milburn Company is said to have been directly responsible for the opening of a branch factory. While the entire business wagon department is transferred to the new quarters, the farm wagon manufacturing will remain at the old plant.

"Our plant was simply getting too small and we didn't have sufficient room to enable us to fill the orders as fast as they came in—that is why we are starting a branch factory," said H. W. Suydam, president of the Milburn Wagon Company. "For a long time we have had repeated orders for custom made automobile bodies, but we had to decline them because they would interfere with our routine business which has kept our men going the limit. In our new plant the company will be able to take care of all that business which it has been compelled to decline in the past.

"Mr. Seeman, who takes full charge of the branch factory, was selected for that position especially because he is better acquainted with high class automobile body construction than any other man of whom we know. Our custom made body business necessitated the selection of an expert body man for the work."

The Milburn officials expect that operations will be started in its new factory within a few days.

**A New Use for Old Electrics**

Owing to the increased business and the prospects of it continually increasing, the Electric Truck Service Company of Salt Lake City, Utah, of which George B. Turner is manager, has pressed into service a new electric service car. The car is not only for hurry-up calls for autoists wanting repair work on batteries, generators and the like, but is also to work for any kind of an electric motor or other appliance needing assistance.

The car is an old pleasure electric overhauled and repaired and a new delivery body fitted. It so struck the popular fancy of the town that it has been dubbed Cleopatra and even got its picture in the local papers.

The company is located at 55 South Second East street and is the local agency for Exide batteries.
The Full Constant Potential Method

For Recharging Storage Batteries

For a long time the attention of electrical engineers in the storage battery field has been centered on a method of recharging these batteries in such manner that there could be no injury from gassing or over heating.

As a result, two successful methods have been developed by the General Electric Company. One is called the “Full Constant Potential Method” and is used to charge a number of batteries either in succession or at the same time. The other is the “Individual Battery Charging Set” for the use that its name implies.

To appreciate the reasons for these methods and their advantages, a description of what takes place in a storage battery during the charging and discharging periods is helpful.

Analysis of the state of a storage battery, when charged, shows that the positive plate contains peroxide of lead and the negative plate is metallic lead in its spongy form, while the electrolyte or liquid is sulphuric acid at its highest specific gravity (1.280). If the battery is now discharged to the normal limit, we find that a large proportion of the peroxide of lead has become lead sulphate through the action of the sulphuric acid. The spongy metallic lead plate too now carries lead sulphate and the specific gravity of the sulphuric acid has dropped to about 1.170. The liquid left is almost water with few of the original characteristics of the acid left. It loses its identity through creation of the sulphates by electrolytic action.

When the battery reaches this stage it should be charged by the application of “direct” current properly adjusted as to voltage, for some hours depending on how much current was drawn from it.

About every fifth or sixth recharge, the battery should be given a scouring or finishing charge (not to be confused with the “finishing” rate described hereafter), at a low rate with a gradually increasing voltage to bring the electrolyte up to its full specific gravity of 1.280, approximately, and to remove all traces of the sulphates, approximately, and to remove all traces of the sulphates, and the like.

The chemical processes of recharging, in the words of chemistry “break up” the lead sulphate on the positive and negative plates and leave the plates in their original forms of peroxide of lead and spongy metallic lead, respectively, while the liquid resumes the original specific gravity and characteristics of sulphuric acid. The voltage across the battery terminals, too, rises along with the gravity of the electrolyte.

It is at this point, when the lead sulphate has changed form, that the special
regulating devices that make possible the “Full Constant Potential” and “Individual Vehicle Charging Set” methods, prove their efficiency because if the “finishing” rate of the current is too high or the current continues to run after all the lead sulphate has disappeared the current will act on the water in the electrolyte and “break it up,” generating heat and liberating the hydrogen and oxygen gases. If continued, the result is ruination of the battery or batteries. This possibility is avoided by the “Full Constant Potential Method” which is based on maintaining the voltage at the terminals of the battery at not more than 2.3 volts per cell. On what is commercially known as a completely discharged battery (with the normal charge extracted), the application of 2.3 volts per cell will deliver current to that battery at about five times the normal rate to start. This current value will fall rapidly from the natural characteristics of the storage battery as the charge therein builds up, until at the end of 3½ to 4 hours the rate has dropped to about 10 amperes or under, which is approximately the “finishing” rate.

As to the maximum charging rate permissible, one of the leading battery manufacturers gives the following rule: “The charging rate in amperes must never exceed the ampere-hours out of the battery. Any method of charging that keeps the charging current within this limit will not over-heat the battery or cause it to gas. In applying this rule it is not necessary to reduce the charging rate below the “finishing” rate recommended by the battery manufacturers. If an ampere-hour meter is used on the vehicle so arranged as to indicate the ampere-hours out of the battery it will also indicate at all times the maximum permissible charging rate. It will be noted that the maximum charging rates are no longer a function of the size of the battery or its relative state of discharge, but depend only on the actual state of discharge.”

A TD voltage regulator is necessary to prevent the voltage at the terminals rising above 2.3 volts per cell with the attending strong possibilities of heating or gassing, in that event. In case the amperage falls below the proper level the automatic switch illustrated in Fig. 2 in the lower left panel will open and interrupt the current. It will open too if the current fails, preventing flow of current from the batteries, and in case the polarity is wrong at any state of charging.

This switch is especially devised for use with the other coils from the bus bars. If the bus bars and battery are in correct polarity, the automatic switch will close, due to the proper coils working in conjunction and the charge proceed at the lowest rate permitted by the resistance of the rheostat. This rate can be regulated to meet battery conditions, by cutting out resistance, as with any series rheostat.

If the bus bars and battery are in opposed polarity, the coils of the automatic switch are in opposition, and no movement of the rheostate blade or any other part of the control apparatus, except tampering with the automatic switch, will cause it to close. The charge cannot proceed until the battery connections are reversed, to correspond with the bus bars and the coils are brought into conjunction, when the operation will proceed as
outlined above.

These automatic switches are suited equally to Edison or lead batteries and are for constant current, constant potential or boosting charges.

It is characteristic of the automatic switches illustrated in both Figures 2 and 4 used with these methods that current cannot pass through zero after the charge is started. The 40-amperere switch will open when the current value drops to 4 amperes or below and the 100-amperere switch will open at 8 amperes or below.

The current ratings are for normal continuous service and the switches are capable of handling considerable overloads as obtained in "Constant Potential Charging," etc., for short periods of time without over-heating or other injury.

Any interruption of the continuous flow of current into the battery will cause the automatic switch to open. As these circuits are arranged, the complete starting cycle must be repeated to make the automatic switch close again. (It is not necessary to disturb the plug if it is properly inserted in the vehicle.)

This is the most complete battery protection obtainable, because it refuses to close the circuit if the polarity is wrong. It will open the circuit should the polarity be reversed during charge. It refuses to allow the battery to discharge into the bus bars or other batteries in case of failure of the charging supply. Its action is very positive and quick. Its glass case makes it practically dust proof and it can be sealed as a meter is sealed, making it tamper-proof. It is always on duty.

In fact all the provisions of "Safety First" as regards battery protection are present at all times. If all conditions are not right the switch will not close. This especially valuable feature does away with breaking of abnormal current values.

For the installation of this necessary control in garages and charging stations, standard sections for switchboards have been devised, that permit prompt shipment, flexibility and ready assembly in the form of a good looking and symmetrical installation. Fig. 2, 5, 6 show types of standard switchboards for both public and private garages. A uniform panel width of 20" for single-throw switches and 28" for double-throw (circuit for three wire service or two sets of bus bars) has been adopted as far as possible. All sections are 12" or multiples of 12" in height.

Where series rheostats are required on the circuits they are usually of the cast grid type supported by the same brackets which attach the slats to the support framework. This permits assembled shipment for each circuit and minimizes the number of connections to be made in setting up. Liberal air space is provided around the grids, wiring and bus work. This is important because the rheostat should be worked at a relatively high temperature to be effective and the heat should not be confined.

There are few if any automatic devices except for the over-load and reverse currents, circuit breakers, the TD voltage regulators and such devices but there are of course installations where further automatic control is desirable and the necessary equipment can be added to the board.

It is apparent that the "Full Constant Potential Method" of battery charging is really for use with a number of electrical vehicles or where numerous batteries are to be charged frequently. It would not be economical to attempt to charge but one vehicle from a motor-generator set large enough to take care of the first rush of current. Therefore the "Individual Vehicle Charging Set" has been developed. It approaches as near as possible to the "Constant Potential Method" and keeps within a reasonable "first cost" for equipment. The set is not automatic in the sense that it starts and stops itself but it is automatic in the manner of reducing the current and raising the generator voltage as the charge of the battery progresses.

The batteries usually have stamped on the jars a starting and a "finishing" rate; for example, an 11-plate MV "Hycap" will start at 24 amperes and finish at 10. This is the old method of marking. If the battery is completely discharged, it is therefore economical to start the rate at about 35 amperes or perhaps 40, provided the current falls off as the voltage of the battery increases so that at the end of the charge the flow is down to about 7 amperes. It is generally agreed that if this condition is arranged correctly, the battery will not overheat nor gas violently and the charge will be completed in from 8 to 10 hours. The condition of complete charge is best determined by a hydrometer and each cell should show a specific gravity of 1.290 or the battery company's recommendation for that particular battery. The voltage of the battery will approximate 2.65 volts per cell and can be quite stationary. The voltage must be taken while the battery is under charge as the voltage readings taken with the battery on open circuit are of no value whatever.

The voltage is highest at the last part of the charge, hence current flow must be kept low and of a steadily decreasing value. The rough rule is given that the current values toward the end of the charge should not be greater than 1.4 times the number of positive plates, e.g., in a 13-plate cell (13-1), divided by 2 and multiplied by 1.4 which equals 8.4 amperes. A current flow not
greater than this value on a 13-plate battery may continue almost indefinitely without injury to the battery. This shows the importance of getting the proper taper on an automatic charging set and the necessity of calling for

Charging Instructions furnished with the batteries should be carefully followed.

The G-E set with its wall cabinet referred to above has been passed by the Underwriters' Laboratories as acceptable to the National Board of Fire Underwriters.

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**Fig. 6. Control Board for Eight Circuits, One Extra Heavy.**

an exact description of the particular battery to be charged by such a set.

Over-night charging may be accomplished easily if the operator starts the charge about 10 or 11 o'clock p.m. and the batteries will be very well charged by 7 to 9 o'clock the next morning, provided there has been no interruption in the A.C. supply. If it should fail during the night practically no harm will result as the set will continue to run in the proper direction but will draw from 2 to 5 amperes from the battery and when the power comes back on the line it will immediately pick up the charge again and continue it. If the battery is discharged (technically speaking) but still retains sufficient energy to move the vehicle under its own power, there will be sufficient power in the battery to run the set reversed, that is at a discharge of 2 to 3 amperes, for so many hours that there is really no danger of injuring the battery so long as provision is made to charge the battery promptly after this abnormal discharge is discovered.

In the matter of voltmeter and ammeter, the better type of vehicles are usually equipped with these instruments hence it is not often necessary to furnish these instruments with the charging set. They can be made part of the wall set, however. Ordinarily, the meters on the car serve every purpose in this connection and they should always be consulted, especially the ammeter, to see that the current is flowing in the right direction to charge before the set is left running for any length of time. The

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**An Unique Electric Vehicle Boat**

Considerable difficulty has been experienced in the New York Coast Artillery armories in obtaining a target which would move on the armory floors at a uniform rate of speed slow enough to permit of a good track on the plotting boards.

In order to solve this difficulty Lt.-Col. W. Irving Taylor, C. A. C., N. G., N. Y., built the miniature electric harbor boat shown on the accompanying illustrations. This boat has been used for the past year with satisfactory results and is described in the July-August number of the United States Artillery Journal.

The apparatus permits of a towing speed simulating upon the scale of the armories and plotting boards constructed for use therein, a maximum actual speed of about eighteen knots per hour. By means of the control lever, three variations of speed ahead, and two variations astern can be had. As the speed is uniform in rate it becomes possible to have vessel tracking drills of practical value.

The apparatus is steered by hand and so may be made to travel in any direction upon the floor. It thus permits of drills in tug direction, the movements of the vessel may be controlled from the Armory Fort Signal Station and thus furnish practice for the signal details in all the authorized methods of signalling.

Power is furnished by ten Edison storage cells Type B-4, which have a capacity of 80 amperes at 12 volts, good for 3½ hours at 20 amperes discharge.

The driving apparatus consists of a General Electric Company's vehicle type motor rated at 12 volts, 11 amperes at 800 r. p. m.

The power controller acts as a combined pole charging switch and rheostat. In the horizontal position of the lever shown the power is off. Raising the lever one notch puts the motor on slow speed ahead, so the next notch on intermediate and third on high. By depressing

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**Lt.-Col. Taylor's Yag and Its Chassis on the Armory Floor.**

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**Successful Spanish Automobile Agency**

A Malaga firm which undertook the agency for two makes of American automobiles, also motorcycles and automobile oil, as the result of information supplied by the United States consulate in that Spanish port, has already sold nine cars and three motorcycles and thirty barrels of oil totaling $12,665.
Trackless Transportation
As Developed by Industrial Railway Specialists

The construction principles of the Electromobile having proved themselves absolutely correct, the Orenstein-Arthur Koppel Company obtained the manufacturing and sales rights from the Electromobile Company in the spring of 1915.

Applying specialized knowledge to the Electromobile Company’s design (patents for which have been granted in the United States and England), and working in collaboration with that company, the Orenstein-Arthur Koppel Company has worked out various types and sizes of the Electromobile to meet every conceivable condition.

The Electromobile has proved itself out in railroad freight stations, steamship piers, wire mills, enameling and stamping works, chemical plants, brick yards, lumber yards, stock yards, steel mills, tobacco companies, wholesale hardware houses, department stores, etc., where rapid trucking work is desirable.

The following table will give an idea of the wide range covered by the Electromobile:

<table>
<thead>
<tr>
<th>TYPE</th>
<th>SERVICE</th>
<th>CARRYING</th>
<th>TRACTIVE</th>
<th>SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>“A”</td>
<td>Industrial</td>
<td>3,000 lbs.</td>
<td>10,000 lbs.</td>
<td>5 miles per hour</td>
</tr>
<tr>
<td>“B”</td>
<td>Yard</td>
<td>3,000</td>
<td>10,000</td>
<td>7</td>
</tr>
<tr>
<td>“C”</td>
<td>Railroad</td>
<td>4,000</td>
<td>10,000</td>
<td>5</td>
</tr>
<tr>
<td>“D”</td>
<td>Steamship</td>
<td>4,000</td>
<td>10,000</td>
<td>7</td>
</tr>
<tr>
<td>“E”</td>
<td>Tractor</td>
<td>15,000</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>“F”</td>
<td>Track</td>
<td>12,000</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

Each of these six types is subdivided into sizes to suit varying lengths of haul and height of platforms. The tractors have the batteries mounted on the platforms; on all the other types the batteries are carried in a cradle suspended from the frame. The track type “F” runs on rails and is designed for various track gauges.

The general design is the same for all types, the prevailing features being simplicity, efficiency and flexibility; the accompanying photographs also show the extreme compactness of the construction which permits free operation in restricted spaces.

The roller channel section frame is carried on four helical steel springs of sufficient carrying capacity not to go solid under a full load, yet sufficiently resilient to

company was desirous of developing some such device which could be installed where conditions prevented the efficient operation of cars and track.

The Electromobile Company of St. Louis, Mo., had had several “Electromobiles” (as the new power truck was named) in actual use for two years and all these “made good.”

Hauling 2,500 Pounds and Pulling the Same Amount.
prevent injurious shaking of the batteries on the roughest going. The springs not only protect the batteries against shocks but the working parts and the load as well—the construction in this respect showing a great superiority to the spring-suspended battery cradle.

This extreme resiliency, in connection with an unusually powerful transmission, renders this truck immune to the difficulties of unpaved yards or bad floor conditions, or even rough country roads, and makes it unnecessary to provide runways or plank roads. Road clearance, a most important feature, is amply provided for by a 5½-inch clearance.

The motor is a Wagner direct current high-speed series motor running on ball bearings. The controller has four speeds forward and four reverse. The motor and controller designs were only decided on after extensive tests made with an Electromobile loaned to the Wagner Company for that purpose.

By means of a Morse silent chain the motor drives a Cullinan differential keyed to a jack-shaft. The jack-shaft runs on three S. K. F. ball bearings and carries sprockets from which the two rear wheels are driven by means of Whitney roller chains. With this powerful transmission the Electromobile negotiates a 30 per cent grade while heavily loaded.

The brake is a duplex external band brake applied on the housing of the differential and is mechanically interlocking with the auxiliary controller drum in such a way that stepping on the foot-pedal releases the brake and closes the circuit from the battery to the controller. The controller is so designed that this foot-pedal cannot be operated without bringing the controller handle to the neutral of "off" position, thus making the operating mechanism fool-proof. Any speed can be made from the pedal by raising foot on same.

The steering gear is a standard automobile type. The cast steel spoke wheels are provided with Timken roller bearings and Goodrich solid rubber tires of the pressed-on type.

Two types of standard battery equipment are furnished—"Thin Exide" and "Ironclad Exide." Automatic recharging rheostats are furnished as part of the regular equipment.

Considered from the standpoint of efficiency this device is earning an enviable reputation as an overhead reducer. It does the work of from four to ten men, depending on conditions under which it is working, and has shattered the belief that industrial trucks were not efficient on hauls shorter than two hundred feet. Cost of operation and upkeep runs as low as seventy-five cents per day.

As to dependability it may be stated that the truck shown in the foreground of (photograph No. 8) Fig. "A" has been in operation day and night for twenty-two months.

To one accustomed to the old style man-power trucks an Electromobile in action is a source of interest. Running quietly at any speed, it carries with ease and rapidity loads that would wreck an ordinary truck. More often than not accompanied by one or more trailers each loaded as heavily as the truck itself, it impresses the observer by its compactness, its carrying capacity and speed, ease and low cost of operation and its wide radius of activity.

The effective combination of all these points in a trackless industrial car is the logical result of its having been designed by men who are specialists in the development of industrial transportation devices.

A System of Remote Control for an Electric Testing Laboratory

In a laboratory in which a large number and variety of electrical instruments are tested it is important that means be provided for the rapid and accurate control of the electric generators which provide the current for testing. In Scientific Paper No. 291, by P. G. Agnew, W. H. Stannard, and J. L. Fearing, published by the Bureau of Standards, an elaborate system of this kind which is in use at the bureau, is described. The control rheostats are not handled by the observers directly, but are operated by small motors which are controlled from any one of several laboratory rooms by means of small multiple lever switches.

Copies of this report will be ready for distribution in a few days and may be obtained without charge upon application to the Bureau of Standards, Washington, D. C.
Selling Your Product Successfully

A Talk to Dealers Drawn from the Fund of Experience

THERE is no definite sales procedure, will profitably sell an electric to all car prospects. The perfection of such a system would be as interesting to us as would be the discovery of The Fountain of Youth. Should some fortunate one find the fabled fountain, a bath for the rest of us would likely be a bit expensive. Just so would also be the use of the key that would unlock the purses of all car prospects to the electric car dealer.

Experience in marketing the Ohio Electric and Millburn Electric together with a number of years of selling has taught a few truths you no doubt have observed in your own work.

Analyzing the sales you have made is a valuable practice for it should make your work easier for you and more sure of results. It is said that five fairly distinct conditions of mind actuate the buyer as he progresses from being a prospect to becoming an owner. Their order or sequence varies with the individual, though are arranged and named thusly, attention, interest, confidence, desire and decision. These several steps are achieved in every buyer's mind before he closes. He may take them one or more at a time, but it is up to you as a dealer to be sure that he misses none of them.

Too many of us neglect many of our best prospects because we guess that a gas car is to be their selection. A man in the market for a car is in reality in the market for transportation service. Because you see the gas car dealer working on the sale do not lose interest, that is all the more reason why you should work doubly hard for consideration. Put forth your best efforts and make known that you are able to furnish them with transportation that is founded on such principles as desirability, usability, dependability, safety, elegance and economy. The gas car man is your competitor. Get a demonstration so that you can open the road to business. The gas car man, with a half sneer, ridicules you. Are you a coward, or do you not know the car you are selling? If you are selling along the line of least resistance by handling a gas car in connection with your electric, out of fairness to the man you sell, work for the sale of an electric that will give service of such grade that you can be proud of your achievement.

Help him select an electric the type of which will serve most successfully. Use that as the entering wedge. Then concentrate, keep the car before him and keep up his interest.

Your engagements must be made so as to conflict least with business hours and avoid many possible interruptions. The better your audience, the better opportunity your car will have to make its desirability apparent.

Be punctual. Rather be ten minutes early than five late. Then be ready with your electric and all of your faculites. It is the opportunity you have requested. Meet it. Excuses do not make sales; they annoy a customer. A confident, strong and clean campaign will get attention and produce business.

Be honest with your customer, with your firm, your factory and yourself. A lie will kill a hundred sales to the one it might make. You must establish in the mind of your customer a feeling of absolute confidence. The truth and past service of your car must help you. You must do business on a basis of justice. It is neither good business to sell an article for more than is worth nor is it good business to accept less. In one case you cheat your customer, in the other you cheat yourself.

Satisfaction follows a clear understanding of the condition of car and at the proper time an explanation of the terms of sale so that no part of the deal is vague, but thoroughly understood.

Your electric of today needs no misrepresentation to sell it. If you do not believe in it yourself, for the good of the business either take the trouble to understand the car or get out and make room for one who does believe in it.

Be conscientious about your sales work. Let the reason for your work be whatever it may, understand your car so that you can be in dead earnest as to what you say. You are not out for a pleasant little social call to fritter away time. You have work to do—to do it right and with such dispatch as is profitable.

Your customer will unconsciously absorb some of the same spirit you feel. The flippan, joking attitude of some people toward the electric can be nailed fast only when you have actually done your work by delivering your message. Make your customer understand by your positive and tactful discussion that a careful investigation of your electric will reveal to him a machine the perfection of which he has not considered possible or has not heretofore fully understood.

Analyze the progress of your sale so that you will be working logically to a decision. Critically guard your speech and manner so as not to destroy your work. Give your customer time to think. Encourage his asking of questions. He is giving you a chance.

Believe that your customer is going to buy from you, but do not presume so or act as though you had completed your work. Keep confidence and a suggestion of gladness in your tone. Avoid familiarity and hold yourself in interested discussion of the many desirable features of your car. Your grammar must be correct and your words easily understood. Have patience and courtesy to answer satisfactorily all questions asked. Be sure your answer explains, if you are not positive, it is better to make sure before proceeding further.

Should your customer lose interest, change your
methods of explanation, the tone of your voice or the subject you are bringing before him.

Remember you must sell the electric car. You must bring the order. Your record is gauged by the cars you sell, not by those you nearly sell.

It is not always possible to get a decision when you expect it. A negative decision is undesirable so it must be prevented. They do not yet understand your car, make the engagement for a consideration of another phase of your car that you have failed to bring out. You want further consideration. Not a refusal. Review your work when you are alone, decide where you did not do the car justice. Your review will do you lots of good. Then get back on the job again to clear matters.

Expect the order, be ready to receive it. Let the actual signing of the order be a detail. It is not the imposing step to your customer that it seems to be to you. The car is going to mean value to him as well as its sale should mean great satisfaction to you.

Let his signature be an evidence that you and your car are giving an opportunity to be of much service to him for the owner truly sold to his electric will show his most sincere appreciation by helping you introduce your excellent machine to his friends.

The Experience of a Providence, R. I., Store

The value of a commercial car lies in its ability to transport the load more miles in a day than a horse-drawn equipment or to carry a greater load the same number of miles. While it is true that cost is the determining factor in many instances, it is not always the case, for with many concerns the chief consideration is clean, rapid delivery, and the greater speed and durability of the motor vehicle makes for economical haulage when it makes twice as many trips daily as the horse-drawn equipment which it replaces. Even assuming that the cost of the automobile delivery per unit is greater than with the horse the expense is warranted if the business is increased proportionately.

This contention is proven, states C. P. Shattuck, in the Commercial Car Journal, by the experience of the Manufacturers' Outlet Co., a large department store at Providence, R. I., and covering an area equal to two New York City blocks. In 1909 the company employed 45 horses and the delivery made of merchandise was limited to the city or a radius of about 4 miles. Today the company utilizes a fleet of 29 motor vehicles, a mixed equipment, makes three city deliveries daily and daily deliveries to 113 cities, towns and villages, seven of which are beyond the borders of the state. In addition two trips daily are made to suburban places, while trucks convey special orders as far as Meriden and New Haven in Connecticut, Boston, New Bedford, Fall River and Taunton in Massachusetts, and to the extreme southern parts of Rhode Island.

The progressiveness of the Outlet Co., led it to purchase its first automobile, an Autocar in December, 1909. Results justified the judgment of the company. The horse-drawn vehicles were continued in decreasing numbers for city delivery, but these were gradually replaced by a fleet of electrics of different capacity and equipment. At the present time five 1000-lb. Commercial deliver packages within the city limits and are known as the package fleet. The electrics proved so efficient that last August three 1-ton Walkers were placed in service and are employed for hauling heavier merchandise within the city limits. In addition there are two 1-ton Commercial electrics which deliver furniture, also a 2-ton and a 3/4-ton Commercial which haul freight, etc.

The company found by experience that the 1,000-

60 capacity electrics were not adapted to the work; that is, owing to the grades in and around the city economical results were not obtained with solid tires and the standard motor. A heavier type of motor was installed and each machine was equipped with quick detachable, quick demountable rims. It has been found that not only is a greater mileage obtained from the batteries, but there is less breakage of fragile goods. It is stated that these changes have reduced maintenance costs to a marked degree. Both lead and Edison batteries are employed, seven of the latter being in service.

The electric package fleet averages about 27 miles a day transporting merchandise within the city limits.

The company believes in paying their drivers good wages and employing efficient men. Although the heads of the departments are looked to for results the fact that the majority of drivers have been with the company for some time proves their efficiency. The men are unionized, as given two weeks' vacation with pay and are paid overtime on holidays. As the store closes one afternoon each week for 10 weeks during the summer, and the company employs its machines for giving outings to the inmates of orphan asylums, etc., the drivers earn a considerable bonus.

The men report in time to load their cars and to start at a given time. Upon completing their work they make out a daily report sheet on which is entered their name, number of car, start and finish readings of odometer, meter readings, (start and finish) stops made, and if any minor repair or adjustment be required this is given in the report. The slips are placed in a rack and are taken out by the head night man and any work required attended to. Every machine is thoroughly overhauled once a year.

In garaging the machines the electrics are separated from the gasoline, the former being located at one end of the building. The arrangement is such that the batteries can be connected to the charging outlet without moving the car which is ready to start out with its load in the morning. Charging is by a Cutler-Hammer 16 battery capacity panel. The batteries are removed but once a week for flushing and an extra charged battery is always available.

While no figures as to costs per package are given, a member of the company stated that the motor vehicle has made it possible to handle its deliveries with greater dispatch as well as has increased carrying capacity per unit. The machines also have made possible the covering of a greater area than with horse-drawn vehicles, express and other means of transportation. The same member of the firm stated that the electric vehicles had demonstrated that they could be operated and maintained at 25 per cent less cost than the gasoline cars. This applies to the city deliveries and work formerly accomplished by the gasoline cars which, as previously pointed out, consists of short distances and having as many as 200 stops daily.

Increased Duty on Automobiles in Ceylon

The duty on automobiles, excluding trucks, imported into Ceylon has been increased to 33 1/3 per cent ad valorem, the increase being effective August 2.

[The former rate on automobiles imported into Ceylon was 5 1/2 per cent ad valorem.]
August 10 was picnic and play-time for the electric interests in Chicago and as usual picnic time was rainy time, but that did not deter those who did brave the showers from enjoying themselves. The morning special train had very few people owing to the threatening skies. A baggage car full of paper caps, favors, candy and cigars distributed with a lavish hand helped everyone take a humorous view of the rain that came down as they entered Ravinia Park. The grandstand of the baseball diamond was crowded with the pleasure seekers while the Chicago Telephone Company’s band played to make them forget the rain, which could not stand the opposition and quit for a while. Soon games were going on high tilt and the athletic events were under full swing and kept the crowds interested until nightfall, the occasional light showers making no difference. Quite a few people drove out from Chicago in their cars to spend the afternoon and the evening at the Ravinia Theater, where Marguerite Beriza gave a splendid rendition of the Mirror Scene and Oasis Scenes of Massenet’s Thais assisted by Morton Adkins as Athaniel and Octave Duo as Nicias. The Casino was filled with a rollicking dancing crew whose forces were augmented by the crowd from the theater during the intermissions.

When the last train left there was quite a tired but happy throng that boarded the cars back to Chicago. The picnic was a success as the accompanying pictures will testify.

On August 24 the Chicago Garage Owners’ Association held a splendid picnic at Cedar Lake. The most of the members and their friends were driven out to the grounds in cars. Friendly speed tilts on the road enlivened things considerably. The day was letter-perfect and all those who went enjoyed the day hugely. A larger proportion of Electrical Vehicle Section was present at Cedar Lake than at the Electric Club Outing, which should be a guide for the next year.

The Midland Railway Co. is making an experiment in the use of electrically-operated drays for delivering goods in the outlying districts of Sheffield. At present three storage battery vehicles are being used, and are giving every satisfaction, states The Electrician.

One vehicle carries goods to the Firth Park and Pitmoor district; another to Crookes and Walkley; and the third to Ecclesall, Fulwood and Ranmoor. The great advantage of the vehicles is that they cover the preliminary part of the journey very quickly, and get into the delivery area in much less time than a horse and dray would take. The chassis of the vehicles are American, but the railway company built the bodies of the drays themselves.

Bermuda’s Motor-Bus Law Fails to Pass

At the third reading of the bill which was to provide for a restricted motor-bus service in Bermuda the Legislature defeated the bill by a vote of 15 to 14.
The Regeneration of Sulphated Storage Cells

The authors of this article, Parley and Davis, in the Journal of Physical Chemistry, have previously shown that sulphated storage cells can be regenerated satisfactorily if the battery acid is replaced by a solution of sodium sulphate. Upon the passage of a normal charging current, the lead sulphate is reduced within sixty hours, even on badly-sulphated grids. This method has since been tried by others with uniformly good results. It was conceivable that some other salt might give deposits that were enough better to justify its use, and, accordingly, some experiments have been made with other sodium salts.

The experiments point to the following general conclusions: (1) Sodium sulphate is the best salt to use in regenerating positive and negative storage-battery grids. (2) Dummy positive grids on the outside of the negative plates diminish the time of reduction. (3) Hydrolysis of the lead salts formed in sodium hydroxide solution yields large and troublesome quantities of lead monoxide. The active material of the grids is removed to a considerable extent. (4) With sodium sulphite solutions, a hard crystalline lead is deposited at the cathode which causes buckling of the grids. (5) Reduction in whole or in part of a sulphated grid results by the use of a solution of sodium sulphate, carbonate, phosphite, or sulphite. (6) Good anode deposits from sulphated grids can be obtained only with sulphate, carbonate, and hydroxide solutions. Relatively high acidity corrosion with sodium hydroxide solutions makes these useless.

Another Fraud Uncovered

On August 9 a supplemental fraud order was issued by the federal postoffice department against the International Automobile League and A. C. Bidwell, president, at Buffalo. The new order included Robert J. Conley, manager, of Buffalo. The fraud order memorandum says evidence shows that Robert J. Conley is an employee of Bidwell's and the address given is Bidwell's place of business. This attempt to evade the fraud order was used by Bidwell to collect past dues for so-called memberships to his league, the applications for which, the fraud order memorandum says, 'were obtained by means of a dummy letter sent out in many instances years after the application for membership had been made.'

On August 16 the fraud order was again extended to include the Buffalo Automobile Supply Company, a new name adopted by Bidwell to evade the effect of government action against him.

Richard H. Lee of Cleveland, former chairman of the legislative committee of the American Automobile Association, is acting as attorney for the Associated Advertising Clubs of the World, following the efforts of Bidwell to further victimize motor car owners in all parts of the United States.

Milburn Raises Price

The Milburn Wagon company of Toledo, Ohio, manufacturers of the Milburn light electric, like the majority of other automobile manufacturers, has been compelled, owing to the increased cost of labor and materials, to advance the selling price of one of its products, the model 22 broughman, on July 15, to $1,585, at Toledo. Reluctance to cut down on the quality of the car made it absolutely compulsory to increase the selling price, the officials of the company declare.

"In spite of the fact that our output has been doubled during the last year," said R. S. Woodhull, sales manager of the Milburn company, "the price of the model 22 broughman was established at such a narrow margin that we would have had to build the car at a financial loss had we continued to sell it for $1,585."

Electric Truck Makes Record

Will Spalding, Portland, Oregon, agent for the Walker electric truck, recently drove a loaded truck to Salem on a single battery charge. Before the truck was put on charge for the night in Salem more than 60 miles were covered. While mileage records like this are common in city delivery this is believed to be a record in the Northwest over country roads.

The truck was a one-ton Walker equipped with 64 cells of A-6 Edison battery. At the end of the day's run the meter showed that the battery had delivered 42 per cent over its rated capacity.

The start was made from Portland at 10 a.m., the trip being made over the West Side route via Newberg and the Wheatland ferry. A stop was made at Newberg for lunch and Salem was reached at 4 p.m. The return journey was made over the East Side route, which is declared a much easier trip for an electric.

This is the first electric truck to be driven to Salem. While electric trucks are built primarily for city delivery this trip proves that they can be used over almost any kind of roads and hills when occasion demands.

From Gas to Electric Cars

Zipf Brothers, who conduct a large coal business in Chicago, are striking examples of the increasing trend toward the electric automobile in preference to the gas car.

A. Zipf, who lives in Winnetka, originally purchased a 1913 Detroit Electric, which was so satisfactory to him that, in 1914, he purchased another car of larger size.

His brother, Edward Zipf, owned and operated two gas cars which gave A. Zipf a taste of touring which he, like many other novices, took to readily and, as a result, he purchased a 1915 six cylinder gas car which has long since served its usefulness and is now for sale for about one-third of what he paid for it, he being very tired of the annoyances contingent to a gas car. He now thinks more than ever of his electric.

A recent trip which he made from Winnetka through Chicago's boulevard system and return, a complete trip of 83 miles, shows to what extent his electric is of use to him and probably answers the question as to why his brother, with his two gas car, one an eight cylinder 1916 limousine and a 1915 six cylinder touring car, has turned his attention to the electric.

Edward Zipf recently purchased a Detroit Model 56 cabriolet roadster, trading in his gasoline touring car and expects, in the fall, to trade in his 1916 limousine for a five-passenger electric brougham.

Both these men are thoroughly sold on the electric and its conveniences, its use 365 days in the year, as compared with the constant trouble of a chauffeur,
Price Maintenance and Sensible Trading
Delivered at the National Detroit Dealers Convention August 21-23

By E. P. Chalfant

In its last analysis an irregular transaction results from a condition of mind. The customer outsells the dealer, or his competitor outbids him. In either case the dealer lacks experience, ability, confidence or judgment. If he firmly believes in the merit and value of his car and contests every point of attack with energy and enthusiasm he is practically certain to win.

Enthusiasm is contagious, more especially the confident enthusiasm born of complete knowledge of and belief in the subject under discussion.

When the dealer is thoroughly sold to sound business policies he finds no difficulty in training each salesman in the same school provided the salesman is not fundamentally warped.

No salesman is worth light, heat and floor space in a dealer's establishment unless he is morally sound.

Ward Macauley says in an article published in the Forum: "Customers will no longer seek the advice of the man who knows the most about his business, and then purchase from a man who will shave a percentage off the selling price. The maintained price places brains at a premium. The cut price fosters trickery and the lowest ideal of business. The maintained price makes the dealer and the manufacturer alike feel a responsibility for the customer. The cut price tends to the feeling, 'a bargain's a bargain, let the customer beware.'"

It seems to be an inherent weakness of automobile dealers to eagerly believe all the stories told them of the business transgressions of their competitors, and frequently I listen to recitals of absolutely impossible transactions, and the astounding feature is that my informants believe them to be true. Modern competition is reasonably clean, and it is a safe bet that if two dealers would compare the stories carried from one to the other by the customer who is working them both, they would be less inclined to believe each other to be business pirates and porch climbers. The other fellow is never as bad as he is misrepresented to be. It has been my experience that when bad blood exists between two local dealers it has been created by customers who worked each dealer against the other.

Benjamin Franklin was right, however, when he said, "Love your neighbor as yourself, but don't take down your fences."

I want to sound an emphatic caution to all dealers against loading up with second-hand cars and staying loaded. They must be moved, and moved quickly, and if your judgment has been at fault, and you have allowed too much for the old car, recognize your mistake and take your loss as quickly as possible. Charge that loss to experience and use the lesson for future protection. Fix this fact firmly in your mind—that you can sell five used cars at their actual market value during the time you hang on to a bad trade, trying to find an inexperienced customer, who will pay the price of your mistake.

After all, why should you overallow for the old car? Is it because you permit your customer to sell you his old car before you sell him your new one? Have you bid at auction against your competitor to get

Price cutting upon standard articles of merchandise is primarily an error in judgment, then it becomes a habit, and eventually a disease.

Many dealers in motor cars delude themselves with the belief, when selling a car, that each dollar obtained over and above the purchase price is velvet.

No greater mistake can be made, because the year's business is decided upon total receipts less total expenditures and absolutely not upon individual sales.

At the end of the season it has cost the dealer an average sum per car for sales and service expense. The greater the cut in price on any one car, the higher becomes the average, because there is just that much less profit to be divided by the aggregate car sales.

Selling expense comprises rent, taxes, insurance, office expenses, sales salaries and commissions and advertising; while service overhead includes a small percentage of shop expense for co-operative purposes.

It is a pretty safe estimate therefore that it costs 50 per cent of the commission per car to cover the sales and service expenses, no matter whether it lists at $2,500 or $500, for the volume of sales preserves the average.

For the sake of example let us say that the commission on a $2,275 electric is $500 and it costs the dealer $250 to sell and maintain it. Suppose he sells it for $2,000 flat under the stress of competition, has he actually made $225 or has he lost $25.

Study this problem carefully because its correct answer decides the question of profit or loss, that is to say, of success or failure.

Turn your thoughts for a moment to the subject of trade-in cars, remembering that six sales out of every ten involve taking old cars in exchange. Suppose the dealer allows $600 for an old style car and finally resells it for $300 and glad to get that much. Has he made a profit of $200 or has he actually lost $50, plus overhead expenses on the old car? Think it over.

The manufacturer who places a fictitious price on his car in order to give the dealer an unnatural discount is cheating the public; the dealer who deliberately allows $600 for an old car which he knows he must resell for $300 is cheating himself and the customer who sees his old car sold a week later to his personal friend for $300 feels that he has been cheated.

He knows perfectly well that the dealer cannot afford to give away $300 in cold cash unless by correspondingly overcharging the customer.

The dealer who will post this adage on the sales room wall will have no unsold used cars on his floor at the end of the season when models become a year older and the price of the old cars drop proportionately.

Stick to list prices and stand for clean trades. Let your competitor have the irregular and unprofitable business, let him load up with foolish trades, let him acquire the name of being a price cutter, let him go broke in the end. Content yourself with the sales that make for profit and for friends.

The customer who gets the best of a deal boasts but never boosts.
a customer? Do you prefer to buy a loss rather than to sell a profit; or is it merely a brain-storm?

Would you invest your good money in stocks and bonds, in cotton, tobacco, grain, lumber, or whatever the product of your section may be, without first consulting the market reports in your daily paper? And would the producer expect to receive more than the market price for his wares? Absolutely not.

Then why not learn the market value of an old car and prove that value to your customer before you make him a proposition? The Anderson Electric Car Company will provide each of its dealers with a printed schedule showing trading values upon all obsolete models of electric cars of every make. If the trade-in of a gas car is involved any local dealer in gas cars will tell you its value.

If you prefer a more accurate and disinterested valuation, subscribe to the Central Market Used Car Report published in Chicago. It is issued quarterly and reports the prices at which all makes of second-hand gas and electric cars are being sold in different sections of the country. When no sales have been made, the appraised value is given.

Nothing can convince a customer of the actual value of his old car so quickly as to open this market report before him. The regular subscription is $24 a year. It is worth while, for it can easily save you several hundred dollars a year that might be lost in bad trades.

The customer who is so intent upon getting the biggest allowance possible on his old car, that he will accept in exchange any make whatever of gas or electric, is positively not properly sold to the advisability of owning a Detroit Electric (or any other electric).

Recently an electric car dealer not a Detroit dealer, thank goodness—told me he had cleared $16,000 in five years. A few minutes later he showed me twenty-four old cars, mostly junk, stored in a covered shed in the rear of his store. When asked if they constituted his profit, he admitted they did. I could well believe it, because I learned afterward he was in financial difficulties.

I asked him if he would take $2,500 for the entire lot. His reply was, not to offer it unless I meant it.

I must impress you with the tremendous importance of refinishing your trade-ins and putting them into resalable condition as quickly as it can be done. A fresh coat of paint immediately adds a couple of hundred dollars to the appearance of the car. Inflating the cars to capacity and painting them white adds still more. The battery renewal can await the sale of the car, thereby satisfying your customer that a new, fresh battery is to be installed.

An old dilapidated car sandwiched between two new ones on the salesroom floor creates the same impression as a man in a new dress suit and silk hat with a dirty white shirt front and unpolished shoes. Even refinished used cars should be shown apart from new cars, in order that unfavorable comparisons cannot be made.

Disraeli, the most famous English statesman of his day, said: "The great secret of success in business is to be ready when opportunity comes." Had the axiom been phrased for the benefit of used cars, it could not be improved.

There is one other abuse of the used car that I must deal with before closing this paper. I refer to the bad judgment and false economy exercised by those dealers who make their important calls, or send salesmen to make such calls, in antiquated cars, frequently of a make other than the one they deal in.

A car of that kind answers very well for scout duty and to enable the salesman to cover ground rapidly, but imagine driving up to the front of a fine residence to see a live prospect and have the customer look out of the window at the rattie trap you came in. Suppose a demonstration is wanted right away. A golden opportunity offers, but the psychological moment for closing the transaction cannot be grasped because you lack the tools.

If you were in the market for a riding horse, would you expect the owner to ride to your door on a broken-winded mule? If a book agent came to your office to sell you the latest edition of the Encyclopedia, would he show you an old shabby copy of an earlier issue? It is just as reasonable to imagine these startling exhibitions of salesmanship as it is to expect a dealer to build an enviable reputation for himself and his car by being constantly seen driving around in an old ruin on wheels. He owes it to his dignity and his business prestige to drive a modern car part of the time.

Sometimes it is a misfortune that we cannot see ourselves as others see us.

South African Possibilities for Electric Vehicles

In response to a request made for certain information relating to the possible field for electric vehicles in Johannesburg, American Consul Edwin N. Gunnasul of Johannesburg states, current may always be obtained for charging batteries from any of the local power companies. Besides the current for traction purposes, there are large power-generating plants owned by companies supplying electricity to the gold mines.

In the Johannesburg municipal area there are 780 miles of road, of which approximately 25 per cent is asphalted; of the remaining roads, some are graveled and others still in their natural state. The roads here are, comparatively speaking, very flat with the steepest grade 1 in 9. The asphalted roads are good, while of the remaining 75 per cent approximately 40 per cent is considered fair, while 35 per cent is more or less dangerous to traffic. This also applies to the outlying districts.

Speaking generally, the success of the electric vehicle should be greater in South Africa than in most parts of the world, because of the fact that gasoline costs here three times as much as in the United States and, roughly, twice as much as it does in any other country. The great drawback to this type of vehicle, so far as South African markets are concerned, is its very high cost compared with that of the ordinary petrol-motor car. In view of the fact that South Africa on the whole is, comparatively speaking, very badly off for electric power on account of the large number of towns without electric-lighting systems, the sale of the electric vehicle would be restricted practically to the small number of towns where electricity is available.

C. T. Opens Chicago Office

The Commercial Truck Company of America, of Philadelphia, feeling the need of closer touch with the central states due to increased business there, has just opened an office at 520 McCormick Building, Chicago. It has been placed in charge of J. W. Freeman, who has been prominently identified with the C. T. sales force in the east. Mr. Freeman begins his active campaign for better business the first of September.
Motorist Will Force Grade Crossing Protection

Third Rail Systems Subject of Attack

Automobile organizations throughout the country, insurance companies underwriting automobile risks and automobile manufacturers have started a movement in an effort to force the railroads of the country to protect their grade crossings in an effort to eliminate accidents, many of which are fatal, and which have become so common that the daily newspapers fail to record them as news except where the person killed is of prominence.

In this movement the organizations behind it have the hearty co-operation of Anderson Pace, manager of the Bureau of Railway Publicity of Illinois, which is an organization of the larger steam railroads of the country and which, through the Chicago bureau, is co-operating with the general public to make travel safe to both passenger and to those persons who find it necessary to cross railroad rights of way on regular roads.

The movement is aimed primarily at the third-rail electric roads, such as the Aurora, Elgin and Chicago Railroad, running west from Chicago. Many of these third-rail electric roads are owned and controlled by local capital and managed by local politicians who depend largely upon their political influence to defray the demands for the installation of safety devices until such a time as the numerous damage suits force the roads into hands of receivers, who usually see the necessity for protected grade crossings.

The attorneys for the persons behind the life-protective measures are busy investigating as to the best method of procedure to force protection. It has been suggested that two methods should be employed, the first to appeal to the Public Utilities Commissions of the different states and the second to bring a criminal prosecution against the officials of the railroad.

Attorneys for one of the third-rail electric systems have declared that a criminal prosecution would not hold because there appears to be nothing in the code to justify such a proceeding but the other attorneys are a unit in declaring that the management of a third-rail electric system with an unprotected grade crossing on which a person is killed could be arrested in the same manner as a motorman of a street car is arrested when a street car kills a pedestrian. They declare that criminal negligence may be proven when there has been more than one accident at a grade crossing and when the person injured took even ordinary care to prevent accident.

One of the best illustrations of an unprotected grade crossing on a third-rail electric road is the Mt. Airy avenue crossing of the Aurora, Elgin and Chicago Railroad at Villa Park, Illinois. It was at this crossing that the illustration accompanying this article was taken, within a few moments after the automobile had been struck by a west bound train of the road.

Leading to the crossing on either side is an up grade of approximately 25 degrees. The crossing is on an "S" curve. On the south side of the crossing the view of the track during the summer months is obscured from both sides. On the west side is a building which is erected practically against the track and on the east side is a heavy growth of shrubbery which cuts off all view from that side.

The occupants of the burning car had come to a dead stop at the south side of the track to allow an east bound train, against which they had been warned, to pass. After the east bound train passed they waited for a whistle or some warning signal. There was none. The car was started on low speed to take the grade. When the car got up the grade and was squarely on the track with the front hood crossing the west bound track, the almost silent west bound train rushed the crossing at approximately forty miles an hour. It hit the car squarely on the right side of the hood and swung it around, throwing the car against the third-rail, the current of which short-circuited through the car and thus ignited the gasoline, oil and grease in the car, setting it afire and reducing it to a mass of junk.

The car was a heavy model and wrenched the third-rail from its posts, breaking the connection and stopping the flow of current. This saved the lives of the three persons in the car and prevented the arrest of the officers of the road for manslaughter on that particular accident.

The other fact that contributed to the elimination of the serious criminal charge in that particular case was the fact that the woman driv-
ing the wrecked car was an expert. When she saw that she could not avoid being struck she managed to turn her steering wheels so that when she was struck she would be carried along with the train and eventually thrown from the track if her car remained intact.

The methods of the third-rail roads are admirably shown in this particular case. Although the accident occurred on July 23 last, C. H. Pegler, of general counsel for the railroad, declared that he did not receive a report on the accident for three weeks. When he did confess to having received a report he declared that the automobile had run into the train. He did not make this assertion of his own knowledge but after he had sent his investigator to Villa Park to make an investigation. Nor did he know at the time that a number of photographs had been taken almost at the moment of the collision, the photographs showing beyond all doubt that the automobile mud guard and hood were crumbled at the exact place of the blow, whereas the front of the car until consumed or melted by the heat of the fire, was practically intact.

Another reason for the accident quoted being an admirable example, is the numerous persons very nearly killed at the same crossing, and who are prepared to appear as witnesses in a criminal suit when the proper time comes.

Dr. Frederick H. Bates, physician for the Aurora, Elgin and Chicago Railroad Company, at Elmhurst, Illinois, was the first physician to attend the persons injured in the accident. During the examination and later in the presence of numerous witnesses he declared that he had been very nearly killed at the same crossing less than a week previous to the accident described. Wilhelm Schwalge, of Villa Park, almost lost his life at the same crossing and called the attention of the railroad officials to their negligence. Mr. Schwalge also called the attention of representatives of the railroad to the fact that the trains invariably “ran the crossing” without a signal of any kind.

While the Aurora, Elgin and Chicago Railroad is an example of grade crossing inefficiency, it is not a great deal worse than many of the other third-rail systems on which complete accident statistics are being compiled.

The automobile insurance companies and the manufacturers are especially interested in this movement. The former declare that the grade crossing accidents contribute considerable to the necessity for keeping the premium figures on automobiles at a very high figure and the automobile manufacturers assert that every grade crossing accident costs them hundreds of sales.

“We have made our car practically fool-proof,” said one electric car manufacturer, “and through the negligence of some railroad manager it is smashed up. Publicity is not given to the fact that in nine times out of ten these accidents are the fault of the railroad. As a result our car is labeled as dangerous. We are willing to contribute to a fund to force grade crossing protection and to maintain a separate fund to push damage suits against railroads where our cars are ruined or damaged.”

E. G. Trimble, attorney for the Employers’ Indemnity Exchange, in discussing the grade crossing betterment movement says:

“We think the grade crossings are a most serious menace and they should be abolished. If they cannot be abolished we have one suggestion and that is, the crossings should be level on either side of the railroad for at least ten feet, thereby preventing the liability of the wheelchair of the car reaching over both tracks of the railroad and resting on any part of the equipment hanging below the car, thereby causing the engine to be killed or stalled and endangering the occupants.”

Legal action on the abolishment movement will be taken immediately upon the completion of the statistics now being collected.

General Vehicle Has New Boston Offices

The New England headquarters offices of the General Vehicle Company have been moved from the Exposition building, Cambridge, Mass., to a new building at 590 Commonwealth avenue, Boston, in the heart of the recently developed automobile district in the outer Back Bay. Under one roof are located the sales-rooms and offices, service, garage, charging and repair departments, battery charging station and parts stock room. A large showroom is provided at the front of the establishment for the display of both electric and gasoline trucks. Besides several charging stations the plant contains a machine shop and forge room with separate outside entrance. About 15,000 square feet of floor space are utilized. The service station is located near the principal battery and tire depots of Boston. George H. Hudson is New England manager of the company.

The American consul at Acapulco, Mexico, reports that the automobile road between Iguala and the capital, Chilpancingo, constructed a few years ago, has, through neglect and the lack of repair, deteriorated and is at present useless. There are no highways in the state, and the narrow trails leading through the mountains afford the only means of traveling from one town to another. Since these trails are not considered safe at present there is no regular overland mail service.

Atlantic Electric Vehicle Co., Newark, N. J., reports a recent demonstration of its one-ton truck running 52 miles on one battery charge. The run was made through heavy sandy country and the result very agreeably surprised the prospective buyer.
Bank Finances Detroit Electric Sales

**Advances Two-Thirds of List on New Cars**

C. HEMPHILL, secretary and electric vehicle expert for the Commercial Investment Trust, 61 Broadway, New York City, on behalf of his company has offered to loan to Detroit Electric dealers, two-thirds of the list price of every electric car made by the Anderson Electric Car Company that they may sell.

The offer was made after a thorough investigation of the factory methods of the Anderson Electric Car Company for the purpose of ascertaining the material and workmanship of the product. The result of the offer is that Detroit Electric dealers will be enabled to accommodate purchasers even to the extent of selling the Detroit Electric on the deferred payment plan.

The Commercial Investment Trust has sent a notification to every Detroit Electric dealer in the United States placing before them the advantages of the deferred payment plan in cases where the prospective purchaser of a Detroit Electric has investments so tied up that they cannot be turned into cash without a financial sacrifice.

Many of the Detroit Electric dealers are enthusiastic over the plan and have signified their intention of taking advantage of it. The Anderson Electric Car Company also has endorsed it, but with reservations. The reservations are that the deferred payment plan must not be used as a selling argument to close a sale when the prospect is not in a position to meet the payments as they may fall due. In other words, the management of the Anderson Electric Car Company desires that the owners of Detroit Electrics be of the same high caliber as in the past. It is not the desire or intention of the management to sell a $1,775 electric to a $1,500 income man.

The offer to the Detroit Electric dealers is that they shall collect one-third of the list price of the car from the purchaser and the Commercial Investment Trust will carry the other two-thirds through the discounting of notes to be made by the purchaser and endorsed by the dealer, after which they will be discounted at 90 per cent of their face value by the Commercial Investment Trust.

The Detroit dealers may sell cars by three methods under the deferred payment plan. In each case they must collect one-third of the list price in cash.

The first plan provides that the two-thirds of the list price of the car will be represented by eight promissory notes, of equal amount, one maturing each consecutive month from the date of delivery of the car.

The second plan provides for four promissory notes of equal amount, maturing consecutively in two, four, six and eight months from the date of delivery of the car.

The third plan provides for two promissory notes of equal amount maturing three and six months from the date of the delivery of the car.

All notes bear the current rate of interest, according to the interest laws of the state in which the sale may be made, but in no event shall the interest rate be less than six per cent.

In case of cars sold on the deferred payment plan all cars must be insured, which necessitates an addition to the purchase price of from $24.38 to $22.00, according to the list price of the car sold. This additional amount is to pay the insurance premium, the insurance being in force from the time the car is shipped from the factory and for twelve months thereafter. This insurance protects the car in transit.

On the initial discount the Commercial Investment Trust discounts only to the extent of ninety per cent of the face value of the notes, when the final note is paid the ten per cent held in reserve is returned to the dealer.

In notifying the Detroit Electric dealers of the decision of his company, Mr. Hemphill declared that he would carry the two-thirds paper for them on every sale they made, if necessary, and without reservation. He called their attention to the fact that this deferred payment plan increased their prospect list to figures beyond computation.

"On the plan we are submitting to you, based entirely upon the value of the output of the Anderson Electric Car Company, and the material and workmanship put into that output," said Mr. Hemphill, "nearly every person with an income of $3,000 or more should own a Detroit Electric.

"You may not think that persons with incomes of but $3,000 could afford to pay $1,775 in eight months, but experience has taught us that they can. In the case of the purchase of a Detroit Electric, their pride would make them meet the obligations as they may come due rather than allow the car to be returned to the dealer.

"It is a fact that many persons with incomes of $3,000 live up to the entire income but when they find it necessary to cut expenses to meet payments on something they desire they make the sacrifices."

In any cases where deferred payments are not met and the dealer finds it necessary to take back the car, Mr. Hemphill gave his promise that full opportunity would be allowed the dealer to find a resale for the car and the amount of the unpaid notes could be rediscounted through his company.

Several Detroit Electric dealers have declared that they will be able to increase their sales five or six hundred per cent by pushing the deferred payment plan and through the accommodation of business men who feel that they cannot afford to withdraw from their business capital the amount necessary for the purchase of a Detroit Electric but who are amply able to meet obligations.

On the other hand there were dealers present from Canada and England who were in doubt as to whether the scheme would apply to them. As far as could be ascertained the unsettled conditions of those countries would preclude anything of the sort. There is a small chance of the company including Canada, however.

In case a Detroit dealer sold one of the Model 68 cars, listed at $1,775, on the deferred payment plan, he would collect from the purchaser $591.67 in cash as the first payment, about $22.00 for the insurance premium, the amount of the freight from Detroit, Mich., to the point of destination, and eight notes, one due every month for eight months, consecutively, from the date of delivery of the car. Each note would call for the payment of $147.92 with interest at approximately six per cent per annum, which is the almost universal rate.

In the case of higher priced cars, the payment would be in proportion to the list price of the car.
Detroit Starts Dealers School

The Anderson Electric Car Company is the first of the manufacturers of electric cars to start a school for its representatives and dealers. The first school, which has just closed, was attended by thirty-four representatives and dealers throughout the country who were taught the fine points of body construction, chassis building, battery work and care and when they left the school they were finished mechanics in so far as it was possible to make them in a short space of time.

One of the most important points taught the members of the first school was the care of a battery and the proper method of charging. All the members of the school returned to their homes fully prepared to show why it was that a battery capable of propelling a car eighty miles on a charge only propelled it ten miles. And better than that they were prepared to correct the difficulty. They learned that in charging some batteries it is necessary to be prolific with the juice in order to stir the battery out of its stagnancy while with other batteries such a condition does not prevail.

The school was in charge of George L. Bixby of the research department who explained everything at great length.

Besides numerous men the first school was attended by three women, Miss Hope Loughborough, of Little Rock, Ark., Miss Evans, of Fort Wayne, Indiana, and Miss May Weston Brooke, of Norfolk, Va. Miss Brooke proved to be Instructor Bixby's greatest assistant as she demanded to know the whys and wherefores of every subject and through her constant questioning brought out many intricate points for all members of the school. By her insistent questioning Miss Brooke went right up to the head of the class.

The next session of the school will open on October 2. Many of the Detroit dealers have signified their intention of sending their repair men as well as their salesmen to this session for the purpose of acquainting the repairmen with every part of the car they must be prepared to put in splendid condition at all times.

The Walker Electrics of the Kansas City Light & Power Co. are still running satisfactorily after six years of service, which is a mighty good record.

Increasing Use of Motor Cars at Shanghai

The introduction of a limited number of electric automobiles into Shanghai, China, has created much interest among wealthy Chinese, who are desirous of purchasing cars of this type. The first electric car brought to Shanghai did not prove satisfactory, because of the inadequacy of the local electric power facilities, but in the meantime this has been remedied and the cars now arriving are operated satisfactorily, states Thomas Sammons of that city.

Two of the electric motor cars at Shanghai are owned and operated by the Shanghai International municipal electricity department. In all there are now six cars of that type in use here, two of which are exhibited by an American firm. One electric truck has also been introduced and is being operated satisfactorily.

Some of the owners of motor trucks that are operated by gasoline complain that they are too expensive to operate, considering the cheap cost of Chinese coolie labor. In some instances the gasoline trucks fail to cover guaranteed distances on a given quantity of gasoline.

Electricity is commercially available at Shanghai for charging electric vehicle batteries, but so far no public garage has been equipped for that purpose. There is, however, no difficulty in individual vehicle users having their own charging outfits at their residences or other convenient places. If sufficient inducement were offered the electricity department of the Shanghai Municipal Council would be prepared to supply charging outfits at a small monthly rental, maintaining them in the same way as the large number of power motors that may be hired.

The Federal Trade Commission has just published two interesting booklets which are of vital interest to the garage man and accessory stores. They are "A System of Accounts for Retail Merchants," a twenty-page booklet with forms and instructions, and a thirty-two page book entitled "Fundamentals of a Cost System," giving a comprehensive series of ledger forms and examples of cost sheets.

These books may be had on request without cost.
Selling Cars on Deferred Payment Plans

I t is not generally realized that the sale of automobiles on the installment plan, or on some arrangement of deferred payments, has reached a figure amounting to a considerable portion of the total sales. Individual buyers who adopt this easier method of payment often imagine themselves to be exceptions to the general rule, whereas in truth it is the cash purchaser who is getting to be the exception.

This practice is not, as is generally assumed, confined to the field of the cheaper cars. Even cars above the three thousand dollar class are frequently sold to purchasers whose actual amount of free cash is far less than that. The only reason the "installment" feature is not quite so apparent in the sales of the more expensive cars is that the buyers of such cars usually have other property upon which they can give mortgage, instead of on the car itself.

It would, indeed, be a peculiar type of business man who would have several thousand dollars lying idle and ready to spend. The average man must put every thousand dollars of his surplus to work earning interest—that is, "tie it up." Very few can afford to carry large checking accounts on the chance of needing thousands for a whim.

There are a good many more car owners than there are home owners. The majority of homes are owned in equity only, and carry mortgages up to half their value. The man who owns real estate clear of incumbrance, and who wishes to buy a car, has a choice in his source of the wherewithal. He can mortgage either the property or the car; and in most cases he will probably borrow on the property.

We have heard this practice condemned by speakers on economics as though it were highly reprehensible. The idea of mortgaging a home to buy a car seems to be regarded as the height of reckless extravagance. We are sure the commercial philosopher, the man of true business instincts, will not look at it in this light.

It is only the poor man whose idea of affluence is to have every pocket filled with currency and a bank vault full of gold waiting to be spent. The man who is accustomed to handling money knows he cannot put a thousand or three thousand dollars into his newest aspiration—a car for example—without withdrawing it from some other investment, where it is probably earning five or six per cent. This interest he must sacrifice; there is no escaping that. But he has a choice of two ways of losing his interest. He can take money away from its task of earning interest; he can leave it alone and use its income to pay the interest on a borrowed sum, or—what amounts to the same thing—pay the interest to the car dealer in lieu of the cash.

Economically, ethically, morally, or any way you care to analyze it, we cannot see that it makes a particle of difference whether a man buys a car with cash out of the bank—which is actually property—or cash by mortgage on other property, which classification of other property includes the car he buys. In other words, he must borrow anyway, using the word in its broadest sense; he must borrow from his account, from a money lender or from the car dealer.
That much being admitted, it should be obvious that the car dealer who makes it easiest for his patrons to get the cash with which to pay him will have the greatest success. The dealer—or manufacturer—who refuses to recognize the manifest impossibility of finding an adequate number of purchasers provided with enough loose change to buy a car, and maintains that it is business only to get the cash, and not to extend any financial service whatever, is on the way to failure. Financial service before the purchase is as important an element of sales success as maintenance service afterward.

The sale of one hundred electrics in a given community at an average price of twenty-five hundred dollars means that a quarter of a million dollars is turned over. It is unreasonable to suppose that this amount of money was on tap, waiting to be spent. It must be diverted from other work; preparations must be made to liberate it and to pay its interest. While the buyer in nearly all cases is competent to handle those financial details himself, it does not follow that he would not appreciate assistance. So while arranging to finance the purchaser of a car is in no sense a necessary function of the dealer, it is one of the elements of service that help sales by making them easy and removing the resistance.

Selling a car on deferred payments is a perfectly legitimate business proposition, and a mortgage on a car is no more immoral or reprehensible than a mortgage on a house.

The Woman’s Influence

While the electric car representatives are working conscientiously to overcome a popular idea that the electric is preponderantly a woman’s car, the gas car designers are striving just as diligently to convince the public that the gas car is entirely suitable for the woman driver. Judging by the number of feminine faces observed above steering wheels, the gas car people are succeeding in their efforts.

We must conclude that the feminine influence is quite largely responsible for the more obvious changes that have been made in gas car design from year to year. The items of deeper and softer upholstery, easier springs, more graceful and beautiful lines, simpler control, more nearly automatic performance of the tasks of starting, tire pumping, etc., are all evidences of concession to the softer sex. Not but that the sterner members of society frankly admit their appreciation of these improvements, now that they have been made; but it is quite probable that a lower degree of luxuriousness would still obtain had the ladies displayed no interest in the active side of automobiling. Many a man could be satisfied with a car costing three hundred and sixty dollars were it not for his wife and family.

The electric car from its very inception has been a prominent exponent of high grade upholstering and finish. Its coach work always has been unexcelled; its interior appointments have carried an air of daintiness, refinement and elegance. Add to those artificial excellences the natural ones of simplicity and ease of control, and it is not surprising that the electric became a woman’s car by adoption and without any special effort of its own.

It is evident now, however, that the man has finally accepted the woman’s viewpoint in this as in all other things. Therefore the car that a buyer selects today is a car that will please his wife or his daughter. That, indeed, is apt to be his first specification.

Convincing the man that the electric is his car, therefore, merely means interesting the man in the present models, or such modification of them as natural evolution may produce. And that is the course the wise makers are pursuing. There has been no attempt to remodel the electric to escape the charge of femininity. That course would not be judicious now.

There are many who still claim that the masculine eye would be better pleased with a longer wheel base, wheel steer, and a few other gas car characteristics. There is, of course, good psychology in this, because it is possible that the gas car followed these lines to meet a demand. If that is true, then it could be argued that the electric car makers are making a mistake in resisting a tendency. If, on the other hand, we assume that the gas car’s lines and characteristics come purely from structural motives, and that the public would have liked them just as well in any other shape, then the electric has just as much right to its own form as has the gas car, and just as much appeal to popularity.

There is hardly a woman living who would not like an electric if she could have it. That fact alone is a pretty safe basis on which to appeal to men.
CONSIDERABLE progress has been made during the past two years by the Electric Vehicle Committee of the Incorporated Municipal Electrical Association, in the matter of organizing facilities for road transport by means of electric-battery vehicles. The constitution of the committee is on a broad basis. It includes representatives of the parent association, the Commercial Motor Users’ Association, the Royal Automobile Club, the Society of Motor Manufacturers and Traders, the Provincial Electric Supply Companies, the Electric Contractors’ Association, the British Electric and Allied Manufacturers’ Association, the Incorporated Association of Electric Power Companies, the Institution of Municipal and County Engineers, and of the Tramways and Light Railways’ Association. The chairman of the committee is R. H. Chattock, city electrical engineer of Birmingham. The hon. secretary is F. Ayton, chief engineer and manager of the Ipswich Corporation Electric Supply and Tramways Departments. The electric vehicle has its own special field in goods-delivery work in urban and suburban areas, and the excellent results that have, so far, resulted from its use by some of the largest and most up-to-date business firms would seem to indicate quite a considerable field for its extended employment in the future, not only for the delivery of merchandise but also for passenger-carrying work in and about towns and cities. The economy in operating cost and the simplicity of the mechanism are, of course, the main features of this class of vehicle. While these advantages were manifest in the period before the war, the present scarcity of horses, the high price of fodder and the rising cost of petrol, very greatly enhance the merit of economy possessed by “the electric.”

ELECTRIC VEHICLE COMMITTEE

A meeting of The Electric Vehicle Committee was held in London on July 28, 1916, R. A. Chattock presiding. It was announced that the Royal Automobile Club had nominated as their representative upon the committee W. Worby Beaumont. With reference to the correspondence that had taken place between the B. O. T. and the Electric Vehicle Committee on “Import Restrictions,” it was decided, as a request had been received from one technical paper, that a copy of the correspondence should be sent to each technical journal.

Consideration was again given to insurance policies for electric vehicles. Correspondence with The Car & General Insurance Corporation, Ltd., was submitted, to come into line with the suggestions previously made by the committee that their standard electric vehicle policy should be altered so as to include the risk on the battery while the vehicle is in transit by road, rail or ship. Subject to this alteration, the committee considered that the Car & General Insurance Co.’s policy met every reasonable requirement, and they decided to give their approval to it.

Arising out of correspondence that the secretary had had with the clerk to the Urban District Council at Rugby, in the matter of providing charging facilities for electric vehicles, the secretary was directed to write and say that the committee regretted the council’s decision not to provide such facilities at the present time. It should be noted that the British Thomson-Houston Company are prepared, when their own arrangements admit and at times convenient to themselves, to charge electric vehicles passing through Rugby.

The secretary reported the action he had taken in connection with the report made by the Borough Engineer of Southwark to the Works Committee of the Council and his action in this matter was approved.

The date of the next meeting was fixed for Friday, the 29th of September, at 2:45 p. m.

F. AYTON,
Hon. Secretary.

J. TERRY OF NOTTINGHAM GIVES EXPERIENCE

Having given much thought and consideration to the various papers relating to motor traction given at our conferences during recent years, I had decided that motor vehicles were not suitable to the peculiar conditions which prevailed in Nottingham.

Many of you will no doubt remember that our conference last year synchronized with an exhibition organized by the Road Board at the Horticultural Hall, where vehicles of various descriptions were displayed, and it was there I saw the first vehicle, with which I was very much impressed. From the information then received, and from my previous knowledge, I summed up the advantages and disadvantages of the various vehicles as follows:

PETROL-DRIVEN VEHICLES

Advantages
Moderate capital cost; high speed.

Disadvantages
High running costs; proved inability to withstand constant starting and stopping; high maintenance costs; heavy tire expenditure; dear fuel; fluctuating price of same; many working parts; motor running while vehicle stands; noisy on low speeds; skilled drivers needed, and special maintenance staff.

STEAM-DRIVEN VEHICLES

Advantages
Moderate capital cost; satisfactory speed; cheaper fuel; satisfactory starting and stopping.

Disadvantages
Constant wastage of power when standing; skilled labor to manage, and then two men required; costly maintenance; heavy tire expenditure; frequent loss of earning power during overhaul; fear of boiler troubles; noise—steam exhaust offensive.

ELECTRIC

Advantages
Ample speed; ability to withstand starts and stops; very rapid acceleration; few moving parts, therefore low maintenance; cheaper tires (initial cost); less wear on tires owing to easy turning movement; cheap fuel at fixed prices; ease of control, therefore horse-men prove successful drivers. By employing the electric there would be no noise, odor, smoke, gears to change, no clutch, no
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carburettor to adjust, no ignition troubles, or no boiler to overheat; therefore I could not fail to lean towards this vehicle which had to be used on the heaviest possible work, with a staff whose engineering experience was, to say the least, modest.

HEAVY INITIAL COST

While I favored the electric vehicle, I did not approve its high cost, and did my utmost to obtain a reduction. I found that the manufacturers, although keenly competitive, were unable to reduce their charges, the reason for this being that the output of electric vehicles is very small compared with other types of vehicles. The work costs must therefore remain high until the demand grows. Added to this, the high cost of freight and insurance brings about a total which appears very heavy compared with the purchase price of petrol and steam vehicles available on their merit at their present prices. I found that users had experienced little or no maintenance, and that the claim that an "electric" was good for a life of even so much as fifteen years, without undue maintenance, was likely to prove true. This materially simplified the proposed initiation, with the result that I advised my committee to make an immediate experiment, which suggestion was promptly acted upon.

I then decided that I needed vehicles of 3-ton capacity, but I have since seen that a mixed fleet of 2 and 3 tonners working in pairs of equal capacity will be ideal for the convenience of our town. The body must be of sufficient capacity to carry the load under average conditions, but no concern need be felt when the weight per cubic yard exceeds normal, as no vehicle of good design should be strained under the occasional maximum conditions.

High speed would be no advantage, for when working in pairs the maximum speed required is governed by the speed of filling. It would obviously be a fallacy to accelerate speed if the empty vehicle has to wait while the second vehicle is nearing the completion of loading, and alternatively the capacity of body is governed by the distance the loads have to be taken. A speed of from 9 to 12 miles per hour is ample.

It was essential that, whenever power was selected, the vehicle must be capable of starting and stopping upon all levels and conditions of road without causing undue maintenance. The simplicity of the mechanism convinced me that the "electric" would excel in this respect.

BATTERIES

The next and more difficult point to decide was the selection of battery. When I first mentioned electric to my chairman he opposed the idea, on the ground that his experience with them was not satisfactory. I replied that I was not surprised, as undoubtedly he had been using lead batteries, and as this may have been the experience of others I trust you will excuse me if I appear to dwell somewhat on this point.

I do not pretend to be an electrical engineer, but I have friends whose advice is worth seeking. Upon hearing my requirements they sagely shook their heads and gave me many hints on the upkeep of lead batteries which were of a more or less bewildering nature.

I agree that the imperfections of the English lead battery may be more aggressive when explained in cold print than when handled by skilled electricians. I had to remember that skill in handling does not end the care necessary for successful maintenance. Much harm can be done to the battery by careless discharge, and temporary short circuit, if not absolutely disastrous, with some types of lead battery, at least causes inconvenience, and may entail its removal from service. This would necessitate spare sets and special appliances for the easy removal of approximately three-quarters of a ton of cells by the means of lifts, jacks, trucks and similar contrivances.

Obviously in this class of service it is essential to have the battery dust-proof and mechanically strong. This you will agree is even more necessary than very high efficiency; for current is cheap, whereas battery maintenance is expensive. In the nickel iron battery in England I believe we have a battery which is almost indestructible within a reasonable service. Certainly the manufacturers believe in its longevity, for they have formulated a special guarantee which states that on the completion of 60,000 miles service the battery will still show a nominal rated capacity, failing which, they will at their discretion bring the cells within the specification, or replace same free of charge. This guarantee is subject to certain conditions as to maintenance, which are simple to follow and offer no loophole whereby the terms of the guarantee can be avoided.

As the mileage per day on refuse collection is from 15 to 22 miles, the average can be taken at 20 miles per day, which represents at 300 days per annum a ten years' guarantee. The manufacturers stipulate that the maximum period of the duration of the guarantee is eight years. It is comforting to know that, notwithstanding this shortening of the actual period of guarantee, "service" is the destroying factor—not "idleness." Since there are many instances where the batteries have much exceeded 100,000 miles service in heavy-duty vehicles, it seems probable that the capital write-off at 10 per cent per annum is much too conservative. At this rate of reduction of value the vehicles successfully carry out the work at a price hitherto unheard of with horse traction; therefore it is wise to retain the figures and benefit of the later date should my calculations prove too pessimistic.

The cost of the best type of lead battery is about half that of the nickel iron. Certain makes carry no guarantee whatever, but for a fixed sum per mile a battery maintenance can be arranged. Other makes are guaranteed for a minimum of 20,000 miles. In the event of this mileage not being completed, then a new battery is equipped at a reduced cost proportionate to the lost mileage. That is to say, if 15,000 miles only is completed, then the replacement will cost 75 per cent of a new one, subject to the fluctuations of the metal market.

COST OF CURRENT

The guarantee of the iron battery has been already stated. Then comes the question of efficiency. The cost of current at ld, per unit (which is the almost universal charge for traction current, but, unfortunately, not so in Nottingham, will average approximately 2s. per day. What is the difference of 10 per cent in efficiency? This is the admitted advantage of the more efficient lead cell. I repeat, what is this small charge compared with the much higher maintenance costs? I doubt if the difference will cover the loss and inconvenience occasioned by the vehicle being out of commission while the lead batteries are being periodically overhauled and defective plates being replaced.

While on the point of cost of current it is well to remember that where destructors are available so can electricity usually be found, or the necessary plant be installed at a cost not affecting the proposition whatsoever.

The makers of the American iron accumulator give me the following description of the nickel iron battery: The battery is composed of a number of steel plates contained in corrugated nickel steel containers. The positive plate contains alternate layers of nickel hydroxide and pure flake nickel, this material being supported in
spatially made steel sheaths, the edges of which are overlapped, the whole being submitted to a very high pressure during filling, rendering the contents to a rock-like nature. These are further encased with a number of small steel rings. These pencils are supported in frames made of the same material. The negative plate consists of a number of perforated steel pockets containing iron oxide similarly supported. The opposite poles are supported by pure rubber strip sheets and frames in a concentrated form, the heavy cost of which, I understand, is largely responsible for the high cost of the cells.

The electrolyte is non-acid, and is composed of a solution of lithia and potash. These ingredients are interesting, inasmuch as it is known that potash is a preservative to steel; all the metal parts being of steel, it is probably due to this fact that the long life of the plates may be confidently anticipated.

With regard to maintenance, so far no cost has been involved, but a small sum of money has been set aside to ward against possible expense at a later date. It is usual to add distilled water to each cell by means of an automatic device two or three times per week, depending upon the climatic conditions. The frequency of these operations is regulated by the amount of evaporations. The filling device indicates whether the cell requires more water, by means of a bell or buzzer, which is vibrated when filling is normal. This process occupies from six to ten minutes and is carried out by unskilled labor. The exterior of the containers is submitted to a bath of nickel, and afterwards painted with an insulating paint known as Esqlite. It is important that cleanliness be observed, and that the cells be regularly repainted should the original coating of Esqlite have flaked off, which is sometimes observed. These precautions are taken with a view to preventing rust, and negligence in this direction may cause leakage to the containers which cannot be repaired, but must be replaced. The replacements of the cans will not destroy the value of the plates, and while the expense is little, such a debit need not be incurred provided ordinary precaution is taken. The Edison battery is totally enclosed, the filling aperture being provided with an ample cap in which is contained a ball valve which prevents foreign matter from encroaching. At the same time it breaks the globules of electrolyte. These are thrown up in an effervescent form during high rates of charge and discharge, and are thus returned to normal useful condition.

WORKING COSTS

In the report presented to my committee in September last I submitted estimates from the makers of various vehicles and the results of special tests made at Barnes, Heston, and Isleworth, Dover and Sheffield, which figures I can supply if desired; but as we now possess figures covering fairly long periods under normal working conditions I think these are preferable.

During six months ending July 1, 1915, the cost of emptying dry ashbins by horse vehicle in Nottingham averaged 4s. 4d. per ton, but owing to the increased charges for horse-keep, wages, etc., the cost is now 5s. Our No. 1 motor was delivered on October 15, 1915, commenced work on the 18th, and has been in use daily ever since. During the six months ending April 15th it carried 422 loads, weighing 1,288 tons, at a cost of £241 13s. 10d., which is equal to 3s. 9d. per ton, the average weight per load being 3.05 tons.

If we take the six months ending July, 1916, we get a period corresponding to the period covered by the figures given in my original report, and this is a more fair comparison than taking the first six months work, which are all winter months. We find that during this time we removed 1,167 tons of refuse, at a cost of £253, or 4s. 4d. per ton, which is exactly the same as the cost by horses, as mentioned in my original report; but it must be remembered that the conditions then were the same as before the war. Under existing conditions, as I have already stated, the cost is 5s., thus showing 8d. per ton in favor of the motor, which means that if all our dry-ash refuse were removed by motors a saving of over £1,000 per annum would be effected, and this in a town which I consider not best adapted to motor traction for this class of work. I have dealt only with the results obtained by our No. 1 motor, but the figures for the No. 2, which has been at work daily since March 13th, are identical.

The costs are made up as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>£</th>
<th>s</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depreciation at 10 per cent</td>
<td>52</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>Insurance</td>
<td>4</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Oil, water, repairs, etc.</td>
<td>11</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Tires—1,819 miles at 1/14d.</td>
<td>8</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Current—2,341 miles at 1/4d.</td>
<td>13</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Wages</td>
<td>151</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>£241</strong></td>
<td><strong>13</strong></td>
<td><strong>10</strong></td>
</tr>
</tbody>
</table>

Mr. Priestley, cleansing superintendent, Sheffield, who has experience of electric motors in the collection of house refuse is greater than that of any other superintendent, recently presented a report to his committee giving a full set of figures.

Mr. Jackson, cleansing superintendent, Birmingham, who has been working an "Orwell" dust van since May 29th, reports that it is equal to 2.5 horses.

Even if the running costs and standing charges of motor vehicles are only equivalent to the present cost of horse collection, I most strongly contend that from a sanitary point of view the change is to be recommended. I feel personally that too much emphasis cannot be brought to bear on what appears of national importance, for the following among many other reasons which no doubt will occur to you:

1. Cleanliness of street.
2. Labor provided for building chassis.
3. Reducing the demand for fodder for horses.
4. Correspondingly increasing the supply available for feeding cattle.

From a hygienic standpoint the value of No. 1 alone compels us as cleansing superintendents to be in the forefront in adopting this improved form of traction.

In conclusion, it is worthy of mention that my faith in the success of electrics is upheld by many other municipal officials who with myself have franked their good opinion by placing orders and repeat orders as follows: Edison Battery Vehicles.—Sheffield, 5; Chester, 4; Dover, 6; Barnes, 4; Glasgow, 2; Pontypriidd, 2; Newcastle, Heston and Isleworth, South Shields and Smethwick, 1 each. Lead Batteries.—Birmingham, 2; Wolverhampton, 1. In many cases reports have been made, in each of which substantial savings have been made.

LARGE DEMOUNTABLE BODIES FOR ELECTRIC VEHICLES

A considerable amount of experimenting has been done with small platform battery trucks to increase the running time of the vehicle and generally keep it in service when loading and unloading operations are going on. The most satisfactory solution of this problem is the detachable body.

The Midland Railway Co., which has shown such commendable enterprise in putting into service a large fleet of electrics, which now numbers nearly 100 vehicles, 

*These figures will be found in a previous issue of Electric Vehicles.*
can claim credit for the introduction of a demountable body which is suitable for vehicles which ply about the streets.

The demand for this class of body almost naturally arises with certain classes of railway transport, in which the complete load requires to be picked up at the station, say, and deposited in toto at a warehouse or factory as the case may be. By means of the demountable body it is possible to save a considerable amount of time in loading and unloading, and where a single consignment of goods runs into many tons the vehicle can be kept working while the loading and unloading operations are in progress. This interesting demountable body is shown in Fig. 1. We understand that the idea has been fully patented, and the sole rights are in the hands of Messrs. Edison Accumulators. The photographic illustrations show four positions of the body. In the first the lorry is about to be backed under the body itself; in the second the operation of backing is completed; in the third the load has been slightly lifted so as to raise the castor wheels from the ground; and in the fourth the entire load has been lowered on to the body, and the castor wheels have been turned at right angles so as to clear the ground. The operations of raising and lowering are carried out by means of an auxiliary motor, which is fitted into the chassis frame, as shown in Fig. 5. The motor is operated by a special control, and it works on the full battery voltage. It is

attached to a small sub-frame immediately behind the battery box, and is placed with its axis at right angles to the direction of travel. There is an extension of the motor spindle to a coupling which is connected with the shaft, having at its outer end a worm wheel.

This is totally enclosed in an oil box, and engages with a wheel upon which a long shaft is secured. This extends from the center towards the rear of the chassis. The shaft is fitted with a square thread at each end, and a block moves on this, there being a toggle attached which operates a pair of heavy levers, one at each end of the shaft. The free end of each lever is provided with a roller. The levers at the front and rear end of the vehicle are secured to a transverse shaft, so that there is a lever on each side of the chassis. It will be noticed from the side elevation that these levers move from opposite directions, therefore there is no tendency to slew the body off the trolley. The entire operation of backing under the load and getting it into position ready for away occupies only a few minutes. When the body has been slightly raised from the ground, each of the castor wheels, which will be noticed at the ends of the four "legs" dependent from the body, is raised in turn by hand and secured in a horizontal position by a movable pin which is attached to the leg by a short chain.

We understand that the Midland Railway Co. has one of these vehicles now running in the London area, and the experiments so far have proved it to be quite a success. The company is considering fitting a number of its lorries with the demountable body, and these vehicles will operate in that class of service for which this form of body is essentially suited. Obviously, there is no need to apply this type of body to a vehicle which is gradually getting rid of its load or picking up its load at different points. We feel sure that the arrangement will have a wide use, and that motor transport firms, aside from railway companies, will find it of great value. There are a number of districts, we understand (Sheffield in particular), in which it is necessary to take heavy loads from one works to another or from warehouses to works, the entire load being taken up and put down in each case. Doubtless it is in such districts that we may shortly expect to see these interesting vehicles put into service.

Melbourne Opens Charging Stations for Electrics

The city electrical engineer of the municipal electric supply department advises the Melbourne, Australia, consulate, in charge of William C. Magelssen, as follows:

"I have pleasure in informing you that this department has decided to open a charging station for electric vehicles at our power house, Spencer street, Melbourne. This charging station will be open day and night to receive and charge vehicles, but we shall not undertake any repairs or cleaning.

"The cost of current for charging will be 1d. (£0.02) per unit between the hours of 10 a.m. and 8 a.m. and during other hours will be 1½d. (£0.035) per unit.

"A charge of 10s. (£2.43) per vehicle per week, or 2s. (£0.48) per 24 hours, will be made for accommodation."

The absence of electric vehicles from the streets of Melbourne is largely due to the lack of charging stations, and the establishment of the one referred to will do much to create a demand for American electric vehicles of all kinds.

It is very desirable that Americans get busy, as the entering wedge has started to work for Australians are like Americans, after they have been convinced they take no half way measures but go in for a thing strongly.

Motion picture slides, if the right amount of thought is put in their construction, form valuable selling aids for the electric agency. They do not cost much, either to run or to purchase, and if they are placed in the program of the best cinema houses in your vicinity will bring results. Any evening spent in observing the crowds going into the picture houses and the type of motor cars outside by the curb will readily repay a close observer. You may then design your slides to suit the audiences of the different houses.

Electric automobile motors, according to the 1914 census just completed by the Department of Commerce, amounted to 11,880 with a value of $1,351,442 and a total horsepower of 36,858. However, this also includes a number of starting and lighting motors for gas cars.
The first national convention of the Detroit Electric Dealers was held in the convention hall at the Anderson Electric Car Company plant on August 21, 22 and 23 and was attended by dealers and representatives not only from all parts of the United States but from Canada and England. Upon its conclusion on the evening of August 23 it was voted as a huge success and a permanent organization was formed which will meet annually at Detroit for the purpose of frankly discussing conditions from every angle in the automobile field. Corrective measure from every standpoint, especially in so far as the Detroit Electric is concerned, also will be discussed.

Delegates to the convention began to arrive at Detroit on August 19. All were met at the depot by factory representatives and were escorted to Hotel Statler, which was the headquarters during the meeting. By the opening hour for the convention, 9:30 o'clock on August 21, one hundred and sixty-nine salesmen and dealers had arrived to take part in the convention.

The opening of the program consisted of a thorough inspection of the factory under the able direction of Bruce Fairgrieve, brother of Gordon D. Fairgrieve, general manager of the company. Every part of the factory was thrown open for the inspection of the representatives who devote their energies to the sales of Detroits. Even the usually locked doors of the experimental department were opened to prove that there was no false compartments.

One of the things that surprised the visitors was the number of bodies being built by the Anderson Electric Car Company for the Packard company, attesting to the fact that the coach work of the electric car makers is recognized as the acme of construction even by gasoline car manufacturers. The visitors also saw the chassis of twenty-five immense busses being made on special orders from abroad. These buses are to be used for transportation in London where the transfer companies have discovered beyond all doubt that the electric propulsion system is the only system for cheap haul and economy.

The visitors saw a pile of aluminum ingots as large as an ordinary house and almost as valuable as gold at present quotations and every pound of which goes into the construction of Detroit bodies. The Anderson Electric Car Company is the largest purchaser of aluminum in the automobile field, mainly owing to the large quantity placed in each body to give strength and reduce weight to a minimum.

Following the inspection of the tremendous plant the convention was called to order by A. C. Downing, assistant to the general manager, who presided owing to the indisposition of General Manager Fairgrieve.

After an address of welcome, W. D. Anderson was introduced to the dealers many of whom he knew personally, having done business with them for years. He showed consideration for his guests by cautioning them not to sit in any poker games with two officials of the company. These gentlemen were described by Mr. Anderson as "sharks who never were known to lose" and he said he spoke from experience. With a few more pleasantities by Mr. Anderson the convention got down to strenuous work during which numerous addresses were made on subjects of importance to the trade. Each address was discussed pro and con, commended or torn to pieces according to the viewpoint of the representatives.

Among the papers read were:
Co-operative Follow-Up Sales Work by Correspondence—A. C. Downing, assistant sales manager.
Research Department—George L. Bixby, in charge of research department.
The Service Department and Its Relation to the Dealer—Carl A. Kirsten, in charge of parts order department.
Dealers’ Service to Owners—D. E. Whipple, central district manager Anderson Electric Car Company.
Sales Development Through Advertising—F. E. Price, vice-president in charge of advertising.
Right Kind of Publicity and How to Get It—Nat S. Stronge, ELECTRIC VEHICLES, Chicago, Ill.
The Utility of the Electric as an Important Selling Factor—Albert T. Clark, southwestern district manager.

Concrete Proof That Electricity Is the Greatest and Coming Power for Automobiles—A. C. Downing, assistant sales manager.

Simplified Methods of Accounting for the Dealer—Wilson Critzer, auditor.

Price Maintenance and Sensible Trading—E. P. Chaffant, manager eastern division.

Credible Selling, or Building Up Business—D. E. Whipple, central district manager Anderson Electric Car Company.

Closer Relations with Dealer and Their Salesmen—E. P. Chaffant, manager eastern division.

Besides these papers, General Manager Gordon D. Fairgrieve, by proxy, gave an accurate account of the sales of the Anderson Electric Car Company during the past year. The report showed that the factory branches of the company had done a satisfactory business and that the business had increased 141 per cent over the preceding year.

All of the papers read had been printed in advance and copies of each were distributed to the attendants with a handy binder in which to keep them. The printed copies were followed carefully during the addresses after which the more important portions of each were taken up and discussed.

These papers will be published from time to time in ELECTRIC VEHICLES for the enlightenment of those dealers who were unable to be present.

The creditable high points of the convention was when President Anderson withdrew a curtain and showed to the delegates the new model 68 Cabriolet which is listed at $1,775. The dealers were fairly taken off their feet and all predicted a tremendous increase in sales. Nearly all of them immediately began to sign up their contracts for the next six months and increased their orders many hundred per cent over the past fiscal year orders.

While the business sessions of the convention were strenuous from every standpoint the Anderson Electric Car Company took care of the entertainment in a royal manner. Tuesday evening, August 22, the company chartered a river excursion boat and took the delegates and their friends to Bois Blanc Island, where dinner was served, the boat returning to Detroit about midnight.

Among the delegates who registered and obtained the official badges which admitted them to the convention sessions were:

W. J. Milling, 1235 Main street, Buffalo, N. Y.
Guy C. Stoltz, Marion, Ohio.
S. A. Cotterman, 604 Downer avenue, Milwaukee, Wis.
W. S. Milling, 127 Russell avenue, Buffalo, N. Y.
W. E. Foster, 1225 Main street, Buffalo, N. Y.
A. T. Blackwell, 516 Wall street, Joplin, Mo.
I. G. Kirsten, 687 Woodward avenue, Detroit, Mich.
W. Reese Dunwoody, 541 Peachtree street, Atlanta, Ga.
H. M. Dunwoody, 541 Peachtree street, Atlanta, Ga.
R. E. McComas, A. C. Berthold Co., Aurora, Ill.
W. G. Davis, East Main street, Hamburg, N. Y.
G. B. Pratt, 1225 Main street, Buffalo, N. Y.
M. E. Dikesman, 127 State street, Binghamton, N. Y.
John K. Mohr, Mohr Hardware & Furniture Co., Bay City, Mich.
H. H. Tenney, 1311 N. Clinton street, Bloomington, Ill.
E. W. Sferron, 650 Beacon street, Boston, Mass.
Helen Goodwin, 650 Beacon street, Boston, Mass.
Jesse W. Garrett, 9-11 N. Brevard street, Charlotte, N. C.
W. A. Kennedy, 229 E. Tuscarawas street, Canton, Ohio.
George Behlen, Chas. Behlen Sons Co., Cincinnati, O.
charged to the room of a man who never tasted wine?

One Chinese restaurant in Detroit serves cockroaches without extra charge. For verification write J. O. O’Brien of the Central Branch.

President W. D. Anderson once sold pumps. He sold ‘em in carload lots. He had to, for W. D.’s dad knew how to use the birch rod, and W. D. had ordered a car load of pumps, when Dad had ordered him to purchase but twelve at a cost of about $30. W. D. tied the entire family fortune of about $2,500 up in pumps. Then he went out and sold them. When he got rid of the last pump he told Dad and saved himself a licking.

Downing proved himself to be some talker. He talked all the time just because everybody yelled for him when he tried to quit.

Even though W. Reese Dunwoody, of Atlanta, parts his name in the center, he says he has to, because all his friends know him as “Reese.” He reports Atlanta booming, with electrics coming into favor more and more every day.

J. L. Hibbard, of Chicago, scored one on Downing when he told the delegates of a company that would furnish the name of every person with an income of $3,000 or more, in any city in the country. Hibbard is dead right, said Sam Menafee. We live and learn A. C.

D. W. Lockerby, of Montreal, has to pay a duty of 42½ per cent on every Detroit he imports. He will sell the $1,775 car for $2,500 and he declares before the end of the season the great majority of the French elite of Montreal will be driving electrics. Mr. Lockerby says the Province of Quebec is the only Province in Canada showing any signs of prosperity.

W. H. Young of Oil City, Pennsylvania, told the fellows he was new in the game; and that he didn’t know a great deal about selling cars. Then he wants right on, giving some of the very best selling arguments of the day.

Rodney S. Cullen, of Philadelphia, reports the old Quaker City awakening, with Quaker Row in the old portion of the city, making numerous inquiries regarding the Detroit.

Numerous dealers wanted to know why D. M. Simpson of the General Lead Batteries Company of Newark, N. J., did not attend the convention. Simpson was called away or he would have been there.

Convenion Sparks

The Hotel Statler guests thought the Central District outfit was a party of Pittsburgh millionaires in disguise. Good thing the convention didn’t last more than three days.

Guessing contest—Who paid that $130 wine bill

Rodeny S. Cullen, 1926 Arch street, Philadelphia, Pa.
A. C. Kendall, 100 E. Union, Pasadena, Cal.
H. F. Muzzy, 4923 Center avenue, Pittsburgh, Pa.
J. Casper, 4923 Center avenue, Pittsburgh, Pa.
A. G. Davenport, 138 Arnold avenue, Providence, R. I.
W. E. Johnston, 1810 Main street, Peoria, Ill.
H. T. Boulanger, 754 Bay street, Rochester, N. Y.
Henry G. Schneider, 405 Fernwood avenue, Rochester, N. Y.
Chas. E. Sager, 30-40 Carleton street, Rochester, N. Y.
R. A. Herrington, 330 S. Church street, Rockford, Ill.
H. B. McCarty, 417 W. Navarre, South Bend, Ind.
C. N. Shaffstall, 321 W. Washington avenue, South Bend, Ind.
Charles R. Powell, 1109 Grandview avenue, Scranton, Pa.
H. S. Gwinn, 1159 Dayton avenue, St. Paul, Minn.
Basil W. Oggi, 230 S. Fourth street, Springfield, Ill.
E. C. Henning, 506 S. Sixth street, Springfield, Ill.
H. A. Jacobs, Savannah, Ga.
L. J. Kitt, 222 N. El Dorado, Stockton, Cal.
Edward L. Tabin, 4302 W. Pine boulevard, St. Louis, Mo.
M. B. Strauss, Twentieth and Locust, St. Louis, Mo.
I. G. Perin, 1117 Van Ness avenue, San Francisco, Cal.
R. M. Griffith, 11 W. Seventh street, Tulsa, Okla.
W. H. Imms, 918 Kansas avenue, Topeka, Kan.
Jno. W. Bull, 826 S. Rome street, Tampa, Fla.
J. J. Hasham, Toledo, O.
H. H. Dennis, 1902 Madison avenue, Toledo, O.
W. H. Dennis, 2440 Hollywood avenue, Toledo, O.
H. R. Morgan, 305 N. Market street, Urbana, Ill.
W. R. Schiller, corner Noyes and Francis, Utica, N. Y.
O. H. Wey, 1751 Park Place, Wichita, Kan.
W. D. Kenny, 208 S. Lawrence, Wichita, Kan.
John T. Sterrett, 2155 Champlain street Northwest, Washingto, D. C.
Robert F. Fleming, Champlain and Koloroma road, Washingto, D. C.
T. G. Capp, 316 Park avenue, Williamsport, Pa.
M. J. Polley, corner Third and Wimona streets, Wimona, Minn.
C. F. DuChanois, Youngstown, O.
D. E. Whipple, 2416 Michigan avenue, Chicago, Ill.
A. T. Clark, 311 Main street, Kansas City, Mo.
Sam W. Menefee, 20 Central Park West, New York, N. Y.

The Convention in Session, with the New Car Holding the Center of the Stage.
General Manager Gordon D. Fairgrieve was taken sick on the opening day of the convention and was remembered by the delegates through a huge box of flowers sent to his residence.

Wilson Critzer, who arrived in Detroit in a flannel shirt and a cowboy's hat twenty years ago, and now is auditor of the Anderson Company, did a lot of talking, but he didn't promise any sixty or ninety day extensions.

T. C. Reid says he is some used car salesman. He never lost a cent on resale. T. C. is right near the factory and equiped cars used with new batteries and a nice new finish. Sells 'em with a guarantee, too! Why brag, T. C.?

Charley Sager of Rochester, N. Y., purchased the first five Detroit that W. D. Anderson ever sold. Sager went back home from New York to get the money. W. D. never expected to see Sager again. He saw him the next day and Sager had a New York draft for $2,500. Sager still is selling Detroit and lots of them.

W. H. Dennis of Toledo, Ohio, advised all the dealers to go out and climb a tree in a Detroit just to get the publicity. He does all sorts of stunts, and makes the Toledo newspapers pay the bills. And he makes ELECTRIC VEHICLES pay some engraving bills. Keep it up W. H.

We're for you.

H. E. Swan, of Davenport, Iowa, complained that he hadn't seen a copy of ELECTRIC VEHICLES for a month and feared he may have lost a sale because some person filched his copy.

Sam W. Menafee, of New York City, reported he recently sold a Detroit to Glenn Curtiss, more noted for air than land traveling.

H. R. Morgan, Urbana, Ill., sold five cars last year. He contracted for fifteen Detroit for the next twelve months and says he will sell them.

Wayne S. Bashaw related his experiences during his last country run and said he couldn't take photographs of himself because some of the roads were too bad. Wayne had his shoes shining before he started.

John M. Volkhardt, Jr., was mad all through when he saw the new model, because his battery factory is working almost to capacity now. His ambition saw enough orders to keep a ten-acre battery factory busy.

Miss Evans, of Fort Wayne, Ind., made every effort to be impartial with her time but the fellows who didn't get a dance thought the fellows who did were "stingy." Some of them "cheated."

G. A. Fortin, the popular Kankakee, Ill., dealer, was forced to leave for home Monday night, owing to illness. J. H. Horsley, the Illinois roadman, spent the entire night looking for Mr. Fortin. Now Horsley has to go to Kankakee.

B. E. Adams, sales manager of the Central District, says it costs him $106 a month to run a gas car. Whed yer get it, B. E.?

The Central District outfit journeyed to Detroit on a special car. Everybody got lots of sleep. D. E. Whipple, the manager, is "everybody" to that branch. Whipple didn't go on the special. He went ahead.

Jesse W. Garrett, of Charlotte, N. C., has persuaded Duke, the Tobacco King, to reduce the price of current from 9 to 5 cents a K. W. hour for car owners. "That means more business for me and Duke," says Jesse.

The General Vehicle Company, Incorporated, has just gotten out an attractive new catalogue of thirty-two pages dealing with their product. It is very neatly done in two colors with a wealth of information and illustrations relative to the use of G. V. trucks in various channels of business endeavor. It is interesting and will be thoroughly perused with profit by anyone interested in knowing what electrics have done in the past and can do in the present. All in spite of the hard strain the gray green type has on one's eyes.

The General Vehicle Company's offices are at Long Island City, N. Y.

In glancing over the latest Frederick Drake & Co. Chicago publication Electric Tables and Engineering Data, by Horstmann and Tousley, one is struck by the fact that all data is alphabetically arranged and easy to find. There is much data that can not be placed in a 332-page book, but the information presented is that which one is called upon every day to answer. It takes in everything from acid fumes, adapters to weights and wires and "Y" connections. There are 35 illustrations and 152 tables, which deal with nearly every problem that may come up in construction work and thus avoid the delays and chances of faulty calculations. As far as the auto field is concerned the authors do not seem to have paid much attention to it.

A new 64-page handbook has just been prepared by the S. K. F. (Svenska Kugellager Fabrik) Ball Bearing Company on "Better Electric Motors." The subject matter is splendid and brings the salient points of the bearing out in splendid fashion. The book is illustrated with a profusion of cuts that become confusing when one tries to read it. The small corner embellishment in two colors detracts attention from the cuts in which the reader would be interested. Quite a few illustrations will be found that are of interest to ELECTRIC VEHICLES readers, such as automobile motor bearings and motor generator sets and the like.

David Beecroft, editor of Motor Age, returned July 17 from a three-months' business trip through South America, made for the purpose of investigating the motor car industry in Argentina, Uruguay and Brazil. He went as a special representative of the United States government Department of Finance, and will report his findings on motor vehicle trade and conditions in Argentina to Washington.

Copies of special agents series No. 118, "Markets for Machinery and Machine Tools in Peru, Bolivia, and Chile," may be procured from the Superintendent of Documents, Government Printing Office, Washington, D. C., or from the district offices of the Bureau of Foreign and Domestic Commerce at 10 cents each. Mr. Beecroft's report will also be printed for public distribution.
The Swiss Electric Vehicle Problem

At first sight the establishment of public charging stations for electromobiles would do much to increase the use of this efficient and convenient type of vehicle. To a certain extent this would be the case but, as pointed out by the new Swiss journal, Elektromobil, no type of storage cell can be completely recharged in much less than six hours. True, a useful “boost” can be given to nickel-iron cells in from twenty minutes to one hour, but the only way of approaching the convenience of a petrol or steam car in point of rapid replenishment of motive power is to exchange the exhausted battery for a set of fully-charged cells. In the present state of electric vehicle development and with the present diversity of battery types, this solution is commercially impracticable. Whatever may be possible later on, one can only afford at present to establish charging stations in districts where they can be utilized fairly continuously by vehicles stationed in the neighborhood. No important revenue can yet be expected on “foreign” electric vehicles passing through the neighborhood, and in any case such vehicles would rarely want more than a boosting charge. In the case of a fair-sized town in which a number of industrial electric vehicles are employed, the range of the latter may be usefully extended by a boosting charge during meal times or whilst unloading and reloading the vehicle. Small public charging stations may be erected for the purpose in the outskirts of the town, or large consumers may have motor-generators and charging panels installed in their central and branch establishments.

As a guide to the location of charging stations round a town, the following data may be taken to apply to the radius and energy capacity of various types of vehicle:

<table>
<thead>
<tr>
<th>Miles per Charge</th>
<th>Mean Speed</th>
<th>Energy per Charge</th>
<th>M. P. H.</th>
<th>Kw. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Hilly route, dry surface)</td>
<td>37½—50</td>
<td>13¼—14½</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Doctor’s car (2 seats)</td>
<td>30—62½</td>
<td>13½—46½</td>
<td>30—45</td>
<td></td>
</tr>
<tr>
<td>Taxi</td>
<td>25—37½</td>
<td>11½—13¾</td>
<td>25—35</td>
<td></td>
</tr>
<tr>
<td>Hotel omnibus</td>
<td>25—37½</td>
<td>10—13½</td>
<td>25—30</td>
<td></td>
</tr>
<tr>
<td>1-ton truck</td>
<td>25—37½</td>
<td>9½—12½</td>
<td>30—35</td>
<td></td>
</tr>
<tr>
<td>2-ton truck</td>
<td>25—37½</td>
<td>8½—11½</td>
<td>40—45</td>
<td></td>
</tr>
<tr>
<td>3-ton truck</td>
<td>25—37½</td>
<td>8—10½</td>
<td>65—75</td>
<td></td>
</tr>
<tr>
<td>4 to 5-ton truck</td>
<td>25—37½</td>
<td>8—10½</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It should be noted that the state of the roads traversed has a great influence on the distance traveled per charge by an electromobile. The distance may, for instance, be 20 per cent higher than the above figures for a good asphalted road and 20 to 30 per cent lower than the tabulated figures on an uneven muddy road. Taking 25 to 30 miles as the minimum distance per charge this gives a radius of action of 12 to 15 miles for heavy vehicles and rather more for light vehicles, so that to fulfill their aim, the auxiliary charging stations should be 9 to 15 miles from the town. The main charging station should be near the industrial center and easy of access to all sizes of vehicles. If the station is in a hollow, an “exhausted” vehicle may reach it which would have trouble in climbing to an elevated station.

Heat Destroys Over 2,800 Chicago Horses

During the hot spell ending Sunday night, July 30, Chicago business men lost something like $50,000 in horse flesh alone, through the death of horses overcome by the heat during the terrific nineteen-day heat wave, states the Electric City Magazine. Horses cannot be easily purchased now, on account of the scarcity due to purchases for the European war; consequently there was a great inconvenience attached to the loss of these horses which must mean still more dollars to their owners.

That statement is based upon the reports of the office of the Commissioner of Health of the city of Chicago. The records show that horses dropped at the rate of about 150 per day. If we multiply this by nineteen we get the total of 2,850 horses killed by the heat during this period. The market value of a good horse is today somewhere in the neighborhood of $200, as a conservative estimate. Multiplying 2,850 by 200 we have the tremendous total of $570,000 as the value of horse flesh destroyed by the weather conditions.

On the other hand, business men who use electric vehicles for their transportation requirements suffered no loss or inconvenience whatsoever. Not only is the electric vehicle more durable, more reliable and cheaper to operate than any other means of transpor-
Fashions for Milady of the Electric
New Fall Garments to Be Seen in Electrics on the Boulevards and Roads

This autumn one will see the electric out on the country road more than ever before. On viewing scenes like the above it will be noticed that the ladies in the electric, like those in the Chicago electric, are persons of discerning tastes, as the two gowns that they are wearing from Percival B. Palmer and Company of Chicago will amply testify.
News of The Electric Vehicle Section, N.E.L.A.

Sectional Development Work, Reports of Committees and New Announcements

This department gives the record of all activities of the Electric Vehicle Section of the National Electric Light Association in all of its sections, as reported by A. Jackson Marshall, national secretary.

Realizing the valuable co-operative development work which the association is doing, the publishers of ELECTRIC VEHICLES offer this exclusive section to association members and all electric vehicle interests in order that they may keep closely in touch with association matters.

EXECUTIVE COMMITTEE MEETING

The meeting of the Electric Vehicle Section's Executive Committee was held at the New York headquarters, 29 West Thirty-ninth street, Friday, August 4, at 2 p. m.


The minutes were approved as presented.

In the absence of Treasurer Edwards, Chairman Mansfield presented an analysis of the Section's finances, showing cash assets of $2,277.99 and accounts receivable $2,194.00, making the total assets $4,471.99. The liabilities, consisting of accounts payable and unlocated receipts amounted to $2,035.64.

It was estimated that the ordinary operating expenses for the Section for the months of August and September would be approximately $2,000, an average of $1,000 per month. The actual average monthly expenses for the Section for the period October 1, 1915, to July 31, 1916, was $1,373. If the Section discharge its outstanding obligations there would be, of July 31, an actual cash balance of $242.35. If the outstanding current year dues and miscellaneous accounts receivable were collected and with a cash balance of $242.35, and assuming that the expenses for the Section for the next two months would approximate $2,000, there would not be a deficit.

Chairman Mansfield advised that he had presented the financial statement to the N. E. L. A. executive committee, in session in the morning, and had requested W. H. Johnson to represent the Section at the Executive committee meeting in the afternoon at which time the following resolution was adopted:

On motion of W. H. Johnson it was voted that the entire accounting and financing of the Electric Vehicle Section be taken over by the National Electric Light Association, the Electric Vehicle Section to draw a check covering its present individual bank account in favor of the National Electric Light Association and that hereafter the National Electric Light Association shall draw all checks and assume all Electric Vehicle Section liabilities and income and that the Electric Vehicle Section endeavor to collect all accounts receivable.

EDUCATIONAL COURSES COMMITTEE

Chairman Mansfield advised that it seemed desirable to have representation on the Commercial Section's educational courses committee in order that perhaps an electric vehicle course might be created and sold to representatives of central stations, the thought being to educate at least one central station employee in each central station, with a view of having such man familiar with electric vehicle fundamentals, and such man to be put in charge of electric vehicle promotion work.

The name of C. E. Robertson of the General Vehicle Company will be recommended to F. R. Jenkins, chairman of the Commercial Section's educational courses committee.

COMMERCIAL SECTION'S POWER SALES BUREAU

It seemed desirable to Chairman Mansfield that the Electric Vehicle Section suggest representation on the Commercial Section's power sales bureau in order that the importance of electric vehicle charging loads be given proper consideration. The name of R. L. Lloyd of the Philadelphia Electric Company will be recommended to George H. Jones, Chairman of the Commercial Section's power sales bureau.

These recommendations were unanimously approved.

MOTION PICTURE FILM COMMITTEE

Chairman Carl Reed discussed the matter of preparing an additional section to the film depicting electrically propelled fire apparatus, discussed at the July 6, 1916, meeting of the Executive Committee, and recommended that the sum of $300 to $350 be raised to complete this film which would be available for the distribution by and use of members of the National Electric Light Association and by others likely to be interested.

After discussion and on motion by Charles Blizard, it was regularly moved that Chairman Reed be authorized to approach various interested parties in his effort to secure sufficient subscriptions to pay for this development.

INSURANCE COMMITTEE

Chairman Day Baker presented a very interesting report indicating that the casualty companies of the United States had collected in the neighborhood of $22,000,000 in premiums on liabilities, property damage and collision insurance for automobiles for 1915, being an increase of 21 per cent over the previous year. Indemnities paid were $5,918,025, allowing $16,000,000 for carrying the insurance and for dividends to stock holders, which suggested that the amount charged by stock companies is too large in proportion to the risk carried and the amount of indemnities paid.

Mr. Baker referred to a mutual organization which insures vehicle risks at a saving of 25 to 40 per cent, and the Insurance Committee proposed sending out blanks to the various points where there are local Electric Vehicle Sections for the purpose of securing information so that the Insurance Committee may be of the most practical value to the association.

LEGISLATION COMMITTEE

Chairman P. D. Wagoner referred to two matters of special interest, one being the proposed law governing the regulation of automobile operators in the city of New York, which was vetoed by the governor,
ELECTRIC VEHICLES

and two New York city ordinances, one of which provided that every motor vehicle, except motorcycles, which is driven by side chains, should be equipped with a fender or guard which would protect such side chains from coming in contact with any object or person.

The other city ordinance provided that the controller handle or current cut-off switch on electric vehicles must be locked so that the vehicle would be rendered inoperative when such vehicle was at a standstill or unattended, also that the emergency brake or brakes must be properly set so as to prevent such vehicle from moving or being moved when at a standstill or unattended. At a hearing on the proposed ordinances before the Welfare Committee of the Board of Aldermen evidence was presented to show that these ordinances were unnecessary, and the Welfare Committee reported unfavorably on the passage of same.

MANUFACTURERS' AND CENTRAL STATIONS' CO-OPERATION COMMITTEE

Chairman George B. Foster had been unable to hold a meeting of his committee, but anticipated holding a committee meeting in the early future, when a program of activities would be outlined.

It was pointed out by Chairman Foster that some gasoline truck manufacturers were extensively and conspicuously advertising central station use of gasoline trucks and it was suggested that the various central stations be communicated with in an effort to eliminate this publicity detrimental to the electric.

In discussing the general activities of the Manufacturers and Central Station Committee, Chairman Mansfield laid particular emphasis on the intention of the Electric Vehicle Section, through this committee, to promote the sale of passenger and commercial electric vehicles and industrial trucks by central stations; and to energetically follow up the suggestion of President Wagner that each central station this year purchase at least one electric vehicle for use or resale. It was decided that Chairman Mansfield would issue, immediately, to all central stations, a letter urging their co-operation along these lines, and that the follow-up work associated with this department would be turned over to the Manufacturers and Central Station Co-operation Committee.

It was thought desirable to attach to this letter a list of electric passenger and commercial vehicle and industrial truck battery and accessory manufacturers, members of the electric vehicle section, with the hint that in the purchase of electric vehicles these manufacturers be especially considered, not only because of the high quality of their product and their facilities in promptly satisfying orders, but furthermore because they are morally and financially supporting Electric Vehicle Section, National Electric Light Association activities. It was also suggested that this general thought be expressed in the Electric Vehicle Section's portion of the monthly Bulletin.

The question of conducting an investigation with a view of ascertaining central station requirements with respect to especially designed and equipped electric passenger cars, was discussed, and it is the understanding that the Manufacturers and Central Station Committee will address themselves to this subject.

MEMBERSHIP COMMITTEE

Chairman G. A. Freeman advised that he would call a meeting of his committee the earliest date possible and institute an aggressive membership campaign.

ADVERTISING AND PUBLICITY COMMITTEE

Chairman F. W. Smith was unavoidably absent and Chairman Mansfield stated that in his opinion, in which the Executive Committee concurred, the time was particularly opportune for raising funds to conduct an advertising campaign and that this matter would be discussed with Mr. Smith and that it would seem desirable that the Manufacturers and Central Station Co-operation Committee co-operate in this matter.

It was also suggested that the matter of preparing a booklet on the electric commercial vehicle for sale to and distribution by central stations, be taken up with the Advertising and Publicity Committee, and that if such a development seemed desirable, that the Manufacturers and Central Station Committee co-operate in financing, preparing and selling the booklet.

GARAGE AND RATES COMMITTEE

Chairman Mansfield represented Chairman C. H. Miles, who was unable to be present. Official garage and charging station signs were discussed and it was suggested that the recommendations with respect to new designs, tendered by the 1914 Garage and Rates Committee to the Philadelphia convention, be considered by the present Garage and Rates Committee.

The Executive Committee directed Secretary Marshall to transmit to Mrs. J. Harry Pieper the following resolution:

Whereas, The Executive Committee, Electric Vehicle Section, National Electric Light Association, in session August 4, 1916, has been advised of the recent death of J. Harry Pieper, of Los Angeles, California; and

Whereas, J. Harry Pieper was primarily instrumental in the formation and successful operation of the Los Angeles Electric Vehicle Section, and has in innumerable other ways generously contributed to the success of the Electric Vehicle Section, National Electric Light Association; and

Whereas, This organization is deeply appreciative of the splendid services so willingly at all times rendered by J. Harry Pieper.

It is Resolved, That the Secretary be directed to convey to Mrs. J. Harry Pieper this expression of appreciation and sympathy.

The meeting adjourned at 4:45 p. m.

The foregoing will in a measure indicate that though we are passing through the comparatively inactive summer period, the Electric Vehicle Section is increasing rather than curtailing its efforts, and it is confidently expected that with the activities of the present administration and the benefits which will accrue from close affiliation with the N. E. L. A., that the early fall will witness marked developments, placing the Electric Vehicle section in a more favorable situation than it has probably ever enjoyed.

PUBLICITY

The continued success of the publicity work of the Electric Vehicle Section is proven by the very extensive reproduction of its articles which are frequently released to approximately six hundred newspapers and magazines. Every opportunity is grasped to boost the practical and efficient electric vehicle, but all the articles are constructed with a certain amount of news value to assure their publication.

The exhibition committee of the N. E. L. A. met at the offices of the association on July 27 for the election of officers for the year. The members in attendance were Chairman K. W. Perry, F. H. Gale, S. E. Doane, J. C. McQuiston, J. Mustard and Secretary H. G. McConnaughy. K. W. Perry of Johns-Manville Company was re-elected chairman, Frank H. Gale of the General Electric Company, treasurer, and H. G. McConnaughy, secretary.
A large amount of business was transacted by the committee but the most important item that presented itself was the surprise in store for the exhibitors at the Chicago exhibition this year. In spite of many expenses the committee has found that these are well within its carefully made estimates, and under these circumstances it is issuing to all the Class D members who exhibited, the notification that it has decided to return to each exhibitor 15 per cent of the amount paid by him for exhibition space. The dividend, which is of a kind that is exceedingly rare in such matters, is due not only to the work of the committee itself, but to the hearty co-operation of the exhibitors individually and as a whole. This rebate is to be forwarded immediately.

A Rauch & Lang electric, the wheels covered with mud, stopped in front of the home of W. D. Leonard, 3115 Brooklyn avenue, one morning not long ago. Three passengers alighted. They were Zenas Leonard, 70 years old, Mrs. Leonard, 62 years old, and their granddaughter, Miss Elizabeth Smith of Pleasant Hill, Missouri, where Leonard is one of the officers and stockholders in a Pleasant Hill bank. W. D. Leonard is their son.

They had just driven to Kansas City from Pleasant Hill, a distance of 43 miles, one of the hilliest and roughest roads leading into Kansas City from any direction. But the electric made the trip without a stop or a mishap, as it had made the trip many times before. Both Mr. and Mrs. Leonard have driven the electric from Pleasant Hill to Kansas City and return, a distance of 86 miles, several times. They think no more of making the trip in their electric than they would of making it in a high-powered motor car. They know what the electric will do.

The Pleasant Hill Electric company extended wires to the Leonard home for convenience in charging the batteries. The road to Pleasant Hill is poorly graded in many places and with many steep hills. Work on a rock highway is under way.

**Hill Climbing Ability Sells Cars**

Oil City, Pa., like Rome, is founded on seven hills and following the adage when in Rome do as Romans do, when you go to Oil City you must do as the Oil Citizens do. That is climb the hills. When W. H. Young, the well known electric dealer and contractor, undertook to sell Detroit electrics he had to prove they could climb hills, which he did. The illustration proves his claim. The cars easily romp up the fifteen per cent grade on Harriett avenue and find the twenty per cent grade on Pearl avenue near Plummer street no task. So successful have the demonstrations been that the owners themselves frequently drive to Rockmere, Cooperstown and to and from Titusville up and down dale without viewing the feat as extraordinary. Last spring Mr. Young drove up the hill at Titusville when the roads were in a vile condition which is quite a feat for those parts. Next month he intends to drive up Clark’s Summit.

**A Seventy Mile Shopping Trip**

Mrs. Mary Wood of Delavan, Illinois, has driven her Detroit electric into Bloomington several times in the morning and left the same afternoon for the return trip. Delavan is thirty-five miles by road and the roads were very dusty in places yet Mrs. Wood has looked as free from dust when she stepped out of her Detroit as though she had just left her home. The return trip has been made on the same charge, and Mrs. Wood encountered no difficulties on the road. Mrs. Wood drove all the way by herself and averaged nineteen miles an hour.

Climbing a Fifteen Per Cent Grade.
PERSONALS.

R. W. Pharis, who has been connected with the Pharis Tire & Rubber Co., Newark, Ohio, in the capacity of secretary and manager of the Columbus branch, has resigned to take up the management of the International Tire Co., a new retail concern at 187 East Gay street.

C. F. Kent, formerly manager of the Dallas branch of the Pennsylvania Rubber Co., has been transferred to the Kansas City branch, of which he will have charge.

Elin S. Hare, formerly vice-president and general sales manager of the Commercial Truck Company of America, Philadelphia, Pa., has been appointed manager of the Packard Motor Car Company of New York. Mr. Hare was until recently manager of the motor-truck department of the New York Packard branch.

W. J. MacInnes, formerly advertising director, commercial branch of General Motors Co., lately connected with the sales department of United Motors Co., Winton Motor Co., and motor car editor of the Chicago American, has become connected with the Western Advertising Agency, of Racine, Wis., and Chicago.

C. E. Greenwood, vice-president of the Boston Edison Company section of the National Electric Light Association, who has been appointed superintendent of the exchange of the Edison Electric Illuminating Company of Boston, Mass., succeeding W. Graydon Steison, has been connected with the commercial department of the company for the last ten years. Mr. Greenwood is a native of Boston, and graduated from Harvard College in the class of 1904. He entered the employ of the Boston Edison Company in 1906, beginning work in the contract department. He later became special agent, giving particular attention to isolated plant work. For the past four years he has also edited Edison Life, one of the most creditable publications issued by a utility organization. Last year in his capacity as assistant manager of the 1920 Boston Electric Show, he made a 9000-mile trip to the Pacific Coast with C. J. Hatch, manager of the forthcoming exposition.

W. J. McDowell, who has just been engaged as special sales representative of the Walker Vehicle Company of Chicago, is well known for his activities in the Electric Vehicle Association of America. He organized the New York sales section in May, 1912, and until October, 1915, was one of the officers, having been secretary-treasurer or chairman at some time. Mr. McDowell graduated from the University of Chicago in 1902, with the Bachelor of Science degree and later took special machine shop and electrical work at the Armour Institute of Technology. For a number of years after that he was engaged in the machine tool business with his father, but sold the business on the death of his father in 1911 and entered the electric truck field. Here with the General Vehicle Company he grounded himself so thoroughly in the science of the electric truck that he was offered the partnership of the electric truck division of the General Motors Truck Company at Chicago in 1913 with whom he remained until the first of July of this year when a change of policy occurred, and he left with a splendid offer from the Walker Vehicle Company, made it imperative that he accept. His new position offers excellent opportunities which his many friends believe will be taken advantage of.

Brevities of the Business

The Activities of the Electric Motor Car Field Told in Short Paragraphs

There has been great activity in the Woods organization during the last few months and it has added some valuable items to its sales force. Among them is George R. Veeder, one of the best known retail electric pleasure car men in the west who is to be manager of retail sales. Mr. Veeder is accustomed to doing things in a big way and built up in a big territory, 100 per cent organization in the last four years with the Anderson Electric Car Co. in Chicago as Chicago sales manager. It has been stated that as a result of Mr. Veeder's policy of modern and aggressive methods, the sales in his territory has increased nearly 175 per cent in the last three years. From these records, the Woods Company is indeed to be congratulated on its acquisition. The many friends of Mr. Veeder at the old plant and in the middle west follow him with their best wishes. A vigorous and extensive advertising campaign will be started in September on the new car, according to Mr. Veeder.

C. A. Luckey has been appointed resident manager of the Edison Storage Battery Supply Company at New Orleans, Louisiana. Mr. Luckey is a graduate of Franklin Military Academy, Franklin, New York, and also of Bliss Electrical School, Washington. He was connected with the Western Electric Company and left there to go with the Safety Car Heating and Lighting Company.

H. C. McComb has resigned as engineer of the General Vehicle Co., Long Island City, to take up other engineering work and has opened offices at 1414 Times building, New York City.

W. J. McDowell.

There has been an announcement of the removal of Mr. John Arthur Benjamin at one time connected with the Babcock Electric's sales department, as a result of which the Babcock Electric has been appointed sales manager of the Ross Automobile Company, Detroit, Mich. His career with the industry dates back to 1898, when he took the agency for the production of the gasoline engine of the National Electric Motor Co., and later took over the Locomobile and was made southern sales representative. In 1902 he became sales manager of the H. H. Franklin company, retaining this connection until the Babcock Electric Co., of which he is a director, was taken over by the Locomobile company and then he was made sales manager of the Detroit Electric Company at Buffalo. Later he was connected with the Aerocar Company, Detroit, and for six years following that handled the Packard in Syracuse. In 1913 he became sales manager of the automobile department of the American Locomotive Company.

Melbert W. Taber, formerly manager of maintenance and construction of the Packard Motor Car Co., has been appointed manager of the Detroit office of the Asbestos Protected Metal Company, located in the Penobscot building.

Ben Edwards, formerly battery expert at the Willard Storage Battery plant, is now in charge of the service department for batteries for the Battery Service Company, Twenty-third and Olive streets, St. Louis, Missouri.

D. M. Ferguson has resigned as consulting engineer for the General Motors Co., and his plans have not been announced. Previously to his connection with the General Motors, Mr. Ferguson was chief engineer for the Studebaker Corporation.

John B. Sebring, Pittsburgh, Pa., representative for the Ward Leonard Electric Co., Bronxville, N. Y., has removed from Baum and Euclid streets to 901 Park Building, Pittsburgh.

R. F. Sewell, formerly connected with the factory force, has been placed in charge of the service department of the Firestone Tire & Rubber Co.'s branch at Columbus, Ohio.

The sale of Ward special light electric delivery vehicles to the C. A. Lange Company, launders, and to the J. Arthur Anderson Laundry are reported by Milton B. Strauss of
the Detroit Electric Car Company, St. Louis, Missouri, which distinguishes the Ward line.

J. W. Spray has joined the selling force of the Timken Roller Bearing Company, Canton, Ohio. He was formerly connected with the Diamond Chain Company of Indianapolis, as sales representative in the Middle West. Mr. Spray is one of the best known salesmen in the motor trade and has for years been calling on the engineers and buyers in this industry.

Messrs. Spry and Diller, who were organized into a company a little less than a year ago at Des Moines, Iowa, have increased Detroit Electric sales over 100 per cent so far over total year sales of former representatives.

A. W. Clapperton, Cleveland, formerly assistant sales manager of the Electric Controller Company, is now in the truck department of the Dorris Motor Car Company. Mr. Clapperton has devised a new system of proving to business men the advantage of motor delivery, replacing the former unsatisfactory method of actual demonstration.

T. H. Bennes, C. D. Cotton and H. M. Manley, of Birmingham, Alabama, have organized a $50,000 company to deal in electric and motor car supplies to be known as the Electric and Auto Supply Co.

A. C. Ritchie, formerly in charge of the office of the Automobile Equipment sales service station of the Westinghouse Electric & Mfg. Co., in Chicago, has been transferred to the main office at Shadyside works, Pittsburgh, Pa.

For J. W. Wray Boyle, of Detroit, Michigan, who was recently presented with a Detroit Electric automobile by his parishioners, finds his new car invaluable in getting about town attending to the many matters requiring his personal attention. The Detroit Electric was purchased for Dr. Boyle by a committee of parishioners well versed in the relative merit of automobile construction. A unanimous vote of the committee was for the Detroit. Dr. Boyle is here shown at the side of his car and he says its comfort and pleasure are beyond expression.

J. Whyte, who has been appointed manager of the storage battery service department of the Prest-O-Lite Company, Inc., Indianapolis, Ind., was formerly electrical engineer for the Maxwell Motor Company, of Detroit, Mich. Mr. Whyte was also at one time assistant chief engineer for the Scripps-Booth Company, of Detroit, and has been connected with other companies in the automobile and electric-starter business.

TRADE ITEMS
The Federal Brass Works, Detroit, Michigan, has just made known the fact that Lloyd F. Jones has become a member of its organization in the capacity of sales manager.

For the past five years Mr. Jones has been connected with the American Bronze Company, and since 1913 has been manager of their western office. Mr. Jones is very well known in the middle western manufacturing trade, who use bearing metals.

Hudson Phillips Motor Car Co., St. Louis, has been named distributing agent for the Philadelphia batteries.

The Springfield Body Co., Springfield, Mass., has moved its advertising and sales departments from the Springfield factory to 509 David Whitney Building, Detroit, Mich.

The Portage Tire Sales Co. has opened northwest distributing quarters at 706 East Pine street, Seattle, to handle the agency for the Portage tire.

The Fisk Rubber Co. has moved into its new branch at the corner of Tenth avenue and East Pike street, Seattle.

The Michelin Tire Co., Milltown, N. J., has let a contract for the erection of a one-story, 25 by 46 and 23 by 780-ft. addition.

The newest addition to Knoxville's already large and steadily growing list of auto and allied industries is McNutt and Company at 813 South Gay street, automobile row, Knoxville, Tennessee, in the building formerly occupied by the Ford Sales Company. This new company will specialize in electrical equipment and repairs, and will also have a regular automobile repair and supply department in connection. It will furnish service on all makes of storage batteries.

The Wagner-Hoyt Electric Company, which will manufacture complete electrical apparatus for automobiles, has been organized in New York. The principal factors in the organization are A. F. Wagner, president of the Wagner Specialties Company of New York, and Frank Hoyt, formerly chief engineer of the Simms Magneto Company.

In the B. F. Goodrich Company of Akron, Ohio, has established a direct branch at 137 St. Paul street, Burlington, Vermont. L. E. Stone is manager of the new store. A complete line of Goodrich "Barefoots" will be carried.

A Subscription to Electric Vehicles Helps to Solve Your Selling Problems

Send along the name of your prospect, and with the first copy of ELECTRIC VEHICLES will be sent a card telling that it comes from you and will be a visitor for a year, a monthly reminder of your good will and friendly interest.

If you have one prospect the cost will be one dollar and fifty cents.

One lucky dealer with twenty prospects sent his entire list.

He sold four of them!

Electricity Magazine Corporation
MONADNOCK BUILDING
CHICAGO, ILL.
A GOOD BATTERY CAN'T BE RUINED

READ HOW THIS BATTERY WAS ABUSED AND STILL STOOD UP ON THE JOB — IT WAS A Philadelphia Diamond Grid

OF COURSE

THIS INHERENT DURABILITY AND DEPENDABILITY OF Philadelphia Diamond Grid STORAGE BATTERIES CAUSE THE MAKERS OF 80% OF THE ELECTRICS BUILT TO INSURE THE REPUTATION OF THEIR CARS WITH OUR BATTERIES. WHAT ABOUT YOUR CAR?

Send for Booklets WI and WTXI

PHILADELPHIA STORAGE BATTERY CO.
ONTARIO AND C STS.

PHILADELPHIA

DEPOTS AND AGENCIES
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The LIGHT OHIO ELECTRIC Coupe

The New Series now being built offers decided advantages and value at its price.

Light weight has been obtained without a sacrifice of comfort, strength or mileage capacity.

Deeply cushioned seats—as wide as our larger models—will accommodate four adults comfortably. A cozy-corner seat will take a fifth in an emergency.

The Ohio Magnetic Control—with Magnetic Brake—identically the same as used on our larger cars is a feature of this model.

THE OHIO ELECTRIC CAR CO.

TOLEDO, OHIO

Chicago Branch, 2634 Michigan Ave., Chicago, Ill.

Kansas City Branch, 3324 Main St., Kansas City, Mo.
While the cost of gasoline increases
the cost of electric current decreases

**Detroit Electric**

Why the great majority of enclosed
car buyers select Detroit Electric

There are many makes of enclosed cars—both of gasoline and electric power.
Some are higher priced than Detroit Electric—some cost less.
Yet, each year, far more buyers select Detroit Electric than any other all-year car.
Evidently, then, it is not price that wins the great majority of enclosed car buyers to Detroit Electric.
It is immediately apparent that the reason for this overwhelming preference is the superiority of Detroit Electric—its ability to give better service at less cost.
Detroit Electric is strictly an all-year car. It gives you unfailing service 365 days each year.
The mechanism is so simple and so finely improved that it but rarely needs any service attention. And the motor is not susceptible to weather change. It does its work efficiently no matter the temperature.
So easy and safe is Detroit Electric to drive that you will never find it idle, for when you are in your office, your wife and daughter are driving through the parks or on shopping errands.
A big mileage range is another feature of this modern electric—a single battery charge is sufficient to carry you 80 to 90 miles.
And Detroit Electric has plenty of power—power to climb any hill and pull thru "the ruff" on any road.
From the standpoint of economy, Detroit Electric is unapproachable.

For the cost of electricity is now so low that owners everywhere find their monthly cost for power seldom exceeds $5 to $7.
Tires last exceptionally long. It is not unusual for Detroit Electric users to get 7 to 10 thousand miles from a single set of tires.
Bills for repairs, replacements and adjustments are few and far between.
We urge you to go to the nearest Detroit Electric dealer. Request him to give you a road demonstration—it will clinch every claim we make for Detroit Electric.
It will convince you that Detroit Electric is by far the best all-year enclosed car—either of gasoline or electric type—either at greater or lesser price.

Remember the Detroit Electric is a quality car at a moderate price

**Anderson Electric Car Company**

Detroit, Michigan
Branches at New York City, Chicago and Kansas City.
THE EDIFICE IS THE NEW CONGREGATIONAL CHURCH OF TOLEDO.—THE CAR THE OHIO ELECTRIC
An automobile which users and dealers say "never gives a bit of trouble"—

An automobile which users and dealers pronounce "the most remarkable motor car ever placed on the market"—

Such is this season's Milburn Light Electric.

Its freedom from mechanical troubles is due to its balanced efficiency.

Its freedom from tire troubles is due to its light weight.

Established 1848

THE MILBURN WAGON COMPANY
Automobile Division
Toledo, Ohio

DEALERS—The great success of the Milburn makes it the profitable electric for you to handle. If we are not represented in your city, write us at once—we'll show you a money making proposition.
Advertising experts say that the buying public usually estimates the value of an article by the eloquence and persistence of its advertisers.

Engineering experts formulate opinions only after making careful laboratory and commercial tests. This is why many engineers and manufacturers buy GLB batteries or plates which they assemble and re-sell, using their own name-plates. In this way GLB plates and batteries are being used in steadily increasing numbers.

If you are a User, and need a new battery, call on the nearest Sales Agency or write the Company direct. Sales Agencies and Service Stations are being established throughout the United States.

If you are a Dealer, write for an Agency proposition and sell batteries under the GLB trade-mark.

If you are a Manufacturer, assembling batteries to sell under your own name, safeguard your reputation by using GLB plates with "TITAN" grids, which insure UNEXCELLED QUALITY, SERVICE and SATISFACTION.

\[\text{GENERAL LEAD BATTERIES COMPANY}\\ \text{CHAPEL STREET AND LISTER AVE.}\\ \text{NEWARK, N.J.}\\ \text{1790 Broadway}\\ \text{NEW YORK}\\ \text{2405 Cottage Grove Ave.}\\ \text{CHICAGO}\]
A New Battery Charging Set

This new motor-generator set for charging lighting and ignition batteries is complete with switchboard control and instruments. The very little space occupied by these sets appeals to garages and to car owners with limited accommodation. The 250 watt set for instance is only $18 \times 10^3 \times 0.8 \times 21^3$ overall. Another big appeal is the variety and number of batteries that can be charged at the same time. By simply turning the control handle the following combinations are possible:

<table>
<thead>
<tr>
<th>Charging One 6V. Battery</th>
<th>Charging One 6V. and one 12 V. Battery</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot; 12V. &quot;</td>
<td>&quot; Three 6V. Batteries.</td>
</tr>
<tr>
<td>&quot; 18V. &quot;</td>
<td>&quot; Two 6V. and one 12 V. Battery.</td>
</tr>
<tr>
<td>&quot; 24V. &quot;</td>
<td>&quot; Four 6V. Batteries.</td>
</tr>
</tbody>
</table>

During the coming winter months lighting and ignition batteries need more frequent boosting to overcome the effects of cold weather on engine and batteries and the insufficient charging of batteries through the generator because of short runs.

There is not only a good profit in the sale of these sets but worth-while income in the sale of current in the late hours of the night, when charging is done. Co-operate with our local offices and the salesmen of automobile supply houses. Making a profit in "dead" night hours is good business for you. Send for descriptive folders and literature on Fort Wayne Motor Generator Sets.

General Electric Company

Fort Wayne Dept., Fort Wayne, Ind.

St. Louis, Mo.  New Haven, Conn.  New Orleans, La.
Salt Lake City, Utah  San Francisco, Cal.  New York, N. Y.
Niagara Falls, N. Y.  Des Moines, Ia.  Chicago, III.
Schenectady, N. Y.  Minneapolis, Minn.  Cleveland, Ohio
Omaha, Neb.  Louisville, Ky.  Columbus, Ohio
Portland, Ore.  Fort Wayne, Ind.  Des Moines, Ia.
St. Louis, Mo.  Knoxville, Tenn.  Hartford, Conn.
Richmond, Va.  Los Angeles, Cal.  Indianapolis, Ind.
Washington, D. C.  New Haven, Conn.  Fort Wayne, Ind.

For Michigan business refer to General Electric Company of Michigan, Detroit.
For Texas, Oklahoma and Arizona business refer to Southwest General Electric Company (formerly Hobson Electric Co.), Dallas, El Paso, Houston and Oklahoma City. For Canadian business refer to Canadian General Electric Company, Ltd., Toronto, Ont.
REMARKABLE ROAD RUN

Motoring history was made recently in a run from Boston to Philadelphia by an electric roadster. The run was conducted by R. L. Heberling, of the Sterrett & Fleming organization, and was made to demonstrate that the electric can be used as effectively and expeditiously for long distance trips as for town work.

The car selected was a Detroit Electric equipped with a Philadelphia Diamond Grid battery and Goodrich cord tires. The run was made in thirty-three hours thirty minutes elapsed time, and the actual time on the road was fourteen hours thirty-seven minutes, an average of 25.4 miles an hour. This compares well with the road average of most high-powered cars. From Boston to New York the elapsed time was twenty hours thirty-three minutes, the running time eight hours forty-one minutes, and the average speed 28.5 miles per hour.

At times the car reached forty to forty-five miles an hour speed, and from Springfield to Hartford the average was exactly thirty miles an hour. Twice the car was delayed, once when it went off the road at West Warren to avoid a man who ambled thoughtlessly from behind a pile of timber, and later in Newark, where a heavy fog made fast driving unsafe and virtually impossible.

ANNUAL OUTING NEW YORK TRUCK CLUB

The fifth annual outing of the Motor Truck Club of America took place on Wednesday, September 13, at Glenwood Landing, L. I. The members and their friends left by boat from East Twenty-third street pier at 12:30. The sports end of the outing was better than ever. There was a fiercely contested baseball game, trade against owner members; a swimming contest; a dancing contest with two valuable prizes awarded to the winners. A light lunch was served on the boat. The committee in charge of the affair were: Roderick Stephens, ex-officio; Willard S. Mears, chairman; T. A. Aspwell, A. C. Bergmann, Charles G. Bond, F. Nelson Carle, Haywood P. Caverly, C. M. Geiger, Robert Hunt, Jr., Joseph Husson, Henry K. Jaburg, George H. Logan, Joseph K. Orr, W. Oscar Shadbolt.

NEW ANDERSON BRANCH OPENED

The Anderson Electric Car Co., feeling the need of personal representation in Los Angeles due to the heavy business there during the past several seasons, has opened an office, show-rooms and service station at 1715 West Seventh street at that city. F. S. Rogers will be in charge as manager to develop the business for the factory branch. Mr. Rogers has been with the company for some time past and has been operating as a traveling representative in the eastern district.

THE MILBURN IN SOUTH AMERICA

The Milburn Wagon Company of Toledo, O., has set forth to conquer new foreign fields—the South American countries. W. V. B. Van Dyke, managing director of the General Electric Company of Brazil, Inc., who has just visited the Milburn factory, declares that some of the South American countries will furnish the best market in the world for electrics as soon as the people have become educated to the merits of that product. In that country, he says, no one but members of the wealthy class can afford gasoline cars. Besides acting for himself, Mr. Van Dyke, who is an American by birth, represented the Argentine General Electric Company in his visit to Toledo.

Gasoline in Brazil costs from 40 to 50 cents a gallon, according to Mr. Van Dyke, but that is not the only expense which faces the gasoline vehicle owner and which is overcome by the electric product. The traffic laws of that country provided that no motorist can leave his car unattended on the public streets for any length of time. For that reason practically every motorist feels compelled to engage a chauffeur and, if he has any mechanical knowledge, he commands a very good salary. It is conservatively estimated, said Mr. Van Dyke, that the upkeep cost on the average gasoline car in Brazil is between $250 and $300 a month.
Detroit Electric Gains Point
E. J. Reidy joins the Detroit Electric sales organization after proving himself to be one of the most successful automobile salesmen in Chicago. He leaves the Woods Dual Power Company to take the new position with the Chicago branch of the Anderson Electric Car Co.

Mr. Reidy after re-entering the field of the straight electric, expressed surprise at the advances that had been made in speed and in mileage capacity in the last two years. He stated that inasmuch as the average purchaser buys a car because of its speed capabilities and immense touring radius that is never used, he believed that an unprecedented rush will develop during the coming season when it is demonstrated to the individual what an electric can do. He confidentially predicts that with the inherent advantages of the Detroit Electric coupled with the low cost price would result in the neighborhood of a thousand cars in Chicago this coming season. It is the every-day practicability of the car giving it its sunshine pleasure and rainy-day comfort that will place it foremost in popular favor of the male Chicagoans.

Speeding Up Production
Within the past decade the industrial world has seen the greatest development of time-saving appliances and systems known to man. We say development because most of these appliances and systems were being utilized prior to this decade but they were in a more or less experimental stage and exercised but a fraction of the influence they now possess in stimulating productive industry; in fact the very existence of some of these appliances and systems—automatic machinery, electric welders, high speed steel, lifting magnets, portable electric tools, copper plating in case hardening processes, time-study systems was known to but a few men in each branch of the trades.

Many of these time-saving methods are confined to one line of business. One of them is known and used in all industries that use tools and that one is the portable electric drill and the purpose of this article is to suggest a further utilization of this extraordinary useful appliance.

Those who have used a portable electric drill need little or no help in adapting it to a score of different jobs. Those who are not familiar with it will find a perusal of the following paragraphs of considerable value.

It will be noticed that in all cases the prime advantage of the portable electric drill lies in “carrying the tool to the work.” This advantage is augmented by speed with which the work can be done and the fact that the tool frequently is utilized for work which formerly required special machinery.

The two operations of drilling and reaming “in place” are used to a considerable extent in automobile assembly work and, with the exception of holes involving micrometer limits, the portable electric drill is used altogether for these operations; also where a true hole is required free from chatter, such as bed plate bolts, column bolts which have to be reamed in place to secure a perfect fitting bolt, an operation that cannot be done with a reciprocating type portable tool or by hand—the electric drill and reamer can better perform this operation owing to its smooth transmission of power.

Some of the many uses of these tools are:—reaming automobile frames; reaming in place on freight and passenger car building, and on bridge building; drilling and reaming in ship yards, on structural iron work, in carriage works, automobile body works, erecting staging for building operations.

In carriage works the portable electric drill follows the work and its “output” of holes is only limited by the ability of the workman to use them.

By the use of various attachments a portable electric tool can be used as a hand, breast, bench or post drill and as a reamer or grinder.

It is possible to secure a good combination tool which can be used for these various kinds of work and will operate on either direct or alternating current but it is best to follow the practice of having a certain tool for a certain work. The Van Dorn Electric Tool Company experimented for a number of years with various types and sizes of drills, reamers and grinders and has established exact standards of designs for various duties.

To the average man who thinks of portable tools as a handy thing to have around it will come as a surprise to learn the manufacture of these appliances is a highly specialized industry. The Van Dorn Electric Tool Company has an extensive plant devoted exclusively to the production of portable electric tools and had some 50 separate types and sizes of tools each of which is designed for a specific purpose.

![Using an Electric Drill in a Small Garage.](image-url)

When one considers the slow, laborious, old style method of carrying the work to and from the stationary drills, reamers and grinders or still slower hand work where machine tools were not available, one begins to appreciate the immense benefit which the portable electric tools have conferred on the industrial world through the remarkable increase in the quantity and quality of work accomplished in a given time.

There are many epoch making machines and methods which are held in higher esteem but the influence of most of them is confined to the particular industry in which they operate. The portable electric tool is not confined to any particular trade and has produced a large part of our prosperity.
Road Improvement in New York, Pennsylvania

A Report of the Work Accomplished During the Past Five Years

The great extension in the use of motor vehicles in the past few years has brought about a marked increase in the construction of new, substantial and more costly types of roads in New York, New Jersey and Pennsylvania, it has been found by the Department of Agriculture. The third five-yearly study of road mileage, road types and highway finances in the three middle Atlantic States, just reported by the Office of Public Roads and Rural Engineering, in Department Bulletin No. 386, shows that in 1914 roads treated with bituminous preparations made up 15.4 per cent of the improved highways as against 1 per cent in 1909.

A similar showing is made in the report for concrete, brick and other of the more substantial materials used in road construction. Approximately 9 per cent of the improved road mileage of the three commonwealths is now surfaced with such materials, while in 1909 roads of this type constituted only 1 per cent of the improved highways. In 1904, when the first road study was made, neither bituminous nor the more substantial roads were found in the three States, untreated macadam and gravel roads predominating. The changes of recent years brought about a reduction from 51 to 39.3 per cent of the total in the proportion of untreated macadam roads during the period from 1909 to 1914.

The figure are complete, except for Pennsylvania, where it was impossible to secure detailed information regarding the type of surfaced roads in the second class of townships.

Of the road improvement made only in the five-year period of the most recent study, more than 3,500 miles, or 37 per cent, were treated with bitumen, while only 20.5 per cent were untreated macadam and 26 per cent plain gravel. This indicates conclusively, in the opinion of officials of the Office of Public Roads and Rural Engineering, that for roads carrying heavy automobile traffic, the old standard type of waterbound macadam has had its day.

In 1914 the three States named spent in road improvement $40,864,831, of which the detailed expenditures were: New York, more than $23,000,000; New Jersey, more than $7,000,000; Pennsylvania, more than $10,000,000. In addition, county, town, and township bonds voted in New York totaled nearly $12,000,000; in New Jersey, $14,000,000; in Pennsylvania, $27,500,000. New York was the only one of the three commonwealths voting State bonds for road improvement. The amount authorized to the close of 1914 was $100,-000,000, of which $55,000,000 has been issued. All the three States have highway departments and apply State funds to road improvement. Approximately one-third of all expenditures are provided by local units in New York, and about one-half in New Jersey and Pennsylvania.

Altogether the road mileage in the three Middle Atlantic States on January 1, 1915, was 185,770.84 miles, of which the approximate State mileages were: New York, 79,000; New Jersey, 15,000; and Pennsylvania, 91,500. This is exclusive of practically all streets in incorporated cities and towns. The percentages of surfaced roads added in the five-year period were 3.5 in New York, 17 in New Jersey, and 7 in Pennsylvania.

The report is the first of a series which will relate to road investigations of mileage, conditions and finances throughout the United States. Owing to the establishment since 1909 of many State highway departments, the investigation for 1914 was made with much closer co-operation with the State and local officials. Much dependence was also placed on the co-operation of local and State road associations, chambers of commerce, automobile clubs, postmasters, and private individuals.

Comparative statistics given in the bulletin show that in 1914, as in 1904 and 1909, New Jersey led the two other States in mileage of surfaced roads per square mile of area. The ratio in 1914 for New Jersey was 0.784 of a mile per square mile of State area; for New York, 0.328; and for Pennsylvania, 0.220. In surfaced mileage per thousand of rural population, New Jersey also led in 1914, with New York second. At the close of 1914, New York had 20 per cent of its improved roads treated with bitumen, while New Jersey had 7 per cent and Pennsylvania approximately the same. Of brick, concrete, and other improved, roads, both Pennsylvania and New Jersey had higher percentages than New York.

The predominance of urban interests in New York, as shown by the fact that 78.8 per cent of the population live in cities and towns, has brought about a high development in State aid work in the State, the investigation showed. At the time of the investigation...
the State, through the highway department, had taken over 3,800 miles of highway, to be built wholly at State expense, and had contributed varying proportions toward the cost for the construction of 8,380 miles of county highways. In addition, it contributed large amounts to the maintenance of these two classes of thoroughfares, as well as for the maintenance of county roads and town highways. The State spent in 1914 more than $8,000,000 for road construction and approximately $12,000,000 for maintenance. During the ten-year period from 1904 to 1914, the total annual expenditures in the State for road improvement increased 308 per cent, reaching 23,231,964 in the latter year.

The road mileage of New York at the close of 1914 was 79,398. Of this approximately 12,000 miles were classed as state and county, highways, and received substantial State aid. More than 15,600 miles, or 19.6 per cent, of the roads of the State were surfaced. The proportion in 1904 was 7.96 per cent, and in 1909 it was 16.13 per cent. The surfaced mileage added in the period 1909 to 1914 was therefore, 3.5 per cent of the total road mileage.

3,108.63 miles were bituminous macadam, more than 150 miles brick, and 244.19 concrete.

Car Parking Service for Chicago

The congested traffic condition of the Chicago Loop district offers one of the most disagreeable problems to the users of motor cars, particularly those who enjoy the freedom of driving their own cars. The congestion is growing greater every day, and at present it is very difficult to find sufficient space to leave one's car under any conditions, and where it is possible to find a place on the street to stand the car, the thirty-minute ordinance subjects the owner to the liability of an arrest if the car stands in one place beyond the time limit.

The Chicago Electric Vehicle Section of the N. E. L. A. has solved in the most satisfactory way this knotty problem for the users of electric vehicles. The Association has two parking stations situated most conveniently to the Loop shopping and theatre district. One at Jevne's store at the corner of Michigan and Washington, the other at the Electric Shop, corner of Jackson and Michigan.

The owners of electric cars eligible to this service present their cars at either one of these stations or preferably leave the car on the east side of Michigan Boulevard opposite the stations and hand their key in at the station and the car is taken in charge by the Association's representative and delivered to Grant Park. When the owner again calls for the car, the Association's representative procures the car and delivers it to the owner at the station. If the owner can state the time the car is to be called for, it will be returned to Michigan Boulevard before owner's arrival to avoid waiting. No charge is made to the owner for this service nor is the owner expected to offer any tips or compensation of any sort for such service.

The value of this service can be readily appreciated by all car users that have experienced the trouble necessary to leaving cars in the Loop. All that is necessary in this case is to deliver the car to the station if a shopping tour, business engagement or a matinee is contemplated. A call at the station procures the car and the owners drive to their homes minus the worries, troubles and delays incident to leaving the car in the Loop.

In winter time this service will prove of greater value than ever. To give an idea of the extent to which this service is now used, over seven hundred electric vehicles were handled by these stations last month. We believe that all users of electric cars will be availing themselves of this great service before another year.

This service is procurable only through garages who are members in good standing in the Chicago Electric Vehicle Section N. E. L. A.

This is one of the many important benefits offered by dealing with members of this wide-awake organization of electric vehicle interests, the Chicago Electric Vehicle Section N. E. L. A.

New York Plans Owners' Sociability Run

Electric pleasure car owners throughout the greater New York City are manifesting much interest in the fourth semi-annual Sociability Run which is scheduled for Wednesday afternoon, October 4th, under the auspices of the New York Electric Vehicle Association.

The first of these events of this season was held in May, forty-two cars making the run to the Siwanoy Country Club. It proved such a complete success in every way that electric car owners have been flooding the offices of the New York Electric Vehicle Association with requests for a repetition.

It is anticipated that between 75 and 100 cars will participate in the forthcoming run. The start will be made from the Electric Garage, Central Park West and 62 street, at 1:45 P. M., the destination being Longue Vue Inn, Hastings-on-the-Hudson, where the participants will be the guests of the Vehicle Association at tea. All requests for entry cards should be addressed to the Electric Garage, Central Park West and 62 street. All owners of electric pleasure cars are cordially invited to come and bring guests. The run to Longue Vue Inn is approximately eighteen miles.
Efficiency of a Thousand Pound Worm-Drive Truck

As Determined in Tests Submitted to Annual Convention of the American Institute of Electrical Engineers

BY A. E. KENNELLY AND O. R. SCHURIG

The investigation herein described was carried on in the Research Division of the Electrical Engineering Department at the Massachusetts Institute of Technology, during the year 1915, under a fund contributed for researches on motor trucks.

Object of the Research. The object of this research was to determine the resistance, including air resistance, offered to an electric truck, by level urban roads of different surface varieties, at standard truck speeds not exceeding 25 km. (15.5 miles) per hour. For this purpose the output of the storage battery on a test truck was measured, for both directions of travel, over standard road beds, at different controller speeds. From this output were deducted all the corresponding electrical and mechanical losses in the truck mechanism, as determined by laboratory tests. The remainder of the output was consequently attributed to (1) road- (2) air- and (3) wind-resistance. The wind resistance was eliminated by averaging the results for both directions of running, leaving as the final result the sum of the road and air resistances.

By “road resistance” is meant the horizontal force required to pull the truck, assumed as internally frictionless, over the horizontal road, in the absence of air. By “air resistance” is meant the horizontal force on the truck required to overcome the resistance of the air, assumed as quiescent in the absence of the truck. By “wind resistance” is meant the horizontal force on the truck necessary to overcome the resistance of the wind velocity, or that velocity of the air with respect to the ground which exists in the absence of the truck.

The Test Truck

Through the courtesy of the manufacturer, a 1000-lb. (450-kg.) worm-drive, single-reduction electric truck, or delivery wagon, was placed at the disposal of the Research Division for the purposes of the test. A picture of this truck is given in Fig. 1. Its specifications are as follows:

- Load capacity: 1000 lb. (450 kg.) equipped with one d-c. series motor.
- Overall length of frame: 4,280 mm. (168½ in.)
- Width of frame: 890 mm. (35 in.)
- Wheel base (i.e., distance between centers of front and rear wheels, when front and rear axles are parallel): 2,730 mm. (107½ in.)
- Wheel gauge: 1,470 mm. (38 in.)

The total weight of the truck, including motor, battery and body, but without load or passengers, was 4,200 lb. (1910 kg.). Each of the four wheels was equipped with one solid-rubber drum type (manufactured for this type of delivery wagon) rated at 36 in. by 2½ in. (91.5 cm. by 6.35 cm.), and actually measuring about 35 in. (89 cm.) tread diameter, and 2½ in. (6.35 cm.) width of base. The brakes were of the internal expanding type on each rear wheel.

A cross-section of the rear wheel, showing bearings and tire, is seen in Fig. 2. Fig. 3 is a drawing of side and front elevations of the truck. This type of electric truck is commonly used for city and suburban parcel-delivery service.

The transmission system was of the shaft type, the speed reduction between motor and rear wheels being accomplished by a single worm with worm wheel, i.e., the worm shaft is extended, through two universal joints, U (Fig. 3), which allow for spring compression due to load and impact, to the worm W (Fig. 4). Through W, the rotation is transmitted to the worm-wheel (Fig. 4), which makes one revolution for every nine of the worm or motor. In order to transmit the motive power to both wheels and yet permit them to revolve at different speeds, the differential gear is provided, which consist of the small bevel gears capable of revolving about axes fixed to the worm wheel, the small gears mesh with two bevels of which one is fixed to the right hand section and the other to the left hand section of the rear axle. The corresponding shaft bearings of the conical roller type are Timmeks, which are plainly visible in the illustration.

Driving Motor and Controller. The electric motor, \( M \), Fig. 3, has the following specification: No. 282,666, E20, W 2, 32 amperes, 60 volt, 1,200 rev. per min. The manufacturer’s test data for this type of motor are given in Fig. 5 on the preceding page.

The controller is of the following description: Type S-35, Form A. It is of the drum type, having four forward and two reverse speeds.

The connection diagram of the controller and motor is given in Fig. 6.

The operation of the controllers is as follows:
ELECTRIC VEHICLES

Storage Battery. The battery consisted of 60 Type A-6 cells of the regular nickel-iron type, with a rated discharge capacity of 225 ampere-hours. The normal charge and discharge rate is 45 amperes, and the normal period of charge is seven hours at this rate. Fig. 7 gives the manufacturer's curves of terminal voltage per cell during charge and during discharge, in each case at the normal rate of 45 amperes. The average discharge voltage per cell is approximately 1.2 volts. The battery was placed in two compartments, one being 23 in. by 18 in. (58 cm. by 46 cm.) and 15 in. (38 cm.) deep with 15 cells at C, Fig. 3; another being 40 in. by 31 in. (102 cm. by 79 cm.) and 15 in. (38 cm.) deep, with 45 cells at B, (Fig. 3).

The entire battery with solution, trays and connections, weighs approximately 1,200 lb. (550 kg.).

EXPERIMENTAL PROCEDURE

The tests made were of two kinds, namely:

1. Road tests, over selected measured lengths of road, at different measured truck speeds, to determine the gross battery output.

2. Laboratory tests, to determine the overall efficiency between battery terminals and rear-wheel treads, at speeds and loads corresponding to the road tests.

Road Tests. The resistance (excluding air-resistance) offered by a level roadbed to a moving truck, depends upon

1. The surface quality; i.e., the smoothness, hardness and resilience of the road surface.

2. The size of wheel and tire quality; i.e., the dimensions, smoothness, hardness and resilience of the tire tread.

3. The speed of the vehicle.

4. The load or weight of the vehicle.

5. The construction of the vehicle, i.e., whether with or without springs.

*Reverse, point 1, same as forward point 1, except that direction of current through series fields is reversed.

In these tests variations in (2) and (5) were eliminated, by using the same vehicle and the same type and size of wheel and tire throughout, which fairly represent standard average conditions for half-ton truck service.

In order to investigate the effects of road surface quality on tractive resistance, stretches of nearly level typical urban roads were selected, with the aid of records in the Boston City Engineers office. Runs were made with the truck over each selected stretch of road, at nearly constant speed by controller, and successively in both directions for each controller point, thus covering the range of speeds afforded by the controller. The effect of load in the vehicle, upon the tractive resistance, was also tried in a few cases.

The technique of the tests was as follows: Previous to the first test of the day, the car storage battery was fully charged. The car crew consisted of one driver and two observers. The driver confined his attention to steering the car, while running at constant controller position. If the driver had to change the controller position, or apply the brakes, during the run, the run was repeated.

The first observer was stationed on the front seat, beside the driver, and noted the stop-watch times of start and finish, as well as the readings of the speedometers during the run.

The second observer was stationed in the body of the truck, and continuously took readings of voltage and current at battery terminals, by calibrated measuring instruments; these instruments being supported on cushions to minimize their vibration. The positions of these instruments in the battery circuit are indicated in Fig. 6 at A and V.

The start and finish for each stretch of road were marked off by chalk, or other clearly visible lines, drawn across the roadway. The car was always set in motion at a suitable distance behind the starting line, so as to reach approximately steady speed when this line was crossed. A stop-watch was started by the first observer
at this moment. It was stopped by the same observer at
the moment when the front wheels of the car crossed the
finish line. The reading of the stop-watch was thus
the time of the run.

The length of the run between start and finish lines
was determined by means of a tape line. The runs varied
in length from 400 ft. (120 m.) to 2,600 ft. (790 m.).

Wherever the grades of the test stretches were not
obtained from the city maps, they were measured directly,
on special days, by the car observers, with surveyors' level and rod, in the regular way.

For each controller speed, the car was run three
times in each direction, over the test section, in immediate
succession. By this method of running in alternate
directions over the same section, the effect of wind
on car resistance was approximately eliminated, on the
assumption that if a wind was blowing, it was uniform
in velocity, and tended to exert a uniform pressure on
the car, whether the latter was running with it or against
it. No heavy windstorms occurred during the period
selected for the tests. The arithmetical means of the road
resistances, as measured at nearly constant speeds in
opposite directions, was assumed to eliminate the effect
of wind velocity.

A further correction, namely that due to the change
of kinetic energy imparted to the vehicle, between start
and finish, became necessary, because the speed was not
absolutely constant during the run; i.e., a slight re-
tardation or acceleration took place over the test stretch,
in spite of the fact that the controller was not changed,
that roads of uniform grade were selected, and also that
the truck was started as far in advance of the mark as
was practicable. The energy imparted to a track which
is accelerating includes not only that necessary to over-
come its internal and external resistances, but also that
finite amount of energy which is required to produce
the acceleration. The latter portion of energy is known
to be equal to

\[ \frac{1}{2} W (v_f^2 - v_i^2) \]

where \( W \) is the mass accelerated (kg.), \( v_f \) and \( v_i \) being
the velocities in m. per sec. at end and at beginning of
the run, respectively; \( g \) is the mean constant of
acceleration due to gravity, i.e., 9.81 m. per sec. This
energy was subtracted from the total energy imparted
to the truck. The importance of this correction and the
method of its application in a typical case may be seen
from Table III.

Table I contains a sample set of observations made
in a particular run in alternate directions over a test
section.

Laboratory Tests. In order to determine the truck-
mechanism overall efficiency, from storage-battery ter-
minals to tire treads, as already referred to, the car was
taken into the Lowell laboratory, the rear wheels raised
from the ground, and belted each to a load-generator.
The motor was then operated through the controller, at
a number of speeds, the power being delivered to the
load-generators and measured over a considerable range
of speeds and outputs. The car B-9335 is supported,
with its rear axle on I-beams. The rear wheels are
belted to two similar 5 h.p. d-c. generators loaded by
banks of adjustable resistors.

The speed of the rear wheels, in these laboratory
tests, was measured by means of a magneto belted to
one of the wheel brake drums. It was also checked by means of a magneto belted to
a load-generator. In order to ensure equality in
speeds of the two truck wheels, under test conditions,
so that the load might be equally divided between them,
and that the conditions might correspond to those when
the car runs on a straight path, a slip counter \( c \) was in-
serted between the two generator shafts, so as to indicate,
by the flashing of a light, if their speeds materially dif-
fered.

The load generators were separately excited. Their
output was measured by d-c. voltmeter and ammeters
in their respective circuits. Separate tests were
made on the load generators to determine their
mechanical and electrical armature losses, under
different load conditions. These losses added to the out-
puts, gave the total generator inputs supplied through
the driving belts.

The losses in the two driving belts were approxi-
mately determined by taking two successive light load
tests, first with the regular heavy leather belts, and next
with special light cotton belts of negligible power loss,
but of very limited transmitting capacity. The differ-
ence between the inputs, in these two tests, measured the
power consumed in the leather belts; because the other
losses in the two tests were the same.

The friction losses in the front wheels (about 70
watts total), were also measured by belting them to the
rear wheels through light belts in special tests. No al-
lowance was made for any possible increase in wheel-
bearing friction under increased gravitational pressures
but since all the wheels had roller axle bearings, such
extra friction losses were probably very small.

The sum of the load-generator outputs, the armature
<table>
<thead>
<tr>
<th>Time</th>
<th>63.6 sec.</th>
<th>51.0 sec.</th>
<th>63.6 sec.</th>
<th>51.4 sec.</th>
<th>62.4 sec.</th>
<th>53.6 sec.</th>
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</thead>
<tbody>
<tr>
<td>Direction</td>
<td>West</td>
<td>East</td>
<td>West</td>
<td>East</td>
<td>West</td>
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<td>Battery output</td>
<td>volts</td>
<td>watts</td>
<td>volts</td>
<td>watts</td>
<td>volts</td>
<td>watts</td>
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<td>80</td>
<td>29.5</td>
<td>16.3</td>
<td>81</td>
<td>22.5</td>
<td>19.1</td>
<td>79</td>
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<td>80</td>
<td>30.1</td>
<td>15.6</td>
<td>81</td>
<td>21.5</td>
<td>21.7</td>
<td>79</td>
</tr>
<tr>
<td>79.5</td>
<td>29.5</td>
<td>15.6</td>
<td>81</td>
<td>22.5</td>
<td>19.7</td>
<td>79</td>
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<td>79.5</td>
<td>28.5</td>
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<td>79</td>
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<td>79.5</td>
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<td>81.5</td>
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<td>15.3</td>
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</tr>
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<td>15.3</td>
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<td>15.3</td>
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<td>Averages</td>
<td>2300 watts</td>
<td>15.4</td>
<td>15.4*</td>
<td>1830 watts</td>
<td>19.6</td>
<td>19.4*</td>
</tr>
<tr>
<td></td>
<td>2350 watts</td>
<td>15.9</td>
<td>15.8*</td>
<td>1910 watts</td>
<td>18.6</td>
<td>18.4*</td>
</tr>
</tbody>
</table>

*Speedometer readings.
†Speedometer readings, obtained from stop watch readings and distance measurement.

TOE: Two independent speedometers were employed and read in each; in the above table one set of speed values has been omitted.

Calibration corrections have been applied to instrument readings.

### TABLE II

**DATA AND RESULTS FOR OVER-ALL EFFICIENCY OF TEST TRUCK.**

**Controller on Point 4 Forward; Battery Fully Charged.**

<table>
<thead>
<tr>
<th>Battery output</th>
<th>Peripheral rear wheel speed</th>
<th>Sum of generator outputs</th>
<th>Armature copper Watts</th>
<th>Stray power Watts</th>
<th>Belt losses Watts</th>
<th>Sum of gen. outputs and losses Watts</th>
<th>Equivalent truck output on road Watts</th>
<th>Overall efficiency per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watts</td>
<td>km.</td>
<td>hr.</td>
<td>Miles</td>
<td>Watts</td>
<td>Watts</td>
<td>Watts</td>
<td>Watts</td>
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<td>1860</td>
<td>31.6</td>
<td>19.7</td>
<td>0</td>
<td>895</td>
<td>237</td>
<td>1132</td>
<td>1866</td>
<td>57.2</td>
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<td>25.7</td>
<td>16.0</td>
<td>872</td>
<td>11</td>
<td>645</td>
<td>141</td>
<td>1682</td>
<td>61.6</td>
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<td>2770</td>
<td>23.1</td>
<td>14.4</td>
<td>1289</td>
<td>11</td>
<td>632</td>
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<td>2062</td>
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<td>3350</td>
<td>28.6</td>
<td>12.4</td>
<td>2001</td>
<td>36</td>
<td>529</td>
<td>98</td>
<td>2598</td>
<td>78.5</td>
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<td>3570</td>
<td>19.2</td>
<td>11.9</td>
<td>2230</td>
<td>30</td>
<td>499</td>
<td>90</td>
<td>2809</td>
<td>78.5</td>
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<td>11.4</td>
<td>2426</td>
<td>63</td>
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<td>86</td>
<td>3042</td>
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<td>3980</td>
<td>17.6</td>
<td>10.9</td>
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<td>70</td>
<td>447</td>
<td>77</td>
<td>3164</td>
<td>77.8</td>
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<td>4120</td>
<td>17.0</td>
<td>10.8</td>
<td>2650</td>
<td>96</td>
<td>427</td>
<td>72</td>
<td>3251</td>
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<td>16.1</td>
<td>10.0</td>
<td>2930</td>
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<td>286</td>
<td>322</td>
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<td>3908</td>
<td>78.0</td>
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</tbody>
</table>

losses, and belt losses, was taken as the car output at rear-wheel treads, at various measured inputs.

A detailed quantitative analysis of these various losses appears in the next section.

**RESULTS OF TESTS**

Although the primary object of this research has been a determination of tractive resistances to an electric truck, under the conditions previously defined; yet, incidentally the tests have furnished results of practical value of the overall efficiency from battery terminals to wheel treads of this type of electric car, under normal operating conditions.

**Overall Efficiency of Driving Mechanism.** A summary of typical data obtained in one of the laboratory tests is given in Table II. The first column gives the output in watts at the battery terminals, determined from the simultaneous readings of a calibrated voltmeter and ammeter, V, A, Fig. 6. Column II gives peripheral

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**TABLE I.**

**SAMPLE SET OF OBSERVATIONS FOR TYPICAL TEST RUN.**

**Run No. 15.** Length 900 ft. (274 m.) Gross Weight 4710 lbs. (2140 kg.) Date June 15, 1915.

Location = Beacon St., Brookline, Mass.

Start = (east) mark in curb at crossing of Kilsyth St., Elevation = 0.

Finish = (west) mark in curb at Strathmore Road, Elevation = 4.3 ft. (131 m.)

Description = tar macadam, in good condition, surface wet.

Weather = cloudy, misty rain; wind east; temp. 60 deg. fahr. (15.5 deg. cent.)

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wheel speeds in km, per hr., and in miles per hr., derived from the voltage readings of the magnetos. Column III gives the total generator output as determined by simultaneous readings of calibrated instruments, volt and ammeters. Columns IV, V and VI itemize the following losses: (I) armature copper losses (watts) in generators as obtained by resistance measurements of armatures, and from the observed armature currents in the ammeters; (II) stray power losses (watts) in generators as determined from special stray-power tests, already referred to; (III) belt losses; i.e., frictions in both driving belts as determined by special belt-loss tests, already mentioned. Column VII gives the sum of the losses in columns III, IV, V and VI. Column VII gives the equivalent output of truck on road, as obtained by subtracting the watts tabulated in column VI, 66 watts for average front-wheel friction, the latter as determined by the special front-wheel friction-loss test already mentioned. The last column gives the over-all efficiency of the car for road runs, i.e., the ratio of columns VIII and I.

Efficiency tests as elaborated in Table II were made at each controller position for forward speeds. In view of the relatively large voltage variation (see Fig. 7) of the truck battery, between full charge and partial or complete discharge, and at different current outputs, it was found necessary to perform efficiency-test runs: (1) at a fully charged battery and (2) at a partially discharged battery, (1) corresponding to high impressed voltage and (2) to a slightly lower impressed voltage. The results of the efficiency tests are shown in Fig. 8. It is seen that the condition of the battery has a considerable effect upon the results. Fig. 8 shows, besides efficiency curves at fully charged battery (full lines), and at partly discharged battery (dash lines), a number of constant speed lines (dotted). For example, the over-all road efficiency of the truck at 3,500 watts battery output, controller on point 2, and at a truck speed of 13 km, per hr. (8.1 miles per hr.) is 71 per cent from Fig. 8. It was for convenience in the handling of the data that the truck speed was chosen as the third factor necessary for the determination of the truck efficiency, rather than the battery terminal voltage. It should also be pointed out that none of the efficiency curves in Fig. 8 are drawn at constant battery terminal voltage, and that they are, therefore, only approximately comparable to the manufacturers' motor efficiency curves reproduced in Fig. 5. Such an approximate comparison shows that the efficiency of transmission between motor and rear-wheel treads is in the neighborhood of 90 per cent for this truck under the conditions tested. This high value may be attributed to the fact that the driving mechanism involves but a single speed reduction, between motor and rear axle, by a worm and worm wheel (Fig. 4). The maximum values of over-all efficiency, including all mechanical and electrical losses beyond the battery terminals are seen from Fig. 8 to be as follows, when an approximately fully charged battery (60 cells, type A 6) is employed:

- 35 per cent, controller on point 1, forward at a battery output of 2,000 watts.
- 73 per cent, controller on point 2, forward at a battery output of 3,000 watts.
- 75 per cent, controller on point 3, forward at a battery output of 3,500 watts.
- 78 per cent, controller on point 4, forward at a battery output of 3,700 watts.

**San Francisco's Illumination Festival**

No, gentle reader, illuminated does not mean tanked up, for in this case it is electric illuminating and even the automobiles in the parade and street pageant of October 4 and 5 will be electrics. The pageant of the history of illumination is to celebrate the completion of the first section of San Francisco's new street illumination scheme on Market street. The most spectacular feature of course are the floats designed by the man who planned the lighting system, W. D. A. Ryan. One of the floats is shown. Others to the extent of twenty-one are being equipped by the Electrical Development and Jovian League on electric truck chasses.

Other features include thousands of marchers, all in costume, and each carrying some form of light. Time magnesium flares will facilitate the taking of moving pictures: special fireworks will be provided, and the street will be decorated, prizes being awarded the best building fronts and display windows. The entire affair will partake of the nature of a Mardi Gras, and because of special rates offered by the railroads from all Pacific Coast points is expected to attract large crowds from out of town.
Fashions for Milady of the Electric
New Winter Garments to Be Seen in Electrics on the Boulevards and Roads

Above a new Broadcloth coat with velvet collar and cuffs edged with high pile beaver plush to lend a finishing touch. To the left—a coat of Boliva cloth with large collar and deep cuffs of electric seal. To the right—A very full flaring coat of wool velour with pelerine collar. All from Percival B. Palmer and Co., Chicago.
A Sunday Tour From Detroit to Mt. Clemens
An Impromptu Pleasure Trip Taken by Four Friends

WHEN it was first suggested that we go to Mt. Clemens and back on Sunday in our Detroit the folks set up an innumerable number of obstacles which vanished as soon as I got out the road map and looked up the distance. In a few moments everyone wanted to go along, but as only four were to take, we followed the hilarious suggestion of John and ceny-meeny-miny-moed the undesirables out and John, Warda and Florence were left. The country road touring idea of course was ridiculed by the undesirables until time to retire. But they were unable to disturb our equilibrium. We were going, they weren’t.

The next morning after breakfast I took the car off charge and drove it around to the front, where the party was waiting for me in the sunshine. In the excitement they nearly forgot the kodak, but our other impediments (outside of John) consisted only of a tire repair outfit. As I wanted to get the exact distance going out, instead of going north on Grand boulevard east, I went down to Jefferson avenue and west to Woodward and then up Woodward. Here I set the speedometer and started out Gratoit avenue, going northeast at a leisurely rate of fifteen miles an hour, following the trolley.

Soon we were out in the country and enjoying the crisp September air. We took our time, stopping at Halfway to photograph everything we thought worth taking. Then passed on over the crossroads due northeast. In less than an hour we passed through Roseville on the straight, hard cement road, some 12 miles out of Detroit, meeting gas cars whose occupants would turn with a laughable expression of incredulous surprise, as if to say, “Why, no wonder butter and eggs are high if farmers run electrics.” We had already stopped at the Detroit Creamery Co. and looked over the mammoth place, and the people no doubt thought we were the prosperous owners of the establishment. It never seemed to occur to one fellow in a Maxwell who stopped us that we were from Detroit, for when asked the direction to Cady we replied we were from Detroit ourselves and didn’t know, he seemed annoyed at our apparent refusal to give him local information. As he moved off he muttered something about snobbish farmers which we failed to catch.

Our main troubles were the chickens who did seem to think that the smooth gliding car could do them harm, so they would saunter along until we were nearly on top of them and then fly off with a squawk.

A little before twelve we drove up to the hotel at Mt. Clemens with twenty-two miles to our credit and had dinner. It is like all Mt. Clemens places, very clean and neat, and the food was excellent. After dinner we rambled around the pretty little town enjoying the scenery. Then all of a sudden Florence gave a shriek of delight that nearly made me turn the car into the curb. Some one in back of us gave an answering whoop and nothing would do but I must turn to meet an old girl friend of hers. So turn I did, on a street that could not have been more than twenty feet wide, and took it in a circle without reversing. At which stunt I was so pleased with myself I did not mind returning, for I resolved to try to turn on a tea cup the next time. Mrs. Fletcher, as her name proved to be, between oohs and aahs and kissing Florence, gurgled in splendid fashion about our nice new car and since-when-were-we-living-in-town? and a dozen other foolish questions. On being informed that we did not live there but in Detroit her eyes grew so large that I could have turned the car around on them then and there if they had been laid on the ground. When it finally dawned on her bright and clear, nothing would do but hubby must see it. So out she routed Fletcher, male half, and informed him about it, and she did not want a gas car, she wants one like this. Then it got boresome, for Fletcher asked about one hundred questions to which I had to answer “No.” Finally I explained as gently as I could that I didn’t know, for in ten months I had done nothing but turn grease cups, oil, and charge it, therefore I have no inside surgical
knowledge of how its tummy looked as no explorations were necessary. This convinced him, and I believe Mr. and Mrs. F. will get a Detroit before winter.

It was nearly five o'clock as we turned homeward and the lights were already sparkling in the Park Hotel as we passed it. On the concrete road we hummed along with the windows up, as it was getting chilly, and felt far more comfortable than the little cottages looked that we passed earlier in the day. We averaged over twenty miles per hour going in and as the lights along Gratiot avenue swung into view we

were doing twenty-five miles an hour. A little after six we turned off into Grand boulevard and got home safe and sound with a total of 52 miles to our credit for the charge, not counting the trip down town.

It wasn't much of a trip, 'tis true, but it gave us all sorts of confidence in the car. At the dinner table under the electric dome when the rest of them heard about it from the loquacious Wanda, who had apparently been soaking up impressions of light, colors, sunsets, distances and places all day, they voted I was elected to give one tour a week until winter came. So there you are. Take my advice, you can do it in an electric.

The Electric Water Wagon Now!


The success of the electric vehicle for street watering has been admirably proven to the cleansing department of Blackpool, England.

The cleansing superintendent in this municipality strongly believes that street cleaning is one of the most important of his duties, that it is essential for safeguarding the health of the people, and therefore the best and most efficient equipment should be secured for this service regardless of the investment.

In spite of the seemingly large initial cost of the electric sprinkler, figures available at the end of one year confirmed the supposition that a considerable saving over the horse-drawn vehicle had been effected.

The electric which Blackpool has used with such entire satisfaction is a unit of 3½ tons, with a cylindrical tank which has a capacity of 750 gallons. The spray operates at the front of the vehicle thus allowing better control by the driver. Generally this electric watering cart sprinkles about twenty-five miles of streets in the morning—then the batteries are given a boosting charge of an hour before it goes out to complete the day’s work. One of the horse drivers was taught to drive the electric, and he has never had the slightest difficulty. The re-charging of the batteries is carried out during the night, and is accomplished in six hours, when the current is automatically cut off. The department is fortunate in being able to secure their current for charging from the refuse destructor plant. With the present high price and scarcity of gasoline in England, Blackpool considers that they made an extremely wise choice in selecting this electric vehicle.

Further proof of the established efficiency and dependability of the electric watering vehicle is furnished by an order for a second electric of the same type by the Blackpool cleansing department. These two vehicles will allow Blackpool to entirely dispense with twelve horse-drawn wagons formerly employed in their street-watering service.

Recently the City of Boston, Massachusetts, has accepted delivery of three new street sprinklers of large tank capacity manufactured by the General Vehicle Co.
Housing the Electric Car
A Discussion of Fire Proof Construction and Plans for Garages

BY H. COLIN CAMPBELL

FORTUNATELY perhaps, the owner of an electric vehicle is not confronted with some of the troubles and worries that are ever attendant upon the owner of the gasoline operated car. From the very nature of the fact that quantities of inflammable fuel must be kept on hand to operate the gasoline car, owners are always wondering whether tomorrow will mark the occasion when their property will go up in smoke. But because an electric vehicle is a valuable piece of property it deserves housing so that it will be protected from possible damage by fire from without.

Instead of being built of permanent fireproof materials, most garages in the past have been built of impermanent and thoroughly combustible ones—built to increase fire risk rather than to reduce it.

No other construction material possesses so many advantages as concrete, especially when viewed from the standpoint that structures properly built of it are firesafe in the highest degree; that they are not subject to depreciation due to rot and other destroying agencies, and being permanent require none of the usual maintenance, such as painting and other repairs necessary to buildings built of impermanent materials.

Still another appeal of concrete is that the material can be used in many ways, so that in the hands of a competent designer it may be made to nicely match the style of architecture which has been the theme for the residence.

Some have had the mistaken impression that concrete is costly compared with other types of construction. As a matter of fact, conditions in the building material lines have been such that for a long time concrete structures have been built in many places for the same price as less durable construction would have cost. Where there have been occasional exceptions to this, the slight additional first cost has soon been offset by the saving in maintenance and insurance. There are cases even where concrete has proved cheapest of all materials.

Thousands of miles of permanent concrete roads and streets now provide 365-day-a-year highways in communities that formerly were all but inaccessible at certain seasons of the year, owing to the bad condition of roads and streets. The fact that permanent streets and highways are increasing in mileage in strict accordance with their increase in popularity, suggests that the motor vehicle, whether it be gasoline or electric operated, should leave the permanent concrete highway only to enter the permanent fireproof concrete garage.

Some persons have wrong ideas as to what constitutes concrete construction. Buildings with walls of wood frame covered with Portland cement stucco, or buildings...
having concrete walls, yet floors, partitions and roofs of wood, are concrete buildings only in part. They are better, of course, than similar buildings of all frame construction, but they are not entirely proof against decay, nor are they proof against the effects of fire.

There are a number of distinct types of system of construction that have been developed for using concrete in houses and smaller structures. Briefly the various systems are as follows:

1. A metal frame, resembling that used in a building built of wood to which metal lath or fabric is fastened and the exterior covered with Portland cement stucco. Metal laths are also attached to the interior, which is plastered with ordinary plaster. Where partitions are necessary, they may be of metal frame and lath like the exterior walls or of hollow cement tile or other fireproof partition material. Roofs may be of flat slabs of reinforced concrete or may have metal joists covered by thin reinforced concrete slabs. Metal lath or fabric is attached underneath the joists, then plastered.

2. Walls of concrete block or similar units, with a type of roof as described in the preceding paragraph. Walls, partitions, floors and roofs may be solid or hollow.

3. Walls, partitions, floors and roof of monolithic concrete construction. Such buildings are constructed by placing the concrete mixture into previously erected forms of wood or metal.

4. So-called unit systems, which mean that slabs constituting walls and partitions, also columns and beams, where such are a necessary part of the construction, are manufactured or precast at a place or in a plant arranged for the purpose. After these units have been properly hardened, they are brought to the building site and set in place in a very short time at small expense. Walls, partitions, floors and roofs may be solid or hollow.

Briefly, these are the principal ways in which concrete may be used in garage construction. Photographs accompanying this article illustrate several of these methods of use.

If careful thought is given to planning a garage, a number of desirable features may be incorporated in the structures that will not materially increase its cost, yet will add considerably to its convenience. One of these consists of a repair pit of suitable dimensions, over which a car can be run when necessary to go underneath to make light repairs or to clean certain portions of the car.

There should be provided a small work bench with vise and other necessary tools, all placed in front of a window where good light may be had, thus contributing to the ease of making repairs. For the same reason, windows should be low enough so that interior lighting will be low down on the car, rather than up toward the ceiling.

All fireproof construction implies windows with wire glass in metal frames and iron shutters outside, especially where the garage is located near other buildings. This secures effective protection from within and without in case of fire, and in view of the value of the average electric vehicle, it deserves all possible protection from without.

Owing to the inflammable nature of gasoline, a heating plant should never be placed in a garage in which a gasoline car is kept. A garage for an electric vehicle may, however, be so heated, yet in town and city the residence and garage are usually located on the same lot not far from each other, therefore connection can readily be made to the house heating system if desirable.

There is one problem that electric vehicle owners are confronted with that the owner of a gasoline car escapes. Battery solutions are strongly acid and if any considerable quantity of such solutions is repeatedly spilled on an unprotected concrete floor, the sulphuric acid will probably injure the floor to some extent. This, however, can readily be prevented by applying to the floor surface after the concrete has properly hardened one of the several proprietary preparations that are intended to render the concrete surface acid-proof. There are so-called acid-proof paints that may be so used. Also, an asphaltic coating may be applied in a layer one-half inch or more in thickness. This coating usually consists of bitumen or hot tar, heated and mixed to a stiff consistency and rolled on the surface of the concrete to utmost compactness while warm. None of these protective measures need be used, however, if the garage is properly planned and special provisions made for handling batteries.

If batteries must be carried from the car to a bench to other part of the garage where they are handled while charging and replenishing electrolyte or doing other work upon them, a strip of rubber carpet laid from the car to work bench will give all the necessary protection to the floor, and prevent all acid spots.
If the car is to be washed inside the garage, a drain should be laid at a central point in the floor, which should be sloped toward this drain that in turn should be connected to a pipe leading to a sewer line or similar outlet. If the car is to be washed outdoors, then a small concrete-paved area in front of the structure will serve as a convenient washing platform, and prevent a mudhole.

Locker room for storing blankets and miscellaneous car accessories will suggest themselves as desirable conveniences to be provided. A lavatory with running hot and cold water is another desirable appointment. These, of course, should not be considered as a part of the cost of the building, but rather as the cost of gratifying individual tastes and desires.

Seven Ward Electric Trucks

A fleet of seven Ward Special electric trucks, one of the largest sales of electric trucks made in this vicinity, have just been delivered to the Salem Laundry Company by D. C. Tiffany Company of 136 Chestnut street, Boston, agents for the Ward trucks.

The Salem laundry has driven one of the trucks fifty-eight miles on a single charge to prove the margin of safety over the rated capacity. The trucks are expected to replace from one to three horses per route at the approximate maintenance cost of a single horse. The low maintenance cost is due to hard tires, low current consumption and a guaranteed battery life of four years.

Milburn Establishes Spanish House

It has been said that just at this time there is no field which possesses wider possibilities for the development of the automobile business than does Spain, and among the enterprising American concerns which are taking advantage of this opportunity for commercial gain is the Milburn Wagon Company, of Toledo, Ohio, manufacturers of the Milburn Electric. This company has just closed negotiations with Roman Oyarzum, who will act as Milburn distributor in Spain, with headquarters in Madrid. Mr. Oyarzum is thoroughly conversant with Spanish methods of doing business; he knows the kind of car best adapted for the requirements of that country, from the standpoint of road conditions and public demand, and he has already placed a substantial order for Milburn Electrics to be shipped immediately.

Up to the present time French and German cars have dominated the Spanish market,” said Mr. Oyarzum, when he was at the Milburn plant a few days ago. “The war, however, has cut into that source of supply to such an extent that America is now the logical place for the production.

“A car fully equipped like the Milburn Electric is the ideal car for the Spaniard for obvious reasons. In the first place it is so simple in construction that any one can operate it and it will give long service with very little adjustment. That is the kind of motor vehicle which appeals most to the Spaniard. He does not want one which requires expert handling.”
The Blue Valley Fleet

That Furnishes Greater New York the Butter for Its Daily Bread

New York receives, among other things, 164,000,000 pounds of butter annually. This city, perhaps, does not consume all of that great quantity, but it is safe to say that at least three-quarters of it spreads Gotham bread. Butter is rated among the daily necessities, for the city demands a certain amount of it every day. But this creamy yellow product of the dairies is quite perishable, and consequently the supply must be moved without delay and disposed of quickly. And since this matter of transportation of butter is the point of this story, it is just as well to state at the outset that electric vehicles have been selected by several of New York’s butter dealers as the best means of distribution from the wholesale warehouse to the various retailers.

One dairy in particular is that distinguished by the bright splash of blue that enlivens the more or less prosaic “produce” street on the west side of Harlem, known in the Directory as Twelfth Avenue. Here the Blue Valley Butter Company of Chicago, New York and elsewhere maintains its metropolitan distribution centre, and from this point twenty electric vehicles, one-ton trucks of the Walker make, start on their tours of the city, each carrying its supply of the well-known blue and gold packages of Blue Valley Butter.

One of the problems and the most difficult in the way of hauling that the Blue Valley Butter Company faced, was the number of short hauls, or to state it more clearly, the number of stops to be made by their vehicles during a day’s deliveries. It was estimated that trucks carrying butter to various retailers made anywhere from fifty to one hundred and ten stops during a day. In reality this meant one hundred and ten short trips from one establishment to another, and it was a problem to find a delivery system that would meet the situation.

The problem presented itself first in Chicago, where the main office is located, and the officials there had, after careful investigation, the satisfaction of finding the solution. They finally determined on a fleet of electric wagons to do the work. First it was found that the electrics could cope with the peculiar situation arising from the frequent stops incidental to wholesale butter distribution. Then the officials, realizing that cleanliness must be considered far above everything else in the dairy business, decided that gasoline trucks or horse-drawn vehicles had no place in their delivery system. Both were bound to produce soiled hands at least, and such conditions were not to be countenanced among the drivers of Chicago, the officials had little difficulty in deciding what vehicles were to be used in this new field, and a New York fleet of twenty cars equipped with Edison A-6 batteries, was established. This fleet has cared for all deliveries in the Metropolitan district for the past year, giving excellent service. According to the manager in the local field, the electrics are proving their worth every day and their operation constantly shows a saving to the Blue Valley Dairy Company of time, money and worry. And the rapid growth of the business here is in a measure accounted for by the efficient delivery system.

—New York Edison Monthly.

Goodyear Plans New Activities

The Goodyear Tire & Rubber Co. will build a plant in East Toronto, Ontario, at a cost of $750,000.

An addition of 350 acres has just been made to Goodyear Heights in Akron, Ohio, a tract of land laid out for workmen in the plant of the Goodyear Tire & Rubber Co. The home building plan for employees has been in operation for three years, the original plot being 100 acres. On this land employees of the Goodyear Company can build their own homes on the basis of rent.
The Yearning for Luxuries Produces Necessities

The Electric Motor Car's Trend toward Distinctiveness and Service

From the days of Cleopatra to the present, the men as well as the women have coveted some means of transportation that was fitting to their station in life to set them apart from their fellows. Thus it was in Egypt that chariots were fitted up with inlaid mother-of-pearl and ivory, as it was thought impossible to change or improve the design. One goes on through history and finds improvements slow; the sedan, coach and four, and the victoria are comparatively recent modes of conveyance. One did not attempt to improve the design, one changed paint, stripping, upholstery and fittings of the carriage instead. However, there were a few men to whom this did not appeal. One of these was Fiske Warren of Boston, who in 1892 designed and had the electric "brake" built for him that is illustrated on this page. It was viewed with awe by all those who saw it, no smoke, no fumes, no noise, only the slight whir of the chains could be heard as it moved up the street. It was the niftiest and snappiest little turnout on the road. In the slang of the modern university girl, it was so urly also twibby, geneat, and some wagon in those days. Those who had minds of the earth, earthly, described it as having wheels, steering with a reducing gear of two to one. The controller was a series parallel affair under the carriage body operated by lever. This was connected with a forty cell 11E chloride battery connected to the controller in groups of ten cells, each thus giving 4, 8 and 16 miles per hour speed over level roads. A reversing switch was fitted on the dash, allowing the motor to run in either direction.

On the eight mile an hour speed the car was good for 40 miles run from a charge. When Mr. Warren ran out of juice he charged direct from a 110 volt current the motor developed 5 hp. at 600 revolutions per minute. However, even this "magnificent mon-

The Dashing Waverley Pianobox Runabout of 1902.

ster," "modern juggernaut," as the papers described it then, for it weighed over two tons, cloyed the taste and palled on one. It was no use talking, it did not look svelt, had no dash and was no end clumsy, you know, old top. Somehow, after the novelty wore off, it did not look distincté or partake of the light and fairy ideas of that fin-de-siècle period. So as in the past dissatisfaction reigned supreme and little glooms rested and perched about until the days arrived when Baker and Waverley brought their respective pianobox electrics. Then the fashion devotees of 1902 heaved a sigh of satisfaction, rolled their eyes soulfully upwards and figured their gods were appeased. Again the foundations of their faith were shaken when it was decreed that such thing were not quite the thing. The car looked too skittish and frivolous, one must turn toward the sober, quiet things of life. Consequently the answer was the electric again, it was quiet and to make it dignified the sedan type was inaugurated. It protected from the heat and cold, it was serviceable every day in the year, it was dust proof.
and, not least, it bespoke individuality and was economical. The frivolous view past into history. The car became not a toy but a serviceable conveyance that was a necessity. Now the Detroit, Ranch and Langs, Ohioans, and other well known makes became frequently seen on the streets. However, the car is small but serviceable and there were a few super-luxurious cars built for a greater number of passengers. There was the Detroit limousine, the Borland town car, and today for those who desire, the car shown in the accompanying illustration. It is dependable and will always go. It needs no self-starter and has no fire risk or hazard attached to it. It is big, comfortable and distinctive, man-sized, and may be furnished in any material required. What more could be asked? Any supposed necessity for a gasoline limousine vanishes into thin air, for the quiet electric can produce more of an air of discernment and good taste than can ever be produced by anything else.

Ward Truck Performs Feat

The Lawrence Motor Company of Pittsburgh reports that a Ward Special Electric truck, fully loaded, property of the Keystone Laundry Company of Pittsburgh, ran sixty-three miles on full charge to run-down condition over the worst hills in the Pittsburgh district. This feat gives undisputed evidence of the remarkable efficiency and economy of service of the Ward Special Electric in frequent stoppage service.

**H. H. Dennis Makes Good Record**

A few days ago H. H. Dennis, distributor of Detroit Electrics, left Toledo at 5 a.m. in a model 42 Detroit Electric, four years old, with speedometer registering 16,560 miles, for the Anderson Electric Car Company's factory at Detroit, Mich., to have the car overhauled and repaired. Mr. Dennis arrived at the Detroit Electric factory at 9:30 a.m. the same morning, the speedometer registering 16,639, making the trip of seventy-nine miles on one charge, in four and one-half hours time, which is an average of 17.55 miles per hour, and he reports that the roads from the Ohio boundary line to Newport, Mich., were very rough and ratty and there was considerable sand in places.

A great many people seem to think an electric car will not run off a paved street and others feel that while they might go on a country road while they are new, they would not do it after they are six months old.

**Philadelphia Storage Battery Expands**

The Philadelphia Storage Battery Company has recently opened offices in Detroit, Atlanta and Los Angeles.

Peter Kain will be in charge of the state of Michigan and is located at 1107 Kresge Building, Detroit, Mich.

The Atlanta office is in charge of D. J. MacKillop, who was transferred from the Philadelphia Storage Battery Company office at Chicago, and who will take charge of the southeastern states. He is located at Hotel Ansley.

The Los Angeles office is in charge of C. L. McWhorter, who was formerly located at Denver, and who will have charge of the Pacific coast states. The Los Angeles office is located at 1105-7 West Pico street.

**G. V. Recent Sales**

The Chicago offices of the General Vehicle Company announces the sale of eleven trucks during the past week. Now-a-days if you live north of Thirty-ninth street you have your Anheuser-Busch delivered in one of the five new three and one-half-ton trucks, or one of the new two-ton jobs. In Toledo you get your Brand's Brew from a similar G. V. truck; in Peoria your Birk's comes in the same way, while back in the Lake Michigan city four new trucks haul the cup that cheers for the Manhattan Brewing Company and the United States Brewing Company. The last two have now a total of ten General Vehicle trucks.

**Interior of Chicago Electric, Edison Model**
October, 1916.

ELECTRIC VEHICLES

Creative Selling, or Business
An Address Before the Detroit Dealers Convention

BY D. E. WHIPPLE

GETTING a product from the producer to the user requires bringing about a state of mind on the part of the user or the purchaser that will cause the purchaser to want the product more than he wants the amount of money necessary to purchase the product.

This feeling of confidence on the part of the purchaser has to be created some time by somebody or something before the purchase is made—otherwise, the purchase will not be made.

If the producer or the salesman is directly responsible for creating this confidence in his product, this may be termed "creative selling, or business." If, on the other hand, this confidence is created in the prospective purchaser through some other source, this class of business may be termed "order taking." It is the result of an existent demand.

Therefore, we may divide the obtaining of business into two distinct classes, viz.: "Creative business," which requires aggressive salesmanship, and business obtained as the result of an existing demand, which may be termed as "order taking."

It would be a liberal estimate to say that only 35 per cent of all the business transacted each day in an old established line of industry is the result of existing demand, or "order taking."

The other 65 per cent is the result of salesmanship in one form or another, and it is this 65 per cent that makes possible the profit on the whole volume which the merchant or dealer realizes. The ratio of business obtained from existing demand as against "creative selling" will vary considerably, depending on the line of industry.

The automobile industry, while the third largest in the world, is comparatively new as far as even approaching the saturation point, and the adoption of aggressive creative selling methods.

Nearly everybody wants an automobile, irrespective of their station in life, consequently the natural demand, or "order taking" class of business has been sufficient to satisfy the average dealer, and in many cases dealers in the smaller cities have handled several lines or makes of automobiles, depending almost entirely on natural demand, and thus have been only "order takers."

Conditions, however, are changing and the wise, far-seeing dealer is appreciating the importance of selecting one automobile line of known reputation, backed by a strong manufacturer, and adopting the plan of "creative selling" as applied to that automobile.

No man has to be very old in the motor industry to appreciate the pleasant sensation of being associated with more than one million automobiles sold in this country this year, I believe it would be conservative to estimate that 80 per cent of the automobiles are sold on the "order taking" plan, or as the result of an existing demand, and the only salesmanship entering into the selling of eighty per cent of the one million is competitive salesmanship—only the salesmanship necessary to sell one type or make of automobile in preference to another; in other words, the desire for an automobile already existed in the mind of 80 per cent of these automobile purchasers, and the desire was not created by the automobile dealer or salesman.

Had the creative plan of salesmanship been used by the automobile dealers and salesmen of this country as it has been applied by older lines of industry, such as insurance companies, cash register companies, typewriter companies, etc., it is quite probable that more than two million automobiles would have been sold in this country this year.

If you were to follow the annual reports of new business, or "creative business," closed by the five leading life insurance companies, you would discover that each average over $1,000,000,000 of new business per year, or a grand total of over a half billion dollars.

This tremendous volume of business, or the bulk of it, is sold by insurance salesmen to men who do not know that they want life insurance.

Call on any one hundred men you may select, or any one hundred at random—ask them if they are in the market for life insurance—I guess you know the answer in advance—no one is interested.

Billions of dollars' worth of life insurance and other commodities are sold every year, and will continue to be sold to buyers who are not interested—who cannot be sold by "order takers," or as the result of natural demand.

If a man can sell a commodity which the buyer cannot eat, taste, wear or re-sell, has to die to win, and always out of season, what possible excuse can a dealer or salesman have for not selling electrics, when they are practical, and useful 365 days in the year?

Creative Salesmanship has been developed to a marked degree in practically all old lines of industry, and the dealer that can in some degree anticipate the future of the automobile industry will have no difficulty in arriving at the conclusion that the big and profitable end of the business will have to be obtained through creative selling methods.

There are a certain number, or hundreds or thousands of people in the territory of every dealer (depending only on your population) that can financially afford to purchase electrics this coming year and who want Detroit Electrics, but do not know that they want them,
because they do not appreciate the possibility and utility of the electrics as applied to their individual requirements.

Creative business applied to the sale of electrics means that you and I, as dealers, must go to this class of people (who have not expressed any desire for an electric), and reflect to them our feeling as to the utility, economy and adaptability of the Detroit electric in their service.

This reflection and transmission of our sincerity and confidence to them, backed up by an actual road demonstration of the car, will cause them to want the Detroit electric more than they want the money equivalent to the purchase price.

To reflect and transmit this feeling and confidence about our product requires persistence, tact and persuasion, and, above all, a knowledge of our product, and the prospective purchaser's requirements.

One of the finest little silken cords in the art of selling is what is commonly termed the "point of contact." One end of this cord is always loose and the other is fastened to the fountain pen of the buyer. When a dealer or a salesman fails to interest a prospect (by a prospect I mean an individual who has the price of our car), he should not tell himself that the prospect is not interested in purchasing, or write in his report "not interested," but he should immediately conclude that he has failed to make the "point of contact," or failed to find the loose end of this cord which is fastened to the fountain pen of the buyer.

On the other hand, the dealer or salesman must know before approaching the individual that he is not interested and then he will not be disappointed or discouraged when told "not interested." If the prospect was interested, he would have already purchased, and a salesman would not be necessary—an "order taker" would do.

In approaching the disinterested prospect—the man who wants an electric but does not know that he wants it—the dealer or salesman must keep in mind that he has within himself a sufficient amount of knowledge and evidence, as to the utility of the car and the requirements of the purchaser, which, when effectively placed before the individual, or prospective buyer, will make him want the car enough to purchase it.

If the dealer or salesman has been unsuccessful in consummating the deal, he has failed to get a sufficient amount of evidence or the right kind of evidence before the prospective buyer, thereby failing to make the "point of contact."

Experience proves that the average man is prejudiced against the electric automobile, and bases his opinion and attitude toward us and the modern utility electric car of today, on the impressions he gained from the old antiquated type of electric of the past.

I can imagine those impressions, and picture in my mind the little old high "tub" looking electric of five or six years ago, so commonly seen on the boulevards of our cities, and possibly driven by a little old woman, dressed in black, wearing a little black bonnet tied by strings under her chin.

These unfavorable impressions have been magnified by reason of these old electrics being equipped with solid tires, "chugging" along at the rate of ten or twelve miles per hour. Then, too, the manufacturer and dealer have been responsible for "branding" the electric by trying to exploit it as a woman's car.

Now conditions have changed and the modern utility Detroit of today is a regular automobile among automobiles; capable of giving the best continuous service; equipped with pneumatic cord tires; with ample speed and sufficient mileage per charge to meet unusually great demands. Dealers and salesmen have learned that our vehicle is not only a woman's car, but truly an automobile for red-blooded men.

Before the close of this convention every dealer and salesman representing the Anderson Electric Car Co. will have become so confident in the utility of the car and its performance, that he will radiate with enthusiasm, which when reflected to the individual, irrespective of all his unfavorable impressions, will establish confidence.

Confidence begets confidence. I conscientiously believe that the modern utility Detroit Electric of today is the best automobile proposition in the automobile selling field, and we, as dealers and salesmen can wholeheartedly approach any individual who has the price of a car with the courage of our convictions, prepared to present information and evidence which will create new business. In order to obtain the volume that our company demands, and the volume that you as dealers require to profitably operate your business, you must be mindful of the possibilities in "Creative Business."

I was recently talking with a dealer in a city of 400,-000 population, who has sold during the past year thirty-four new cars, and this dealer remarked that "due to local conditions it seemed impossible to sell more."

This dealer, however, made all of these thirty-four sales himself and I believe that if you were to place that dealer in a city of one hundred thousand or one million population, under most favorable or unfavorable conditions, he would probably sell in twelve months approximately thirty-four new electrics.

But, if that dealer in that city of four hundred thousand population would employ five men equally as capable as himself, he would probably sell approximately 180 new Detroit's in one year.

The difficulty seems to be that the average dealer does not appreciate the possibilities in "Creative Business." They wait until some one expresses a desire for an automobile, and then they try to sell that someone a Detroit Electric in preference to their competitor selling some other type of automobile.

A dealer will occasionally undertake to hire a salesman, and the failure of the salesman is often due to his calibre or type. He will hire a salesman that never has made a success of anything, and without proper training him as to the merits of the car and its performance in the hands of individual owners, put him to selling. If he fails to make his salary of one hundred dollars per month, more or less, within a short period of time, he is discontinued.

Gentlemen, there are productive salesmen in your city in other lines of industry—perhaps men now selling typewriters, adding machines, stocks and bonds, life insurance, etc. The service of these men can be obtained, and if properly trained in our line of business, a high average percentage of them should be able to make good in selling Detroit's. If you fail in trying out one or two salesmen of a high calibre or type, do not become discouraged; keep on trying.

You must realize that after you pass a certain volume of business, your additional gross profit is practically net profit, as your rent, taxes, insurance and general expenses do not increase.

The "order taking" type of business is usually more or less unprofitable for the reason that trade deals are involved and concessions are expected, while the "creative
type" of business is clean and profitable. I would like to see Detroit Electric Dealers from coast to coast adopt the most aggressive methods of any yet adopted in the automobile industry.

Our company has come to realize that a dealer must do a business profitable to himself in order to be a profitable and permanent dealer for our company.

It has been estimated that 79 per cent of all the working men in the world earn less than one thousand dollars per year; 17 per cent earn between one thousand and five thousand dollars per year; 3 per cent between five thousand and ten thousand dollars per year; and 1 per cent earn over ten thousand dollars per year. Your earning capacity for yourself largely establishes your value to your company.

To be more specific as to the methods of obtaining "creative business": during the coming year every dealer should prepare a list of names representing the individuals of your city, who are financially able to purchase a Detroit Electric, and from the time that you return to your city a year from today, do everything possible to create on the part of these people favorable attention, interest, desire and action pertaining to our product.

Some of the things that may be done to bring about this condition is systematically making personal calls; placing new information and evidence regarding our product before these people; systematically forwarding intelligent personal letters about our product; envelope inserts; circular matter of all descriptions. proving the utility of the modern car under all weather conditions; close co-operation with Detroit Electric owners already established in your territory; co-operation with electric garages, Central Stations; general publicity and local newspaper advertising.

Everybody, everywhere, has something to sell—his personality, ability or services, and the reason more of us do not meet with greater success, is because we are satisfied with "order taking," or the result of natural demand.

Selling electrics is a big business—a desirable business, and we as dealers and salesmen should feel proud of our chosen profession, and study to prove ourselves capable and worthy of the undertaking.

When we stop to think that nearly all other lines of profession require a college course of four or more years, we should be willing to make the sacrifice necessary to become leaders in our line of business.

Electric Garage Will Exhibit at Electrical Show
One of the features of the Electrical Exposition and Motor Show of 1916, which will be held in Grand Central Palace, Lexington avenue, 46 and 47 streets, New York City, Oct. 11-21, 1916, will be the exhibit of the New York Electric Garage. The Garage has taken a large and prominent space in which will be exhibited electric pleasure vehicles of the smaller types and very latest designs. There will also be a comprehensive working exhibit of the newest charging apparatus used in private garages. It is planned to make the annual New York Electrical Exposition as distinctly an electric automobile show as the other automobile shows held in New York City are distinctly gas car shows. At these shows the electric vehicle is given a back seat, but at the Electrical Exposition and Motor Show it is the most prominent feature. The details have not yet been completed for the inter-city run which will be held under the auspices of The New York Electric Vehicle Association.

A test run of unusual interest is now being planned to be held during the exposition. The Electric Garage of Central Park West and 62 street, New York City, one of the largest and most perfectly appointed electric garages in the country, will have an exhibit representative of the work it is carrying on. Among the latest types of pleasure vehicles to be seen will be the Baker, R. & L. and Detroit cars. Among the exhibitors of commercial cars will be The General Vehicle Company, The Walker Vehicle Company, and the Ward Motor Vehicle Company. The Edison Storage Battery Company, and The Electric Storage Battery Company will have interesting and comprehensive exhibits.

Ward Battery Rental System
A new battery rental system for Ward Special Electric Trucks will be put into effect immediately in Boston and will be of advantage to the truck buyer. The customer is only obliged to purchase the chassis and pays a fixed cost per month for the rental of the new type Edison Battery. This gives the buyer of a Ward Special the advantage of knowing the exact cost of maintenance per year.

The D. C. Tiffany Company, Boston, agents for the Ward Special, offers a guarantee of maintenance at a fixed cost which is most unusual. The electric truck is becoming more popular every year, due to its efficiency on routes with a great number of stops.
ELECTRIC VEHICLES

Vol. IX, No. 4.

Fort Wayne Motor-Generator

Almost invariably the ills to which automobile storage batteries are subject are traceable to insufficient distilled water or insufficient charging.

The instruction books furnished by the battery manufacturers cover the care of the battery very thoroughly and if directions in regard to filling with distilled water and keeping charged, be carefully followed, the batteries will unquestionably give good service.

Short distance runs, such as city driving, puts very hard service on the starting and lighting batteries for the many demands for the starter, horn and lights, coupled with the reduced motor speed, are likely to reduce the battery charge to a point where it requires recharging. Winter service too is especially hard on batteries as the batteries operate less efficiently in cold weather and require more charge than would be required for the same starting and lighting service in the warmer seasons. These facts have developed a demand for a battery charging equipment by which the garages or car owners can recharge the batteries.

The equipment for this purpose should be simple, compact and easily operated and should take its current from the ordinary incandescent lighting circuits. Such equipment must also be of low cost both for the installation and for operation.

A battery charging outfit of this nature which is suitable for either garage or private use is made by the Fort Wayne Department of the General Electric Company and represents the best thought and experience of that organization. The outfit can be furnished for service on either 60 cycle alternating current or direct current incandescent lighting service lines of either 110 or 220 volts. Both types of outfit are furnished in outputs of 50, 100, 175 and 250 watts, and for charging voltages of 12, 18 or 24 volts direct current as desired, sufficient generator field rheostat resistance being furnished in all cases to reduce the voltage to that proper for charging six volt batteries.

These outfits consist of a small motor-generator set on which is mounted a small controlling switchboard panel made of steel. The outfit for use on alternating current has an alternating current motor direct connected to a small direct current generator while the outfit for use on direct current lines has a small direct current motor coupled to the direct current generator.

The switchboard panel has voltmeter for reading the voltage generated, and a meter for reading the charging current delivered to the battery, a rheostat as before mentioned for controlling the charging voltage, and a double snap switch which at a single turn serves to either close or open both the motor and generator circuits. The batteries to be charged can be connected to the generator circuit by means of lamp cord, while the motor end of the set can be connected to the lighting circuit by means of lamp cord and connecting plug screwed into any convenient incandescent lamp socket. The outfit is, therefore, exceedingly simple to connect and operate.

Hundreds of these Fort Wayne battery charging sets are already in service and have proven to be both efficient and reliable. The maximum space required by the largest of these outfits, the 250 watt size, is length 18 inches, width 10 inches and height 21 inches.

S. A. E. Electric Vehicle Division Report

The Electric Vehicle Division has one subject ready for report. It is proposed to revise some dimensions of the Electric Vehicle Association standard charging receptacle which is shown on Data Sheet 50, Vol. I of the S. A. E. Handbook. The changes involve the lengthening of the shell in order to obviate the present tendency toward breakage of the shell when the plug is inserted or withdrawn. They have already been put into practice by one of the principal manufacturers of charging plugs and receptacles.

Walker Truck Gets Large Order

Walker Vehicle Company of Chicago reports the sale of twenty-five trucks to the Consumers Company of that city. Five are to be five-ton jobs and the remaining trucks are of three and one-half capacity. This makes one of the largest sales reported in recent months and should do wonders to help advertise the electric truck in Chicago.

A. C. Faeh Acts as Host

A. C. Faeh, advertising manager of the Baker R & I Company, spent the first part of the month with E. S. Partridge, eastern sales manager, assisting him to take care of the fifty guests of the company on the eastern five-day sociality run which they gave.

The Garage Efficiency Magazine has changed its name to Retail Motor Trade Journal, to be published in the future by the Automobile Trade Press, Incorporated, which is composed of Wesley T. Christine, the National Automobile Trade Association and others.
Gas Cars in Central Station Use

Central station companies, being public utilities, required by the laws of regulation to conduct their business with all possible efficiency and economy, frequently use gas cars for the transportation of their employees and materials. This, to the mind of the shrewd layman, is an argument for the gas car. More important, it is also an argument against the electric. No one would criticize a gas company or a telephone company for using gas cars. Those corporations are subject to the same whims and convictions that actuate human individuals. The fact that their purchasing agents select cars driven by gasoline instead of cars driven by some other motive power is of no special significance. It merely means that the individual responsible for their selection personally preferred gas cars, or was convinced of their superiority by the force of numbers or some other influence.

But gas cars in the service of an electric company are a staggering testimonial. There is no answer to such an argument. It would be more reasonable to have gasoline delivered in an electric truck. That even this miracle has been accomplished, as a photograph on another page illustrates, is but another triumph for the electric.

Occasionally we hear a protest directed against central stations which use gasoline vehicles. Occasionally, but not often — sometimes in the warmth of convention discussions. Most of us have become rather calloused to the sight. The Electric Vehicle Association has even had as officers central station men whose companies used gas cars at least in a part of their work.

These must be the people who are responsible for the statement sometimes heard, that there is no competition between the gas car and the electric. Such a mollycoddle, pacifist argument as that ought to bring failure to its proponents. How any electric car man holding such a theory can hope to do a real business is beyond our understanding.

There are central stations—quite a few of them, as the car manufacturers and the association are aware—that are not interested in electric vehicles. In plain American, they don’t give a whoop about the electric or its success or failure. For them there is still hope. When they are finally converted—an inevitable event—they are just as apt as not to jump to the other extreme, and be able to see nothing but electrics for all purposes. Their aloofness is due to ignorance, nothing else. They are too far out of this world to know a good thing when they see it, and the only use they know for the current they sell is to heat the filament of an incandescent lamp. They need educating, and that is the function of the N. E. L. A.

But the central station which actually professes an enthusiastic interest in the electric car, who takes an active hand in propagating its virtues across the continent, and then continues to use gas cars in its own work—that central station is worse than illogical, incongruous and inconsistent. It is a damage to the cause it espouses, a living testimonial to the faithlessness of its own claims. It is a laughing stock to the people it seeks to influence, like a drinking, swearing, gambling parson or a restaurant keeper who goes out to lunch.

The Electric Vehicle Association never was strong enough to make its disapproval felt. The Electric Vehicle Division of the National Electric Light Association, if it has the sup-
port of the organization, may be able to bring some of these recalcitrant central stations to a reasonable attitude. Better that they cease advocating the electric altogether if they cannot practice what they preach.

The central station which commits itself to a support of the electric car—and it must be a foolish management that refuses—should avoid the gas car as it would the plague. Nothing in the world is more incongruous, more ridiculous, and more harmful to the electric car business than the public use of gas cars by central station companies.

Making Charging Current as Available as Gasoline

The handicap against which the electric labors in its efforts to make a big industry is the necessity of co-operation. The manufacturer of electrics, however enthusiastically he works, cannot build a consequential business unless the central stations are equally enthusiastic and equally enterprising. Universal indifference of the central stations would kill the electric car business in spite of the most self-sacrificing effort of the manufacturers. The central stations, of course, cannot ever be wholly indifferent to the revenue derived from charging car batteries. But that enterprise is only a minor branch of their business, which fact gives them a certain attitude of independence toward the interests which are devoted wholly to vehicles.

The gas car business had no such handicap. Gasoline was always available, and the crossroads store sold it before any self-propelled vehicle ever stopped at its door. Increase in the demand, as the engine-driven buggies appeared and gradually multiplied to their present amazing count, did not mean the installation of special equipment; it meant merely larger tanks, filled more frequently at a consequently lower price to the store-keeper. No co-operation with the seller of potential power was needed or asked for by the manufacturer. The purchaser of a gas car bought with the knowledge that he could get plenty of fuel—even, if necessary, from store-keepers who never saw a car before.

Electric current, of one sort or another, is practically as available as gasoline today. The supply voltage—the "retail" pressure—is practically constant at one hundred and ten volts. The only obstacle to its use is that, in the majority of places, the current is alternating, and it takes direct current to charge a storage battery.

The popular mind is not definite in its knowledge of practical electricity. Out of three possible buyers of electric cars, only one will be informed as to the facts of battery charging supply. Another will know that alternating current is available, but not suitable; the third will not even know that any current is available outside of the circle with which he is familiar.

It ought to be generally known that alternating current is usable for charging storage batteries. The first step in that direction is to make it usable. There is no hope of increasing the availability of direct current; indeed, it is more probable that alternating current will entirely supersede direct in time. Presently all electric car batteries will have to be charged from alternating current circuits. That means that either every charging station, or every car must be supplied with a rectifying device for changing the alternating to direct current.

Rectifiers of one form or another are simple enough, and common enough. There is no reason why every electrical station on every possible electric vehicle route should not have one. On the other hand, there will always be thousands of alternating current connections available without rectifiers, and the obvious way out of that difficulty is to carry a rectifier on every car.

The mechanical difficulties in the way of such practice seem likely to be overcome as the result of experiments now being conducted. The development of a rectifier small, compact and light enough to pack unobtrusively as an electric car accessory will practically mean that all electrics should be so equipped. For with electric current universally alternating, the rectifier will be as essential a part of the vehicle as a gas car's carburetor.

Equipping every car with a rectifier would add thousands of useful charging stations to the present available list, enormously extend the scope and value of the electric, and establish a public confidence that would make for greatly increased popularity and sales.
News of The Electric Vehicle Section, N. E. L. A.
Sectional Development Work, Reports of Committees and New Announcements

This department gives the record of all activities of the Electric Vehicle Section of the National Electric Light Association in all of its sections, as reported by A. Jackson Marshall, national secretary.

Realizing the valuable co-operative development work which the association is doing, the publishers of ELECTRIC VEHICLES offer this exclusive section to association members and all electric vehicle interests in order that they may keep closely in touch with association matters.

BIG CHICAGO MEETING GREETs MANSFIELD

Chicago broke all records on September 19 when an even sixty members turned out at the Hotel Metropole to greet Edward S. Mansfield, the chairman of the Electric Vehicle Section N. E. L. A., who gave an inspiring address on what is being done. Vice-Chairman Foster of the National Electric Vehicle, who is chairman of the local section, spoke of the good that had been done since the last meeting, June 27. As proof of the progress made he stated that the new electric taxicabs were to be placed in commission soon and that soon there would be twenty-five new coal trucks of large capacity on the streets of Chicago. Secretary Fliedner was then called on to report membership progress and gave the names of Guy Woods, American Motor Livery Co.; M. Walsh, of the Robert Bland garage, and J. W. Freeman, of the Commercial Truck Company of America, and Mr. Henderson of the Terminal Garage, as new members.

Mr. Mansfield in his remarks stated that his cold and hoarseness which was apparent was the result of arguing in a sleeper with a salesman of gasoline the night before and for which he must apologize on those grounds. He went on to state that "I have never considered that the electric would entirely supersede the gasoline car, nor have I believed in a sudden sporadic or mushroom growth as good for the industry, but I do believe we are steadily growing in a good, healthy manner, and will continue to do so."

In this connection I may state that Mr. McGraw of New York told me he had recently been present at a meeting of gasoline car interests and was referred to as one from the enemy's camp as an advocate of electric vehicles. The speaker at the banquet stated he did not deride the electric, but he wished to say that if the electric vehicle manufacturers and the central stations had been awake and had co-operated at that time (in 1900) the way they should, the relative position of the respective types would have been entirely reversed. The electric would be now in the high state of advancement and public approval that the gasoline car now enjoyed. So it is now necessary for us to make that statement a reality.

He next touched on the history of the Electric Vehicle Association from the time of its formation in Boston in 1909 until the present time. The advantages of the alliance with the N. E. L. A. were touched upon by giving the relative number of central stations interested in the association before and after joining and the advantages of the N. E. L. A. Bulletin, which is gotten out each month and would now reach some 15,000 people. Mr. Mansfield also suggested that the secretary, Mr. Fliedner, of Electric Vehicles, keep the Bulletin informed as to what is doing in Chicago, and the members to hand news items in to him from time to time.

The letter which is going out to class A members of the N. E. L. A. was then read. In it Mr. Mansfield asks each of the companies to buy one electric to encourage sales in its town. This letter, he said, was to be followed up by a general letter of President Wagner, asking for the support of all electric industries for this movement to foster electric vehicle sales. In the
past it has been the lack of central station support that has caused most of the failure of interest in the field and now it can be obtained.

To further this public interest an idea is under foot to establish an educational course for those who wish to know about the vehicle or support themselves by driving them. In this way a corps of experienced and educated men may be had who know the vehicle from battery-solution to paint.

To enlarge our scope this idea we have been worked up into a popular film for cinema houses, demonstrating the ability and value of electrical fire apparatus and equipment.

A publicity committee is also being formed whose duty it will be to supply the newspapers with news of the field.

“Our chief difficulty, however,” stated Mr. Mansfield, “is the securing of a serviceable electric for central station salesmen and solicitors at a reasonable price, and I am glad to announce that in Boston we have a group of men working studiously on the problem, a car is running and I believe the cheap electric below a thousand dollars will arrive shortly.”

Under the subject of items of encouragement the chairman mentioned the central station dealers and garage owners agreement, the mutual garage of the E. V. A. in New York city and the one under way in Boston of 200 cars capacity, and the fact that the Pittsburgh central station men sent two men all through the country investigating the case of the electric vehicle. Of course we all know of the local Chicago cabs and the Detroit ones, but also few present knew of the fact that Minneapolis will also enter the electric taxicab field.

He next gave the probationary service records of gasoline trucks and electrics that resulted in the placing of the Staples Coal Co. order for a large fleet of twenty trucks.

At the conclusion of his remarks and the applause had subsided, Chairman Foster announced a meeting in the future would be addressed by John G. Learned.

New Factory for Johnson Bronze Co.

The wonderful progress that has been made in the machine shop practice is truly revealed in the large new plant of the Johnson Bronze Company, formerly The American Car & Ship Hardware Mfg. Co. at New Castle, Pa.

Kelsey Wheel Plants Combined

The Kelsey Wheel Company of Michigan, the Kelsey Wheel Company of Canada, the Kelsey Wheel Company of Tennessee and the Herbert Manufacturing Company of Detroit, have been merged into one company with $13,000,000 capitalization. John Kelsey will be president of the new company.

A limited amount of the common stock of the new concern has been offered to the public at $55. A part of the $3,000,000 preferred, which is seven per cent cumulative, has also been offered. It is expected that the stock will be listed on the New York stock exchange.

The Kelsey companies, although less than seven years old, had net tangible assets on December 31, 1915, of $2,500,000, and at present have $10,000,000 worth of orders on their books and nearly 3,500 people in their employ. During the first six months of this year the sales totaled $3,949,222, on which profits of $590,525 were shown.

It is stated that the contracts on hand for 1917 delivery call for 625,000 sets of complete automobile wheels and to provide for this production the erection of two new buildings and a power plant have been started at the Tennessee plant. The enlarged plant will have a capacity of 1,500 sets, or 6,000 complete wheels daily. An addition of over 300 men will be made to the force in Memphis, making 1,000 employees connected with that plant.

Timken Takes Over Worm Gear Stock

By taking over stock interests in the Timken-David Brown Company of Detroit, formerly representing David Brown & Sons of Huddersfield, England, the Timken-Detroit Axle Company comes into full possession of that enterprise and will consolidate its manufacturing operations under the management of the axle company, from which it has never been very distantly separated. Coincidentally, Cornelius P. Myers retires as chief engineer and manager of the gear company and will devote himself to his practice as a consulting engineer. The gear company produces worm gearing of the David Brown type for the axle company, and also for other customers, occupying a position in the trade somewhat similar to that occupied by the Timken-Roller Bearing Company so far as its manufacturing and marketing relations are concerned. Its product was originally developed by the British concern, which produced the gear generating machinery first used in this country in producing the Timken worm drive—but Timken sales methods brought success here.
Down Grade for the Grade Crossing Accidents!

Crusade Begins to Gather Heavy Momentum as It Goes On

The first result of the campaign started six weeks ago in an effort to force grade crossing protection by the railroads of the United States is the co-operation of nearly all of the large daily newspapers of the country, which have agreed to run a first page story every Monday, giving details of all the automobile grade crossing accidents in the territory served by them. This publicity plan was worked out after a conference in which automobile manufacturers, automobile insurance men and publishers took part. It was the consensus of opinion of that meeting that wide publicity of all grade crossing accidents would have a salutary effect upon the railroads that have neglected to protect their crossings.

At the same meeting it was decided that the efforts of the Long Island Railroad to make its grade crossings safe would be advertised widely throughout the country. The Long Island Railroad has been carrying on a campaign for many months in which artistic posters were used and in which much advertising space was purchased in the newspapers adjacent to its territory. This advertising space was utilized for the purpose of publishing "Life Saving Bulletins" and calling upon the automobileists to co-operate with the railroad in eliminating all accidents. The Long Island Railroad went to a tremendous expense and is continuing that expense, notwithstanding that every one of their grade crossings is protected and every precaution has been taken to make them safe. The statistics gotten up by the road, as a result of their own accidents, show that it has been the reckless driver of automobiles who has been injured or killed. They still have to record an instance where a careful driver has even been injured. The Long Island Railroad takes the stand that their grade crossings must be protected and asks for the co-operation of the careful automobileists to force the reckless driver to take some precaution.

Life Saving Bulletin No. 8, of the Long Island Railroad Company is given in the next column.

This bulletin is just a sample of a series of twenty-four gotten out by this road. It is their effort to go through the year 1916 with a clean record on grade crossing accidents. The railroad has found that the protection of their grade crossings means a financial saving to them. The work of their accident claim department has been reduced to a minimum and the claims they have had to pay were very few because they have been able to show that there has been no neglect on the part of the railroad company, and that where accidents have occurred, the neglect was on the part of the reckless driver. This is the attitude the automobile companies and automobile insurance companies are attempting to force on the other railroads of the country, especially the third rail systems.

According to the National Safety Council, with headquarters in Chicago, 1,080 people lost their lives in 1915 as a result of grade crossings accidents. This same council is carrying on a separate campaign in an effort to educate automobileists to stop at every grade crossing. This is strictly a "safety first" idea, but the council realizes that the education of automobileists to stop will not entirely eliminate grade crossing accidents, if the grade crossings are not protected by watchmen, gates or signal bells. This is especially true where grade crossings are hidden from view by buildings or shrubbery.

The influential men behind this grade crossing protection movement have no idea of using drastic measures at present against the railroads which refuse to recognize the value of protection. They are in communication with most of these railroads and are waiting for replies to their communications. It has been suggested that the railroads that refuse to protect their crossings should be the subject of attack through city and village ordinances, which would limit the speed of trains while going through the city and village. Numerous municipalities have such ordinances now, but nearly all of them are decorations for the statute books rather than for enforcement. Practically the only time anything is heard of these ordinances is when a suit for damages is brought against the railroad. Then it usually is proved that the train causing the suit was running far faster than the speed limits allow. The speed ordinances probably will be the motive of attack in Illinois, where grade crossing accidents in the last few months have been daily occurrences.

Beside the action being taken by the automobile interests the American Railroad Association has been conducting investigations through its special committee on the prevention of accidents at grade crossings. As a result of this investigation the committee has suggested that a uniform kind of grade crossing signal be used by all the railroads of the country. It has been suggested by the committee that instead of the old flag system of red for approaching train and white for clear track that the crossing watchman be equipped with discs which they...

LIFE-SAVING BULLETIN

No. 8.

Team Work Can End Them—

those avoidable accidents to automobileists at grade crossings on Long Island. You who ride in or drive automobiles, working together with the management of this railroad, can stop all such accidents forever.

Last year, despite the warnings of the railroad, eleven people were injured and twenty automobiles smashed up as a result of reckless driving.

The railroad's part is to guard their crossings as securely as may be.

Yours is to—

Stop Before You Cross.

The Long Island Railroad
will carry in their hands upon which is printed in very prominent letters the word "stop." Their idea is for the watchman to stand in the middle of the road of the grade crossing when there is a train approaching with this disc in his hand. Under this system if a reckless driver insists upon crossing the railroad at a dangerous time, he is very liable to kill the watchman, and few, even reckless drivers, desire to commit murder. The complete recommendations of this committee consists of:

1. Uniform approaching warning signs.
2. Uniform color of light-night indications.
4. Uniform painting of crossing gates, alternate diagonal stripes of blue and white.
5. Uniform rules governing crossing watchmen while regulating street or highway traffic.

This last suggestion is called for by the fact that many crossing watchmen use their own discretion in allowing automobilists to cross the track when a train is approaching. If the watchman figures that the automobilist has time to get across he will motion to him to proceed, not knowing that the engine may be stalled in the middle of the tracks. The railroads desire to enforce a rule on this and prevent the watchman from using his discretion. The railroads also suggest a campaign to enforce the states to erect and maintain signs in the highway at a distance from 400 to 500 feet each side of every grade crossing. Laws of this kind are enforced in New Hampshire and Vermont. The automobilists desire such signs to be erected but they believe that it is the duty of the railroads and not the duty of the states to stand the expense of them. The automobilists take the stand that the highway is the property of the railroads and that it is exactly similar in theory to the fact that a private realty owner has to fence his own property. For this reason the automobile interests fail to see why any exception should be made in the case of the railroads. The companies and individuals signify their intention to take an active part in this present campaign and who have started to do so are the following:

- M. Hoyne, State's Attorney, Cook county, Ill.
- The Automobile Club of America, New York City.
- Cadillac Motor Car Co., Detroit, Mich.
- The Lexington-Howard Co., Connersville, Ind.
- Chandler Motor Car Co., Cleveland, Ohio.
- Dixie Motor Car Co., Louisville, Ky.
- Auburn Automobile Co., Auburn, Ind.
- The Allen Motor Co., Fostoria, Ohio.
- The H. A. Lozier Co., Cleveland, Ohio.
- American Automobile Ins. Co., St. Louis, Mo.
- Employers Indemnity Exchange, Kansas City, Mo.
- Motor Vehicle Underwriters, Chicago, Ill.
- Bureau of Railway Publicity, Chicago, Ill.

General Vehicle Moves Chicago Offices

Manager Squires of the Chicago office of the General Vehicle Co. announces its removal, October 1, to 1621 Michigan avenue. Here a show room and office of 43 frontage and 165 depth is to be used to exhibit all models of G. V. classes. A full line of parts will be carried.

Tire Company Officials Arrested

Carl F. Guyer, president, and Ralph C. Harper, secretary of the Double Service Tire & Rubber Company, Akron, Ohio, have been arrested by federal authorities charged with using the mails to defraud.

This action was brought about by Richard H. Lee, representing the National Vigilance Committee.

Many complaints against the methods of this company, which has used newspaper and farm paper advertising extensively, had been received by the National Vigilance Committee and the Akron Advertising Club. Repeated warnings from the Akron Club failed to work reformation and more vigorous action was necessary.

The business of the Double Service Tire & Rubber Company was building a tire out of two old tires, by stitching them together. They claimed the tire they made would give seven thousand miles of service. However, users of the tires complained that after fifty miles or so of continuous service, they were worthless.

It is alleged that when this company found the scheme was not feasible, they simply kept the money sent them by prospective customers.

Mark B. Miller has been arrested for conducting what is said to be a similar business at Fiqua, Ohio, under the name of the Fiqua Tire & Rubber Company.

Thomas A. Edison Brands Story False

In a telegram to ELECTRIC VEHICLES Thomas A. Edison denies flatterly as a malicious falsehood any statement that the United States government had forbidden the use of his batteries in the various governmental departments. This message comes as a result of a telegraphic inquiry from ELECTRIC VEHICLES to the Edison Storage Battery Company regarding a news item sent out by the International News Service of New York.

Thomas A. Edison Conversing with John Burroughs and Mr. Firestone.

City under the date of July 19, 1916, which was published in the Chicago American of that date, as follows:

**Disaster to E-2 Makes U. S. Shy of Edison Batteries.**

New York, July 19.—The fate of the submarine E-2, which was blown up with a loss of five lives while the Edison batteries by which it was to be propelled were being tested, has taught its lesson to naval officers.

As a result but one submarine in the American navy will at present be equipped with the Edison invention.

The single exception to the temporary ruling against Edison batteries is the L-8, now building at Portsmouth, which was equipped with power of this design several months before the E-2 disaster.
The Hot Cathode Argon Gas Filled Rectifier

A Brief Review of Hot Cathode Phenomena and Its Practical Application

BY G. STANLEY MEIKLE

It has been known for a number of years that a vacuum tube containing a hot and a cold electrode acts as a rectifier. The problem of applying this principle to a practical rectifier was, however, beset by numerous difficulties. The variation in the magnitude of the current was extremely erratic with a slight variation in the degree of vacuum. The blue glow phenomenon accompanying the electron emission (indicating the presence of residual gas) caused a very rapid disintegration of the hot electrode and made the tube inoperative after a short period of life.

Early investigators had assumed that the electron emission was a secondary effect due to the presence of gas. Dr. Langmuir in his investigation of the whole field of electronics demonstrated that all of the irregularities thought to be inherent in the hot cathode vacuum discharge disappeared with the elimination of all residual gas effects. It has been found possible to produce and maintain vacuums so high that no gaseous discharge occurs with voltages as high as 100,000 volts; this is particularly demonstrated in the kenotron\(^1\) and the Coolidge X-Ray tube\(^2\) both of which are commercial devices.

In these types of high vacuum apparatus, the current is more or less limited, due to space charge effect. The electrons emitted from the hot cathode produce an electrostatic field around it, which limits the motion of electrons towards the cold electrode. This space charge, however, is rendered less effective, and the current is increased, by raising the positive potential or by increasing the surface from which the electrons are evaporated. The kenotron, in its present commercial form, is made to supply currents as high as 250 milliamperes, at voltages up to 100,000 volts.

However, owing to the fact that the voltage drop in the kenotron when rectifying currents of the above order of magnitude is relatively high (100-500 volts) it is impracticable to use this device on low-voltage circuits.

In the presence of positive ions the space charge of electrons is partially or completely neutralized. When minute traces of gas are introduced into the kenotron under certain conditions, a sufficient number of positive ions may be formed to completely neutralize the space charge effects and then the voltage required to draw a given current through the space is reduced many fold. The presence of the gas not only has an enormous effect upon the current carrying capacity of the space between the electrodes but also may have a very marked influence on the number of electrons emitted from the cathode. In the presence of oxygen, whether in a free state or contained in a gas (such as water vapor) the electron emission from a pure tungsten cathode is cut down to a small fraction of that in a high vacuum. Inert gases and vapors evidently have no effect upon the electron emission from pure tungsten.\(^3\)

In the previous investigations, the work has been confined to the effects of minute traces of gas where the molecules are few in number and where the ionized gas is not in a dense state. It has been shown that under these conditions the positive ions acquire a very high velocity, and when they strike the metal, until the function of the cathode is destroyed. The disintegration becomes very much more rapid as the voltage is increased.

A very careful investigation was made to determine the effect of gases at higher pressures upon the cathode filament. (By higher pressure is meant pressures exceeding 50 microns.) It was found that the nature of the gas had much to do with the rapidity with which the cathode was disintegrated. Certain impurities, even though present in very minute traces, cause the formation of volatile compounds with the cathode material in the presence of high temperatures, which ultimately effect destruction.

At pressures smaller than several millimeters, the effect of positive bombardment is still very troublesome. As the pressure of the gas is increased from vacuum condition the number of molecules increases very rapidly, limiting the free movement of the positive ion, and therefore decreasing the velocity. The energy given up by the individual ion at impact is then very much less than under conditions when it moves at the higher velocities; but there are vastly more positive ions present, so that the effect of bombardment by positive ions is much more disastrous in gases at certain pressures than under conditions where only minute traces of gas are present. In order to prevent disintegration of the hot cathode it becomes necessary to isolate the causes, and produce a condition which would not only eliminate the principal agents of destruction, but also the many secondary effects which are present. During the investigation of conditions covering a period of several years, the properties of many gases at varying pressures have been studied, with particular reference to their adaptability for rectifying purposes. Many electrode materials have been investigated with reference to their size, shape, and indestructibility. By a proper adjustment of the pressure of a selected gas, we have not only been able to reduce disintegration to a minimum (practically eliminating it), but have also been able to secure conditions where the emission of electrons from the cathode has been sufficient to actually cool it when rectifying excessive currents.

As a result of these investigations it has been demonstrated that a rectifier filled with gas at pressures within a more or less definite range can be designed to rectify currents from a few milliamperes to exceedingly high values at voltages varying between several volts and several thousand volts.

During the investigation, many observations were made which in themselves are worthy of elaboration. The object of this article, however, is not to present any of these noteworthy facts, or even to venture a scientific exposé of any phase of the investigation, but rather to refer to one of the several combinations of conditions which have given us a rather interesting type of low-voltage gas-filled rectifier for rectifying currents within a wide range.

\(^1\)Dr. Dushman, G. E. Rev., 15, 156-67, 1913.
Fig. 1 shows a sketch of a rectifier in which the cathode consists of a filament of small tungsten wire coiled into a closely wound spiral, and a tungsten anode of relatively large cross-section, with a comparatively smooth surface. The filament ends are welded to heavy tungsten wires, while the anode lead is swaged from, though is still a part of the anode. All leads are sealed directly through the high heat-resisting glass into 3-inch spherical bulbs of a similar glass. Although the anode of the tube shown consists of tungsten, other materials have been used with good results. Care, however, must be exercised in mounting all anodes, particularly where the material (such as graphite) can not be welded to the tungsten lead.

The rectifier shown in Fig. 2 differs only in the shape of its parts. The cathode is shown as a straight filament of small tungsten wire, which, if properly proportioned and mounted, consumes a minimum of energy for a maximum number of electrons emitted. The anode is shown in the form of a thin disk made large in diameter, to give a big radiating surface, which is found to be desirable when such metals as copper are used.

Fig. 3 illustrates a gas filled rectifier designed to rectify high current or low voltages. Two cathodes are shown; one is in filament form identical to that shown in figures 1 and 2 used for starting and the other is a tungsten rod cathode with beaded tip used during the operation of the tube. The construction between the bead and the lead suffices to prevent conduction of heat from the tip. The object of using such a cathode is to secure long life. Any disintegration unless very severe has no appreciable effect upon the life and operation of a rectifier of this sort. A graphite anode mounted on a heavy tungsten lead is shown, as graphite has been found to be a very desirable anode material for rectifying high currents. As before, all leads are sealed directly through the glass and, for currents between 20 and 45 amperes, into a 3-inch spherical bulb of a similar glass.

The rectifiers just described are constructed of high heat-resisting glass, since it is possible to seal the tungsten parts directly into the glass, and bulbs of small volume can be used for tubes of large energy consumption. Soft glass bulbs are used with very good results. It is then necessary, however, to use special scaling-in wires, or blended seals.

All tubes, whatever the material of which they are constructed, are carefully exhausted and filled with a gas in a high state of purity. As has already been stated in the introduction, certain impurities, even though present in small quantities, produce a very rapid disintegration of the cathode, and also have a very marked effect upon the voltage characteristics of the rectifier. It is advisable in certain types of gas-filled rectifiers to introduce substances which react chemically with such impurities as are introduced with the gas, or are given off by the parts during the operation of the rectifier. The reaction which occurs keeps the gas in a pure state. It is found convenient in certain types of the low-current rectifier to introduce the purifying agent in the form of an anode. As the impurities are distilled from the anode or cathode, or from the overheated glass parts, the arc drop increases. The increased energy consumption automatically causes evaporation of the anode material until the high state of purity is re-established, when the evaporation ceases. In Figs. 1, 2 and 3, the purifying agent is shown as a coil wound around one of the leads. During aging it is evaporated, and redeposited on the sides of the bulb, carrying with it the impurities in their respective chemical combinations.

The experimental work with argon indicates that rectification is possible in all pressures of gas. With an increase in the gas pressure the potential at which the arc is established increases. At the higher pressures, the temperature of the filament is also a factor in determining the starting voltage. After the arc is formed, the arc drop increases very gradually for big increases in gas pressures. Between gas pressures of 10 and 15 centimeters, the nature of the arc changes from a sharp concentrated arc to one diffused in character, which at very low pressures assumes the characteristics of the blue glow. At the lower pressures, the filament temperature above 2200 K. has little effect upon the characteristics of the arc.

For the low-voltage tubes of all current capacities a pressure is selected at which the effect of disintegration are a minimum and where the voltage conditions for starting and operating are desirable a pressure of argon between 3 and 8 centimeters (measured cold) gives very good results and is therefore the pressure used in this type of rectifier.

The principles already briefly discussed are applied equally well to half-wave or full wave rectifiers. The half-wave type shown in Figs. 1, 2 and 3 is very desirable, because of the simplicity of its construction and installation. A typical circuit for the half-wave rectifier, consisting of a 40-watt transformer for filament excitation, a load, and a means of regulation, is shown in Fig. 4. Where efficiency is not a serious consideration, regulation can be secured by placing resistance in series with the load. If efficiency must be considered, however, the line voltage is transformed to values where no regulation is required, so that the load can be placed directly between the terminals of the transformed source. Unless a sufficiently great number of these units controlling relatively large amounts of energy are placed in a power circuit in such a way as to badly distort its wave shape, the use of this type
of tube is permissible. As a matter of fact, the half-wave unit of low-current capacity if generally installed will have no appreciable effect upon the power-supplying circuit. Should this feature, however, become objectionable to the central station when high current units are used, two half-wave rectifiers can be placed in circuit, as shown in Fig. 5. The compensator is designed to transform the voltage to values required for regulation, and to supply current for exciting the filament. It possesses as much or as little reactance as the characteristics of the load require for proper operation. Where it is possible to split the load into equal parts, or where the total load is divided into units, as for example the vehicle battery of a central

charging station, the half-wave units, each with its individual battery load, are connected into the circuit in such a way that half of the tubes are rectifying one loop of the wave, while the other half rectify the remaining loop. The resultant effect upon the wave shape of the main circuit is similar to that when the full-wave rectifier is used.

The full-wave gas-filled rectifier shown in Fig. 6 consists of a tube into which are sealed two anodes and a common cathode. This type of rectifier is connected in a compensator circuit, Fig. 7, very much in the same way as the two half-wave units shown in Fig. 5. The energy consumed by the two cathodes in the former arrangement is somewhat greater than that consumed by the one filament of the full-wave unit. The effect upon the general efficiency it, however, relatively small, and is offset by other features, depending upon the service for which the rectifier is used.

A particularly desirable characteristic of the hot cathode gas-filled rectifier shown in Figs. 1 and 2 is the self-starting feature. When the alternating-current circuit switch is closed, the cathode filament is heated very much in the same manner as is the filament of an electric lamp by the turning of the snap-switch. A supply of electrons is liberated from the filament, and through the mechanism of ionization positive ions are produced, which, with the electrons, carry the unidirectional current of the arc. Normally the arc forms very rapidly upon the closing of the switch. This characteristic is particularly attractive to communities where the power-circuits are frequently broken during the night. The rectified current service is re-established automatically immediately after the power-circuit is completed, and continues to give service as long as desired.

In the low-current unit the cathode filament is excited continuously during operation. The apparent loss of energy, due to the excitation, is compensated for by a low loss of energy in the arc when the filament is excited from an external source, under which condition we have repeatedly observed arc potentials as low as 1 volt d-c. Once the arc is formed, the tube continues to operate as a rectifier even though the filament circuit is broken, except in instances where the rectified current is very low. The electrons are not so freely liberated from the unexcited cathode, and the deficiency of electrons results in the formation of a positive space charge. The voltage required to overcome this positive space charge and cause the electrons to be emitted by bombardment may be sufficient to make the total loss within the tube greater than when the filament is excited by external means. With no filament excitation, the spot concentrates on a few turns and there is a tendency to shorten the life of the cathode by evaporation. It is therefore feasible in tubes of low-current and low-voltage capacity to con-
continuously excite the cathode by external means. In the high current rectifier, the intensity of the bombardment is sufficient to produce electrons from the cathode with remarkable ease and the energy consumed is small. The filament is no longer necessary during operation. It functions in such tubes only as a starting cathode. A three-pole switch closes the filament-circuit, and also connects it with the anode. The gas is immediately ionized and the current begins to flow to the operating cathode, which is acting temporarily as anode until it becomes hot enough to emit electrons at which point the rectifying arc is established between it and the anode.

If conditions warrant, the tube is made to start automatically by placing a direct-current relay in the rectified current circuit. When the arc forms between the operating cathode and anode the three-pole switch is opened and is closed when the power-circuit is broken.

When a constant purity of the gas can be relied upon, the filament is used both as a starting and as an operating cathode even in the high current rectifier. Rectified currents as high as 80 amperes have been drawn from a tungsten filament 20 mils in diameter for short periods without any appreciable harm to it. The filament remains relatively cool and the spot moves toward the filament lead connected into the main circuit, as the current increases. The 20-mil tungsten filament in a low-pressure atmosphere of argon normally fuses at 31 amperes. Unless extreme precautions are taken to free all parts of the rectifier from gases which are later given up during operation, or unless purifiers are incorporated in the rectifier, it is advisable to use the point cathode. This is not noticeably affected by the irregularities inherent in a poorly treated tube.

In this as in all types of gas or vapor rectifiers, it is necessary to ionize the gas before the arc can be started. Furthermore, in order to prevent the arc from going out permanently it is necessary to maintain the cathode spot and re-establish ionization at comparatively low voltage. As long as the arc exists it supplies its own ionization. During that portion of the cycle when the voltage is too low to maintain the arc, and is zero, the cathode cools only slightly due to its heat capacity, and with the aid of the residual ionization the arc reforms at low voltage without the starting anodes and other devices for overlapping the voltage waves. The rectifier is not only self-starting but also self-maintaining. The persistency of ionization in argon seems to be particularly marked and this makes it possible even without filament excitation to use the rectifier for supplying current for very low frequencies. For the same reason, it is possible to operate the tube on very low current when the cathode is not externally excited.

No auxiliary starting load is required when beginning a battery charge. The supply switch is closed and the charging current picks up immediately, giving a slightly tapering charge as the battery voltage increases. On a resistance load, the current is very constant due to the fact that the cathode spot does not wander.

The efficiency of the tube depends upon the supply voltage, increasing with it as the voltage become higher, and upon the energy consumed in the arc indicated by the arc drop. The arc drop of the low-current low-voltage rectifier in which the filament is externally excited is between 4 and 8 volts measured on a direct-current circuit. The energy consumed in keeping the filament cathode hot enough to produce initial ionization is less than 40 watts. Therefore for a 6-ampere tube the energy consumed by the arc and filament is equivalent to that of a rectifier having an arc drop of 10.66 to 14.66 volts. The actual drop in this tube without filament excitation is, however, somewhat higher than indicated by the curves.

The tube operates satisfactorily on current ranging from a fraction to many amperes. With a properly-excited cathode the rectifying arc is started on alternating current supply voltages as low as 20 volts and is maintained on voltages as low as 14 volts.

The life of the low-current low-voltage rectifier, upon which the greater part of the work has been done, varies from nine-hundred tube hours to over three thousand hours. Some of the high current half wave tubes have a life of over a thousand hours and many others have a life of five hundred hours or more. Most of the life runs have been made with resistance loads. Many of the low current tubes have been in actual service for over eighteen months in several local central charging stations. Here they have been used to supply current for charging batteries. The life and characteristic have proved very satisfactory. The outfits consist of a half wave rectifier screwed in a fuse block and a 50 watt filament transformer supported by a small bracket screw to a window post. The direct current meter placed in the load circuit is screwed to the window sill beneath the tube, the rectifier itself being of cigar-box size. The supply circuit is a 60-cycle 236-volt alternating-current city power main. To secure flexibility, a variable resistance was placed in series with the battery load. In practice where efficiency must be considered, a variable transformer should be used in place of resistance. When the photograph was taken the rectifier was supplying a 6-ampere charging current to 15 batteries or 54 cells of miscellaneous character. At one period during the life run of this particular tube all of the available batteries in the garage were coupled into a series circuit and the characteristics and oscillograms taken. During this period eighty-nine cells were in circuit being charged with a direct-current of 6.2 amperes. The direct-current voltage over the total number of cells was 224 volts (average value) and the alternating-current voltage at this instant was 236 volts (root mean square value). The total direct-current voltage measured over the battery and variable series resistance was 236 volts (average value). It is evident that even a larger number of batteries can be charged by reducing the regulating resistance to zero value. The characteristics indicated above are typical.

In order to study the characteristics of the rectifying arc, frequent oscillograms have been taken under varied conditions. In all of the oscillograms the current graph shows that the rectification obtained is absolutely perfect and that, by a proper use of purifying agencies, a very desirable voltage condition is established.

In conclusion, the writer wishes to express his indebtedness to Mr. J. H. Clough, who has assisted throughout these investigations, also to acknowledge the generous co-operation of Mr. G. M. J. Mackay and others of the Research Laboratory staff.

—General Electric Review.
Battery Service

A Paper Delivered This Summer Before the Chicago N. E. L. A. Convention

BY P. D. WAGONER

PRESENT day inventions and new mechanical applications usually result from a pressing need fostered by abnormal conditions. It is interesting to watch the development of the article or device evolved and the expansion of the method devised to effect its distribution.

If an industrious employee in a huge metropolitan department store invented a superior cash-carrying device in New York, the device may be snapped up by some enterprising merchant from San Diego, Cal., before it hits Trenton, N. J. Merchandise is a fluid, in that it follows the lines of least resistance.

In its development the electric vehicle has had much in common with the electrical industry as a whole. The type of administration, local conditions and many other things largely govern the progress of the individual central station. Similar factors influence electric vehicle growth and success.

I mention the foregoing because it has much in common with the more specific points in the paper I have the honor to present to you today. The best battery service system, exchange battery plan, multiple battery method, or whatever name you choose to give it, is not a cure-all, may never be self-contained as regards being independent of the central station, and certainly must always be secondary to the electric vehicle itself. The principle involved offers a solution for certain problems. The application of the principle will find favor first where the idea appeals to progressive men as one having merit. I repeat—battery service is not a cure-all—not a "nurse" for the electric vehicle. It is a unit in a comprehensive plan for the successful exploitation of the electric vehicle.

Confining ourselves for the moment to the commercial electric, I think it must be obvious to all, that even after it was made a good practical road vehicle, its distribution and use was still inevitably a matter of evolution as to its application. The wholesale grocer, for example, knows more about electric trucks in the second year than he did in the first year of operation, and his ideas of adaptability and scientific operation are, at the end of five years, much more concrete than when his first truck gave him trouble because he neglected to properly charge the battery for instance. Not only do users in various trades progress in knowledge from year to year, but in a broad sense, entire cities modify their ideas of electric vehicle qualities as experience has shown users therein what the electric will do when operated efficiently.

While the battery service principle may be adopted and successfully applied in a city where there are a very few electric trucks, battery service is in line with the general evolution of the electric truck idea and represents at this writing the foremost step in electric truck progress. Battery service, rightly applied, is a success because it supplies a clearly defined and existing need. It stimulates the sale of electric trucks and simplifies matters for the electric truck user, due to the fact that it reduces his operating costs to a definite basis. Even if the Battery Service System did not show him any saving over charging, inspecting and maintaining the batteries himself, he would much prefer to obtain the benefits to be derived from the flexibility of the system.

The average man is still somewhat mystified by electricity and its workings. Storage batteries, kilowatt hours, amperes and volts, to him, all move in a world of mystery. The business man often feels that he has not the technical knowledge necessary to intelligently handle electric trucks, and is likely to question the ability of his employees to solve the "mystery" of the storage battery.

Another mystery to the business man is the amount of current required to operate electric vehicles. He does not want to know the cost in terms of kilowatt hours. He wants his transportation measured in miles.

Two parties are most vitally interested in the continuously satisfactory performance of the electric vehicle—the central station man who has current for sale, and the merchant or manufacturer who has goods to move.

The idea of using duplicate batteries to obtain additional mileage, either for long runs or to overcome abnormal operating conditions, is not new except as to specific application. The plan has been successfully worked out for taxicabs and mail wagons abroad, and a textile mill, two coal companies, a postal transfer company, a number of central stations and several department stores, to my knowledge, developed private battery exchange methods some years ago, and I assume that many other electric truck users have applied the idea.

I am indebted to Mr. E. R. Whitney, Vice-President of the Commercial Truck Company of America, for the following notes on a plan that they have in operation in Philadelphia:

"Of course the question always of first importance is keeping trucks continuously in service. We have a very well equipped service station where we garage from 35 to 40 trucks. This service station is equipped to do all kinds of repair work, including the chassis, battery and body. We carry a complete stock of spare wheels, equipped with rubber tires, for all capacities of trucks, which are rented to the user at an amount which will net us a small nominal profit. We also carry spare batteries for all sizes of trucks for rental on the same basis, and in the same manner we are equipped for renting a complete truck if necessary to take the user's truck out of service for extensive repairs, painting, etc. In this way, while the users pay for this service, they are very glad to do so as it makes their electric truck almost absolutely dependable for use every working day.

"We are offering guaranteed service at so much per month, which includes any one or all of the following: Garage, washing, current, chassis maintenance, tire maintenance, battery maintenance, body maintenance, the latter including touching up and varnishing one year, the complete repainting the next year. In this way while the cost would be slightly more than it would cost
the user of a large number of electric trucks who had a well organized force, the cost is less than the amount a small, inexperienced user would spend for maintaining his trucks in the same condition himself.

Six or seven years ago the General Vehicle Co. began to supply what we still call the "underslung" cradle, to facilitate the use of duplicate batteries. Naturally it has taken several years of careful constructive work on the part of the several interests involved to develop these ideas to a point where they are suitable for general commercial use.

Having settled that the limitations of mileage, hills, and bad road conditions could be overcome by the use of exchangeable batteries, the next question to be decided was the charge for the electric current, for, obviously, it would be almost impossible to continuously exchange batteries in all states of charge and discharge and keep accurate account of the kilowatt hours input or output. At this point A. C. Dunham of the Hartford Electric Light Company and his organization, with the vehicle manufacturer co-operating, came to the assistance of vehicle operators and devised a system by which the owner of an electric vehicle could be billed "by the mile" for electricity used.

Exchangeable batteries and electricity by the mile were united, and building on these factors there was gradually evolved a system for the operation of electric vehicles which is now known as the Battery Service System—also called the Geveco Trucking System.

When an electric vehicle is to be operated on the Geveco Trucking System it is sold to the purchaser without a battery, the vehicle being supplied with a specially designed, detachable battery cradle. It is by the use of this quickly exchangeable cradle that the company furnishing power is enabled to exchanged a discharged or partly discharged battery for a fully charged one in from two to five minutes. This feature enables the user of the electric vehicle to obtain practically unlimited mileage.

The purchaser of the vehicle contracts with the central station to furnish all power for operating the vehicle, supplying charged batteries as often as may be required to keep the vehicle in operation for as many hours per day as the owner may find desirable. In some cases where extra long mileage is desired, batteries are exchanged several times per day.

The central station furnishing power makes a monthly charge for the service (i.e., having batteries on hand ready to exchange at any time) and the power used is included in a bill to the customer at definite rates per mile, according to the size of the vehicle and amount of mileage used as recorded by the odometer. The ready exchange of batteries eliminates mileage restrictions because of grades. It also relieves the merchant of troubles which come with snow covered streets, and the extra rush trips required during the holidays. In fact, the Geveco Trucking System admits of operating the vehicle 24 hours a day should this be necessary.

The uncertainty as to the cost of operating frequently deter merchant of purchasing a motor wagon, but under this system he can, from tables, be shown in advance the exact cost in detail for the operation of a vehicle per month and per mile with all the principal items definitely fixed. The usual schedule of charges under this system recognizes the use of vehicles for the greatest possible mileages, the cost per mile decreasing as the mileage increases.

That such purchasing of electric power by the mile is flexible and attractive is shown by the fact that of the customers who have purchased vehicles under the battery service system in Hartford, 63 per cent. have so purchased to replace gasoline vehicles; and the purchasers have stated that they would not consider returning to the use of gasoline machines. This certainty is a practical demonstration of the fact that electric vehicles, when operated at a known cost per mile, are preferred by the merchant.

We have gone at this matter very conservatively. We co-operated with the Hartford Electric Light Company very closely during the first year the system was in operation there, and then we watched another year to see how the plan would work out. Then, in co-operation with the Washington Water Power Company in Spokane, Washington, we developed the system at that point. We watched this tryout point carefully and compared figures on the respective systems in the two cities. A certain similarity in operating costs was shown, regardless of the fact that one city was level and the other city hilly, and we felt that the idea could be safely expanded.

At the present time the battery service system of my company is effective in Hartford, Spokane, Boston, Baltimore, Harrisburg, San Francisco, Los Angeles, Worcester, Fall River and Wichita.

The value and effectiveness of the system when properly supported by a local selling organization are already established.

The Hartford Electric Light Company has sold electric cars since 1910 and every truck is still in continuous active service. In the first two years that it operated the General Vehicle agency it sold 15 G. V. Electrics. In June, 1912, it started with 18 trucks on the System; in June, 1913, with 32; in June, 1914, with 46; in June, 1915, with 62; and on April 1, 1916, it had a total of 77 trucks on the battery service system. This with but one manager-salesman, giving perhaps one-third of his time to actual selling.

A good battery service system insures several things, among them continuity of satisfactory operation for the electric vehicle user and continuity of off-peak current sales for the central station. A glance at the records of 12 vehicles on the system in Hartford discloses the fact that an average of from 1,000 to 1,100 miles per vehicle per month, for two and three years, is no uncommon thing.

The Boston Branch G. V.; Wise, Smith & Co.; Newton, Robertson & Co.; O. K. Bakery; Sage, Allen & Co.; Sanitary Laundry; C. N. Dodge; Eagle Dye Works; Hartford Market; Gaffney's Express; Downing & Perkins City Coal Co. In all twelve concerns with an average service of 32.3 months ran an average of 941 miles.

And from the central station's standpoint, you may ask: "Are they as satisfied as the users?" Well, they are selling approximately 600,000 kilowatt hours of off-peak A. C. primary current per year.

In the paper read by Willis M. Thayer at the E. V. A. convention held in Cleveland last year, on the Hartford Electric Light Company's experience with the battery exchange system, appeared the following figures:

<table>
<thead>
<tr>
<th>Total of Operating</th>
<th>Items</th>
<th>Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st year—June, 1912, to June, 1913</td>
<td>$3,847.59</td>
<td>$5,543.88</td>
</tr>
<tr>
<td>2d year—June, 1913, to June, 1914</td>
<td>$13,910.82</td>
<td>18,559.07</td>
</tr>
<tr>
<td>3d year—June, 1914, to June, 1915</td>
<td>$14,352.38</td>
<td>26,559.13</td>
</tr>
</tbody>
</table>

3-year total................. $31,705.79 $50,662.08

And to Mr. Thayer I am indebted for similar figures covering the first nine months of the fourth year of
the Hartford Company's experience with the Battery Service System, viz.:

Total of operating items: $10,397.72
Income: $22,167.51

Mr. Thayer states that these figures do not include depreciation on the battery equipment or interest on the money invested in the same; that they do, however, include all operating costs, power, etc., and that perhaps the notable point in the figures is the improvement in the results attained with increasing number of vehicles.

During the first three years of operations at Hartford, the ratio of "Operating Items" to "Income" was approximately 63 per cent, while during the first nine months of the fourth year the ratio was approximately 47 per cent.

In Boston, the System has been in practical operation only a short time. Eliminating what might be called the "Converted Pleasure Car Type" of commercial vehicle, as the Ford and Buick for instance, the G. V. Electric is fourth on the list of all registered commercial vehicles in Massachusetts. The G. V. Electric in the Service in Boston have been sold largely within the last four months. Such sales gather momentum rapidly once the ice is broken in leading lines of business.

Smaller firms are adopting the electric ten times more rapidly where the system is available than where it is not. Retailers in suburban districts who go into the city for their supplies each day, buy electrics where the system is available. Merchants who deliberately operate gasoline cars at higher cost than electrics, rather than buy charging equipment and charge the electric on their own premises, waive their past objections when offered service on the per-car-mile basis.

The electrics on the system in Boston represent varied lines of business.

The City of Boston has contracted for the watering of the streets of the city by a fleet of 3½-ton G. V. watering carts, which will be furnished electric current on the battery service system. Now any of our friends who desire to live up to the motto "Do It Electrically," cannot on the supplies delivered to them by one of the 1,500 G. V. Electrics used by the manufacturers of thirst quenching material, but they can, by going to good old Boston, find transportation facilities on a high grade electric water wagon, and should they fall off, and it become necessary, they can be taken to the police station in smooth running electric police patrol wagons.

In the Far West, the progress of the System has been somewhat retarded because of local business conditions. Spokane, however, has 12 vehicles operating on the System. One of the one-ton wagons is covering 20,000 miles per year, over the difficult streets of Spokane. This is accomplished by a shift of drivers, each driver working nine hours per day, and also two shifts of batteries. There is food for thought in the fact that by means of the battery service system an electric truck can average 66 miles per day over a two-year period.

What I have said regarding battery service I have meant to be in the nature of a progress report to date. Big things gather momentum slowly.

Our experience has convinced us that we are on the right track. We have reached certain definite conclusions and some of these I would like to leave with you for thoughtful consideration:

The idea behind the battery service system is commercially sound. It makes possible, through co-operation, the distribution of what might be called the development difficulties of all three parties interested—the electric vehicle manufacturer, the central station, and the electric vehicle user. It makes it possible for the manufacturer to give more adequate service to the industry; it insures greater electric truck load for the central station, and it does away with the stumbling blocks which have heretofore confused and discouraged the electric truck user.

There is a difference, however, between battery exchange and battery service. Duplicate battery plans as developed by large firms or others independent of the fundamental idea of service as developed in the above plan, fall short of the idea which I have tried to present.

Under the battery service system the operation of electric vehicles is reduced to the simplest possible form, and means to truck users:

A substantial reduction in truck investment; no charging apparatus or garage investment; unlimited mileage and continuous service from trucks; busy season difficulties and bad roads overcome; relief from care of batteries and a reduction of all items of battery cost, including current, to a definite monthly basis of miles traveled.

The central station's business is to deliver current to the customers. Ordinarily, at considerable expense, it delivers its current through a sub-station, over a distributing system to transformers, house connections, meters, etc. Under the battery service system, the central station delivers its current to its customers in a container, namely the battery, and this saves the distribution system expense. It is a relatively new method of delivering current to the customer, but is just as much a part of the regular business of the central station as the old method, with the advantage, however, that under the new method the investment in batteries becomes productive as soon as made, and this investment is paid back to the central station on the installment plan by the readiness-to-serve charge made to the merchant.

New Beardsley Branch

The Beardsley Electric Company of Denver, Colorado, has just been organized to push the sales of the Beardsley car of Los Angeles in that territory. A new showroom has been opened at 1431-1433 Cleveland Place, Denver, in charge of G. A. Showers, general manager, and A. K. Aucker as sales manager. The new low-priced Beardsley will be pushed.
Brevities of the Business

The Activities of the Electric Motor Car Field Told in Short Paragraphs

PERSONAL

E. D. Wilkerson, of Birmingham, Alabama, who formerly was with the United Auto and Supply Co., has opened up a splendid tire salesroom at 517 South Twentieth street, where he will handle the Pennsylvania line of tires.

John H. Fanver, formerly Detroit branch manager of the Prest-O-Lite Co., has become sales manager for the Extra Quality Motor Oil of the White Star Refining Co., of Detroit.

A. G. Cameron, of Dallas, Texas, succeeds W. E. Finney as St. Louis manager of the Goodyear Tire and Rubber Co. Mr. Cameron's promotion is a popular one as he has been with the Goodyear forces for over three years.

J. A. Staub of 127 North First street, Grand Rapids, Michigan, will represent the Willard Batteries in the future. A complete service station will be maintained.

O. P. Stehn, general sales manager of the Hydraulic Pressed Steel Co., of Cleveland, has recovered enough from his operation of two months ago to take up his duties again at his desk. The rest has worked wonders and he returns with a bunch of new ideas.

Aubrey Hurst has just been appointed sole Canadian concessionaire of the Detroit Weatherproof Body Co. He will conduct all Canadian business for this firm at 32 Front street, West Toronto, Ontario.

Earl E. Day, of the General Rubber Company is now in Sumatra in the Orient on a business trip in the interests of the General Rubber Co., of New York City. In conjunction with his trip, Mr. Hotchkiss of the same company a complete inspection of the company's rubber plantations will be made and the rubber situation carefully looked into before they return to New York late in November.

P. S. Russell, of Philadelphia, of gas car fame, has accepted the directorship of sales of the Hale and Kilburn Company of that city, the manufacturer of bodies and frames.

Warren T. Neihart, of Nebraska City, Nebraska, is in the market for good electric vehicles of the passenger type. He states price is immaterial.

W. A. Simonson of the Woods Motor Vehicle Co. is on a business trip through Fort Wayne, Dayton, Cincinnati, Pittsburg, Rochester, Buffalo, Canton, Cleveland, and Detroit.

J. E. Duffield, who resigned the western management of the Thermoid Rubber Company several months ago, has been appointed sales manager of the new tire factory of the Brunswick-Balke-Collendar Co., which is just entering the field. The new factory is at Muskegon, Michigan.

G. A. Showers has just been made manager of new distributing agency for the Beardsley Electric in Denver.

N. A. McCoy has complete charge of the new Philadelphia branch and service of the Wagner Electric Manufacturing Company of St. Louis. The new offices are at 1430 Vine street.

J. A. Grandle, formerly with the Anderson Electric Car Co., at its Chicago and Milwaukee branches, has accepted a position with the Woods Motor Vehicle of Chicago, representing it in the capacity of assistant to Mr. Veeder, city sales manager.

W. A. Sturgeon of the Henry L. Walker Co., of Detroit, is the representative for that territory of the Woods Electric Car Co. C. H. Hooker has been given the Cincinnati territory.

H. L. Browne, of Louisville, Kentucky, who for the past few years has been associated with the King Motor car as southern representative, has just completed arrangements with the Ohio Electric Car Company to represent them in the south. Mr. Brown is well known in automobile circles, having previously been connected with the Locomobile, Stevens-Duryea, and Oldsmobile, and his associations with the electric car industry is simply another indication that those thoroughly familiar with the automobile industry, having noticed the success of the electric car during the past two years, are confident that there is a wonderful future in store for this movement.

B. H. Blocksom will continue to have charge of the curbed hair department of Wilson and Co., successors to the Sulsberger and Sons Company, who have always been noted for its sterilized curbed hair for automobile upholstery.

John K. Kiern's million property on Kensington avenue, Buffalo, N. Y., has been leased to the Buffalo Pressed Steel Company.

TRADE ITEMS

The Perkins-Campbell Co. of Cincinnati, Ohio, has added 10,000 square feet of floor surface to its factory recently and 8,500 square feet more are being rushed to completion before the first of October.

Stable Falls Rubber Co., Cleveland, has leased space at 1844 Euclid avenue and will open a branch.

The Tay-Miller Manufacturing Company, Philadelphia, has increased its capital stock to $100,000, of a par value of $10 per share. The additional capital is to provide facilities to take care of the increased business in the company's patented Hand-I-Wash combination of water, soap and towel.

An addition is to be made to the factory of the New Departure Co., Bristol, Conn., 300 feet long and U-shaped. This will be known as the ball department when it is completed. The company has acquired considerable other ground for the enlargement of the factory.

The Steel Products Company, Cleveland, Ohio, has obtained control of the Michigan Electric Welding Company, Detroit, and the Metal Welding Company, Cleveland, O., and the concerns will be consolidated under name of the Steel Products Company, with a capitalization of $4,000,000.

The Jackson-Church-Wilcox Company, Saginaw, Mich., manufacturers of the Jacox steering gear, will build an addition to its plant on North Hamilton street. The new building will be of brick, one-story and 120 by 208 feet and will practically double the output of the concern. Employment will be given to 800 men in the enlarged plant, which will cover nearly two city blocks.

The International India Rubber Corporation, South Bend, Indiana, has contracted for the erection of the first plant of its tire factory. The dimension of the building will be 382 by 80 feet, and will contain 28,700 square feet of floor space.

The Dunlop Tire & Rubber Goods Co., Toronto, Ontario, is contemplating the erection of a factory building to be of brick and will mill rubber for manufacture of tires.

A new building has been erected for the Philadelphia Storage Battery Company at Boston, Massachusetts, at the corner of Jersey street and Brookline avenues.

A new battery service station has been opened at 507 Broadway, Lincoln, Nebraska.

The Pennsylvania Rubber Company has just moved its Boston offices into the new building at 683 Beacon street.

The Ohio Storage Battery Co., Columbus, has been incorporated at $20,000 to take over the business of the Columbus Storage Battery Company, 79 East Long street, central Ohio distributor for the National Carbon Co. The incorporators are George C. Lee, Jr., George C. Lee, Sr., James C. Langley, James W. Collins and J. A. Weston, George C. Lee, Jr., is president.

The Union Products Company, of Rockford, Illinois, has been incorporated for $200,000.00 to manufacture patented articles of merit, specializing in automobile accessories and automobile parts. Exclusive manufacturing licenses have been obtained on six patents issued and four that are pending on the manufacture of automobile and other kinds of wire wheels. Some sixty patents have been offered the company, but selection of the remainder has not yet been announced.

Plans for a factory building are completed, and work is being rushed on special machinery.

The officers of the new company are A. A. Martin, W. E. Williams, M. R. Harris, H. P. Norris.
Many have already judged the Chicago Electric

Its graceful lines and easy riding qualities have won constant admiration. Its ever increasing popularity seems to bring just this unanimous verdict; ideal in every sense of the word.

The demand for this “best built Electric in America” testifies to its superior workmanship, satisfactory service and enduring qualities.

Walker Vehicle Company
CHICAGO SALESROOM: 2700 Michigan Avenue Telephone, Calumet 3000
EVANSTON BRANCH: 1017 Davis Street Telephone Evanston 481
FACTORY: Thirty-ninth and Wallace Streets, Chicago
A GOOD BATTERY CAN'T BE RUINED

READ HOW THIS BATTERY WAS ABUSED AND STILL STOOD UP ON THE JOB—IT WAS A Philadelphia Diamond Grid of Course

THIS INHERENT DURABILITY AND DEPENDABILITY OF Philadelphia Diamond Grid STORAGE BATTERIES CAUSE THE MAKERS OF 80% OF THE ELECTRICS BUILT TO INSURE THE REPUTATION OF THEIR CARS WITH OUR BATTERIES. WHAT ABOUT YOUR CAR?

Send for Booklets WI and WTXI

PHILADELPHIA STORAGE BATTERY CO.
ONTARIO AND C STS.
PHILADELPHIA

DEPOTS AND AGENCIES
NEW YORK CHICAGO ST. LOUIS WASHINGTON BOSTON CLEVELAND ROCHESTER PITTSBURG DENVER SALO LAKE CITY DETROIT CINCINNATI BUFFALO MINNEAPOLIS KANSAS CITY, MO. TORONTO OAKLAND SAN FRANCISCO SEATTLE LOS ANGELES SACRAMENTO PORTLAND, ORE.
OHIO ELECTRIC

An electric car—designed and built for those who demand a light, snappy conveyance and yet insist on quality, comfort, and mileage capacity.

Just the size for a personal car—yet so designed that as many as five passengers can be accommodated in an emergency.

So simple and safe to operate—and so easily handled that the maximum degree of comfort is possible when driving.

A most economical car to own. Light weight—with large battery capacity—insures long mileage and minimum wear on tires. Sturdy construction makes repairs and replacements practically unheard of.

THE OHIO ELECTRIC CAR CO.
TOLEDO, OHIO

CHICAGO BRANCH, 2634 Main St., Chicago, Ill.
While the cost of gasoline increases the cost of electric current decreases

Detroit Electric

A real automobile not merely a town car

Detroit Electric has power—plenty of power to top high hills and pull thru hub-deep mud.

It has a wide mileage range. Big batteries give forth 80 to 90 miles of untroubled travel—sufficient for 98% of all trips undertaken.

So Detroit Electric is a thoroughly practical car for country ways as well as city travel.

If you are not already familiar with the rapid advances made in electric car construction, we urge you to see the new Detroit Electric models.

Let our nearest dealer show you in the best way possible—by actual demonstration—why Detroit Electric is fitted for interurban travel.

The 1917 models are now in the show rooms of Detroit Electric dealers' everywhere.

YOUR EARLY INSPECTION IS URGED.

Remember—the Detroit Electric is a quality car at a moderate price

ANDERSON ELECTRIC CAR CO.
DETROIT
MICHIGAN
F. E. Price and Party in Detroit Electric at the Detroit Athletic Club
The largest and only exclusive demountable rim plant in the world, covering five acres. The mechanical equipment is new and up to date, ensuring volume and quality production. Producing five thousand sets of demountable rims every working day. Enough to equip over one million, five hundred thousand (1,500,000) motor cars annually. Prompt shipments of demountable rims in any desired size and quantity.

Perlman Patent Protection Policy Protects Purchasers.

Perlman, the Original Demountable Rims are—FIRST in Quality, Quantity, Service, Saving, Economy, Efficiency, Use and Value—

We solicit your demountable rim business, inviting correspondence.

PERLMAN RIM CORPORATION
(Controlling Perlman Demountable Rim Patents)
MANUFACTURERS OF
Demountable Rims
Plant Clincher and all styles of Q. D. Demountable, Straight Side or Clincher
All correspondence should be sent to the
Executive Offices and
Sales Department
No. 1790 BROADWAY
United States Rubber Co. Building
Broadway and 58th Street
New York, N. Y.
The Greatest Success of Them All

Two years ago the Milburn Light Electric made its bow. And almost instantly it was touched by the fairy wand that brings success. It grew and grew in popularity until today it is pre-eminent among electrics—and remember, the electric is more popular than ever before. The car has always possessed undeniable beauty, finish, charm. This season these features are even more pronounced. And there are other substantial reasons for Milburn success. It is the lightest electric built, and by far the easiest to control.

It is speedy, too, with unusually long mileage per charge. The operating cost is less than any other car—gasoline or electric. And last, but not least, there is the Milburn price—a price made possible only by our large production and advanced manufacturing facilities.

Dealers: The great success of the Milburn makes it the profitable electric for you to handle. If we are not represented in your city write us at once. We'll show you a money-making proposition.

Established 1848
THE MILBURN WAGON COMPANY
Automobile Division
The Milburn Charger solves the home charging problem—inexpensively—efficiently

Toledo, Ohio
A New Battery Charging Set

This new motor-generator set for charging lighting and ignition batteries is complete with switchboard control and instruments. The very little space occupied by these sets appeals to garages and to car owners with limited accommodation. The 250 watt set for instance is only 18"x10½"x21" overall. Another big appeal is the variety and number of batteries that can be charged at the same time. By simply turning the control handle the following combinations are possible:

<table>
<thead>
<tr>
<th>Charging One 6V. Battery</th>
<th>Charging One 6V. and one 12 V. Battery</th>
</tr>
</thead>
<tbody>
<tr>
<td>“” “” 6V. “”</td>
<td>“” “” 18V. “”</td>
</tr>
<tr>
<td>“” “” 6V. “”</td>
<td>“” “” 24V. “”</td>
</tr>
<tr>
<td>“” “” 2V. Batteries</td>
<td>“” “” 12V. “”</td>
</tr>
</tbody>
</table>

During the coming winter months lighting and ignition batteries need more frequent boosting to overcome the effects of cold weather on engine and batteries and the insufficient charging of batteries through the generator because of short runs.

There is not only a good profit in the sale of these sets but worth-while income in the sale of current in the late hours of the night, when charging is done. Co-operate with our local offices and the salesmen of automobile supply houses. Making a profit in "dead" night hours is good business for you. Send for descriptive folders and literature on Fort Wayne Motor Generator Sets.

General Electric Company

For Michigan business refer to General Electric Company of Michigan, Detroit.

For Texas, Oklahoma and Arizona business refer to Southwest General Electric Company (formerly Hobson Electric Co.), Dallas, El Paso, Houston and Oklahoma City. For Canadian business refer to Canadian General Electric Company, Ltd., Toronto, Ont.
Anderson Electric Purchases Chicago Electric

Sale Proves Sensation of the Month

THE Anderson Electric Car Company, manufacturer of the Detroit Electric, has purchased the pleasure car business of the Walker Vehicle Company and on November 1 assumed all of that business.

The Walker Vehicle Company was the maker of the Chicago Electric, which as a pleasure car had a splendid name among the elite of Chicago.

The purchase of the Chicago Electric by the Anderson Electric Car Company was engineered by D. E. Whipple, central district manager for the Detroit Electric. It was at his suggestion that the Anderson Electric Car Company first thought of getting control of the local, Chicago-manufactured pleasure car. It was the opinion of Mr. Whipple that by concentrating the energy of the two sales forces, those of the Detroit Electric and those of the Chicago Electric, the electric pleasure car would become even more popular in the future than it has been in the past. He felt that with the elimination of the pleasure car end of the Walker Vehicle Company, the Detroit Electric would enjoy an even greater success.

In his announcement to the trade Mr. Whipple says:

"The Anderson Electric Car Company, the largest builder of enclosed automobiles in the world, and considered the best fitted to promote the passenger electric vehicle business, has engaged the services of Mr. Gail Reed, general sales manager of the Walker Electric Vehicle Company, also those of Mr. Bush and a number of Chicago Electric mechanics and shopmen." "We will sell all the Chicago Electrics in the process of construction at reduced prices," continued Mr. Whipple, "after which the building of others will be discontinued. We will furnish all Chicago Electric owners with the same high quality service and attention as furnished Detroit Electric owners, and we will carry all repair parts for the Chicago Electric in Chicago just as long as is necessary."

The Walker Vehicle Company, which manufactured Chicago Electrics, is owned by the Commonwealth Edison Company of Chicago. It has been the consensus of opinion for several months that the Commonwealth Edison Company, as a public service corporation, the main duty of which is selling current to users, should not be in the pleasure car end of the electric vehicle business. Several of the other pleasure car manufacturers seem to have felt that the Commonwealth Edison Company should devote its efforts to making and selling current and perhaps to the marketing of cars in the business end of the field. Hereafter the Walker Vehicle Company will devote all of its efforts and capacity to the building and selling of the Walker Electric Trucks, which business is rapidly increasing.

Not only did Mr. Whipple spring a big coup in eliminating the Commonwealth Edison Company from the electric pleasure car field, but he made a big move when he took over into his Detroit Electric organization at the same time Gail Reed, general sales manager. Reed has been active in the electric car industry for more than ten years, having been prominent with the Woods Motor Vehicle Company, and subsequently was first to open up
an extensive selling organization for electrics in Kansas City. He subsequently handled the Ranch & Lang and was manager of the Detroit branch at Kansas City.

In 1912 when the Chicago Electric Motor Car Company was organized by Frederick J. Newman, Reed held an executive sales position and secretaryship when purchased by the Walker Vehicle Company.

Reed always has been active in association work of the electric vehicle industry. He was elected president of the Chicago Electric Garage and Dealers' Association, May 27, 1915, and has held a position on the executive board of the Chicago section, Electric Vehicle Association, for the last two years.

At present he is the chairman of the Garage and Rates Committee of the Chicago Electric Vehicle section, member of the mid-West section of the Society of Automobile Engineers and the strong electrical society, the Jovian Order.

Reed can be called one of the pioneers of the electric vehicle industry. His experience, dating from the early days of the automobile industry, has covered every phase of the business to the present day.

The Walker Vehicle Company is a pioneer in the manufacture of the most efficient electric commercial cars. The large fleets of its cars that have been in service for several years have, through their economy and satisfaction, brought a great increase to its business until today it finds it necessary to confine the entire facilities of the factory and organization to the commercial electric field.

Amsterdam Electric Taxicabs Economical

At the present time the sixty electric taxicabs in use by the Dutch operating firm in Amsterdam have cost just 7.8 cents per mile including all working expenses.

Fine Body Work Shown at Palace

There are a number of fine examples of custom body work among the electric vehicle exhibits at the Electrical Exposition and Motor Show of 1916, which is now being held at Grand Central Palace. Those interested in this type of automobile will find eleven separate exhibits beautifully displayed on the main floor, for at this Exposition the electrics have a "front seat."

Among the electric vehicle, battery and accessory makers who are in attendance at the Electrical Exposition, considerable optimism prevails over the future of the electric vehicle. The steady growth and development of this type has been overshadowed by the more rapid and spectacular advance of the gasoline car. The increasing shortage in the supply of gasoline and the rising price of this fuel is one reason why the electric vehicle makers are prophesying a more prosperous future.

There is also more talk about improvements, particularly in batteries, which will give the electric a greatly increased mileage, and also lower prices.

Several new things of interest to automobilists are exhibited at the Electrical Show at Grand Central Palace. One is a new small-capacity alternating current rectifier shown by the General Electric Company. An entirely new principle is used, the gas in the bulb being argon instead of mercury vapor. It has several advantages over the mercury arc rectifier. It is inherently self-starting; 25 per cent cheaper to build and operate; slightly more efficient; more compact; requires less auxiliary apparatus, and most important of all, it can be made in very small sizes, for charging even a single storage battery. At present it is made in two capacities, 2 and 6 amperes. The smaller delivers 1 amp. at 15 volts or 2 amperes at 7.5 volts. The price is $14. The larger is 75 volts and will charge up to thirty cells or ten three-cell batteries. It is equipped with an ammeter and sells for about $100.

A 6-ton heavy-duty truck is a new model shown by the General Vehicle Company, Long Island City. It has a particularly convenient demountable battery cradle, which is so designed that it may be removed either by dropping into place or sliding out to one side. Its speed is 6 m. p. h. and it will operate about 50 miles on a charge, having a forty-four-cell G. V. X. battery. Price is about $8,300 with body. An interesting feature of the body shown, which was for delivering coal, was the use of a Wood hydraulic hoist, driven by an electric motor, permitting the driver to raise the body and discharge its load without leaving the seat.

Electric Car Popularity International

The growing popularity of the electric automobile is being felt not only in this country, but in many foreign lands.

Recent reports recently received from the Anderson Electric Car Company, manufacturer of the Detroit electric, record the sale of Detroit electric cars in Siam, Sweden, Denmark, Norway and India, in which an electric car was recently sold to H. H., the head of the Mysore Government, Mysore, India.

All cars recently sold in foreign countries have been delivered through regularly established dealers, who have purchased demonstrating cars from the Anderson Electric Car Company and are conducting a regularly established agency business. These dealers report that their clients are very favorably impressed and promise a very splendid volume of business from their respective countries during the coming season.
Use Circular Letters to Help Sell Accessories
Tell the Owners in Your Territory of Your Business, and Build Up Your Accessory Department

NOT many years ago two men sat in a bare little office.
They were father and son. From their expression it was plainly evident that they were worried. As far as the older man could see, the firm that he had tried for many years to build into a great organization was a failure, He was thoroughly and utterly discouraged.

His son, however, although disappointed, was not discouraged. With the bright optimism of youth, he figured the business could be put back on its former plane and gradually increased.

"It's no use, son," said the older man, "we have to unload our stock before we can afford to start manufacturing again, and if we don't unload it pretty soon, we will never be able to, because someone will come along with an improvement and our machines will be worthless."

"Then, let's unload them," said the younger man. "That's easy enough to say," replied his father, smiling sadly; "but we have tried unloading them all season and they have not gone. There is no use of keeping our salesmen plugging at the dealers to handle these machines."

"That's just where you have been all wrong," interrupted his son. "You have been trying to sell high priced machinery in car load lots to the dealers. Let's join hands with the dealer and help him to get to the man who is going to use the machinery. Sell it to the ultimate consumer, through the dealer, so that he will not have to invest a great deal of money and, possibly, keep his stock several months before he can turn it over. You let me have a free hand for two months and I'll show you results."

After a great deal of argument he obtained his father's consent to allow him to work out a selling plan for the machinery on hand. It worked. In three months seventy-five per cent of the stock had been turned over and very soon afterwards the demand became so great for this machine that more of them had to be made. Today—ten years later—this company is one of the largest manufacturers of agricultural machinery in the United States, and the young man, who is now president of the company, believes that their success has been largely due to the manner of keeping after their customers.

In turning over this machinery, the young man had used, perhaps, the simplest and most inexpensive of advertising methods—the circular letter. Today he is a large national advertiser, carrying space in nearly all of the farming papers, but he still sticks to the circular letter to supplement them and keeps the personal equation throughout his business.

This same method presents an opportunity to the accessory and automobile dealer that is overlooked by a great many. There is hardly any expense other than postage connected with making Uncle Sam a partner in your business. There is no method of advertising that has a more direct appeal than a letter.

Circular letters today are universally used by the class of trade who deal with a small personal and exclusive clientele of a local territory. This includes tailors, modistes, milliners and businesses of that nature.

The dealer of accessories is in much the same class as these people. He has an exclusive class of people to deal with and he has the merchandise that they must have. If he is an up-to-date merchant, it is the advertising of the manufacturer who takes space in nearly every sort of advertising medium known to co-operate, and a great many of these national advertisers are anxious to co-operate with the dealer in furthering the sale of their products. A certain garage owner and a large and successful dealer attributes a large part of his remarkable success to his method of getting and keeping business.

"I keep the largest and most complete line of automobile accessories in this territory," he said, "and while there are a number of other garages who handle accessories their lines are none of them complete and few of the owners of these garages realize that greater profits come from the sale of accessories than from any other individual part of their garage business."

"Each month I send a circular letter to every automobile owner in my territory, calling his attention to something in my accessory department. I have a card file of each customer in this locality and I make notations in this file of the larger purchases that they make. If, for instance, a man buys a tire from me, I drop him a card about a month later, suggesting that he drive in some day and let me look over his tires. This service, of course, is free, but gets me the good will..."
of the car owners and, in many cases, brings new
customers.

"When these owners receive my letters regularly it
keeps me continually in their mind. When they need a
particular accessory that they are unable to get at the
garage nearest their home, where, in all probability, they
buy gasoline and have minor repairs made, they remember,
possibly, I have suggested something of this nature and
they call on me.

"I have found that this system works remarkably
well and a large portion of my growing business is
directly responsible for it."

If you have never tried circular letters before, it is
suggested that you try such as those gotten out by the
various large accessory manufacturers. Perhaps you
will want to modify a form to suit your purposes. Great
results may not appear from the initial letter, but
steady and judicious use of them will eventually bring
results.

The car owner, should he receive the letter regarding
Blank's Motor Products would, probably, think that it
was a wasteless expense. But, after pumping up a tire or
two on a country road, the idea that it might be just as
well to have a motor-driven pump on his car occurs to
him. He recalls your letter and, while the return on your
letter may have been some time turning up, a sale is a
sale after all, and is, probably, directly traceable to your
letters.

Besides this there are many ways that form letters
can be used to advantage around the garage. They can be
enclosed with the bills, from time to time, as letters,
enclosed with the bill, are more likely to be given more at-
tention by the recipient. Care should be taken, though,
that the letter shall not bear any reference to the cus-
tomer's account.

Besides this there are other little advertising forms
of several kinds, some of them in the form of envelope
inserts that can be utilized in a very satisfactory manner
to help build up business.

Many concerns of national reputation use advertising
matter of this nature to help the dealer wherever possible,
and some tire and car manufacturers often go so far as
to furnish stationery to the dealers handling their
line of goods.

The dealer should keep in mind at all times the
fact that national advertising, while it is of inestimable
value to him, can only bring him the greatest possible
results by co-operative interest on his part. While the
national advertiser points out the advisability of using his
ber of advertisements prepared in electrotype form and
to help boost its products. These will be sent upon ap-
lication. They have helped other dealers increase sales
and will help you.

Paul G. Hobart in Stewart Letter.

Doak Joins Ohio Electric
Announcement is made by the Ohio Electric Car
Company, Toledo, Ohio, of the appointment of Ralph C.
Doak, as assistant general sales manager, coincident with
an increase in the number of field men and with the
inauguration of extensive advertising and sales plans.

Mr. Doak is one of the best known men in the automo-
bile field in the middle west, especially in the electric car
division of the business.

He first became associated with the marketing of elec-
trics in November, 1910, as branch manager of the
Woods Company, in St. Louis. After a year there he went
to Detroit as city sales manager for the Anderson Elec-
tric Car Company, but soon returned to
the Missouri metropolis, establishing the Missouri Motor
Car Company, to handle the Alco, Marmon and Abbott-
Detroit cars.

In April, 1913, he returned to the Woods Company
branch in St. Louis and remained there until October 1,
of this year. He was a director and moving spirit in the
St. Louis Automobile Manufacturers' and Dealers' Asso-
ciation.

Mr. Doak is an enthusiast upon the prospects in the
electric pleasure-car business and on the new Ohio elec-
tric quality models.
Electric Truck Operation Efficiency

In the Collection and Delivery of All Laundry Work

Electric commercial vehicles, after a protracted test, have solved the collection and delivery problems of laundries. The writer has been fortunate in securing an illuminating interview with Henry Sieminski, treasurer and manager of the Brunswick Laundry, Jersey City, New Jersey, based on an important paper on the electric truck in the laundry service which Mr. Sieminski presented before the Convention of the National Laundymen's Association of America the early part of October. This interview produced herewith, conclusively demonstrates the superiority of the electric commercial vehicle for laundry service, and when it is realized that there is a probability of thousands of electrics being used in this industry, the significance of the development becomes the more apparent.

"The collection and delivery of laundry, or the service end of the business, is as important as the quality of the work which any plant may turn out. The quality of the work, no matter how superior it may be, is of little value to the customer, unless the soiled laundry is collected and the laundered material delivered on time and in good condition. To accomplish this one must have a system of collection and delivery to satisfy these demands.

"About four years ago, after having had some twelve years of the usual experiences with horse-drawn and gasoline delivery wagons, with their attending high cost and comparatively unsatisfactory operation—and having had the opportunity to study and partially appreciate the efficacy of electric commercial vehicle operation in many other lines of business, I decided to experiment with a few electric vehicles for the collection and delivery of the material handled by the Brunswick Laundry. After four years' use of the electric trucks, during which time careful and complete cost accounting records were maintained, I can more thoroughly appreciate why most of the large commercial fleets, such as those of department stores, breweries, express companies, bakeries, and the like, are chiefly composed of electric vehicles.

"As soon as the all-around efficiency of the vehicle

*Secretary Electric Vehicle Section National Electric Light Association, (99 West Thirty-ninth Street, N. Y. C.)

is realized by the laundry industry, I am convinced that most laundries will use the electric car, well-nigh to the exclusion of all other means of collection and delivery. I am able to cite facts and figures which I believe will convince even the most skeptical that the claims that I put forth on behalf of the electric vehicle are reasonable and conservative.

"The daily load average of the Brunswick Laundry is approximately 1500 pounds, and at least sixty-five horses are necessary to do this work, allowing for emergencies. During the time we were using horse-drawn wagons it was often impossible to give our patrons good service. This was particularly true in the winter, when the horses were incapable of covering their usual routes because of the severe weather and the icy streets. Added to this was the extra loss of time occasioned by the necessity of sending the horses to the blacksmith to be sharpened. Even with the greatest precautions accidents were bound to happen on the slippery streets, and especially on the steep grades, all of which was not only a loss to us financially, and a detriment to our service, but also inhumane.

"Under the same conditions the electric delivery car quickly proves its worth. Thirty-three electric vehicles are sufficient to replace the sixty-five horses, and during inclement weather the only extra preparation necessary is the addition of chains, and each driver can equip his car with non-skid chains in fifteen minutes. Last winter during the unusually severe weather we were able to make all our collections on time, much to the surprise of many of our patrons, who were being inconvenience by continued delays in their milk and grocery deliveries, wherein electric vehicles were not employed. In fact, I may say that the electric car is so dependable that our customers can always expect deliveries at a definite time each week within fifteen minutes of the hour.

"In electrifying our delivery service we were not obliged to discharge our former drivers and engage experienced chauffeurs, as the simplicity of the cars enabled the men who had been driving the horses to learn to operate the new vehicles very successfully in a few hours.

A Special Ward Vehicle Truck used by the Keystone Laundry.

The Empire Laundry prefers this G. V. Truck.
This saved us expense and inconvenience as there is a
distinct advantage in employing men who are familiar
with your patrons and routes as well as your policies.

“The comparative operating cost and upkeep of the
electric vehicle with the horse are as interesting as the
facts concerning the dependability of each. Figures for
the comparative investment follow:

<table>
<thead>
<tr>
<th>INVESTMENT FOR HORSE-DRAWN EQUIPMENT,</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>One Wagon</td>
<td>$400.00</td>
</tr>
<tr>
<td>Two Horses</td>
<td>500.00</td>
</tr>
<tr>
<td>Two Sets Harness</td>
<td>90.00</td>
</tr>
<tr>
<td>Two Blankets</td>
<td>14.00</td>
</tr>
<tr>
<td>Two Rain Covers</td>
<td>10.00</td>
</tr>
<tr>
<td>Stable Accessories</td>
<td>1.00</td>
</tr>
<tr>
<td>Stable Room</td>
<td>500.00</td>
</tr>
</tbody>
</table>

Total ........................................................................ $1,515.00

INVESTMENT FOR ELECTRIC DELIVERY CAR—COMPLETE—$2,500.00

“The extra investment necessary for the electric
is, therefore, approximately $1,000. But the initial cost
is not the only thing to be considered. The following
figures furnish conclusive evidence of the economy in
the operating cost of the electric delivery wagon.

MONTHLY COST OF SIXTY-FIVE HORSES AND WAGONS.

<table>
<thead>
<tr>
<th>Monthly Feed Bill @ $17.00 per Horse</th>
<th>$1,105.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four Stablemen @ $6.00 per Month</td>
<td>240.00</td>
</tr>
<tr>
<td>One Harness Cleaner</td>
<td>60.00</td>
</tr>
<tr>
<td>One Wagon Washer and Helper</td>
<td>100.00</td>
</tr>
<tr>
<td>Horse-Shoeing @ $2.50</td>
<td>162.50</td>
</tr>
<tr>
<td>Harness Bills @ 30c per Horse</td>
<td>32.50</td>
</tr>
<tr>
<td>Veterinary @ 20c per Horse</td>
<td>13.00</td>
</tr>
</tbody>
</table>

Total ........................................................................ $1,715.00

MONTHLY COST OF ONE ELECTRIC DELIVERY CAR.

| Six Per Cent Interest on $1,000.00 per Month | $5.00 |
| Electric Current @ 10c per Day             | 4.00  |
| Night Mechanic per Car                    | 3.00  |
| Day Mechanic per Car                      | 3.00  |
| Washman and Helper                         | 4.00  |
| Battery Depreciation                      | 10.00 |

Total ........................................................................ $20.00

Total for Thirty-three Cars ....................... $57.00

“The depreciation of the car is not included in these
figures, but this is balanced by the depreciation of the
horses, wagons, harness, etc. Thus the electric shows a
saving of over forty per cent.

“The electric cars of the Brunswick Laundry average
25 miles per day, visiting all the outlying suburban
districts. Some of the best drivers deliver as many as nine
hundred bundles per week, and make an average of
thirty-two miles per day. At an average of twenty-five
miles per day and a current cost of four dollars per
month, the current cost per mile is about six-tenths of a
cent on this basis, figuring nine hundred bundles delivered
per week, the energy cost of each bundle delivered is about
one one-hundredth of a cent. In other words, the cur-
rent consumed in delivering one hundred bundles costs
about one cent. This is reducing economy to well-nigh
the irreducible minimum.

“As for repair bills, I find that they are a negligible
quantity in electric vehicle operation. We have a system
which enables us to keep our cars in the best condition
possible, and which eliminates blacksmith’s bills. Every
week one of our electric cars is taken down, carefully
looked over, cleaned and put in first-class order. Thus
every thirty-three weeks each car goes through a thorough
overhauling, and as this work is done by our men in their
spare time, no additional labor is required. The vehicles
never show any particular wear, except possibly the driving
chains.

“The average life of the tires on the gasoline cars
which we have used for long hauls is about three to four
months, while those on our electric vehicles last from a
year and a half to two years. This is not only a con-
siderable saving in the cost of tires, but is reflected in
another direction. A gas car that is hard on tires gen-
erally depreciates rapidly, as the vibration effects the body
and engine also. The smooth running electric car
eliminates the jerking and spinning of the wheels in start-
ing, and is much less affected by vibration.

“The advertising value of the electric must also be
considered. As compared with a horse-drawn delivery
wagon, or gasoline car, the electric has the distinct ad-
vantage of being clean and odorless,—and is almost no-
useless. The cleanliness is an especially important feature,
as any woman in selecting a laundry would be rather
skeptical of the efficiency of a company whose men looked
like a lot of blacksmiths from the dirt and grime of a
gasoline car, or who had the disagreeable odor of horses
and stables about them.

“The safety element of the electric should be men-
tioned. Collisions are very rare things with these cars,
even in congested traffic, as they are started and stopped
so easily. Our cars are geared for a maximum speed
of ten miles an hour, which I consider sufficient for any
heavy vehicle running through the city streets.

“In purchasing electric cars for laundry service, as
for any work, the load must be considered, and a vehicle
of suitable size and capacity should be chosen. The
bodies of the delivery cars which the Brunswick Laundry
use are four and one-half feet wide, five feet high and
seven feet long behind the driver’s seat.

“Since we have been operating the electric delivery
cars our business has more than doubled itself, and while
I do not credit this entire growth to the electric, I be-
lieve the improved service made possible by the electric,
the attractively painted, silent, clean car, and the neat
appearance of our drivers have all played large parts in
gaining new customers.

“As in most large laundries where everything is run
by electricity, we generate our own power and charge
our electric vehicles at night, then with the exhaust steam
we heat a sufficient volume of water to be used the next
day—thus eliminating the necessity of the use of live
steam in the water heaters during the day. The distilled
water which we use for our nickel-iron batteries is avail-
able in any laundry—the condensed steam from the ironing
machines—and is therefore a by-product as well as the
current used in charging the batteries.

“The Brunswick Laundry has collected, washed,
The Sanitary Laundry was operating four horse-drawn wagons and covered 400 miles per week, or 100 miles for each wagon per week. Two teams were disposed when the electric went into service, and the two remaining horses at that time were covering 70 miles per week instead of 100 miles which they formerly covered, the difference representing additional work satisfactorily discharged by the electric vehicles. This economic and efficient service of the electric has been maintained.

The Charity Organization Society of New York city reports that the three electric vehicles in the service of its laundry have reduced their cost of delivery at least twenty per cent, and the general results are much better.

Probably the most conclusive evidence of the electric’s ability to make good is indicated by the orders for additional electric vehicles which have been placed by laundries after they have had an opportunity to experiment with one or more electric vehicles. As an illustration the Salem Laundry, of Salem, Massachusetts, in December, 1915, installed one electric delivery car. This proved to be so entirely satisfactory that within six months an order was placed for six more cars of the same type. Another example of a repeat order in this case in four months after the first installation, is that of the J. Arthur Anderson Laundry of St. Louis. In April of this year the first car was put in use, and in August four additional cars were in service. Both the Pilgrim and Crystal laundries of Brooklyn are operating three electric vehicles, repeat orders having been given for two cars each, after the first car had been well tested. Numerous other illustrations of the adoption of electric vehicles by laundries might be mentioned if space permitted.

With the comparative cost data as the premise, and with the practical endorsement of a number of laundries successfully using the electric vehicle, a few of which have been indicated, the extended use of the electric in laundry service seems assured.

Used Car Market Report Issued

The tenth edition of the National Used Car Market Report has been issued by the Chicago Automobile Trade Association. The book is much the same as the ninth edition; zone 15, centering in Dallas, is still missing, the co-operation of dealers in that section not having yet been arranged.

At present there are fourteen makes of electrics listed and they have full data concerning them. For this reason the report should be on every electric car dealer’s desk, in order to help keep the price uniform on used cars to better the industry.

A type of wagon suitable for laundry or parcel delivery.
Gas Car and Electric Comparison
Among the many advantages which electric automobile manufacturers claim for their product, in comparison with gasoline motor cars, is the minimum amount of oiling necessary to keep the car in perfect running order. Inasmuch as this is a point with which the average automobile owner-driver is very little acquainted, the writer took the popular Milburn electric, manufactured by the Milburn Wagon Company, of Toledo, Ohio, as an example and obtained some data on the lubrication proposition which is interesting to all who own or expect to own motor cars whether gas or electric.

The Milburn Company has specialized on building its chassis in such a way that the necessity of lubrication or oiling is practically eliminated. To this end, spring bolts, brake pedals, rear axle brake and other parts of the mechanism are equipped with self-lubricating bushings which run indefinitely without attention.

The rear axle has a very generous oil reservoir which has been found so efficient that in several cases Milburn electrics have been operated 14 months without any additional oil being placed in the reservoir. This in itself
is a feature which instantly appeals to the thousands of owners who are constantly bothered with lack of sufficient rear axle lubrication.

In the whole Milburn chassis, there are only seven grease cups and of these there are three which require attention only once in from three to six months. The other four are conveniently located on the front axle and can be filled with oil every week or so without any soiling of the clothes or hands. There is no getting out and under a Milburn car when it is necessary to oil it. The grease cups which need attention now and then can be reached by a woman in her best gown, without any danger of getting dirt on the gown, as easily as she closes the door of the car.

As an indication of the remarkable strides which the Milburn has made in developing its lubricating system, one should hear in mind that today there are 23 less points to bother with, in oiling the car, than there were formerly.

"Although we have received many compliments on the efficient lubricating system of our car, we have not stopped looking for still further improvement," said R. S. Woodhull, sales manager of the Milburn Wagon Company. "Our whole aim is to build the car strictly for the benefit of the owner. We want to make it possible for the owner to relieve his mind entirely of all thought of taking care of the mechanical part of his machine—all he will have to do will be to start, drive and stop it. We feel that the Milburn electric is a big step in this direction—a step far ahead of anything attained by its gasoline competitors.

"We have reasonable assurance that our product is satisfying the public in the fact that our production is increasing every day in order to fill the incoming orders. Already it has been necessary for us to open a branch factory in Toledo and organize new departments to take care of the business. Among the new departments is a planning department which is for the purpose of studying the best methods of handling the various parts, building, etc. Another new department is the routing department, which decides how the parts shall proceed from machine to machine and department to department. In view of the higher cost of materials, all of this has been necessary in order that we continue to build high grade electrics without materially increasing the list price."

America's Electrical Week

Advantage should be taken by the electric car dealers of the wealth of advertising being done for America's Electrical Week. The movement is nation wide and publicity matter is easily obtained from the Society for Electrical Development, New York City. If you do not know what your city is doing, get busy.

The feature of the America's Electrical Week celebration this year in Syracuse, N. Y., will be an illuminated parade of electric pleasure and business vehicles, including several new tractors used in rural communities about the city. It is probable that last year's electrical show will be repeated with electric devices used on the farm as a feature.

M. O. Dellhain announces that the civic organizations which promoted the Noc-No-Mor and Sac-Bust'r celebrations will co-operate with the local committee in special street illuminations and decorations of Syracuse's new lighted shopping center.

J. H. Mosely, advertising manager of the Texas Power & Light Company, announces an illuminated parade as a feature of the America's Electrical Week celebration in Dallas, Texas. The Good Roads organizations and Merchants' Associations will co-operate in new street lighting and participate in outdoor demonstrations of electrical devices. El Paso, Galveston, Houston and San Antonio committees will make pageantry, shopping district lighting and school essays on electricity features of the local celebration.

George W. Hill, traveling representative of the Society for Electrical Development, in a report to J. M. Wakeman, general manager, announces that Birmingham, Atlanta, Charlotte, Nashville and Memphis committees have held meetings, appointed sub-committees to cover official city participation in America's Electrical Week. In each of these cities the general scheme of participation by chambers of commerce and by non-electrical merchants has been adopted. To this program will be added, according to the plans discussed at the preliminary meetings, electric vehicle parades and, in the case of Birmingham and Charlotte, an electrical pageant.

Pennants furnished by the Society will be placed by the local Automobile Club in Cleveland, Ohio, upon all cars owned by the city and by those driven by members of the club.

Activities of the committee in St. Louis are already far advanced. Large quantities of the Society's campaign helps have been ordered and several meetings of the entire committee and sub-committees have been held.

The Float and Band Committee, in charge of F. B. Adam, is to build an ornamental float upon an electric truck to hold a band and illuminations. This float will run over the business and residence streets before and during the week.

The poster stamp, which is the object of interest in this cut, is the famous prize-winner and is supplied free by the Society to those interested in electrics. It is in four colors and is bound to arouse interest.
New York Electric Owners Hold Sociability Run

Over Four Score Participated in Trip to Hastings-on-the-Hudson Last Wednesday

MARKED success attended the fall sociability run of the New York Electric Vehicle Association, held last Wednesday afternoon. Over four score took part and both weather and road conditions were ideal.

The start was made at 2 o'clock with forty-seven cars in line from the electric garage on Central Park West at Sixty-second street, with Arthur Williams, president of the New York Electric Vehicle Association, leading the long line, accompanied by Miss Delores Duncan, metropolitan golf champion. There were many women in the party, and the majority of the cars were driven by their fair feminine owners, who were most enthusiastic over the outing, and not one of them experienced any trouble whatsoever. Especially conspicuous were the new models of Detroit electrics—a whole fleet of them gliding along smoothly, silently, and carrying with them an atmosphere of refinement and class. Others were the R. & L., Baker Electric, etc.

The Longue Vue Inn at Hastings-on-the-Hudson, was the objective of the run and it was reached in time for tea, which was served at 4 o'clock, and the toast accompanying it was prepared on modern electric toasters. From the glass-enclosed dining room the guests looked out on a glorious sun preparing to set in a western haze, and glistening over the glassy-like surface of the Hudson—making a most charming environment for the party.

The return trip was completed before dark, and not the least factor which helped to make the run such a success, was the fact that every car participating finished without any trouble and on time.

Among those who took part in this run were: Mr. and Mrs. Herman Acher, Mr. and Mrs. W. D. Batsholts, Mr. and Mrs. Gail Borden, Mr. and Mrs. Albert Brown, Mr. E. P. Chalfonte, eastern manager of the Anderson Electric Car Co., Mrs. M. E. Drake, Miss L. L. Dodds, Mr. and Mrs. Sol Dreyfuss, Dr. and Mrs. A. B. Duley, Mr. and Mrs. E. A. Darby, Miss Delores Duncan, Mr. and Mrs. Chester Fulmer, Mr. and Mrs. G. C. Frissell, Mr. and Mrs. M. P. Graham, Mrs. T. M. Gibson, Mr. and Mrs. R. F. Greene, Mrs. A. C. Grossman, Mr. and Mrs. Jacob Hasslacher, Dr. and Mrs. Anton Hilbert, Mr. and Mrs. George L. Hunter, Mr. D. A. Harwood, Miss J. M. Johnson, Mr. and Mrs. Charles S. Keene, Dr. and Mrs. D. A. McNeill, Dr. George A. Maurer, Dr. and Mrs. Ward B. Hoag, Dr. and Mrs. H. G. Myers, Mr. and Mrs. S. W. Menefee, Mr. Joseph Marsh, Mr. and Mrs. Donald McLean, Mrs. Estelle Miller, Mr. and Mrs. Morris Meyers, Mr. and Mrs. Walter Neumuller, Mr. C. A. Pratt, Mr. and Mrs. Nat. Platt, Mrs. Isabelle Rode, Mr. and Mrs. Otto Rohsberger, Mr. and Mrs. R. W. Rhodes, Miss Esther Schmoll, Mr. and Mrs. Julius Somm, Mr. Robert Schmitte, Mr. and Mrs. Henry Stemmes, Mr. and Mrs. Sydney W. Stern, Mrs. W. J. Sheehan, Mrs. L. G. Steinmetz, Mrs. Henrietta Shotwell, Mrs. Oscar Tausig, Mr. and Mrs. L. A. Talman, Mrs. A. P. Thom, Dr. and Mrs. Leonard G. Weber, Mrs. E. E. Wolcott, Mr. Arthur Williams, Mrs. Esther Wolff.

Buffalo to Youngstown

This photograph of a Detroit electric automobile, owned and driven by a prominent Buffalo woman, was taken on the Canadian boulevard, while making a trip from Buffalo to Youngstown and return on one charge, covering more than 84 miles during the trip. This car left Buffalo at 3 o'clock in the afternoon and arrived back at 7 o'clock in the evening, going down the Falls side over Suspension bridge and then to Youngstown.

"It came back over the Lewiston hill, one of the highest and longest in this part of the country, without any apparent effort and back to the American boulevard, then to Williamsville and then to Buffalo, arriving here at 7 P.M.,” said W. S. Millring of the Detroit Electric Car Company of Buffalo.
November, 1916.  

**ELECTRIC VEHICLES**

"The same car the next day made a 79-mile trip from Buffalo to Cowlesville and return. The road to this place was very rough and hilly, especially one hill known as Hart hill. The Detroit electric automobile carried its full capacity of five passengers on both trips."

**Nearly Two Hundred Mile Trip**

"I have taken a great many trips in the last ten years, but I do not think I have ever had a nicer one than the one I finished in July in a Milburn from Toledo to Bay City, Michigan," states W. H. Nickless, Jr.

"We left Toledo one Saturday afternoon and made the run to Monroe of thirty miles in two hours and five minutes, although the roads were very rough, especially the last nine miles of clay. We got to Monroe in a rain that was nearly a cloudburst and stayed over night as did several gas cars, as it was nearly 6 P. M. when it stopped raining.

"I had the electric charged that night as I knew we would have fifteen miles of heavy clay roads in the morning. Although the roads were still muddy and full of deep ruts and I had to put on tire chains, the Milburn made the fifteen miles in one hour and ten minutes.

"The first good roads we found were from Rockwood into Detroit, a distance of twenty-five miles, which we made in one hour and twenty minutes, nearly twenty miles an hour average, while we made twenty-six miles an hour at times.

"We drove around Detroit during the day and put the car on charge that night so as to have a full charge for the long run ahead of us. We drove to Pontiac in one hour and thirty-five minutes (26 miles) and had to make a detour from Birmingham nearly to Pontiac on account of repairs being made to the main road, and this distance was very rough and hilly.

"From Pontiac to Flint (35.4 miles) there is nothing but hills and some sand, but neither bothered the Milburn at all, and we made it in two hours and forty-five minutes. Total so far for the day sixty-one miles.

"We put the car on charge while at dinner, but could not regulate the charger so as to give it a quick boost, so we were only able to bring the S. P. up to 1.175. When we got into two miles of heavy sand, between Flint and Saginaw, and the motor was drawing over 150 amperes, "I drove the Milburn fourteen miles farther after arriving in Bay City, making in all a run of 126 miles in one day, which I think was a good run for an electric, considering the roads.

"The Milburn got pretty well covered with mud at Monroe and it got dried on before I could have it washed off, so I left it on and it attracted a good deal of attention all along the road. In the picture I had taken after getting here you can see the mud and also the signs I put on in Detroit.

"The total distance covered on the trip was 182.4 miles, which we made in twelve hours and five minutes running time and not over the kind of roads you would find in Ohio or New York."

**A Series of Trips from Little Rock**

Hope Loughborough, the Detroit agent at Little Rock, Arkansas, has been making a series of one-charge trips during October.

The second road trip of the Detroit electric, to Lonoke, proved probably more conclusively than the first the adaptability of the electric for road runs within a radius of 50 miles or so.

On the Lonoke trip a Detroit electric brougham of usual stock model was used. W. G. Bottom of the Kansas City office of the company drove, with Hope Loughborough, local agent for the Detroit here, Moorhead Wright, president of the Union Trust Company, and a representative of the Little Rock Gazette as passengers.

These trips to the surrounding towns near Little Rock, Arkansas, by the electric are being made to prove the adaptability of the electric to road work; also to prove their cheapness of operation and show that they will balance accounts as to speed with the gasoline driven car under ordinary road conditions.

The mileage covered between Little Rock and Lonoke was 49.4 miles, and made in two hours and 40 minutes, although three or four stops to take pictures and for refreshment at Lonoke were not taken into considera-
New York Electric Owners Hold Sociability Run

Over Four Score Participated in Trip to Hastings-on-the-Hudson Last Wednesday

MARKED success attended the trip to Hastings-on-the-Hudson on Wednesday, held last Wednesday afternoon. Over four score took part in the drive, and on the weather and road conditions were ideal.

The start was made at 2 o'clock with forty-seven cars in line from the electric garage on Central Park West at Sixty-second street, with Arthur Williams, president of the New York Electric Vehicle Association, leading the line, accompanied by Miss Delores Duncan, metropolitan golf champion. There were many women in the party, and the majority of the cars were driven by their fair feminine owners, who were most enthusiastic over the outing, and not one of them experienced any trouble whatever. Especially conspicuous were the new models of Detroit electric—a whole fleet of them gliding along smoothly, and carrying with them an atmosphere of refinement and class. Others were the R. & L. Baker Electric, etc.

The Longue Vue Inn at Hastings-on-Hudson, was the objective of the run and it was reached in time for tea, which was served at 4 o'clock, and the feast accompanying it was prepared on modern electric toasters. From the glass-enclosed dining room the guests looked out on a glorious run preparing to set in a western breeze and glistening over the glassy-like surface of the Hudson—making a most charming environment for the party.

The return trip was completed before dark, and not the least factor which helped to make the run such a success, was the fact that every car participating finished without any trouble and on time.

Among those who took part in this run were: Mr. and Mrs. Herman Schilling, Mr. and Mrs. W. V. Banfield, Mr. and Mrs. Gail Gordon, Mr. and Mrs. Albert Brown, Mr. E. P. Chalson, eastern manager of the Anderson Electric Car Co., Mrs. E. E. Drake, Miss L. L. Dodds, Mr. and Mrs. Sol Delays, Drs. and Mrs. A. B. Duol, Mr. and Mrs. C. A. Burke, Dr. and Mrs. S. A. Doub, Dr. and Mrs. Chester Fulton, Mr. and Mrs. G. C. Frissell, Mr. and Mrs. M. P. Graham, Mrs. I. M. Gibson, Mr. and Mrs. R. F. Greene, Mrs. A. C. Grossman, Mr. and Mrs. Jacob Hass, Dr. and Mrs. Anton Hillert, Mr. and Mrs. George L. Hunter, Mr. J. H. Howes, Miss I. M. Johnson, Mr. and Mrs. Charles S. Reine, Dr. and Mrs. D. B. Kohl, Dr. George A. Mann, Dr. and Mrs. Ward B. Haag, Dr. and Mrs. H. G. Myers, Mr. and Mrs. S. W. Mead, Mr. Joseph Marsh, Mr. and Mrs. Donald McLean, Mrs. Estelle Miller, Mr. and Mrs. Morris Meyers, Mr. and Mrs. Walter Neumiller, Mr. C. P. Pratt, Mr. and Mrs. Nat. Platt, Mrs. Isabelle Rod, Mr. and Mrs. Otto Rothberger, Mr. and Mrs. K. W. Rhodes, Miss Esther Schmoll, Mr. and Mrs. Julius Sonn, Mr. Robert Schmidt, Mr. and Mrs. Henry Steinmer, Mr. and Mrs. Sydney W. Stern, Mrs. W. J. Steedman, Misses L. G. Steinm, Mrs. Henrietta Shewell, Mrs. Oscar Tanug, Mr. and Mrs. L. A. Tulman, Mrs. A. P. Them, Dr. and Mrs. Leonard G. Weber, Miss E. E. Wolcott, Mr. Arthur Williams, Mrs. Esther Wulf.

Buffalo to Youngstown

This photograph of a Detroit electric automobile, owned and driven by a prominent Buffalo woman, was taken on the Canadian bulletin, while making a trip from Buffalo to Youngstown and return on one charge, covering more than 84 miles during the trip. This car left Buffalo at 3 o'clock in the afternoon and arrived back at 7 o'clock in the evening, going down the Falls side over Suspension bridge and then to Youngstown.

It came back over the Lewiston hill, one of the highest and longest in this part of the country, without any apparent effort and back to the American bulletin, then to Williamsville and then to Buffalo, arriving here at 7:30 P. M.,” said W. S. Milling of the Detroit Electric Car Company of Buffalo.

November, 1916.

“The same car the next day made a 29-mile trip from Buffalo to Oswego and return. The road to this place was very rough and hilly, especially one hill known as Hart hill. The Detroit electric automobile carried full capacity of five passengers on both trips.”

Nearly Two Hundred Mile Trip

“I have taken a great many trips in the last ten years, but I do not think I have ever had a nicer one than the one I finished in July in a Milburn from Toledo to Bay City, Michigan,” states W. H. Nickless, Jr.

“We left Toledo one Saturday afternoon and made the run to Monroe of thirty miles in two hours and five minutes, although the roads were very rough, especially the last nine miles of clay. We got to Monroe in a rain that was nearly a downpour and stayed over night as did several gas cars, as it was nearly 6 P. M. when it stopped raining.

“I had the electric charged that night as I knew we would have fifteen miles of heavy clay roads in the morning. Although the roads were still muddy and full of deep ruts and I had to put on tire chains, the Milburn made the fifteen miles in one hour and ten minutes.

“The first good roads we found were from Rockwood into Detroit, a distance of twenty-five miles, which we made in one hour and twenty minutes, nearly twenty miles an hour average, while we made twenty-six miles an hour at times.

“We drove around Detroit during the day and put the car on charge that night so as to have a full charge for the long run ahead of us. We drove to Pontiac to one hour and thirty-five minutes (26 miles) and had to make a detour from Birmingham nearly to Pontiac on account of repairs being made to the main road, and this distance was very rough and hilly.

“From Pontiac to Flint (334 miles) there is nothing but hills and some sand, but neither bothered the Milburn at all, and we made it in two hours and forty-five minutes. Total so far for the day sixty-one miles.

“We put the car on charge when it was dimmer, but could not regulate the charger so as to give it a quick boost, so we were only able to bring the S. P. up to 1.175. When we got into two miles of heavy sand, between Flint and Saginaw, and the motor was drawing over 180 amperes.

“I drove the Milburn fourteen miles farther after arriving in Bay City, making all in a run of 126 miles in one day, which I think was a good run for an electric, considering the roads.

“The Milburn got pretty well covered with mud at Monroe and it got drier on before I could have it washed off, so I left it on and it attracted a good deal of attention all along the road. In the picture I had taken after getting here you can see the mud and also the sign I put on in Detroit.

“The total distance covered on the trip was 182.4 miles, which we made in twelve hours and five minutes running time and not over the kind of roads you would find in Ohio or New York.”

A Series of Trips from Little Rock

Hope Loughborough, the Detroit agent at Little Rock, Arkansas, has been making a series of one-hour trips during October.

The second road trip of the Detroit electric, to Lomel, proved very much more satisfactory than the first the adaptability of the electric for road runs within a radius of 50 miles or so.

On the Lomel trip a Detroit electric brougham of standard Model 78 was used. W. G. Bottom of the Kansas City office of the company drove, with Hope Loughborough, local agent for the Detroit here, Mr. W. S. Moulton, president of the Union Trust Company, and a representative of the Little Rock Gazette as passengers.

These trips to the surrounding towns near Little Rock, Arkansas, by the electric are being made to prove the adaptability of the electric to road work; also to prove their cheapness of operation and show that they will balance accounts as to speed with the gasoline driven car under ordinary road conditions.

The mileage covered between Little Rock and Lomel was 60 miles, made in two hours and 40 minutes, although three or four stops to take pictures and for refreshment at Lomel were not taken into consideration.
tion, thus showing an average speed of some 18 to 20 miles per hour under ordinary road conditions.

Washington, D. C., to Ridgeville

"The average person believes that when the modern electric is driven around the city and suburbs twenty to thirty miles it is then necessary to recharge the batteries before traveling further," states Arthur Foraker, the Washington, D. C., agent of the Milburn car. "This is all wrong, of course. "I think I effectively established that in the minds of several newspaper men who accompanied me the first of October on a trip in the new Milburn. We traveled the entire distance from Washington to Ridgeville and return—seventy-six miles—over very hilly country on a single charge.

"The electric is not a touring car. Let me dispel any such impression at the start. It is built essentially for the city and suburbs and due to its great economy, ease of operation and the soothing effect of its quietness it is unquestionably the ideal town car. Low upkeep, complete comfort in every sort of weather and the lack of necessity for gear shifting, make this odorless, clean vehicle the last word in desirability.

"It is possible at this time to secure an electric car of the closed type with a radius of 75 to 100 miles per charge at nearly half the price of electric three years ago.

"It is merely a question of time when the electric will come into its own as the one car for city and suburban transportation."

Seattle to Tacoma

Frederick A. Wing of Seattle, Washington, and president of the Broadway Automobile Company, has both a sporting disposition and mean one. In a letter to Electric Vehicles he evidently wants us to help trim our friends who don't believe 100 miles is possible on one charge. As we have seen it so nearly accomplished we refuse to bet. Here is his letter. We will not bite:

"Whenever you hear anyone expressing any doubts as to the mileage, over country roads, possible to be obtained by the Detroit electric car, and should the [Doubting Thomas] happen to have any easy money about his person that he wants to wager that we cannot go out and do 100 miles on a single charge, send him to us.

"Recently we made the round trip from Seattle to Tacoma, the first 48 miles of the '92 against a good stiff southerly wind, returning later in the day when the wind had died down, receiving no benefit on the return trip from the wind. On arriving at Seattle, we have to negotiate the long Jackson street hill, climbing up to the garage, which is some 250 feet above the city level, which, coming in as it does on the last end of a long drive, makes a pretty severe finishing test. However, we made the record trip, in record time, and the car registered a total of 92 miles all told, and finished good and strong.

"While this would be no mileage in a level country, it is rather remarkable for Seattle, and only goes to again prove our claims for sufficient mileage for all ordinary purposes with a Detroit."

Now do you blame us for not wagering with the gentleman from Seattle?

Kansas City to Excelsior Springs

"It can't be done," That's what I said before we did it, said J. A. Calvin of Kansas City.

One Saturday, a short time ago, a party chaperoned by A. T. Clark, manager of the Anderson Electric Company, makers of the Detroit Electric, made the run to Excelsior Springs and return in two Detroit cars. The time
going over was one and three-quarter hours from the bridge, and returning was only five minutes more.

Anyone familiar with the roads between Kansas City and Excelsior Springs will realize what a remarkable performance it was for an electric car to make the round trip without recharging.

Those composing the party were Mr. Clark, E. E. Peake, secretary of the Automobile Dealers’ Association, Dr. J. A. Reilly, C. L. Schmack, E. C. Hemmenway, Harry Hargreaves and myself.

We arrived at the Elms at twelve-fifteen and parked the two cars in front of the hotel, where they excited considerable interest among the hotel guests, many of whom found it hard to believe an electric could do the trick. Two elderly couples from a northern state were very much impressed when told we were coming home without recharging the cars, and expressed a determination to come to Kansas City and visit the salesrooms to see if we actually got back, and incidentally to inspect a few of the cars.

The ride home in the late afternoon, through the country broken into hills and valleys and shady drives in the lowlands and along the banks of several small streams, was a delight not dreamed of by Mr. Clark’s guests, who themselves had looked on the invitation as the dream of an overwrought enthusiast, but being a hardly bunch, had said they could “take any chance Clark could.” The only real chance they did take was as to whether or not the Elms would have enough food to go ‘round after Dr. Reilly got both hands working.

Columbus to Springfield, O.

H. A. Miller, manager of electric vehicles sales of F. E. Avery & Son, 1429 Franklin avenue, of Columbus, Ohio, with a small party made a trip to Springfield, Ohio, in a Detroit electric about the first of October and demonstrated the usefulness of this car for suburban purposes. The trip was made Thursday and covered 110 miles. At the noon hour the car was recharged at Springfield and the return trip in the afternoon, a distance of 48 miles, took two hours and 10 minutes, making the average speed a little less than 24 miles an hour. An investigation on arrival home showed that the batteries still had plenty of mileage in reserve.

Talk of New Electric, Merely Talk

“There has been some gossip heard about Boston regarding a new electric motor car to be placed on the market shortly. From what meager details have leaked out, some men prominent in the financial world are behind it,” states a Boston newspaper.

“The man named as the designer has a national reputation in the electric field, and he is connected with the largest electric corporation in this country. It is said that the machine has been tested out and that its success is certain.

“One of the chief features,” to quote further from this prominent but foolish Boston newspaper, “will be a self-charging battery that will store up juice when the car is running on level ground.” “It will run along for a few days before the batteries will need a boost,” is another claim. Having a letter on our desk from the leading spirit of the company ELECTRIC VEHICLES knows he does not claim anything of the sort. In fact he is entirely too sensible a man to pretend he has discovered a perpetual motion motor car.

Forty-Five New Electric Taxis

The Detroit Taxi and Transfer Company have been so successful with the electric cars they have been operating that they have started to build forty-five new ones. This will bring the total number of electric cabs close to eighty.
The Fashionable New York Sociability Run

A fleet of Detroits lined up for the start of the run in front of the majestic looking Century Theater, Central Park West and Sixty-second street.

Arthur Williams and Miss Delores Duncan, Metropolitan golf champion, Mrs. Sidney W. Stern and two beautiful guests in her Baker R. & L.

The fleet of Detroits lined up at Long Vue Inn while the crowd made merry within. This shows only a few of the cars that participated.

The gentlemen were not very polite; they didn't give up their seats to the ladies, but shucks, the ladies didn't mind it at all. The ground at Long Vue was a trifle cold. Everybody was there. Their Names?—Just get the Social Register.

Arthur Williams (dodging the camera man), president, and Walter Neumuller, the treasurer of the New York Section E.V.A., the two men most responsible for the jaunt, returning pleased as Punch at the success of the run.
TWO-EIGHT years ago I left my home town to seek work in New York, and found myself in the office of a trade-paper publisher. From that day to this my life has been spent among publishers and advertisers. I have been an editor, and for a good many years I have been an advertising man, and would find it difficult to suggest some of the ways in which I think trade-paper publishers can help their advertisers, what I say is not in the nature of criticism from one outside the fold, but rather in the way of suggestions from one of your own family. Also, I am not unmindful of the tremendous progress that has been made in the field of class journalism within the past quarter of a century.

How could I fail to be impressed with the progress that has been made when I think of those first trade papers with which I was connected? There were four of them, not one of which, I believe, survives today, except as a memory. But they were in their day leaders in their respective fields, and they were typical of the average trade paper of 25 years ago.

The editorial force was small and poorly paid. The stuff we printed consisted largely of trade notes, personal items and writings of the goods more generally. The trade-paper rate-card presented nothing but a basis for arbitration, and the circulation was anybody's business but our own. Our advertising manager was one of the old school, who, if he failed to convince a publisher that advertising was a good investment for him, would take the other tack and remind him that we were in a position to hurt him if he didn't advertise.

It is needless to say that the advertisements were as bad as the methods used to obtain them. The advertisers rightly considered them a sort of nuisance, and the same is true of the sale of news and the delivery of goods. From one to eight pages and eighth pages would run unchanged week after week and month after month, because the advertisers felt that the stock copy was the only way to prevent publisher comment, and the publishers were not inclined to encourage change of copy, because that meant additional expense in the composing-room.

How greatly things have changed in the class-journal field I need not tell you. The trade and technical publications of today are not leeches, but leaders. They are doing constructive work; work which is of benefit to the industries they represent, and which could only be done by such splendid and costly organizations as are maintained by the leading trade and technical publications. Advertising rates are based on cost of production, circulation books are open to the advertiser and there is a real consciousness of interest between the trade-paper publisher and the merchant or manufacturer who uses the advertising pages of the publication.

THE ADVERTISER DESERVES THE HELP OF THE PUBLISHER.

The advertiser is entitled to all the help you can give him, because if there is anything that can enable you to conduct your business, the time has long since passed when more subscribers meant more profits. Every subscription today means a loss, for the trade paper that costs the subscriber four times as much to produce. The subscriber is only valuable to you because he is a potential customer of your advertisers. This fact is of itself beneficial to your advertisers because it leads you to seek not circulation merely, but circulation with purchasing power. As publishers you have just two things to sell: news-trade information—which you sell at a loss to your subscribers, and access to the possible customers, which you sell at a profit to your advertisers.

The importance of the advertiser to the trade-paper publisher being taken for granted, the question is: In what ways can you assist this good customer? Perhaps the experience of the advertiser will contain some suggestion for you. The trade-paper advertiser is usually a manufacturer, and in former years manufacturers considered that the advertising and sales department was their whole duty when the output of the factory had been disposed of to dealers. So was the dealer's business to secure customers for the goods he had purchased from the factory. But it was discovered in time that the dealer could dispose of the goods he sold much more quickly, and to much larger customers in his own territory, if he had the assistance of the factory in disposing of them; and it came about that the manufacturer began to study the dealer's problems, and, having in his sales force a well-organized body of trade investigators, he was able to formulate suggestions for new ways of developing neglected opportunities.
passing into the crushers with the coal. These bits of "tramp" metal, as they are called, may be a nail or a nut, or more often a broken pick-point or drill point. A small piece of iron or steel with this kind of coal is quite likely to cause a great deal of damage to the crushing rolls and may even cause a shutdown until repairs can be made. The magnetism of the pulleys, having no attraction for coal, which is non-magnetic, permits the bridges containing the coal to fall out of the crushing machine; but any bit of iron or steel, no matter how small, which may be mixed with the coal is attracted by the pulley and is held in contact with the belt until it passes around the pulley, when the "tramp" metal falls off from the belt and is clear of the hopper. Thus all bits of metal which might injure the crushing rolls are automatically separated from the coal and this separation is effected by a piece of apparatus occupying only a few feet of space and costing only a hundred dollars, or so, to install.

Now, the point is this: The magnetic pulley was developed some twenty years ago for use in the coal-mining industry. It was sold in the beginning only to coal mines. But ten years ago there were a dozen other industries in which magnetic pulleys could have been used to advantage. Little by little, and always by channeled pulley to special to these other industries have come to the manufacturers of the pulley, but there are doubtless scores of other uses for it that have not yet been discovered.

One of the first industries to adopt it after the coal mines had been using it for several years was the cement mill. In the process of manufacture is also passed through crushing rolls, or pulverizing machines, and these machines, like the coal-crushers, were very dainty bits of metal getting into them. The magnetic pulley was just what the cement mills wanted; but the manufacturer who developed the pulley for coal mines was not familiar with the requirements of the cement industry. When the cement mills didn't know that the coal mines were using an expensive machine that they also could use to advantage.

Rubber in the process of manufacture is passed through rolls. Linoleum in the process of manufacture is passed through rolls. The blocks of wood from which the wood pulp used in the manufacture of paper is made are shredded in crushing machines. Wheat is milled by passing it between rollers, and flour mills, and so on, all show the same phenomenon as an explosive mixture that results when fine flour dust is mixed with air—just such a spark as would be caused by a bit of metal falling with the grain into the milling machine. Here are a few examples of industries that might probably employ the magnetic pulley to protect their plants, their machinery, or their products from injury. And yet it has taken ten years for knowledge of the "magnetic" pulley to reach other industries.

This lack of co-operation of manufacture with the trade paper and even between departments of the paper has resulted in a ten year loss.

"My Dear Sir: I wonder if you know that in such-and-such a factory in Cleveland there is an interesting installation of the apparatus advertised by you in the January 6 issue of our publication. It is used in connection with ..." and so on.

Or these: "My Dear Sir: I notice that in your advertisement in our issue of January 6 you illustrate a piece of laboratory apparatus designed to indicate variations in atmospheric pressure and so constructed that a slight increase in the pressure for which the device is adjusted will close an electric circuit to a signal lamp. I am wondering whether, with slight modifications (such as the substitution of alarm bell for the signal lamp) this device would not find a ready market in Pennsylvania and West Virginia, where, it would seem, such a device might be used to indicate the presence of a dangerous amount of coal-gas in the mines.

Whether the suggestion made could be acted upon or not, such a letter would certainly indicate a desire to be helpful, and it would go far towards proving what many of us doubt—that everyone is familiar with the things advertised in their own publications.

The establishment of service departments to help the advertiser in the preparation of his copy has been tried by a number of manufacturers as an advertising publication. The editors have done much to increase the interest and typographical appearance of the advertising pages, and they are particularly useful to the small business which has not yet attained to the dignity of an advertising department of its own. But to the large users of advertising space—concerns big enough to have advertising departments of their own—most of them are of little value. And I will go so far as to say why. There are so many people advertising outside of the information furnished by the advertiser.

The first request of the service department is for a copy of the manufacturer's catalogue and other printed matter. Out of this old material which now adorns the walls of the advertiser's newspaper publication are compiled, with the aid of some knowledge, will you or ought you to know, more about the requirements of your particular field than any single manufacturer that caters to that field. You have the machinery for gathering information. You have the capacity of speaking English. You have a world of acquaintances, each possessing special knowledge which is yours for the asking. Give me the opportunity to use the facilities that already exist in the office of any well-conducted trade or technical publication and I will make the advertising pages as interesting as the reading pages. Why shouldn't I? What advantage will the editor have over me when I possess the same facilities that he has for gathering information? When I can use the same men for putting my stories into shape?

I foresee a day when the advertising pages of trade and technical periodicals will be as are the pages compiled by the editorial staff—when working side by side with the editor-in-chief will be an advertising editor, whose business it will be to pack the advertising pages so full of information by the use of revamping and editing that not a single page will be skipped—when, instead of a heterogeneous collection of unrelated fragments of information, advertise-ments bearing on the same subject or of interest to the same class of purchasers will be fused into homogeneous depart-ments with information too valuable to be passed lightly by.

SELLING SPACE WITH A PLAN.

Let us profit by the experience of the dealer in real estate. The old method of selling city lots was to divide the land into spaces of a certain size, just as you divide your advertising pages and to sell them to whoever would buy without restrictions as to the use that was to be made of them and without assistance from the dealer after the lots were sold.

Today when a new sub-division is opened, streets and pavements are laid, water and gas mains are run to the various lots ready for connection when the houses are built, saloons, stores and apartment houses are forbidden in the bill of sale, provision is made for the no-residential lots, for homes only. Why not, economists say, in a book that makes the public aware of it? The city government, or a private corporation the acts of which are those of a city department, lay out the streets and utilities. The houses are built on a given line at a certain uniform distance from the street, and after the lots are sold the city assists the purchaser with building plans and loans, so that the land becomes a community land. The city may require each unit fitting into the general plan, and the value of the un-sold lots increasing as the barren land becomes transformed into an all residential development.

Compare this result to what happened under the old methods of selling real estate. The dealer was then interested only in finding a purchaser for the lots, just as you are now interested only in disposing of your advertising space at a profit. Every purchaser did as he pleased with his own lot, and the result was a hodge-podge of dwellings, neighborhood stores and apartment houses, big and little, cheap and expensive, attractive and unattractive, all jumbled together like the advertisements in your publications.

Now, the only difference between these two methods of selling, which produce such widely different results, is that in one case the title is a plan, in the other it is a thing. In the case where there is active and intelligent co-operation with the purchaser after the sale is made, and in the other the seller's interest in the transaction terminates when the purchase price is paid. If this fundamental policy in selling city lots is followed the com-mer-son is seldom in the market for a second lot, why should it not be good policy in a business where the same space can be sold to the same customer week after week, month after month and year after year?

ADVERTISING MUST BE, TO PAY, TO BE PERMANENT.

Let me sum up in a few words the substance of what I have said. It seems to me that if trade and technical publications are to be a help to the advertiser they must have much more than the ordinary advertising space. I believe, they deserve (because without the revenue derived from advertising the trade press would dwindle to insignificant proportions), you must recognize the fact that the only
advertising that is permanent is advertising that pays the man who pays the bills, and you must put the whole power of your organization squarely back of your advertisers. You have not done enough when you place at the disposal of the advertiser a specified amount of space for a stipulated sum.

Ninety per cent of the advertising that appears in magazines of the type to which you are devoting too much attention to the easy task of chronicling events after they have occurred, and are shirking the heavy labor of digging for data not easily obtained, but which would be of vital interest to the merchants and manufacturers who advertise in our trade press?

The Importance of Chairs

It's the little things which go to make up the big and important things. On the face of it, the average person would consider the seating arrangement only one of the small items which enter into the desirability of any particular motor car. The Milburn Wagon Company, of Toledo, however, builds the Milburn Light Electrics and it will tell you that the seating arrangement is a most important feature in the building of a bar and that no small part of the great success of their product is due to the fold-away seats with which it is equipped.

There are scores of reasons why we think the fold-away type of seat is more suitable for electric vehicles than the standard revolving chair,” declares R. S. Woodhull, sales manager of the Milburn Company. “But greatest of its advantages is that of room. We will consider for a moment that you have been suddenly called out of the city. You must take your trunk with you, but the train is about to leave and you have no time to get in touch with the cartage company. If you happen to have a Milburn Electric, however, you need not worry. Extra wide doors and the unusual inside space made possible by the fold-away seats will give you plenty of room for the trunk. All you have to do is put the trunk in the electric and then your wife can drive you to the station—trunk and all.

“For the woman shopper, the fold-away seats also possess advantages which are almost too numerous to mention. Chief among these is the fact that she can use the car for something besides the sole pleasure of riding. For example, if it happens to be raining hard and she hears of a bargain in peaches at the market, she doesn't need to worry about the delivery of those peaches. She can take care of that herself because there is plenty of room in the Milburn to accommodate even a bushel basket.

“Furthermore, if there are only two passengers in the Milburn Electric, they have the feeling of riding in a car built for two persons. There are no vacant front seats which give the car an empty appearance as though it were but half filled and too large for the use to which it happens to be devoted.

“Still another important advantage in our seating arrangements is that it decreases the weight of the car. These are a few of the many reasons why we believe the seating plans of the Milburn are superior to those of our competitors.”

Various other improvements make the Milburn an interesting new car.
Turning Dreams Into Realities

W. C. ANDERSON, the head of the Anderson Electric Car Company, manufacturers of the Detroit electric car, is not only a thorough business man in every sense of the word, but he is also a staunch supporter of outdoor exercises and healthful sports, and takes particular pride in the sleek Kentucky thoroughbreds of his stable. Practically every evening, after a strenuous day at the factory, Mr. Anderson may be seen gallowing through the country on one of his fine horses, of which as a judge has few peers. Recently he stated it was while on these rides that he often conceived ideas which were later worked out successfully in his factory.

Through Mr. Anderson's initiative, his belief in the business and his willingness to spend large amounts of money in research work, the electric vehicle has been brought to a stage of perfection undreamed of a few years ago.

GLEN CURTIS put Hammondsport, N. Y., on the map because he thought. The results are ably shown by the big double decker dual motored hydroplane just tested out for the government. Often his laboratory engineers call him for consultation in the middle of the night. Then he steps into his always ready, never freezes, never overheated Detroit and away he goes. The soothing smoothness and quietness of his car helps create a concentrated attitude on the dreams for the future. Thus the electric does its "bit."
Brick Roads in Ohio and Other States

Improvements That Make Electric Suburban Runs Possible

TRAVELING across the country in an automobile with eyes glued to the road,—picking out the best parts,—dodging the bumps for his passengers' comfort; the average driver heaves a gasp of relief when he hits a stretch of concrete or brick road. Then he can pay some attention to his passengers and be sociable and enjoy life. On a recent trip through Ohio the writer traveled over nearly every type of road-bed made, and was particularly surprised to find that the old brick roads of ten years ago were still in good condition.

The truth regarding the brick streets of the city of Cleveland, and the country highways of Cuyahoga County, cannot be told in words. It is the universal testimony of everyone hitherto unacquainted with the proper construction of brick streets that a conception of their worth, their beauty, their comfort and durability is utterly impossible—they must be seen to be appreciated. It is likewise quite impossible to appreciate the extent of these splendid pavements except in the opportunity afforded in a day's automobiling over a great number of miles, enabling one to observe both to the right and to the left, the vast number of these beautiful streets—so many that time forbids a careful inspection of more than a few miles in a single day's travel.

But in a personal inspection of these streets there are not only disclosed ideas of economy, comfort and utility, particularly striking in the case of streets occupied by street car tracks, and where in passing over such tracks a jolt or jar is not discernible, but the sanitary condition, the ease with which the streets are cleaned, and withal their very beauty is impressive. No more attractive residence locality is to be found in any city of the world than that found in Wade Park, of which it is entirely proper to say that section is adorned with handsome brick streets.

The one thing that cannot be fully appreciated even by a personal inspection of these properly constructed brick streets in Cleveland is their durability; thus far time and use have not set their limit upon them.

In one case a street in Cleveland with a fairly heavy traffic, known as Holmden avenue, was inspected, which was nearly eighteen years old. This pavement had been laid down in 1898 with a sand foundation with expansion joints one-quarter inch wide with a grout filler and a four-inch block and it was still in excellent condition as can be seen from the photograph which accompanies this article. The secret however seemed to be the fact that the cement joints are flush with the brick, presenting a smooth surface which allowed no cracks or offered no corners to be broken off by the traffic. Occasional longitudinal cracks could, however, be seen.

There are brick roads, however, like Euclid avenue east of Wade Park, which were in frightful condition. These were being torn up and repaved. The disturbing of its foundation by street car track repairs was the cause.

Ansel road—all diagonal traffic ways of street width in Cleveland being called roads—was a very good example of brick pavement which had been down for nearly ten years. This road was laid on a sand foundation and was filled with cement. The interesting thing being the large radius of the brick which was not chipped. In some cases, however, where the pavement had been torn up the street had not been properly repaired with the result that the foundation had shifted and the brick started to crack for a radius of some twenty feet in each direction and then had rapidly deteriorated.

However the average pavement in Cleveland was very good and the roads out were a joy to ride on as can be seen in one of the photographs in this article, which shows the road to Elyria. Country roads paved with vitrified brick are becoming quite common in many of our states besides Ohio, according to the professional bulletin "Brick Roads," recently issued by the Office of Public Roads and Rural Engineering, U. S. Department of Agriculture.

The principal advantages which brick roads possess, according to the authors, may be stated briefly as follows: (1) They are durable under practically all traffic conditions; (2) they afford easy traction and moderately good foothold for horses; and (3) they are easily maintained and kept clean.

The principal disadvantage is the high first cost. The defects which frequently result from lack of uni-
formance in the quality of the brick or from poor construction are usually to be traced indirectly to an effort to reduce the first cost or to a popular feeling that local materials should be used, even when of inferior quality.

The first brick pavement constructed in this country, it is stated, dates back to 1872, and Charleston, West Virginia, has the distinction of being the first American city to employ this product for paving. For a number of years after its introduction, however, the use of paving brick was confined principally to city streets, and owing to the frequent inferiority in the quality of the brick and lack of care in construction, very few of the early pavements proved satisfactory. Even now, after the experience of forty years, it has demonstrated that it is entirely practicable to construct satisfactory brick pavements when proper care is exercised, and that much waste results from the use of poor materials or faulty construction which has occasioned the Cincinnati failures. Instances can still be frequently found where comparatively new pavements have wholly or partially failed from causes which might easily have been prevented.

The purpose of the new bulletin, which can be had free, as long as the Department’s supply lasts, by road engineers, supervisors, and others contemplating the construction of brick roads, is to make clear certain important essentials in the choosing of brick for a pavement and in laying it so that the highway will endure.

The selection of the brick is one of the most essential features, for the success or failure of such pavements depends, to a large extent, on the way in which the brick will withstand the kind of traffic for which the road is designed. The engineers point out that it is very poor economy to use a locally-manufactured brick unless this brick is of a high standard. Color, specific gravity, absorptive power, or even the crushing strength, of brick are not necessarily reliable tests. In general, of course, the brick should be uniform in size, perfect in shape, free from ragged and deep kiln marks. Each brick should be homogeneous in texture and free from objectionable seams. Fire cracks should be limited in number and extent, and the entire brick should be vitrified and should contain neither unfused nor glassy spots. Even field inspection and laboratory analysis, unless conducted by those especially experienced, however, may prove of little value.

According to the bulletin, the test upon which highway engineers appear to place most reliance is the “rattle” or abrasion test. In this test 10 dry bricks are placed in a rattle barrel with 10 cast-iron spheres 3/4 inches in diameter and weighing 7.5 pounds each, and enough sphere 1/6 inches in diameter and weighing 0.95 pound each to make up 300 pounds of metal. The loaded rattle barrel is then revolved continuously 1,800 times at a speed not lower than 29½ nor exceeding 30½ revolutions per minute. When the test is over the results are reckoned in terms of the loss in weight sustained by the brick. No piece of brick which weighs less than 1 pound is considered as having withstood the test.

Good paving brick under this test ordinarily will lose from 18 per cent to 24 per cent of its original weight. The specialists point out, however, that it is advisable to require a minimum as well as a maximum loss which any sample may sustain. This is necessary for insuring against too much variation between the softest brick and the hardest brick which may be supplied.

The remainder of the 40-page bulletin is devoted to detailed descriptions and diagrams, showing proper methods of construction of brick roads, including the preparation of the road bed, the construction of the formation or base, the laying of the brick, the construction of curbing, expansion cushions, and the final finishing of the pavement. The paper also includes a chapter on cost of brick pavements. Special emphasis is laid on the maintenance of these roads and the need for proper engineering supervision in their construction. An appendix is devoted to typical specifications for constructing brick roads.

Gasoline Pumps Cost Public

Dear Sir—The Bureau of Standards, Department of Commerce, has recently published a report, “Technologic Paper No. 81,” pertaining to the accuracy of liquid measuring pumps commonly used in dispensing gasoline.

The development of the cheap motor car resulting in a phenomenal increase in the number of cars in use, has brought about a steady increase in the quantity of gasoline consumed, and this together with the present high price of gasoline makes the method and accuracy of the retail dispensing of gasoline a question of the highest importance.

On account of the convenience of the measuring pump in delivering gasoline to the consumer with a minimum of evaporation, spillage and fire hazard, by far the greater part of this commodity is sold through this type of measuring apparatus.

Of numerous measuring systems of various types chosen at random and tested by the Bureau of Standards’ inspector in a number of different cities, seventy to eighty per cent had excessive errors. There were many outfits so constructed as to be absolutely unsuited for retail liquid dispensing. Of those outfits which were incorrect, nearly all were delivering in deficiency, which is unfortunately a characteristic of the types of measuring pumps now most commonly used.

Since this paper was written, subsequent tests in many cities corroborate the figures given above in every essential, and it is safe to say that in all localities not under an efficient and competent weights and measures administration, and in a large majority of those which do have a relatively competent weights and measures administration, the condition of measuring pumps is such that the motoring public is being subjected to regular and continuous shortages in its purchases of gasoline. Figures based on the best estimates obtainable show that in the State of Illinois, the losses to the people of the commonwealth due to short measure in gasoline, are not less than $530,000 annually.
Your Hydrometer

*A Simple Explanation that Will Interest Owners of Electrics*

**By D. M. Simpson**

As a battery owner you probably have a feeling of disgust and perplexity when told by the inspector from the battery company, and the inspector from the electric car company, and the battery expert from the local garage, that you should always use your hydrometer to determine when the battery is charged. Your disgust is probably due to your dislike to handle a hydrometer—which is usually dirty and covered with acids, and to the lack of information you are able to obtain from hydrometer readings. Your perplexity is probably caused by the persistency with which all battery manufacturers are unanimous in advising the use of the hydrometer. Some electric car salesmen may tell you to determine the end of charge by the voltmeter but occasionally to check this up with a hydrometer. Another salesman may tell you to determine the end of charge by an amperc-hour meter but to check it up occasionally with a hydrometer. The rectifier salesman may tell you that the rectifier is "automatic" and will "cut off" when the charge is completed but that this should be checked up occasionally with a hydrometer. All this must convince you that the hydrometer is the one means of determining definitely the condition of a battery. This being true, would it not be well for you to become more familiar with the hydrometer, which is dependable under all circumstances, and disregard all methods?

The intention in this article is to explain briefly the principle of the hydrometer, in order to outline a systematic method of taking hydrometer readings, and to translate these readings for daily service.

The hydrometer is an instrument for measuring the relative weights of liquids. Some liquids are by their very nature heavier than others. For example, syrup is about twice as heavy as water, so that a body which would float in water would float much higher if placed in syrup. A float of suitable shape for this purpose is shown in Figs. 1 and 2.

The weight of this can be so adjusted that when placed in a glass of water, the float will sink down nearly to the top of the stem, as shown in Fig. 1; or when placed in a glass of syrup, will rise up until the level of the liquid comes nearly to the bottom of the stem, as shown in Fig. 2. A float similarly graduated is called a saccharometer and is used to determine the percentage of sugar in a solution. That is, if placed in water, the float will sink down until the level of the liquid is at the mark near the top of the stem and if sugar is gradually stirred into the water the float will gradually rise, indicating at any time the amount of sugar added.

In the same way, a float can be graduated to indicate the relative amount of sulphuric acid in a solution. These floats, or hydrometers, as used in connection with storage batteries, are graduated to read from 1150 to 1300. That is, the 1150 mark is placed at the top of the scale and the 1300 mark at the bottom of the scale. See Fig. 3. If this float is put into pure water it will sink to the bottom of the vessel, but if sulphuric acid is stirred into the water until the mixture has a strength of 1150, then the hydrometer will rise until the 1150 mark at the top of the stem is level with the top of the liquid. Now if more acid is stirred into the solution, the hydrometer will continue to rise—indicating at any time the strength of the solution. The strength of the solution, or the amount of acid which it contains, is spoken of as its "gravity." For instance, we say that a fully charged battery should have a gravity of 1270 or 1280. Verbally these gravities are spoken of as "twelve-seventy" or "twelve-eighty."

When a storage battery is shipped out new the lead plates in the cells are immersed in a solution having a gravity of 1300 or less—more usually about 1275. When the battery is being used, the electricity is produced in some unexplainable way by the acid in the electrolyte going into and combining chemically the lead in the plates. It is not known why this action takes place, nor why it produces electricity, so that the layman need not feel embarrassed in discussing this point with the batteryman because all have the common bond of ignorance. However it is known that the lead plates, in producing electricity, absorb acid from the electrolyte. This weakening of the electrolyte, which can be determined by the hydrometer, is an exact measure of the amount of electricity produced. That is, the weakening of the electrolyte indicates exactly how much the battery has been discharged.

During the normal full discharge of a battery of the medium plate vehicle type the gravity of the electrolyte will drop approximately 125 points—that is—from about 1275 down to about 1150. Therefore if you wish to know at any time how much a battery in normal condition has been discharged, test the gravity of the electrolyte with a hydrometer. If the gravity has dropped 25 points—from 1275 down to 1250—the battery is one-fifth discharged.
Detroit Electric

Greatest Enclosed Car Values

ever offered by world’s largest exclusive enclosed car builders

You might ask in a sincere desire to get accurate information. “Do you actually build the finest enclosed cars?”

And we would answer your question in this way. Most motor car makers build very few enclosed cars. The major portion of their business is confined to other types.

But we build only enclosed cars. That is our sole business. And we have specialized in enclosed car construction for 10 years.

Is it not reasonable to believe that we are further advanced and better able to build enclosed cars than others who specialize on touring car types?

Then you might say, “Are Detroit Electrics greater dollar-for-dollar values than any other?”

And this is how we would reply:

1. Our factory contains 20 acres of floor space. Every square foot was designed and is used solely to promote the efficient and economical manufacture of enclosed cars.

2. There is $550,000 worth of manufacturing equipment. Every dollar’s worth was installed with the single aim of building enclosed cars better and more economically.

3. With the growth of Detroit Electric sales we have attained a volume of manufacture so great that it has enabled us to avail ourselves of equipment (such as presses, tools and dies) for the exclusive building of enclosed cars, which is of the same modern type as the equipment employed by other big manufacturers who specialize on open type cars and to whom the enclosed car is an odd or a special model.

4. Our engineers and designers devote their time exclusively to building an enclosed car of the utmost convenience and safety in driving. For instance, Detroit Electrics have clear vision windows all around that make it easy and safe for you to motor even in crowded traffic. And they are constantly devising ways and means of obtaining quality with greater economy.

5. There are in our employ 1100 men. Each one of these men is a specialist in enclosed car work. And because he is doing his particular duty day after day, he has become expert and efficient in the degree that only a specialist can become expert and efficient. Should he be called upon to work on open cars 85 per cent of the time, and then turn his hand to enclosed car work—as he is in factories where enclosed cars form but a small portion of the output—his ability and efficiency would naturally be lessened greatly.

Is it not evident that the Detroit Electric organization—with its specialist mechanics working exclusively on enclosed cars—can build better enclosed cars with far greater economy than an organization of open car workmen?

Perhaps you hesitate to make up your mind before having the higher quality and greater value of Detroit Electrics confirmed by others.

If so, we ask you to contemplate this further fact. There are cars of higher price and there are cars of lower price than Detroit Electrics, but more enclosed car buyers select Detroit Electrics than any other—either of higher or lower price—either of gasoline or electric power.

We urge you to visit your nearest Detroit Electric dealer and inspect these 1917 models.

ANDERSON ELECTRIC CAR CO., DETROIT
Detroit Electric

**Model 68**

$1775

4-passenger Brougham, 42-cell, 13-plate battery, 100-inch wheelbase, 33x4½-inch Goodrich Silvertown Cord Tires, Safety Tread Rear, 65 to 100 miles per charge, 6 to 25 miles per hour speed range. F. o. b. Detroit.

**Model 63**

$2275

4-passenger Brougham, full aluminum body, 42-cell, 13-plate battery, 100-inch wheelbase, 34x4½-inch Goodrich Silvertown Cord Tires, 65 to 100 miles per charge, 6 to 25 miles per hour speed range. F. o. b. Detroit.

**Model 66**

$2375

5-passenger Brougham, interchangeable front or rear seat drive, full aluminum body, 42-cell, 13-plate battery, 100-inch wheelbase, 34x4½-inch Goodrich Silvertown Cord Tires, 65 to 100 miles per charge, 6 to 25 miles per hour speed range. F. o. b. Detroit.
If the gravity has dropped 100 points—from 1.275 down to 1.175—the battery is four-fifths discharged. If the gravity has dropped 125 points—down to 1.150—the battery is fully discharged and also has given its rated capacity.

The next point of interest is how to determine with the hydrometer when a battery has been fully recharged. During the recharge, who the acid (which went into the plates during discharge) is driven out of the plates back into the electrolyte. When all the acid has been driven out of the plates back in the electrolyte, the electrolyte will have the same strength or gravity as before the discharge. Then the recharge is completed.

Taking hold of the hydrometer is the part to which many people object, because it is usually left where it gets dirty and the possibility of getting acid on the hands is not very inviting. So that when one thinks of going through the performance of taking gravity readings every day, it looks like an unfair task to ask any car owner to perform, but with the proper facilities, which can be easily arranged, it is not so much a task as backing the car out of the garage.

First get a good hydrometer. These are obtainable already inclosed in a glass tube fitted with a rubber bulb, etc., ready for use. See Fig. 4. When buying one order an hydrometer syringe complete. It is advisable to get one bearing the name or trade mark of a reliable battery manufacturer as they are more careful in selecting a satisfactory type.

Before starting to use the hydrometer, study it carefully. Note the position of the figures on the stem of the float. After fixing in your mind the markings on the stem and the position of the figures, with very little practice you will be able to read the gravity as easily as you can tell the time.

Arrange a convenient place to hang the hydrometer. Nail a board three or four inches wide and about a foot long upright against the wall. Put two long nails at the top and a shelf at the bottom. Hang the rubber bulb of the hydrometer between the two nails and put a cup on the shelf at the bottom to catch the drip from the hydrometer. Next, keep a towel hanging on the wall in a convenient position. Underneath this keep a basin of water into which has been dissolved half a cup full of common baking soda. If, while working with the battery, you should get acid on your fingers, dip them for a few seconds into the soda solution and dry them on the towel and they will be absolutely free from any acid. With these simple conveniences, one is in a position to enjoy using a hydrometer.

The thoughtful driver of a gas car always estimates or measures the amount of gasoline in the tank before starting out for a run. The driver of an electric should be even more interested in knowing the amount of "juice" in the battery before starting out with the car.

As stated before, there are several electrical instruments which, if in good condition, will assist one in guessing at the condition of the battery but the only dependable way of knowing the condition of the battery is by using the hydrometer.

In normal condition the gravity of the electrolyte should be about 1.275 when the battery is fully charged. During discharge the gravity of the electrolyte drops gradually until at the end of a full discharge it has dropped about 125 points; that is, down to about 1.150. Therefore the gravity of the electrolyte at any time during discharge indicates how much below 1.275 the battery has been discharged and how much longer it can be used before the gravity gets down to 1.150.

It is advisable to keep a daily record of the gravity of the electrolyte in one cell of a battery. Figure 5 shows a convenient form which has been arranged for this purpose, enabling the user to make comparison with previous readings. A comparison of these from time to time shows whether or not the battery is continuing to give its normal capacity; and if not, whether the lack of capacity is due to insufficient charging or to some other condition which should have the attention of the
battery manufacturer. Further advantages of keeping these records are that they enable one to state definitely just what service has been received from the battery and in case of any trouble that may arise the records enable one to determine more quickly and more accurately the nature and cause of the trouble.

SPECIMEN CHARGING RECORD.

You will note from the above specimen charging record that on the morning of the first day of the month the car went out with the gravity of the electrolyte in the pilot cell reading 1280; in the evening it was 1183. There were still 45 points to go before getting down to 1150, but it was thought that this would not be sufficient for the next day's use, so the battery was put on charge that night. The next morning, the second day of the month, the battery went out charged up again to 1280; that evening it came in with the gravity at 1230 and as it was decided that there was sufficient charge left for the next day the battery was not put on charge that night. When the car came in the evening of the third day the gravity had dropped to 1150, which was practically a full discharge, so the battery was put on charge. On the morning of the fourth the car went out with the gravity back up to 1280. During the fourth day the car was used very little, the gravity having dropped only ten points—to 1270; on the fifth, the gravity dropped to 1225; on the sixth the car was not used; on the seventh gravity dropped to 1190 and there was probably enough charge left to run another day, but this was not certain, so the battery was put on charge again.

From the rest of the month's record it will be noted that the battery was charged every third or fourth night. On the evening of the fourteenth it was found that the electrolyte was getting low and the cells were all flushed with water and although the battery was probably fully charged that night, the gravity did not come above 1270 on account of the additional amount of water in the cells.

On the morning of the twenty-sixth, before the car went out, the gravity of the electrolyte was taken in all of the cells. This is indicated by the "X" on the margin. These individual cell readings are written on the reverse side of the sheet on which the daily readings are recorded. These individual cell readings can be taken any day of the month, but it is well to take these readings about the same time each month. From these readings it will be noted that there is some variation in the gravity of the different cells, but this is as uniform as can be expected. The "X" mark beside the reading of cell number eight indicates that this is the cell used during the month as the pilot cell.

The battery company supplying these forms sends out with them a flier which reads as follows:

"You have confidence in the reliability and accuracy of the bank you deal with, yet you make a record of every dollar you deposit or draw out. This is not because you distrust the bank or its employees, but because you want to know at any time the amount of money you have in the bank—how much you can draw when needed."

"Would you like to know how much power you have in your battery at any time—how much you can depend on when needed?"

"Look over our simplified battery record form attached. See how easy it is to keep. Try it for a few days. Get better acquainted with your battery. Learn to read it. Learn its language. Let it tell you what it can do. You will then be better friends with it because you will understand it."

Shortage of Freight Cars Leads to Long Cross-Country Drives with Ohio Electrics

Electric car buyers must have deliveries even though it is sometimes impossible to secure freight cars in which to make shipments. This has led Ohio electric dealers in cities adjacent to Toledo to follow the custom of dealers in other types of cars and drive the new electric cars across country when freight cars in which to make shipments have been very hard to secure.

This has resulted in some very interesting demonstrations of the roadibility of the electric car which until very recently has been considered strictly a town car and unsuited to cross country or even suburban driving.

A short time ago the Ohio Electric Car Company had cars completed and ready for shipment to Fremont, Fostoria and Tiffin, Ohio, and, because of their inability to secure freight cars in which to make shipments at the promised time, they suggested driving the cars across country, which was done without any trouble whatever and in each case the demonstration was a revelation to the customer who had purchased the car believing it suitable only for town use.

A few weeks later a similar delivery was made across country from Toledo to Detroit, but the most remarkable of all of these cross country runs was a delivery made Saturday afternoon, October 14, from Toledo to Defiance, Ohio, following the very hard rain during the night of Friday, October 13.

C. J. Markey, the Ohio dealer in Defiance, arrived at the factory just before noon and the start was made at twelve o'clock sharp.

The road conditions made speed impossible and made necessary a demand on the battery exceeding the normal discharge rate practically all the time during the run which, including necessary detours and a demonstration to the purchaser, required five hours.

This proves that the 40-cell battery with which Ohio cars are equipped will give in actual use a discharge greatly exceeding the rated capacity of the battery.

The present day electric is an all purpose car and the Ohio Electric Car Company proposes to make further demonstrations of this kind in order that the present owners of electric cars, as well as prospective purchasers, may better understand that the use of their electric car is not necessarily confined within the boundary lines of the city in which they live.

Novel Charging Method

An electric truck that carries its own charging set is in use by the line crew of the Benton Harbor-St. Joseph Railway & Light Company of Michigan. The electric truck, a one-ton vehicle, carries a motor-generator set in order that the battery may be recharged at any transformer station. Otherwise it would not be possible for the truck to be recharged in the country districts where no facilities are afforded for the handling of electric vehicle batteries.

London Electric Taxicabs

At the present time there are 191 electric taxicabs in the City of London, distributed among the Heiford Street, Krieger, Stocker and Longdonette Companies.
News of The Electric Vehicle Section, N.E.L.A.

Sectional Development Work, Reports of Committees and New Announcements

This department gives the record of all activities of the Electric Vehicle Section of the National Electric Light Association in all of its sections, as reported by A. Jackson Marshall, national secretary.

Realizing the valuable co-operative development work which the association is doing, the publishers of ELECTRIC VEHICLES offer this exclusive section to association members and all electric vehicle interests in order that they may keep closely in touch with association matters.

EXECUTIVE COMMITTEE MEETING

A meeting of the Executive Committee of the Electric Vehicle Section of the National Electric Light Association was held Friday, October 13th, at 3 p. m. at Association headquarters, New York city. A number of very important matters came up at this meeting for discussion and action and the writer anticipates the pleasure of publishing a very interesting report with regards to the Electric Vehicle Section work in general next month.

One of the most interesting developments since the appearance of the report last month has been the campaign inaugurated to acquaint the central stations with electric vehicle possibilities. An effort is also being made to have each central station this year purchase for use or resale at least one electric vehicle. Following is a copy of a letter issued by Chairman Mansfield to the 1,200 odd Central Stations N. E. L. A. membership:

To Class A Members:

At the Chicago convention our newly-elected president, Herbert A. Wagner, president Consolidated Gas, Electric Light and Power Company, Baltimore, Maryland, in speaking before the Electric Vehicle Section on the subject of "Central Station Co-operation," bespoke for the new section the support and co-operation of the N. E. L. A. He expressed it as his belief that the only kind of co-operation which counted for anything was active co-operation, and that each central station member of the N. E. L. A. should take active steps to support the sale and use of electric trucks and vehicles. He was a strong advocate of the central stations taking a manufacturer's agency for the sale of electric trucks, or of actively backing some such agency. He urged upon member companies the purchase, for resale or use, of at least one electric truck to be delivered during the year, and announced that his company would start the ball rolling by placing an order immediately for twenty-five electric trucks. This order has been placed.

Believing that this praiseworthy example should be emulated by other central stations, and feeling that many would grasp the opportunity of extending a welcome in a substantial manner if this were brought to their attention, we are asking every central station to agree to purchase at least one electric passenger or commercial vehicle or electric industrial truck during the year for use or resale.

We agree that your name will not be given to electric vehicle manufacturers or agents, but you will be left to make your purchases when and in any manner you desire. We would, however, like to know the number of electric vehicles you are willing to purchase so that the total figures may be used as a matter of encouragement and record. A list of manufacturers is available upon request.

It is hoped that you will heartily co-operate in this movement as we believe that the benefit will be shared by yourself, the N. E. L. A. and the electric vehicle section. Your co-operation will materially aid in generally popularizing the electric vehicle, off-peak, long-hour, low-demand charging load, which is rapidly becoming a highly profitable source of revenue to central stations fostering electric vehicle development.

Kindly reply at your earliest convenience to the secretary.

(Signed) E. S. Mansfield.

President Wagner of the N. E. L. A. has given this activity his valued endorsement and I am including hereewith a copy of the letter which President Wagner sent to all of the N. E. L. A. Central Station members on October 2, 1916.

To Class A Member Companies:

Several days ago E. S. Mansfield, chairman Electric Vehicle Section, wrote your company and other Class A members, strongly advocating your practical co-operation in promoting the more extended sale and use of electric vehicles by central stations in their immediate territory.

Electric trucks have fully demonstrated their superiority over gasoline trucks for city use, where stops are frequent and hauls not too long. If the electric truck is to come into its own and fill the large field for which its qualifications entitle it, central stations throughout the country should get behind it and actively promote its sale, either directly or by backing some active agency.

This movement has the hearty endorsement and support of the National Electric Light Association, of which the Electric Vehicle Section is an integral part, and I trust you will find it possible, as an evidence of faith on your part, to comply with Mr. Mansfield's request.

The example and active promotion of the use of electric vehicles by central stations will have great influence in bringing about their general use by the public which will, in turn, reflect to the benefit of central stations in securing a very desirable off-peak load in battery charging. One central station is now deriving a yearly income of about $650,000 from the sale of current for charging electric vehicle batteries, while many other central stations are enjoying substantial revenues from this profitable class of business.

Now is the time to lend your support by ordering, for use or resale, at least one electric truck for delivery during the following year. My own
faith in this proposition is evidenced by my placing an order for my company for twenty-five electric trucks for resale.

Surely we can count on your co-operation.

Yours very truly,

(Signed) HERBERT A. WAGNER,

Vice-chairman of the Electric Vehicle Section, Mr. G. B. Foster, as chairman of the Manufacturers and Central Stations Co-operative Committee, will issue a series of follow-up letters at intervals of about one week over a period of time yet to be determined attempting to drive home and clinch the arguments advanced in favor of electric vehicles liberally supporting electric vehicle developments. Mr. Foster’s numerous communications will contain information of the first order of importance and it is expected that this sustained aggressive campaign will be productive of very valuable results. The writer hopes to be able to give some further report on these developments in his next review.

MANUFACTURERS AND CENTRAL STATIONS CO-OPERATION COMMITTEE MEETING.

Very well attended was an important meeting of the Manufacturers and Central Stations Co-operative Committee, which was held in New York headquarters, September 21st. Those present were: G. B. Foster, chairman; P. D. Wagoner, vice-chairman; Wm. A. Donkin, A. C. Downing, F. M. Feiker, J. J. Rockwell, H. W. Snydham and A. J. Marshall. A number of very important topics were discussed and the writer hopes to have the privilege of making a specific report on this meeting in the next review. However, it may be stated that this committee affords the opportunity for the manufacturers and central stations to profitable co-operation on mutual grounds and that there is every reason to believe far-reaching results will be obtained.

GARAGE AND RATES COMMITTEE MEETING.

A meeting of the Garage and Rates Committee was held in New York headquarters on September 21st. Those present were: C. H. Miles, chairman; E. F. Chalfant, Bernard Lester, R. L. Lloyd, Willis M. Thayer and A. J. Marshall. From the discussion ensuing at this meeting the writer believes it is safe to predict that there will be a number of interesting announcements in the near future with respect to the Garage and Rates Committee activities. The minutes of this meeting are now in the course of preparation and until they are revised by Chairman Miles it would be quite improper to make them public. However, this information, together with other data of importance, will be incorporated in the next report.

OFFICIAL BANQUETER OF ANDERSON ORGANIZATION BANQUETS WITH THE CHICAGO SECTION.

A. D. Downing, assistant general manager and official banqueter of the Anderson Electric Car Company of Detroit, acted as proxy on Thursday, October 24, for W. C. Anderson and addressed the Chicago section of the Electric Vehicle Association. During his remarks Mr. Downing paid high tribute to the Chicago section for the manner in which the members have advertised and advanced the cause of the electric and thanked the Commonwealth Edison Company of Chicago for the manner in which it has stood behind the manufacturers of electrics. These words of praise were bestowed by Mr. Downing as the representative of all the electric car manufacturers. During his remarks Mr. Downing insisted that there must be more “pep” and more constructive work done by the men who seek to make the electric vehicle the popular car. He declared that the field is very wide but that it has not been worked as it should be. He sees signs of a change and believes that the early future will witness that change.

Mr. Downing also outlined the constructive work being done by the Anderson Electric Car Company. Much of this work, he said is being done to educate central stations to the value of the electric and to show the sellers of current where they are failing to make the best of their opportunities in not pushing the sales of electrics. This campaign is being conducted through advertising which is appearing in the Electrical World of New York and which is followed up with a series of letters. The Electrical World is widely read by central station men. Mr. Downing said that as a result of this campaign already the Anderson Electric Company had received numerous letters from far distant cities and towns which never had been thought of, heretofore, as fertile electric vehicle territory.

To prove the economic success of the electric in business fields, Mr. Downing told of the electric taxi-cabs in commission in Detroit. The company running those taxis cabs started a short time ago with just one. It now has a fleet of seventy-five and the general manager of the company reports them much more economical than the gasoline taxi-cabs heretofore used by him.

Following Mr. Downing’s remarks George H. Jones, representing the Commonwealth Edison Company of Chicago, announced another reduction in the cost of electricity to garages. This reduction will go into effect on November 1.

Other important talks of the month have been those of Albert L. Deane of the Guarantee Securities Company of New York City on the deferred payment plan for automobile purchases, on Tuesday, October 3, 1914; The talk of James Thorpe of the National Automobile Trade Association on Co-operation Between Associations, and Carlyle Fliedner, associate editor of Electric Vehicles, on the “Safety First Campaign,” on October 17, 1916.

It is very sad to relate that one of the members of the section who listened to that discussion that day should lose his life the next day in an automobile accident. W. W. Hincher and his wife were found late Wednesday evening underneath their car down in Indiana, where they were overtaken by death through some accident. The Chicago section, on the motion of O. P. Smith, passed resolutions of condolence and grief to be transmitted to the bereaved relatives.

Edison C. Turner’s Interesting Chair Car Seen in New York This Fall.
Cold Weather Garments for Vanity Fair

When Vanity Fair ventures out into the cold winter winds in her electric runabout or cabriolet to bring a rosy color to her cheeks, she will doubtless be clothed in a garment similar to these shown.

Full loose model in velour de Nord with a generous sweep. It is lined throughout with grey Peau De Cygne. The collar is edged with oppossum. The coat may be worn buttoned close or open.

This graceful flaring model of black seal plush, with its novelty belts is buttoned across the front. The collar is convertible. The lining is of satin, of soft texture and beautiful colors.

Burgundy velour cloth displays to advantage this full graceful model banded at hem, collar and cuffs with high pile beaver plush. Full lined with fancy silk. Made in all shades.

All garments here shown through the courtesy of the firm of Percival B. Palmer & Co., Chicago.
The Economy Argument for Electrics

Gasoline in England is now enjoying a quotation of approximately seventy-three cents per gallon; and even at that price the supply is far from reliable. As in all the countries now at war, the government demand for motor fuel naturally takes precedence over all other uses. It has even been proposed in Great Britain that pleasure riding be stopped altogether, to conserve the government supply of "petrol." The natural result has been to encourage the development of various substitutes for private use, most of them apparently consisting of mixtures of benzol and other similar products with alcohol. In this country the gas car trade is familiar with experiments of this nature, encouraged by our own high price of gasoline. But the gas quotation here, while uncomfortably high, has not yet become impossible, and so the substitutes remain tentative.

All this discussion of gasoline prices and gasoline substitutes would be amusing to the electric vehicle trade if the public in general could be made to realize that the only reasonable substitute for gasoline is electricity. Those who use electrics do realize it. Those who use gas cars do not, or they would be using electrics.

No one will claim, of course, that an electric car will perform all the functions that are demanded in emergency of a gas car—on the battlefields, for example. Charging facilities for storage batteries are not yet provided in the desolate places of the earth.

But with nine hundred and ninety-nine car owners out of a thousand there is no question of emergency driving. And with probably a million owners in this country alone there is no disposition to go over sixty or seventy miles a day, or to run faster than twenty-five miles an hour. With most drivers there is a desire to start easily, to accelerate smoothly and rapidly, and to work safely and calmly through a tangle of traffic. All of these things the electric will do better than the gas car, and more economically.

England, with gasoline at seventy-three cents and a possibility that its use for pleasure driving will be forbidden at any price, offers an ideal object lesson in the possibilities of the electric. Charging current at fifty cents a kilowatt-hour would be more economical for the car owner than the English price of gas; and yet electric current in England costs no more than here, and averages less. At present the man who pays seventy-three cents for fuel for his gas car would have no difficulty in finding charging current at four cents for his electric. The economy separation under these circumstances becomes so exaggerated as to be almost ludicrous.

Under this wholesome stimulus the electric in England has multiplied itself by five since the war started—an increase of four hundred per cent in two years. That shows what stress of circumstances will do. And there is no reason to suppose the advantage gained will ever be lost, even if gas or some of its substitutes drops to ten cents a gallon.

It is presumable that, in this country also, multiplying the price of gasoline by five would multiply the number of electrics in use by the same ratio. Any of the possible conditions
that would make gas car driving prohibitive would accomplish the same end. But none of those conditions is even remotely possible here. The electric must win in an even field on its merit, of which it has plenty. At present American prices the electric has considerable economic advantage; but that is apt to have the least weight of all the arguments in its favor. The class of people who constitute eighty per cent of the electric pleasure car buyers are only incidentally interested in the saving of a few dollars. The electric should sell because it is better, not because it is cheaper to run.

With the commercial cars, of course, conditions are different. Economy becomes a business proposition—the watchword of efficiency. The bigger and more prosperous a business house is, the more keenly it will be interested in the real economies of the electric as compared to the gas car.

And these business economies are readily demonstrable. They are matters of fact and record, not of theory and hypothesis. The business that uses gas cars for intra-city transportation and delivery work is spending money that would go to profit if electrics were used.

A great many gas cars are being used in commercial work that could be performed more economically and more efficiently by electrics. Commercial cars are sold strictly on performance, and in time electricity will displace gas in that field as surely as electricity has displaced gas in illumination.

There is nothing but success ahead for the electric builder who is patient and persistent and aggressive.

Consider the Driver

Those who make and sell commercial electric vehicles count it a good argument that the electric demands less skill of its driver than the gas truck. Less skill implies lower wages for the drivers, with a consequent saving that is calculated to prove attractive and tempting to the purchaser of the trucks.

That the argument is absolutely true and easily proven seems sufficient reason for advancing it; and its selling effectiveness is valuable. But the truck manufacturer, who presumably expects to stay in business for some time, to grow with the industry and enjoy the repeat orders that are inevitable to an honest and meritorious product, possibly overlooks one point to which his salesmen are indifferent. Every time the argument of lower wages for drivers is used it makes enemies for the electric. The driver himself would not be human if he did not resent the suggestion; and we all know that drivers are quite human.

Whether or not the electric truck proves its reliability, efficiency and economy to its owner, or appears to develop the negative of those desirable qualities, depends almost wholly upon the driver. The manner of its operation is up to him. He cannot be adequately supervised during any of the time that actually puts him to the test. While he drives he is the absolute master of his vehicle. Whether it proves far superior to a gas truck or infinitely inferior is wholly within his control. And if the electric promises to reduce his earning power, he can hardly be blamed, from a selfish and human standpoint, for preferring the gas truck and putting the electric in a bad light.

In this we are not advocating a surrender to labor, nor favoring a compromise with the principles of sabotage. We are merely trying to bring out the fact that the driver of a commercial truck, either electric or gas, carries more responsibility than is ordinarily credited to him. On the principle that the laborer is worthy of his hire, we cannot concede that the simpler operation of the electric truck justifies any reduction in the driver's wage.

The mere cranking of an engine and operation of gear lever and accelerator pedal do not constitute the function of a truck driver. These operations become obsolete in the electric; but the really important points of driving still persist with both kinds of power. The maintenance of most efficient speeds, the use of coasting rather than braking to a stop, the judicious observance of loads and temperatures and general mechanical conditions, all are common to both gas and electric trucks. A good wage makes a contented and careful driver; a reduced wage makes a doubly reckless one.

The electric truck driver is entitled to the wages of the gas truck driver.
The great number of electric vehicles at the present time and the assurance that future increases in their number will even be at a greater rate, makes anticipation of the facilities needed to properly care for such vehicles a question in which a great amount of planning and discrimination is necessary. Based on the present outlook, garage service in the future will need amplification and many firms are now taking advantage of the opportunity for preparing to furnish additional service. The proper selection of garage sites, convenient to present and prospective customers, should be augmented by facilities for giving the very best service, which necessitates the installation of the most modern equipment.

The Rienzi Garage, 554 Diversey Parkway, Chicago, cars are provided. One of the conveniences on this floor is a turntable.

The second floor is used for the storage, charging, repairing and general care of electric vehicles, facilities being provided for 90 cars. The electrical construction in the entire garage, and especially on this floor, together with the electrical devices installed, is of more than usual interest. Energy for the entire building is supplied from the private power plant of the Lessing apartment building, which has a capacity of 2,000 kilowatts at 110 volts direct current. Four cables, each 600,000 circular mils in cross-sectional area, connect the main switchboard with the distributing panelboard on the second floor of the garage. In order to connect these two points, it was

III., erected during the early part of 1916 and recently placed in service, according to Electrical Review, is a garage designed primarily for service, with modern facilities for the storage and care of electric vehicles. It occupies a two-story fireproof building, 60 by 186 feet, of reinforced concrete beam-and-slab construction. Arrangements were made in the building plans for an addition of two more floors when the increase in the demand for electric garage service taxes the present capacity.

On the first floor there are ample accommodations for the storage of 80 gasoline cars, and modern facilities for washing, repairing and general maintenance of these necessary to run the cables over the boilers in the apartment building, thence in 40 feet of tunnel crossing the alley between the two buildings and thence in pipe lateral to the second floor. These cables are in four-inch conduit the entire distance. Because of the proximity to the boilers and because they are adjacent to high-pressure steam and hot-water pipes in the tunnel, these cables were made especially for this installation by the Simplex Wire & Cable Company. The insulation of the cables over the boilers is 7/64-inch varnished cambric and double braided. In the tunnel conduit and pipe lateral the same insulation is used with the addition of a 5/64-inch lead sheath. A
ELECTRIC VEHICLES

A Charging Panel

Weston voltmeter and ammeter, and plug receptacles for charging four electric cars at the same time. They are also provided with double-throw switches which permit the charging of a second group of four cars and metering the energy from the same panelboard. Each switch connects in circuit either of two meters, being connected in the positive legs of the circuits leading to the meters.

Referring to the accompanying illustration of one of the charging panelboards, the upper switch is the one controlling the entire board. Beneath this are the four specially designed switches that control the individual charging circuits. In addition to the main contacts, one of which is longer than the other, there are two other contacts made, depending upon the position of the blades. After batteries are placed in circuit for charging, the control switch is moved to make the first contact, which gives the voltage of the car batteries. Moving the blades to make the second contact, the line voltage reading is obtained. The operator then closes the switch on the first of the main contacts, which gives the ammeter reading of the charging circuit. This current is then lowered to the proper figure by the adjustment of the sliding-contact rheostat on the same side of the board, after which the switch is closed on the main contacts, which disconnects the ammeter, places the batteries on charge and connects in the wattmeter.

The reason for subdividing the charging switchboards into five separate units was to obtain economy in operation. This saving is accomplished by making it possible for the attendant to tend to the duties incident to charging while doing cleaning, repairing and other work on the car. After the car has been placed in position for charging, a specific-gravity reading is taken of the electrolyte in the batteries. This determines approximately what duration of charge will be needed. The attendant then places the batteries under charge, noting the time and the wattmeter reading on a blank form. He is then at liberty to give his attention to other work on the same car or to other duties.

Considering a typical case, if the duration of charge is estimated to be four hours and the charging current 25 amperes, the attendant may ascertain by referring to the blank form or by taking specific-gravity readings what the condition of charge is. When the batteries are nearly charged, the attendant reduces the charging current to about five amperes for the finishing charge, usually given at this rate for about three hours and avoids buckling or

Exterior View of the Garage.
sulphating the battery plates. The energy consumption is recorded by Sangamo watt-hour meters, eight meters being provided for each charging panelboard.

The owners of the garage have adopted a schedule of rates for measured service for electric vehicles and are advocating this class of service as preferable to the flat rate for storage and general maintenance. Unit prices have been fixed, such as $10 per month for storage and 40 cents for washing and polishing. Energy for charging is at the rate of six cents per kilowatt-hour for the first 100 kilowatt-hours used during a month, five cents per kilowatt-hour for the next 100 kilowatt-hours and, four cents per kilowatt-hour for all in excess of 200 kilowatt-hours.

The data necessary for making the unit charges are placed on a car record sheet which is kept on a slate near each customer’s car. Referring to the reproduction of this sheet, the first column is for the days of the month. In the second is placed the speedometer mileage reading. In the next two are placed the time when the car is placed on charge and the time charging was completed. The next two columns are for specific-gravity readings of the batteries when charged. The next column is for the wattmeter reading. The remaining columns are for other work to be done on the car. Each customer is provided with a separate wattmeter, which enables a check on the attendants’ record. From data collected, it is found that the cost of charging varies from 1.1 to 1.8 cents per mile.

One of the charging panelboards is equipped with four meters, each of which can be used for measuring energy when transient cars are being charged. The control arrangement for these is the same as for the other meters. However, they have a large dial and resettable hand which registers the individual charge. The amount of energy can be read to one-fourth of a kilowatt-hour.

An elevator, with a capacity of two cars, semi-automatic control and driven by a 10-horsepower motor, is used for conveying the cars to and from the second floor.

![Electrically Operated, Front-Entrance Door.](image)

A tower was built so that the elevator is now arranged to give service to the third floor when it is added.

On the electrical installations, the most unique is that of a Stewart door-opening and closing device. This device consists of a drum worm-gearred to a 0.25-horsepower, 1,750-revolutions-per-minute series-wound motor, which together with the necessary cable and levers, accomplishes the opening and closing of the main-entrance door. The device is controlled from a number of stations, one being in the office and several located at different points on the first floor. Each station has three push-buttons, one for opening, one for closing and one for stopping the door in any position. An electric vulcanizer and an air compressor driven by a 0.25-horsepower motor are also installed in this garage.

The direct method of illumination is used in lighting the building. The wiring was installed for 60 200-watt outlets on each floor.

The electrical construction in the garage was engineered and installed by the Peerless Electric Company, 350 West Harrison street, Chicago, III., under the direction of W. W. Ahlschager, architect, 1744 Conway Building, Chicago, Ill.

Wind-up of Standard Company’s Affairs

T. E. Barkworth, the trustee of the Standard Car Manufacturing Company of Jackson, Michigan, is asking the courts on October 16, 1916, to accept his report of the trusteeship and to allow him $1,250 in full for services including stenographer, postage, telephone, stationery and the like. The amount of cash on hand is $6,433.82, which is probably all that is left of the realizable assets. In addition to the sum on hand, Mr. Bartworth, as trustee, has paid out to date $1,244.78 of labor claims and $791.05 of taxes, having priority under the law and under the mortgage the indebtedness will approximate $175,000.

The agents for the defunct concern who have deposited advances on orders for the Standard for cars are not entitled to priority according to a decision.

Buenos Aires Garage List Free

In order to foster South American trade, Electric Vehicles will be glad to furnish those interested with a list of some 230 odd garages in Buenos Ayres which are live and up-to-date. All correspondence must be in Spanish except the few German and French garages.
British Electric Vehicle Progress

_A Review of the News and Ideas in Motor Cars from Over Seas_

A ONE TON ELECTRIC LORRY AT MANCHESTER

When considering the advisability of substituting motor traction for horse vehicles, traders are frequently at a loss to find a suitable basis for a comparison of the performance of the two systems, and in addition they usually have but a hazy idea of the cost of their existing service. The following notes relating to trials with an electric lorry by the Manchester Corporation electricity works will, therefore, doubtless be of interest, states The Electrician in a recent number, as the method of comparison employed can be adapted to most cases where horse vehicles are employed.

Prior to the purchase of the vehicle which is built on a standard Edison Accumulator model G.M. chassis, supplied by Drake & Gorham (Ltd.), 47, Spring Gardens, Manchester, the carting work was carried out by light horse lorries supplied under contract at a very cheap rate. Until recently the charge made for a lorry with horse and driver was 1s. 4d. (32 cents) per hour, but this rate has now been increased to 1s. 6d. (36 cents) per hour. For the purpose of comparison, the lower figure has been taken, and it may be remarked that the charge is an extremely moderate one, even under pre-war conditions.

Unlike the horse vehicle, the cost per hour of running a motor wagon of any description varies according to the distance travelled. It is made up of two components—the standing charges, which are, within limits, independent of the mileage; and the running costs, varying with the distance covered. In the case of the Manchester vehicle, the standing charges have been taken at £125, and are made up as follows:

- Interest on total capital outlay at 4½ per cent.
- Depreciation on chasis and body, written down in 10 years.
- Depreciation on battery, written down in 5 years.
- Insurance and drivers’ licenses.

It will be noted that the allowance for standing charges is on a liberal scale, as the manufacturers anticipate a battery life approximately equal to that allowed for the chassis, viz., 10 years.

The total of £125 ($600.00) per annum spread over 2,500 working hours per annum gives a figure of 1s. (24 cents) per hour, to which 7d. (14 cents) per hour for the driver’s wages should be added.

With regard to running costs, the vehicle has been found to take on an average 6.5 amperes-hours battery input per mile run, and including the loss in the motor-generator used for charging, the energy per mile averages exactly 1 kw.-hour, for which the cost is taken as 0.5d. (one cent). The cost of tire renewals has been taken as 0.5d. per mile, while for maintenance, renewals, and repairs 1d. per mile is allowed, which should prove ample. The total running costs are thus 2d. (4 cents) per mile.

The total cost of an hour’s work during which a mileage of, say, 3 miles is covered, is therefore:

- Standing charges .......... 1s. 6d. $0.24
- Driver’s wages ............. 0 7 0.14
- Running costs, 3 miles at 2d. .. 0 6 0.12

Total ..................... 2s. 1d. $0.50

The curves in Fig. 1, which is due to H. A. Ratcliff, of the Manchester Corporation electricity works, indicate the relation between the horse and electric lorries in cost per hour and per mile for different average speeds. A is the cost per hour of the horse lorry, which is constant at 10d. (32 cents), and B the cost per mile for various average speeds. Similarly, C is the cost per hour, and D the cost per mile of the “electric” at different speeds.

As already stated, the average effective speed of the horse lorries has been found to be about 2 miles per hour, corresponding to a cost of 8d. (16 cents) per mile. It will be seen that to compete with this figure the “electric” must average about 3 1-3 miles per hour, including all standing time.

The following schedule, supplied by S. L. Pearce, chief engineer of the Manchester Corporation electricity works, contains an analysis of the work of the electric lorry for the month of July last. It will be seen that the average effective speed has been increased to 4.04 miles per hour. This is due to the fact that although the maximum traveling speed is not greatly in excess of that of a trotting horse, the electric vehicle can be kept hard at work throughout the day; it does not require a “breather” after a stiff hill, nor a prolonged rest at midday. Two drivers are available and consequently time may often be saved by changing drivers in the middle of the day and running through without a break. This is in striking contrast to the horse-drawn vehicles, which have to be allowed a break of 1½ hours for baiting. It may be noted that the two drivers are rated as fitters’ mates, and they can thus be kept fully occupied when not required on the lorry. Their experience in this capacity is also frequently of assistance in unloading motors, etc., and in certain cases makes it possible to dispense with an extra man.

The lorry has been in daily use for over five months and has replaced several horse vehicles. On mileage alone it is the equivalent of 2.4 horse vehicles, which on an average run about 100 miles per week. The work performed is mainly in connection with the mains, substations and testing departments, and the material conveyed includes motors, switchgear, transformers, air compressors, cable, trenching and timber, bricks and tiles, cement and mortar, coke, sand, broken stone, castings and general stores. On a large proportion of the journeys made the lorry is working for more than one department, as indi-
cated under references 10 and 11 on the schedule, and the improved organization rendered possible by its employment has further increased the displacement of horse lorries, so that actually it is performing the work previously done by about 3½ horse-drawn vehicles.

Substantial evidence of this is provided by the reduction on the carting contractor's accounts, the difference between this reduction and the cost of the electric lorry being given by Mr. Pearce as over £5 ($24.00) per week. It should be remembered that this saving is effected after full provision is made for capital costs and other contingencies, and it will be agreed that the electric has thoroughly justified itself. The results shown in the schedule are in no way abnormal and are being well maintained. So far, the maximum daily mileage has been 56.1, and this was attained with a mid-day boost of 120 amperes for half-an-hour, given whilst the vehicle was being loaded.

**ANALYSIS OF CARTING RESULTS WITH ELECTRIC LORRY.**

<table>
<thead>
<tr>
<th>Particulars of carting.</th>
<th>Week ended</th>
<th>Average of four weeks results.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>July 7</td>
<td>July 13</td>
</tr>
<tr>
<td>1. Total miles</td>
<td>210.7</td>
<td>231.4</td>
</tr>
<tr>
<td>2. Total hours</td>
<td>56.5</td>
<td>56.16</td>
</tr>
<tr>
<td>3. Total journeys</td>
<td>39.0</td>
<td>30.0</td>
</tr>
<tr>
<td>4. Average miles per hour</td>
<td>7.47</td>
<td>4.12</td>
</tr>
<tr>
<td>5. Average miles per journey</td>
<td>38.4</td>
<td>42.1</td>
</tr>
<tr>
<td>6. Average miles per day</td>
<td>10.6</td>
<td>10.6</td>
</tr>
<tr>
<td>7. Maximum miles per day</td>
<td>45.6</td>
<td>35.5</td>
</tr>
<tr>
<td>8. Average hours per journey</td>
<td>0.85</td>
<td>0.88</td>
</tr>
<tr>
<td>9. Average journeys per day</td>
<td>5.27</td>
<td>5.45</td>
</tr>
<tr>
<td>10. Equivalent number of departmental journeys</td>
<td>47.0</td>
<td>52.0</td>
</tr>
<tr>
<td>11. Average journeys per journey</td>
<td>1.62</td>
<td>1.73</td>
</tr>
<tr>
<td>13. Average load “In” (cwt.)</td>
<td>2.73</td>
<td>3.13</td>
</tr>
<tr>
<td>14. Total average tons-miles</td>
<td>104.3</td>
<td>104.1</td>
</tr>
<tr>
<td>15. Average cost per mile</td>
<td>6.42</td>
<td>6.74</td>
</tr>
<tr>
<td>16. Total cost per week</td>
<td>6.42</td>
<td>6.74</td>
</tr>
</tbody>
</table>

**NOTE.**—5½ working days are reckoned to the week. 12 pence to a shilling, 20 shillings to a pound. A pound is equal to about $4.80 U. S.

**WATER STREETING AT BLACKPOOL.**

In the course of a report on mechanical traction for municipal purposes, H. Shaw, borough surveyor, Ilford, includes the following particulars, supplied by Mr. Bee, cleansing superintendent, relative to the above:

"With regard to the actual saving effected by the vehicle it will be difficult to ascertain until we have the figures for a full season's working; but although we have only had the vehicle at work since the last week in July, what it has accomplished in this period has convinced me that it will prove a great saving to the department, as the work it can perform during an ordinary day of nine hours is really marvellous. It has already displaced six horse-drawn watering vans, whilst in connection with the washing of the Promenade it has released four men for other work, which is, of course, equal to saving of four wages for this class of work alone. Taking an average day of nine hours, the vehicle waters 48 miles of streets, using 24 loads or 18,000 gallons of salt water. The tank has the advantage of being cylindrical in shape, and having a capacity of 750 gallons, it is capable of watering a good distance before it requires re-filling, which takes from five to ten minutes to carry out, according to pressure. The usefulness of the vehicle is not limited to the watering of streets, as it has already accomplished good work in connection with the cleansing of sewers, as with a flush of 750 gallons we are in many cases saved the trouble and expense of having to resort to dredging operations, which are both slow and costly. The vehicle is also used for the washing of streets in conjunction with our motor sweeping machine. Only half the usual quantity of water is used, whilst the work is done better and quicker. This street sprinkler is equipped with a standard 3½-ton 'G. V. electric' chassis and an 'Ironclad Exide' battery. The battery is charged from the electric plant at the refuse destructor. The tank is made removable, so that when the sprinkling season is over the vehicle may be used for dust collection or other purposes."

**Manned by Women**

If by chance you should journey across the waters to London, you will find the Zeppelin-raidcd, submarine-surrounded country of England, from whence came our forefathers, rather pleasant, in one way, at least.

When you arrive in London (it is not necessary to wear a little U. S. flag on your coat, for your good clothes will make you known), the first matter of importance will be to obtain a room. In the hotel of your choice, be sure to select lodgings near the cellar, for should a Zeppelin drop a bomb on the roof of your hotel, a room on a close-up-to-the-roof-floor would prove rather exciting, also annoying, and cause you to get out of your easy chair. Anyway, we Americans are not accustomed to dodging bullets and the like. A visitor always needs something in wearing apparel, so a trip to Harrods (Ltd.) department store is necessary. You ask the clerk to have the package delivered to your room. The package boy raps at your door and it is with a broad smile of surprise that you receive the package from one of London's fair damsels, providing one is not in negligee, for Harrods now employs women as drivers and package boys for its large fleet of forty-six Walker Electric Vehicles.

At this time if you should gaze from your window you would see one of Harrods (Ltd.) white-topped Walker electrics waiting for the return of the package girl. Occupying the driver's seat is a woman ready to continue the delivery trip. The women are doing their "hit"—the Walker makes it easy for them.

E. L. Kroner.
In Built Quality and Individuality

George Bader the Successful Louisville Dealer Explains His Methods

FAVORABLE distribution of an electric car claiming "quality" as its right to consideration implies the assumption of two obligations.

The first is assumed by the factory. The car must embody well defined and approved principles. It is necessary to avoid both the ordinary and commonplace in designs to achieve individuality, that is not a mere matter of artistic effect. They must positively secure, by the means of proper co-ordination of superior elements, a durable electric that will withstand years of strenuous service.

The second is assumed by the dealer. He must awaken car using individuals to a full appreciation of what, "in built quality" consists of, how it is recognized, what it adds in the way of present and ultimate value. In other words, he must display to the public his dividends from "in built quality" in the ever enlarging circle of enthusiastic owners.

Louisville car buyers do not pay more money for an Ohio Electric simply because the car has a higher listed valuation than have other cars. It has taken a deal of co-operation on the part of the factory with my local branch to convince our taxing buyers that the car is what we represent it to be—the finest vehicle of its type produced.

Louisville people differ very little from the better people in any other city. They are hospitable, generous, and cultured; able to possess as well as appreciate the best that can be had in any line. So in interesting them in the Ohio Electric we have analysed the car and laid stress upon such features as naturally appeal to those who have been accustomed to the luxurious and who expect the best as a matter of course.

We have pointed out the fact that the body of the car is symmetrical in the highest degree, that the graceful elegance is a result of the blended curves that distinguish this car and give it the appearance of modish completeness. We have shown how the use of hand-hammered aluminum, over the entire exterior of the car, insures for the owner a car that will not crack, rust, rattle or warp; instead, it retains its original beauty and durability longer than would be possible if any other material were used. It is apparent that the use of very large sections of hand-hammered aluminum not only eliminates many troublesome joints but adds to the desirable smoothness of the body. The new method of construction now employed produces a body as smooth and tight as though it were cast. This is done by expertly closing seams electrically. The use of the one-piece aluminum top curved even more neatly than the tops on cars of this past year, adds a further step toward perfection. It is unnecessary to mention value when the customer sees the result.

The magnetic control found only on this make of electric is carefully explained. Its simplicity, safety, convenience and desirability are readily conceded when examined and tested. As a step in the further refinement of this essential part of our car, we may now point out the fact that the 1917 equipment will contain only one-fourth as many parts as were used in controller construction this year. This type of control has now been in use on the Ohio Electric for eight years and has proven itself so free from objections that it has been our experience that a customer once having used it would never exchange it for any other type.

Another feature which readily appeals to an electric car prospect is the use of machined bronze fittings that have been nickel-plated. Various other less durable and less valuable materials might be substituted and so lessen the cost to the buyer but the insistence upon the proper selection of all such details throughout the car, adds to the value in wearing quality.

We show a variety of upholstering materials including many patterns of the most durable and correct fabrics. They afford a selection that in great measure avoids duplication of interiors.

Our owners appreciate the fact that the car is unique in the exclusive use of real hair in all the cushions and seats. This added refinement retains for the interior a greater comfort and a decidedly better appearance after hard use.

Such seemingly minor details as rubber floor mats, floor cushions, genuine rugs instead of carpets, real padding under the upholstery do not escape appreciation with our owners.

We can always verify our contention as to the exceptional wearing quality of the paint on our cars by taking our prospect around to our many owners where they can have the proof first hand. Through the co-operation of our owners we are able to entice our prospects and at the same time satisfy them on any questions regarding which they may still have incomplete information.

Demonstrations bring about decisions. A ride and a trial at the operation of the car serves to dispel any fears that a prospect may entertain about learning to drive an Ohio Electric. Your customer can select the road to be travelled. Then in actual performance the car will have an opportunity to demonstrate its road ability and by its performance help to complete a sale.

Our Louisville customers have sought for more than just a machine, and when our people look for the artistic as well as the practical we have suggested combinations that would lend a particular individuality to each Ohio. This has enabled our owners to secure exclusiveness by expressing artistically their conception of fitness. Each Ohio possesses a distinct atmosphere of individual refinement so gratifying to our owners. They have come to accept that custom of making their car to order so that it is the rule with them to expect it. It gives them so much greater pleasure to know that their car was made and finished for them. It is the expression of the same human impulse that thrills at sight of the home that was built to plan, not bought old or made in the common mold of the row on a common street.

Perhaps the general design of the car favors greater variety in finish but it is possible to make each Ohio Electric different from all other cars in town.

Thoroughbreds have the charm, so too there is the difference between the oriole and the sparrow, why not be particular as to your electric? Let it reflect your personal taste.
Portable Machinery for Package Freight Handling

Steamship Docks Prove Interesting Transportation Problem

The handling of package freight in railway terminals, piers and warehouses is one of the most variable propositions that can be imagined. The packages run from a spice box to an auto truck with bundles of pipe and stacks of tank plates by way of shapes. The number of like packages in a given movement may range from one to one hundred and twenty-five thousand and the starting and ending points of the movements will be found to shift freely and in a most disconcerting manner all over the area that can be affected.

Packages are moved in every possible combination between ships, lighters, cars of many types, vehicles, sheds, open spaces and warehouses high or low. To cope with these trying conditions the "gang" with hand trucks has been almost universally used because such as organization is as flexible as the service is exacting.

To do this work to any great extent by machinery requires types of machines approaching the versatility of the man and hand truck for it has been proven over and over again that traffic practices cannot be changed to any great extent to fit the rigidity of ordinary machine practice. There are so many commercial considerations running parallel with and throughed through freight movements that the most unexpected complications arise wherein far more than the most superficial changes are attempted.

**Fig. 1. Upper left.**
Two Horse Power.

**Fig. 2. Upper right.**
Hand Trucking Coffee.

**Fig. 4. Lower right.**
Moving 1800 lb. Tobacco Car to Ship's Side.

*Power and Mining Engineering Department, General Electric Company.*

Portable machinery is being used successfully on various phases of package freight work, though success in one place does not mean that the same machine will be successful on apparently similar work in another place. Besides having to be suited to the physical conditions of location and to the work carried on, machinery has to be acceptable to the labor and immediate management else it will surely fail.

By portable machinery is meant devices that may be moved about, self propelled or otherwise handled, and with or without power. Track devices include cranes and vehicles. Trackless devices include cranes, conveyors, hoists and vehicles. Floating devices include cranes, both radial and gantry types.

The most popular of the rail machines is the locomotive crane. Electric motors are used on the ordinary types of locomotive cranes to a considerable extent and have proven to be well adapted to certain classes of work. The most marked advantage of this type lies in intermittent work, as the electric crane is always ready to begin operations at a moment's notice at any time of the day or night without in the meantime having to carry banked fires or requiring any time for getting up steam. The operator is not required to have any knowledge of care and maintenance of a steam plant and does not have to devote any of his time to firing. The number of motors applied may be
anywhere from one to five, but the usual practice is to use one large series wound railway type or mill type motor, transmitting the power to the various movements through the usual arrangement of gearing and clutches.

Where work is being done in a thickly populated locality the absence of smoke and steam is an advantage. A wood covered third rail is usually laid alongside the track on which the locomotive crane is to work, current being collected by a slip shoe. On some cranes it is the practice to dispense with the steam boiler and run a pipe line from a stationary boiler plant to the crane. This requires the service of a couple of steam fitters whenever the crane is moved along the track beyond certain very narrow limits and at a cost and delay that makes a very marked advantage for the electric means of transmitting power. The maintenance on an electrically operated crane is very much less than that of a steam crane, as there is no boiler maintenance and no fire, water or gas (with all their destructive tendencies) to contend with.

Motor capacities for locomotive cranes run from 35 h.p. to 200 h.p. the size being determined largely by the duty cycle expected. Where it is necessary to use a-c. energy, wound rotors with resistances are specified.

Bridge cranes are so little used in package freight handling that they will be omitted. Gantry cranes are common in railroad yards for serving gondola and flat cars, drays and temporary storage piles. A common span is 50 ft. and capacities run from 25 to 100 tons. There are usually four motors used, viz., main hoist, auxiliary hoist, bridge motion and trolley motion. They are equipped both a-c. (wound rotors) and d-c. (series wound). Drum controllers are used in both cases. Modifications and combinations of the above are found in roof cranes, half gantry cranes and gantry locomotive cranes, the latter being popular in foreign parts. A special type is the conveyor cranes such as are used for discharging and loading fruit steamers. These machines use a single 15-h.p. squirrel-cage motor which runs the endless conveyor, adjusts the articulated leg and moves the whole structure along the pier to the proper hatch. This machine conveys bananas from the hold to the wharf near the cars at the rate of 42 bunches per minute.

The cranes at Balboa, Panama Canal, for package freight handling represent still another type in which loads are trolleyed along an adjustable structural steel boom between two towers that stand on tracks on the wharf apron. The inshore end of the boom projects within the shed where the loads are deposited or picked up. When ships are being moved or when not in use the boom is luffed to a nearly vertical position out of the way. Three motors with drum controllers are used for these cranes—two of 115 h.p. and one of 25 h.p. capacity.

Trackless machines include conveyors, hoists, cranes and vehicles. The conveyors are of two types,
articulated horizontal conveyors and single unit stackers. The continuous conveyors can be used on inclines and the end sections are capable of considerable angular adjustment to suit receiving and discharging conditions. They are quickly reversed, can be moved bodily short distances or when disjointed are easily moved to distant points or stowed closely when not being used. For a capacity of 60 tons per hour at 100 ft. per minute there is required a 5 h.p. motor every 50 ft. if inclines of 20 per cent are to be worked. This motor may be compound wound d-c. or squirrel-cage a-c. either totally enclosed or covered with a close fitting metal shield to keep out cement, chaff, lint, etc. Drum controllers are much more satisfactory than any other form of starter for these machines. Fixed conveyors without end extensions are very much inferior to the portable type for reasons outlined in the first part of this article and illustrated by Fig. 16 showing the hand loading of a steamer within a few feet of a fixed conveyor.

Stackers are motor driven conveyors capable of working at an angle up to 60 deg., and are made in lengths up to 40 ft., requiring a 5-h.p. motor to operate. Their weight is not great and being mounted on ball bearing caster wheels no hardship is involved in the frequent moves required to suit the growing or shrinking piles—the machine being reversible and frequently used to lower material.

The use of a relatively small number of portable dock hoists rather than a large number of fixed ones is becoming common. They are made in single drum and double drum types with gypsy heads and one and two motor drives. The control may be by drum controllers mounted on the machine or by magnetic control where the panel is mounted on the machine, and the master controller is carried by the operator who has a range of 100 ft. radius or more if necessary. Both a-c. and d-c. motors equipped with solenoid brakes are used where the control is remote. In some cases the motor runs continuously and the drum is handled by a friction clutch and foot brake. The small size illustrated in Fig. 14 is equipped with a 15-h.p. motor and has a capacity of one ton at 200 ft. per minute.

Trackless cranes are of two types—"battery" and "cable," i.e., one is operated from a storage battery and is self-propelling while the other takes energy from a service station through a long cable and is not self-propelling. The battery truck crane is built in one and two ton sizes and is very useful in gondola and flat car work especially when a short haul is required. The cost of taking cast iron water pipes (1600 lb. units) from a gondola car to alongside a ship 60 ft. distant has been reduced to one-fourth the cost of hand methods reinforced by trucks, skids, block and fall, etc.

Portable cranes taking energy by cable are called "tramp cranes" and are used for serving unrigged craft supplying service akin to the ship's cargo, booms and winches. They are also used for gondola and flat car work. The tramp crane illustrated in Fig. 12 discharged many sugar barges (elevating 25 ft.) at the average rate of 48 tons per hour with a 15-h.p. squirrel-cage motor.

Vehicles used as freight handling machines are of two types—tractors with trailers and electric freight trucks. Both use storage batteries, the first towing its loads on a plurality of trailers and the latter carrying loads on its own deck. Tractors are heavily built and carry large capacity batteries so as to have a high tractive effect for starting and grade climbing. Trailers are provided in liberal numbers so the tractor always finds loads to tow and empties to return. Being on the go all the time, one man, one battery and one motor keep roughly 400 sq. feet of carrying deck busy, viz., 9 trailers 4 ft. by 12 ft. Rather long hauls are most favorable for this method. Cotton has been moved one-half mile at the continued rate of 30 tons per hour over rough roads with frequent short grades by a tractor having a 21/2-h.p. automobile type motor and a 44 cell, 185-amp., hour battery. To economize power the trailers should have roller bearings and liberal springs, which take up all the severe shocks.
The industrial trucks, electric warehouse trucks or electric stevedores as they are called are usually rated at 2 tons capacity and have 24-volt batteries and motors. These trucks are among the most easily applied portable machines and where distances are great or grades steep they can usually be used to advantage. Packages that can be put on and taken off in a 25-man gang was effected in 20 minutes, not one of the men having had any experience with such machines. The care of batteries has been very much simplified and battery charging equipments are reliable and easily understood.

Floating machinery is represented by the numerous lighter derricks or cranes in harbors. These run to by not more than two men are most advantageous as the self-loading and self-unloading feature of the hand truck make it hard to displace on packages of 300 lb. or over. Men very readily learn to "navigate" these miniature trucks as is proven by the fact that a complete change-over from hand trucks to electric trucks 150 tons capacity for freight handling and the most active size is about 75 tons capacity. Some have a large carrying capacity on deck; one in Montreal harbor can carry 600 tons. They serve admirably on long waterfronts, often competing with fixed cranes which are frequently in the wrong place. The "Pelican" in
New Orleans harbor frequently discharges ship loads of great marble blocks directly to flat cars, the cars being shifted almost continuously to provide empty spaces within reach of the boom.

The spreading use of portable machinery is developing auxiliary apparatus to meet peculiar requirements. Two and three wire cables suitable for exposure to weather and the wear and tear incident to much dragging over wharves as well as to horses’ hoofs and wagon tires are available for even very large motor equipments at 220 volts.

Rugged cable connectors for use at the service stations, between sections and at the machines, are not so readily obtained but will be developed as the need grows. Service stations consisting of a fireproof cabinet, containing fuses, switch, meter, cable connectors and fitted with a conduit for bringing in the feed wires are so inexpensive that they should be installed liberally for it is much easier to bring a machine to the job, if current is conveniently available, than it is to bring the job to the machine. In fact, the work will be done by hand if the machine is not readily put in operation there.

Storage battery machines have a distinct advantage on short jobs by being self propelled and being able to work anywhere on short notice. Their disadvantages lie in the capital investment in batteries and battery charging apparatus, in the room taken up and expense of attendants.

All these machines make a desirable load for central stations and the great field in which they have hardly found a foothold could be canvassed energetically by central station men to their advantage. Prospective users of such machinery are frequently so out of touch with electrical progress that they do not know how easily machinery can be substituted for hand work or how little extra wiring is necessary to make such machinery available.

**Engineers Standardize Automobile Names**

One of the objects of the standardization work now being carried on by the Society of Automobile Engineers is the establishment within the automobile field of a precise and compact language. Only last week copies of a pamphlet on nomenclature were mailed to all the members of the society, together with a number of data sheets giving in a concise form the results of standardization work accomplished during the first six months of the present year.

There are many advantages in having uniform names of car parts. The automobile user would find it much easier to make replacements. The manufacturer would benefit for the same reason. The entire industry should welcome any list of names that will remedy the present chaotic condition, in which each maker seemingly uses a different terminology.

The list of names recommended by the S. A. E. was developed through the combined efforts of engineering and service representatives from a number of the leading automobile manufacturers. Over six hundred separate names of the more important parts are given but no attempt has been made to list minor parts, the names of which are well settled.

A striking exception to popular usage is the name “engine” which is recommended rather than “motor” to avoid confusion with the electric motors used for starting the engine installed on automobiles. Definitions have been included for axles, brakes and bodies for which usage varies. The names of bodies particularly are in need of standardization because of the wide variety of names used by individual car makers. That this action is appreciated is shown by the fact that the Chicago Automobile Trade Association, composed of practically all the dealers in that city, has recommended that its members adopt the S. A. E. body names. It is likely that the manufacturers, through their organization, the National Automobile Chamber of Commerce, will in the near future adopt the complete nomenclature.

When the difficulties arising from the use of different names for the same things are considered, it surely is desirable that the S. A. E. nomenclature be widely adopted, particularly as it is the result of the painstaking labors of the highest authorities in the industry.

The standards initiated by the Electrical Equipment Division of the S. A. E. Standards Committee are of special value to every car user. Three sizes of the forked type head-lamp supports are standardized. Dimming devices that operate by reducing the current to the head-lamp are not recommended for the purpose of eliminating glare. The anchor pins of head-lamp bulbs are to be in a vertical plane when installed. Focusing devices are to be arranged so as to neither revolve nor cause the bulb to move out of its axis; it is recommended that head-lamps be mounted as high as practicable and that the lamp centers should never be less than three feet from the ground. In addition the Division has developed complete specifications for the flexible steel tubing used so widely for automobile electric wiring.

Body names that have been standardized have been published in *Electric Vehicles* along with the definition of the type.
Chicago Country Club Holds "County Fair"

A very large annual undertaking of a fine and worthy nature, is the "County Fair" held usually the last part of September in the beautiful and spacious grounds of the South Shore Country Club, Chicago. No better place could be found for such a large affair, as there is not only ample ground space but the prestige of the leading country club of the west can be exercised in full force for the benefit of the numerous charities to which the proceeds go; and there is the very necessary personal supervision of the club membership backed up by the convenience and facilities of the great club house, and the electric lighting service which entered the grounds.

The Fair lasted four days, September 20, 21, 22 and 23, during which time a huge attendance registered and a profit of many thousands of dollars was realized for the twenty-three charities in charge of the following:

Mrs. L. F. Swift, Helen Adelaide Goldsmith, Kathleen Alford, Marjorie Sieh, Mrs. C. C. Right, Mrs. Thomas Watkins, Mrs. L. C. Rollo, Mrs. J. Ellsworth Gross, Mrs. Fred B. Woodland, Mrs. John J. Palendeck, Mrs. D. J. Normoyle, Miss Emily Napieralski, Miss Faye Hart, Mrs. George W. Payson, Baroness Von Rieswitz, Mrs. I. Zinger, Mrs. Hans A. Leafgreen, Mrs. C. A. White, Mrs. John Bonnickson, A. Stamford White, Mrs. Kenneth White.

Every one of these charities was represented by some special attraction or booth. Among features not listed under the name of some particular charity were the following:

Mrs. Thos. F. Scully, Mrs. Wm. J. Sutherland, Mrs. Macdonald Conger, Mrs. Lawrence Heyworth, Mrs. Edw. J. Holslag, Mrs. John G. Campbell, Mrs. Wm. T. Morgan, Mr. Richard W. Clancy.

There were many other attractions, chief among which were the acrobatic and athletic entertainments in the central arena. Around this big space the Club has an installation of converted ornamental street lamp posts, which provided brilliant illumination. These street lamp posts have each been provided with an extension which supports a 250-watt high efficiency Mazda lamp in an aluminum reflector at an angle which directs all the light toward the center of the space. This apparatus itself is festooned with ordinary incandescent lamps, and a similar installation provided light for the large stage on which the boxing contests and other acrobatic performances were held. Several of the booths, to increase their trade, used electric signs to advertise themselves, and in all of them sufficient illumination was provided to make them look like bright attractive stores. At one end of the fair grounds was a large electrically operated and lighted merry-go-round, which was a continuous joy for the children who thronged the County Fair every day. An Irish jaunting car was another popular attraction, and when the writer was present was more or less appropriately devoted to conveying attractive members of the feminine police force to and fro... By whose report is here followed.

Fifty-five members of the athletic squad of Uncle Sam's recruits at the Great Lakes Naval Station came down and camped in the grounds for the four days during which they gave athletic programs including boxing, rowing and swimming matches, racing, wrestling, and parade drills.

An ambitious advertising program was also produced and sold, the proceeds from this alone being considerable.

A great deal of newspaper space was given to this County Fair on account of its charitable objects and also because of the personal interest attaching to the participation of so many well known club and society people.

The automobile fashion show section was a notable success, if the results obtained by the Anderson Electric Car Company, manufacturers of the Detroit electric, reflect a general condition.

Bruce E. Adams, general sales manager, states that the Detroit exhibit was thronged throughout the four days and nights of the fair, and that thirty-eight live prospects were obtained, and four sales can be credited to the interest developed by the fair.

The Chicago people claim to have had an equally successful exhibit, according to the Electric City Magazine.
St. Louis Motor Show

The fashion show of the Agricultural Fair at St. Louis, Missouri, October 7, 1916, was one of the ideas of the fair promoters which proved most successful, and the outpouring of spectators testified to its drawing power.

The grand stand was thronged long before the hour for the exhibition. Cars of the contestants were parked around the clubhouse, and, when the hour for competition arrived, were driven around once and then lined up. The cars and occupants were announced and each then made a turn around the group of judges, following this with a circling of the track and lining up again in front of the clubhouse. After driving as far as the judges’ stand they wheeled and turned around to await the decision.

Consuls and foreign visitors represented in the jury of awards were: Jose Alvarez of Spain, Sir James Arbuckle of South America, Alessandro Broletti of Italy, Augusta Aguilera of Cuba, Marc Seguin of France, and Dr. Otto von Hubicki of Austria and Germany, while Frank W. Taylor, Jr., of St. Louis, and C. E. West of Colorado Springs, Colo., represented America.

Announcement was made that applause for the different entries would be given due consideration by the judges in deciding the winners. The spectators were requested to voice their approval by as noisy a demonstration as possible when their favorite was approached by the judges, who suspended an American flag over the head of each competitor for an instant.

Fifty-six contestants, gowned in the latest fashion and driving cars that were groomed until they shone in the sun like living creatures, appeared for the competition. Mrs. Lon O. Hocker, who took first prize in the electric division and fifth in the general division, wore a rose-colored afternoon gown, with black hat, black patent-leather shoes, white gloves and white fox fur. She drove a Detroit electric car and her costume was that of the “afternoon call” order.

Next Month’s Issue

The December issue of Electric Vehicles will be a commercial car number having the specification of all the current 1917 models offered for sale.

Walker Balance Drive Electric

Many fleets of Walker Elecric are in the service of such large concerns as the Blue Valley Butter Company. This surely answers the truck efficiency question; satisfies any doubt of haulage and delivery service and offers many good reasons that endorse the Walker.

Be Sure to Know the Walker Balance Drive

Part of Walker fleet. Blue Valley Butter Company, New York. This company operates fleets of Walkers in other large cities.

Walker Vehicle Company

Manufacturers of Chicago Electric Passenger Cars and Walker Electric Trucks

Chicago

New York Cincinnati San Francisco
Battery Efficiency Demands Pure Water

The subject of distilled water in connection with your storage batteries is a subject of vital interest to you, as its use means greatly increased life and much greater efficiency. There is scarcely a natural supply of water that is free from impurities which are highly injurious to storage batteries and the frequent addition of such water to the cells will quickly result in a concentration of impurities injurious to the elements.

Only distilled water should be used in flushing batteries or in bringing the electrolyte to the required density. Condensed water is highly undesirable, as owing to the temperature of high pressure steam, the impurities are vaporized and carried over. Filtered or condensed water does not in any sense mean pure water.

Iron, chlorine, and nitrates are present to a greater or less degree in natural and condensed waters. Iron causes self-discharge of the batteries and chlorine, and nitrates disintegration of the positive plates. Boiler compounds contain elements especially injurious to batteries. These elements are entirely removed by the use of a still.

Distilled water when obtained from the still is chemically pure, because the temperature of the water is carried barely beyond 212°, so that only water steam is carried over, and the impurities which require higher temperatures to vaporize are retained in the undistilled water.

Considering the above, it is clear, if the life of storage batteries is to be prolonged, pure distilled water is absolutely essential.

Many battery failures are due to impurities. Your troubles from this source can be entirely eliminated by the use of distilled water. All storage battery manufacturers strongly advocate the use of distilled water, and many insist on its being used.

The cost of producing one gallon of distilled water varies from 1-10c to 2c, according to the kind and price of fuel used.

Many garages and storage battery distributors quickly pay for a still with the profits derived from the sale of distilled water to garages, gas and electric car owners, druggists, hospitals, physicians, chemists, and other users of distilled water.

When distilled water is used, all the old electrolyte can be saved; you can also purchase 1,800 acid and reduce it to proper battery strength, thus saving transportation charges on water and carbays. The greatly increased cost of acid becomes a question of minor importance if distilled water is used. This feature alone, entirely aside from the reduction in battery plate diseases, such as are caused by impurities in the flushing water, would easily warrant the general practice of using distilled water for flushing storage batteries.

The collection of scale or sediment on the inside of boiler tubes is somewhat typical of one of the results of not using pure distilled water for battery flushing. In the operation of the still the entire pure distilled water goes off as vapor, the impurities being left behind; similarly, in the operation of a storage battery, only pure distilled water, or its equivalent in hydrogen and oxygen gases, is given off by evaporation and by gassing on charge.

Here, again, as in the case of a still, all impurities which existed in the water which was used for flushing the storage battery are left behind in the electrolyte of the battery. If battery flushing with impure water is continued, these impurities in the flushing water gradually accumulate in the electrolyte until they soon exist in such quantity that they seriously injure the battery plates.

The use of pure distilled water in the Edison storage battery is particularly necessary, because during the process of distilling all chlorine, lime and other salts are eliminated which, if allowed to remain in any quantities, would shorten the life of solution and if quantities were allowed to increase would tend to decrease the capacity of the elements.

The almost universal use of distilled water in connection with batteries of both the lead and nickel iron type has created a demand for a practical and efficient still.

The Rochitz System of distillation supplies a distillate which is absolutely pure and free from iron, chlorine, nitrates and other impurities.

That the Rochitz Still has been selected by the leading railroads, service stations and garages of this and foreign countries, and many of the world's foremost industrial concerns is proof that the American stills stand for supremacy in the field covered.

It is stated by the manufacturers that as the still has the unqualified approval of all the leading storage battery manufacturers and operators, over one thousand garages and distributors have installed them in their stations.

Personal

Manager H. O. Seerist of the Detroit Electric Car Company, 8335 Euclid avenue, has added A. J. Weidenkopf, Jr., to his selling forces. Weidenkopf has been connected with the sales of electric cars for some time. Recently his work has been with the sales force of the Baker R. & L. Company in Cleveland territory.

Harry Brown, one of the leading younger trade journalists in the West, has just been promoted to the western editorship of the Electric Railway Journal, one of the McGraw publications. Mr. Brown, after graduating from Michigan University, has represented the Electric World in the Central West up to the present and has taken quite a deep interest in the Electric Vehicle Association in Chicago. His offices will be in the Old Colony building of that city.

A. J. Brechtel, for several years past one of the leading jovial spirits of the Chicago section of the Electric Vehicle Association and prominent in motor affairs as one of the star salesmen of G. V. electric trucks, has accepted a position as assistant commercial car sales manager for the Studelbock Co. in Detroit. This department to be known as the Anderson Electric Car Company of Detroit electric, has completed negotiations whereby the services of William G. Haitch, treasurer of Harry Newman, Inc., will be obtained by Manager D. E. Whipple.

The experience gained by the former association with the electric car business in Kansas City, together with the knowledge derived from the multitudinous duties of his last connection, should prove a valuable asset in his new position.

Mr. Haitch has gone a step further in this year's work thoroughly to the class of live men in the industry located along Chicago's automobile row, and will have a great opportunity in the future for a display of the energy and ability which has characterized his work in the past," said Mr. Whipple.

Edward L. Tobin of St. Louis has just been appointed manager of Mr. Walsh's new electric car department in Dubuque, Iowa, and will take over his duties immediately. This department to be known as the Detroit Electric Car Company, will sell Detroit Electrics manufactured by the Anderson Electric Car Company of Detroit. Mr. Tobin is twenty-seven years of age and was born and raised in St. Louis. He graduated from the St. Louis University and then studied law at Harvard, returning to St. Louis to practice. Shortly after, he was sent to Bloomington, Illinois, for the Anderson Electric Car Company and in less than a year Bloomington boasted of thirty-six new Detroit electrics. Since then Mr. Tobin has been at the factory in Detroit and in Chicago. He is a brother of Paul Tobin, with the company in Chicago, and a son of T. J. Tobin, general comptroller of the Wabash Railroad Company.

Mr. Walsh is erecting a new garage and salesroom for the Detroit Electric cars at 940 Clay street, adjoining his Ford salesroom. A carload of new models are on display at the Clay street salesroom,
Prominent English Firm to Adopt Electric

Daimler, Ltd., of Coventry, England, who set the motor world by its cars sometime back by adopting the Knight motor and marking a new epoch in motor car engineering, have seen daylight again and now have ten electrics in operation, according to a recent report. The cars are nearly a year old and careful and satisfactory cost records have been kept.

CLASSIFIED

FOR SALE—Large, exclusive electric garage, located in a large city in Southern Ohio, big paying proposition. Excellent reasons for selling. Address E. G., care Electric Vehicles, Monadnock Bldg., Chicago, Ill.

**The Electric—the ideal winter vehicle**

There is no closed car that offers more in luxury, comfort and economy than does the Electric. In rain, hail or snow the Electric can be depended upon to take you there and bring you back. No bother with cold motors or danger of "freezing," no chilly sessions changing tires with the winds howling around your ears.

**Speed, Mileage and Economy**

The modern Electric has more speed than the law allows, and ample mileage—from 85 to 100 miles of untroubled travel on a single battery charge. For all-around use for yourself and your family, there is no car which gives better service at less cost than the modern Electric.

Call Randolph 1280 and ask our Electric Vehicle Expert for unbiased information about Electric Vehicles

Commonwealth Edison Company

72 West Adams Street

CHICAGO

ILLINOIS

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Statement of the ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, of Electric Vehicles, published monthly, at Chicago, Ill., for October 1, 1916.

State of Illinois, County of Cook, ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Paul H. Wadsworth who, having been duly sworn according to law, deposes and says that he is the Editor of Electric Vehicles and that the following is to the best of his knowledge and belief, a true statement of the ownership and management of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

   Publisher: ELECTRICITY MAGAZINE CORPORATION: 1251-1256 Monadnock Bldg., Chicago.

   Editor: Paul H. Wadsworth: 7023 Yale Ave., Chicago, Ill.

   Managing Editor and Business Manager: E. J. Mock: 9345 Pleasant Ave., Chicago, Ill.

2. That the owners are:

   (Give names and addresses of individual owners, or, if a corporation, give name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.)

   Ed J. Mock: 9345 Pleasant Ave., Chicago, Ill.

   John Cocker: 9345 Pleasant Ave., Chicago, Ill.

   R. C. Sampson: Blue Island, Ill.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are:

   There are no bonds, mortgages, or other securities outstanding against Electric Vehicles.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affidavit has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

   Sworn to and subscribed before me this 30th day of September, 1916.

   (Seal)

   Leon J. Eskstrom.

   My commission expires Aug. 17, 1917.

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Cold Weather Comforts obtained at a small cost with a Lee Electric Radiator in your car. It is a safeguard of your family's health.

Ask Your Electric Dealer Booklet On Request

Lee Electric Radiator Co.
629 Peoples Gas Building
122 S. Michigan Avenue
CHICAGO, ILL.

A Subscription to Electric Vehicles Helps to Solve Your Selling Problems

Send along the name of your prospect, and with the first copy of ELECTRIC VEHICLES will be sent a card telling that it comes from you and will be a visitor for a year, a monthly reminder of your good will and friendly interest.

If you have one prospect the cost will be one dollar and fifty cents.

One lucky dealer with twenty prospects sent his entire list.

He sold four of them!

Electricity Magazine Corporation
MONADNOCK BUILDING
CHICAGO, ILL.

Give Your Storage Batteries a Chance

Increase their life and capacity by using only distilled water when flushing or washing.

The cost of producing one gallon of distilled water varies from 1-10c to 2c, according to the kind and price of fuel used.

Produce distilled water for your own needs, also for sale at a splendid profit to garages, gas and electric car owners, druggists, hospitals, physicians, chemists, and other users of distilled water.

Your profit from the sale of distilled water will quickly pay for the Still.

The improved "Rochlitz" and "Delta" automatic Water Stills

Are Recommended and used by the following storage battery manufacturers: Edison Storage Battery Co. Gould Storage Battery Co. Willard Storage Battery Co. The Rex Storage Battery Co. The U. S. Light and Heat Corp. "U. S. L." Vesta Accumulator Co. The Electric Storage Battery Co.

Manufactured by W. M. LALOR, Manhattan Building

Storage Batteries Are Installed by the Largest Electric Car Manufacturers sold in Chicago and Suburbs.

For Further Information Ask the Users

Volkcar Storage Battery Company
2437-39 Michigan Avenue
CHICAGO, ILLINOIS
IMPROVED STORAGE BATTERIES HAVE NOW BEEN IN SERVICE SOMEWHAT OVER A YEAR IN BOTH COMMERCIAL AND PLEASURE VEHICLES AND TO THE BEST OF OUR KNOWLEDGE EVERY ONE OF THEM IS GIVING COMPLETE SATISFACTION

The superiority of Philadelphia Diamond Grid Improved Batteries over previous types is evidenced by the following:—

They give 10% more mileage.
They give 10% more life.

Being equipped with the patented Philadelphia hard wood separators they require no change of separators during their life.

Being built upon the Diamond Grid, buckling is unknown.

IT WILL PAY YOU TO INVESTIGATE PHILADELPHIA BATTERIES BEFORE MAKING YOUR NEXT PURCHASE

Send for Booklets W-I and WTXI

PHILADELPHIA STORAGE BATTERY CO. ONTARIO AND C STS. PHILADELPHIA

DEPOTS AND AGENCIES
NEW YORK CHICAGO ST. LOUIS WASHINGTON CLEVELAND ROCHESTER DETROIT BOSTON PITTSBURG DENVER SALT LAKE CITY CINCINNATI BUFFALO ATLANTA TORONTO MINNEAPOLIS KANSAS CITY, MO. OAKLAND SEATTLE HARTFORD HUNT.INGTON SAN FRANCISCO LOS ANGELES SACRAMENTO PORTLAND, ORE.
There are certain cars—perhaps not more than two or three in both the gas and electric field—ownership of which is a recognized hallmark of social position.

The Ohio Electric occupies a unique place in this respect among electric cars. It is designed solely for those whom nothing less than perfection will satisfy. Its possession naturally implies the ability to appreciate and afford decorative art in its highest form.

This year's models carry Ohio Electric supremacy still further. The body-lines, already close to artistic completeness, have been still further refined. The market places of the world have been searched for distinctive decorative fabrics.

The exclusive Ohio combination of magnetic control and magnetic brake, with double drive, enters upon its seventh year of supremacy. It enables you to drive your car in safety and comfort unattainable in any other way.

See the Ohio Electric at the nearest Ohio showroom. Or write us for literature.

The Ohio Electric Car Company
1525 West Bancroft Street, Toledo, Ohio
There Are Hundreds of “Ward Specials”

in the baking industry alone, in installations ranging from one to one hundred or more. Department stores, groceries, laundries, and other businesses with similar delivery requirements are rapidly swelling this host of users.

The Largest Truck Fleets in the Country

belong to companies whose success hinges upon reliable and economical delivery service, and in these fleets electric trucks predominate. The reason is obvious; the natural advantages of the electric insure this kind of service. The “Ward Special” offers these advantages at a price within the reach of every merchant.

The “Ward Special” Opens to the Dealer

a new field, rich with prospects and productive of many fleet orders. It enables him to build up a substantial business with profitable and steady returns and a minimum of service expense.

Some Very Attractive Territory

is still open to live dealers who wish to establish a permanent business of this kind. Factory co-operation, prompt deliveries, and satisfied customers, coupled with energetic solicitation, practically guarantee success.

WARD MOTOR VEHICLE COMPANY

Builders of Electric Trucks up to 5 Tons Capacity

MT. VERNON                  NEW YORK
The One Accepted Standard

For over two years the entire electric vehicle industry has been striving to produce this car's equal in beauty, lightness, performance and price. Electrics are lighter and lower in price—But the Milburn Light Electric is still the one accepted and established standard of beauty, lightness and efficiency among electrics.

It is still the lightest electric built—still the most economical to run—still the easiest to operate—still the easiest riding—still the most beautiful and most popular of all—and still the lowest in price. The Milburn was the first real light electric. And today it stands alone—absolutely unapproached in its field—the modern low hung, roomy, comfortable car. No car—electric or gasoline—can be operated at such small cost.

Established 1848

THE MILBURN WAGON COMPANY

Automobile Division

Write for catalog

Toledo, Ohio

The Milburn Charger solves the home charging problem—inexpensively—efficiently.

The best evidence of its dominating position is the effort of those from whom leadership has been wrested to modernize their cars—to approximate Milburn standards.

Dealers—The great success of the Milburn makes it the profitable electric for you to handle. If we are not represented in your city, write us at once—we'll show you a money making proposition.

The Milburn Light Electric

$1685 f.o.b. Toledo

KEEP THE SPOT ON MILBURN
A New Battery Charging Set

This new motor-generator set for charging lighting and ignition batteries is complete with switchboard control and instruments. The very little space occupied by these sets appeals to garages and to car owners with limited accommodation. The 250 watt set for instance is only $18''x10\frac{1}{2}''x21''$ overall. Another big appeal is the variety and number of batteries that can be charged at the same time. By simply turning the control handle the following combinations are possible:

<table>
<thead>
<tr>
<th>Charging One 6V. Battery</th>
<th>Charging One 6V. and one 12 V. Battery</th>
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<tr>
<td>&quot; 12V.</td>
<td>&quot; Three 6V. Batteries</td>
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<td>&quot; 18V.</td>
<td>&quot; Two 6V. and one 12 V. Battery</td>
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<td>&quot; 24V.</td>
<td>&quot; Four 6V. Batteries</td>
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<td>&quot; 12V.</td>
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During the coming winter months lighting and ignition batteries need more frequent boosting to overcome the effects of cold weather on engine and batteries and the insufficient charging of batteries through the generator because of short runs.

There is not only a good profit in the sale of these sets but worth-while income in the sale of current in the late hours of the night when charging is done. Co-operate with our local offices and the salesmen of automobile supply houses. Making a profit in "dead" night hours is good business for you. Send for descriptive folders and literature on Fort Wayne Motor Generator Sets.

General Electric Company

For Fort Wayne Dept., Fort Wayne, Ind.

ADDRESS NEAREST OFFICE

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<th>Jacksonville, Fla.</th>
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For Michigan business refer to General Electric Company of Michigan, Detroit.
For Texas, Oklahoma and Arizona business refer to Southwest General Electric Company (formerly Hobson Electric Co.), Dallas, El Paso, Houston and Oklahoma City.
For Canadian business refer to Canadian General Electric Company, Ltd., Toronto, Ont.
Has the Cheap Electric Arrived?
Startling Announcement Made in New York City

WITH the statement that the Dey Electric Corporation of 45 Broadway, New York City, would take space in the New York automobile show at the Grand Central Palace, apparently the biggest thing that the electric vehicle held ever has seen broke into the public gaze.

It is the low-priced electric utility vehicle which Dr. Charles Steinmetz, engineering authority of the General Electric Co., has been advocating for several years to all appearances. The Dey company has secured a factory in the Metropolitan zone. That the company will go forward with an interesting manufacturing program is also apparent in that it is strongly financed and presumably closely connected with one of the large electrical manufacturers.

A comprehensive line of what is described by the company as the lightest, lowest-priced and highest efficiency electric vehicle ever built will be manufactured. The company will specialize on a runabout intended primarily for utility work, such as solicitors. The car is not a passenger type, nor yet a truck, but essentially a utility vehicle. In addition to this runabout a closed type of passenger vehicle will be produced. The company will manufacture what might be termed a utility chassis suitable for taxicab purposes, as well as passenger bodies and light truck uses.

The price of the new lowest-priced electric to be built by the Dey corporation has not been determined, but it is understood that it will be under $1,000 and that eventually the dream of Dr. Steinmetz for a $500 vehicle may be attained, if not carried further.

At the same time this announcement comes out others appear, one in Chicago and one in New York. The New York company has been formed to place 500 electric taxicabs in that city, while a similar one is projected for Chicago. At the same time the Walker Vehicle Co. of that city have brought out an utility chassis on which a runabout body has been fitted for the Commonwealth Edison Company for the use of its solicitors about town.

The first of these cars are shown in this article. The lines are very graceful, as can be seen, the hood tapering into the dash in a pleasing manner. The lines of the body, however, are strongly reminiscent of the well known Ford car, while the chassis is of the same substantial quality that has always characterized the company's Chicago electrics. Pneumatic tires will be fitted. The car provides a type far more suitable for salesmen and solicitors than the converted and electrified weak Ford chassis used in New York city. The present car being a real electric motor car, that central stations should welcome with open arms.

Whether the new Walker and the Dey are a step towards the $500 electric as it was styled two years ago by Charles Steinmetz remains to be seen. Such a car has been a cherished matter with Dr. Steinmetz. It has been known for several years that he has been perfecting features of design which would make it possible to produce a utility electric vehicle at practically the same price as the cheaper gasoline machines. Dr. Steinmetz strongly advocated this type of vehicle before the different electric interests, as well as before the electric vehicle manufacturers. It was generally considered impossible to build such a vehicle that would give the desired service. The possibility of producing such a vehicle resulted in many strenuous arguments on convention floors, between central station concerns, or companies manufacturing electric current, and those engaged in vehicle manufacture. The central station interests were strong for such a vehicle, as it would naturally be a great source of revenue if manufactured in large quantities. On the other hand, electric vehicle makers were catering to pub-
lic requirements for larger and more luxurious types of electric vehicles.

With the sphere of the electric widening, with electric taxicabs in four large American cities, the cheap electric on its way and the small industrial truck and tractor going strong and electric trucks it looks propitious for a rosy future.

**Hope Gone for Low Priced Gas**

All hopes of a lower priced gasoline has fled the breast of those who held it dear. The foremost authority in the gas car field, Motor Age, admits it and has the following to say:

"What has become of the Rittman process? It is not so long ago that the oil fuel world was more or less electrified by the reports that an answer to the gasoline problem had been reached by the use of this form of cracking method. In June, 1916, Dr. Manning, of the Bureau of Mines, issued a statement in which he mentioned the names of twenty refineries that were using the Rittman process, and yet today, it is difficult to discover a single manufacturer who is producing commercially a gallon of Rittman gasoline.

"A canvass of the companies which were named at that time as users fails to disclose one who is actually producing and selling gasoline made by the Rittman process, in fact, the majority of them have not even started to operate as they have been unable to secure the materials for the process.

"One of these concerns, the Muskogee Refining Company, of Muskogee, Oklahoma, writes: "After careful investigation into cost, etc., we have come to the conclusion that the Rittman process is impractical commercially."

"The Pittsburgh Oil Refining company often has been referred to as one of the largest operators of a Rittman still, and there is even a general impression among some members of the oil trade that it is using this process regularly. As a matter of fact, the Pittsburgh company states, "The information which has been published to the effect that we are using Rittman process is misleading for the reason that its installation has never been completed owing to the delay in the arrival of materials."

"The Pure Oil company, Minneapolis, Minn., which has been cited as another example, has never installed a plant and probably will not be able to do so for at least 6 months. The Associated Oil company, San Francisco, California, which was said to be using the Rittman process, says in connection with a request for cost figures: "This company is not using the Rittman process and cannot furnish data."

"Results from inquiries to every concern mentioned as having used the Rittman process have led to the same negative results. The more or less sanguine hopes held forth for help from this source probably will have to be abandoned, and the natural expedi-ent of kerosene looks to be the only relief. This is being successfully used in tractors where the speed is constant and the next step is the development of the kerosene burning car."

**Kansas City Activities**

Among the encouraging reports which come into the office of the Milburn Wagon company of Toledo, manufacturers of Milburn electrics, concerning the popularity of its product, is one just made personally by Ben B. Hood, in charge of the Kansas City territory for the Milburn company. According to Hood, the Kansas City dealers have awakened to the fact that the Milburn electric is especially suited for Kansas City service, which, because of the hilly and rolling conditions of the streets and highways, has long been undesirable territory for the sales of electric vehicles, and are competing against each other for the privilege of representing the Toledo concern in that district.

"The growing popularity of the Milburn car in the Kansas City territory is due entirely to actual demonstrations," Hood told the officers of the company. "Without any special tuning up or extra equipment, I took my Milburn electric, fresh from the factory, and drove it 2,000 miles up and down those Kansas City hills at an average of from 65 to 70 miles on a charge. I made no effort to avoid the bad hills, but took them as they came on practically every street in the city, and when I finished the 2,000 mile run I made 67.2 miles on the last charge.

"Such a performance with an electric car in that locality was little less than astounding. The Kansas City people were interested in a car which would make the same mileage over steep hills that the average electric makes on level roads and it did not take long for the Milburn to acquire an enviable reputation. Another stunt which it performed recently was the climbing of Hospital Hill, the highest hill in Kansas City, with a grade of about fourteen per cent, at a speed of from twelve to fourteen miles an hour. Big, powerful gasoline cars have attempted the feat with no more creditable records."

The demand for distribution of Milburn cars is not alone confined to the Kansas City territory, claim the officials of the company. It has become nation wide, and R. S. Woodhull, sales manager of the Milburn Wagon company, is becoming more discriminating every day as to his selection of dealers.

"A car of character requires a dealer of character," he says. "Nothing reflects on the quality of the car any quicker than the type of man who sells it."

**Philadelphia R. & L. Moves**

The Rauch & Lang company, Philadelphia branch, manufacturers of the electric car of that name, has moved from 2214 Spring Garden street to the southwest corner of Twenty-second and Chestnut streets, with a service station and used car department at 2120 Market street.

Its branch headquarters and retail sales rooms will, however, be located at the Chestnut street address under the management of H. H. Doering. They are occupying a new building at that address with frontage of thirty-five feet and a depth of seventy-five feet, splendidly lighted and well adapted to show room and office uses. Joseph Buchanan is in charge of the service station and used car department.
The Evolution of the City Ambulance

By A. Jackson Marshall

It is a curious fact that some of the greatest developments in the peaceful sciences have been fostered by war, and of these the advancement in surgery and its attendant equipment is the most notable. The imperative need of new remedies seems to act as a proficient spur, and proves the old adage about the mother of inventions. In the present war, for example, the number of face and jaw wounds caused by explosions in the trenches has resulted in an evolution in dental surgery probably unparalleled in its previous history.

The Civil war may be held directly responsible for the modern city ambulance in the United States, while the Crimean war performed a like service for Europe. At the outbreak of the war in the Crimean peninsula, France had the only army with a special conveyance for carrying the wounded. Their allies, the British, seemed to have depended on chance quartermaster's wagons to carry the men to the rear. It is claimed that the French had ambulance service as far back as the time of Henry IV. in the Sixteenth century, the so-called being litters slugg between horses or sometimes carried by men. But it is certain that in the wars that followed the French revolution, the French adopted special wagons to convey their wounded; and one of the most enthusiastic supporters of the field hospital movement was Napoleon, who, with that marvellous grasp of detail that makes him as great a statesman as warrior, found time to applaud and further the efforts of his generals, Percy and Larrey. Consequently, the French had an ambulance service comparatively developed at the outbreak of the Crimean war. Their example gave weight to the complaints of the British soldiers and the urgent demands of Florence Nightingale and her followers, so that this war saw the birth of the British Army Ambulance Corps.

In the United States, in an article published January, 1864, appears a protest in regard to the ambulance service in the Federal army. The article is written by a Harvard volunteer who speaks feelingly from personal experience with springless carts and straw-stuffed mattresses. It is interesting to note that the writer inveighs against the delay, lingering and wait methods of the congress of his day in regard to passing on army appropriation bills just as bitterly as do the army men of our own times.

Four years later, Dr. Thomas Evans published a brief history of the development of the ambulance, and illustrated his work with engravings of the type advocated by him—high, four-wheeled vehicles drawn by two horses, with curtained sides that could be raised at will. It had, however, room for a water tank, and the question of springs and mattresses was treated of at length.

Up to this time the ambulance has been confined in use to its original meaning of field hospital. But with the growth of municipal life following upon industrial
It was realized that a similar means of conveying the sick and injured was needed in time of peace. Paris established its first ambulance station in 1887. The United States appears to have been before France, however, according to a speech made by Dr. Evatt at the International Health Exposition in London, 1884. He deplores the practice prevalent among philanthropic Londoners of bundling up the sick and maimed of the city streets into public vehicles for conveyance to the hospitals. "In America," says Dr. Evatt, on this occasion, "If a man falls down and breaks his leg . . . they have a telephonic arrangement with the hospital, a message is sent, an ambulance comes down and the man is carried away."

As a matter of fact, the present day city emergency service dates from 1869, when Dr. Edward B. Dalton inaugurated the work at the Bellevue hospital in New York city.

The first motor ambulances were placed in service about fifteen years ago. Although the gasoline, horse-drawn and the electric ambulance each has its own field, the electric is particularly suited to city use, as it can be successfully operated through congested traffic. It runs without noise or vibration, and starts and stops without lurch or jar besides having the distinct advantage of being clean and odorless. Most of the hospitals in the large cities now operate electric ambulances, and it is generally estimated that they do twice as much work as the horses at about half the total expense.

The evolution of the city ambulance may be said to be complete until some inventive genius designs an air machine that will obviate all difficulties of blocked traffic and rough pavements. Until then the "electric" is the ideal means of transportation for the sick and injured.

The Queen Mary hospital, London, is now operating four electric ambulances, while in America nearly all large hospitals of national reputation are using them.

**Anderson Annual Meeting**

The annual meeting of the stockholders, also board of directors, of the Anderson Electric Car company, was held at the company's Detroit offices, October 28, 1916. The stockholders elected the following board of directors: W. C. Anderson, M. S. Townson, Jr., G. M. Bacon, G. D. Fairgrieve, W. M. Locke, W. P. McFarlane, W. H. Murphy, W. M. Locke, F. E. Price, J. B. Book, Jr. Executive, G. D. Fairgrieve, chairman; M. S. Townson, W. P. McFarlane, Wilson Critzer, G. M. Bacon.

The following officers were elected for the ensuing year: W. C. Anderson, president; M. S. Townson, vice-president; G. D. Fairgrieve, vice-president and assistant treasurer; W. P. McFarlane, secretary and factory manager; W. M. Locke, treasurer; F. E. Price, assistant treasurer; Wilson Critzer, assistant secretary.

The statement presented to the stockholders showed the company to be in strong financial condition, also in a more prosperous condition from a manufacturing standpoint, brought about largely by the buying of large quantities of material for several months past. Much of the improvement in the condition, is due to the fact that the company reduced its list prices more than a year ago, so that the Detroit electric is now within the reach of an increased number of purchasers.

Last year the Detroit electric sales showed an increase over the previous year of 141 per cent, while four months of this year show an increase in car shipments of 79 per cent over the same period of last year and the heavy shipping season is just now beginning. It is estimated that at the present rate of increase, the company's current year's business in electric pleasure cars will exceed last year's by at least 100 per cent and when it is considered that the company has practically all of its raw material for building these cars, either delivered to its plants, or under contract for specified delivery dates, it is apparent that the company is justified in expecting a large increase in their production, which would mean the largest output in the history of the company.

Aside from the splendid condition of the company's Detroit plant, their Cleveland factory (where motors for theDetroit plant are made, electric railroad baggage cars and industrial factory trucks manufactured) also shows an increase in sales of over 100 per cent to date this year as compared to the same period of last year.

It is interesting to know, that although the production of Detroit electric cars increased the past year 141 per cent, the increase in number of workmen to produce these cars was less than 100 per cent, which fact indicates clearly that the increased degree of efficiency made possible through quantity production and the use of the latest improved machinery installed from time to time in the past 18 months, is responsible for the very excellent showing in output, both at Detroit and Cleveland.

**New Automobile Factory for Norway**

It is reported by Consul General E. Haldeman-Denison of Christiania, that in the near future a company will be started in Christiania, Norway, for the construction of electrical automobiles. These automobiles will find a great field along the routes of the western coast where electric power is easily available. The tourist travel in that section of the country has developed so rapidly that preparations must be made for an increased service to handle it properly. It is thought that the introduction of cars propelled electrically is practical and of the greatest economic importance.

**Goodyear Makes Own Fabric**

The Goodyear Cotton Mills, of Killingly, Conn., has been incorporated with $5,000,000 capital, to engage in general textile manufacturing. This concern is practically a subsidiary of the Goodyear Tire & Rubber Company, Akron, and will manufacture tire fabrics for that concern.
Building a Concrete Garage

PRIMARILY, the garage is a building intended to shelter the automobile. In the early days of the automobile, and, in fact, until quite recently, the owner was satisfied to house his car in nearly anything that had a roof. Old stables, sheds and other crude shelters were enlisted to serve as garages. But now the owner of an automobile demands more than a mere housing. He aims to have a building that is distinctive in design, fireproof, durable and equipped to make the necessary work on the automobile easier.

A great deal of credit is due American architects for the rapid development to its present high standard of garage construction. The design of a garage is generally influenced by the architectural treatment of the house and other buildings in the immediate neighborhood. A garage may be attractive and well constructed, but if the architectural treatment does not harmonize with that of adjacent buildings, the general effect is displeasing. Even where a house is old-fashioned, it is well to let some feature of its design predominate in the new garage. However, the style of the garage is a matter that may safely be left to the discretion of the architect.

The logical location for the garage is at the rear of the house. This is a point, however, that can be discussed only generally, as the individual requirements may make it necessary to have the garage elsewhere on the property. Considerable thought should be given to the selection of the site, and the choice should be influenced by the idea of convenience and accessibility from the road or street.

In deciding upon the size of the garage, future possible requirements should be anticipated. Many automobile owners have made the mistake of building to meet only their present needs, and when a few years later they have decided to have a larger car or two cars instead of one, they have found it necessary to make expensive alterations. Even where it is fairly certain that there will never be more than one automobile, it is often a good idea to make accommodations for two. There is then room for visitors' automobiles, or if it is desired, half of the garage may be rented to a neighbor.

It is most important that the garage be absolutely fireproof. No inflammable building materials should be used. The fact that modern garages everywhere are built of concrete is a strong indication that architects and builders recognize this material as the proper one for garage construction.

The many advantages of concrete over other building materials for garages are obvious. It has demonstrated its fireproof qualities in hundreds of notable instances. Insurance companies give lower rates on property protected by concrete. A concrete garage is easily and cheaply built, is permanently attractive, and is everlasting. It is dry at all times—and is warm in winter and cool in summer. It is clean and easy to keep clean. It is economical because it eliminates the necessity of painting and repairs and lasts practically forever.

The photographs reproduced on this page show some pleasing effects in garage construction secured by the use of concrete. The illustrations on the following pages suggest attractive designs for inexpensive types of one-car and two-
car garages, suitable for town or country.

SUGGESTIONS WHEN BUILDING

Sand for concrete should be clean—free from organic matter—and well graded from coarse to fine. The presence of foreign matter may be easily determined by shaking some of the sand in a bottle of water. If 5% or more settles on top of the sand in the form of sediment, the sand should be washed.

The crushed stone should be of varying sizes from one-fourth inch to one inch in diameter. It should be clean, hard and broken with sharp angles. Trap, granite and hard limestone are among the best. If gravel is used instead of crushed stone, it should be screened on a 1/4-inch screen to remove the sand and small particles, and then passed through a one-inch screen. Gravel should have no rotten stone and should be clean, in order that the cement may adhere tightly. Water should be clean and free from acids, alkalies or oils.

Concrete mixers do their work more quickly and more thoroughly than hand mixing. Where the work does not warrant the use of a mixer, the materials can easily be mixed by hand in batches with good results. Materials should be measured accurately. A bottomless box holding one cubic foot is generally used for this purpose.

Spread the sand in a thin layer on the mixing board, cover this sand with cement spread out in a very thin layer, mix thoroughly by turning three times dry, then add water and mix twice, making a thoroughly mixed mortar. Spread this mortar out in a thin coat on the board and dump the stone on it. Spread the stone out and wet it slightly, then mix the mortar and stone three times. The act of shoveling this mortar into the barrel or into the form will make another turn. Uniform, dense concrete depends upon thorough mixing with enough water to avoid the necessity of excessive tamping in the forms. As soon as the concrete is mixed, it should be removed quickly in wheelbarrows and immediately used.

The size and depth of the foundation walls depend upon local conditions—the nature of the soil, drainage, variation of temperature, severity of frost, etc. As a rule, however, the foundation walls for the average sized garage need not be more than 12 inches wide and three feet deep, which will carry it below the frost line.

The concrete for the foundation may be mixed in the proportion of one part cement, three parts sand and five parts stone or gravel. The foundation trench is then filled with concrete and well tamped. The top of the wall should be brought to the surface of the ground and made perfectly level.

The walls of a medium size garage need be only six inches thick and they should be erected on the center of the foundation walls, leaving three inches of foundation on either side. The forms for the walls may be assembled flat on the ground and then raised into position. They should be made of 2x4-inch studding, placed upright, spaced about two feet apart. One-inch boards should be nailed horizontally to this studding and care should be taken to have the joints well matched if it is desired to give a very smooth surface to the finished wall. The forms may be tied at the required distance apart by means of twisted wire passing between the one-inch boards and around the upright studding. Window and other open-
ings may be provided for by making rough frames of one-inch boards, six inches wide, and setting them in the forms at the proper location. In some cases the frame itself may be placed in the forms and concrete cast around it. If this method is employed precautions should be taken against warping of the frames.

The top of the foundation should be thoroughly cleaned and wet, in order that the concrete in the walls will adhere to it. To make the walls strong and to prevent the development of cracks, they should be reinforced with mesh wire or light rods running in both directions. The reinforcing materials should be placed in the centre of the forms before the concrete is deposited. The forms should be left in place until the concrete is hard. In summer the forms may be removed after the concrete is three days old, but in cooler weather they should be left in place for at least five days, and then the concrete should be tested carefully before the forms are removed.

The concrete for the walls should be mixed mushy wet in the proportion of one part cement, two parts sand and four parts crushed stone or gravel. In placing the concrete it should be spaded thoroughly with a thin board paddle thrust between the forms and the concrete in order that the stone or gravel may be forced away from the forms. This will leave a smoother surface than would otherwise result. As soon as the forms are removed the walls should be scrubbed with a stiff bristle brush or a wire brush, in order to remove the surface film of mortar and the marks of the forms. This will also give it a pleasing and satisfactory finish.

The floor should be laid after the erection of the walls. It may be laid in slabs—the floor being divided into four quarters, one quarter to each slab. By using a light wire mesh or similar reinforcing materials placed two inches below the surface, a single slab may be used for the entire floor.

Excavate to a depth of not less than seven inches and fill in with crushed stone, cinders, brickbats broken up to a two-inch size, or broken tile, to within four inches of the surface of the finished floor. A four-inch layer of concrete is then placed and spread evenly over the entire area. A mixture of one part cement, two parts sand and three parts crushed stone or gravel should be used. The surface should be troweled to a smooth finish and allowed to set.

A Hundred Thousand Mile Car

W. W. Bond of Indianapolis, Indiana, sales agent for Detroit electrics in that city, reports that C. E. Frank of Elkhart, Indiana, has an old Model 18 Detroit. This car has given cheerful satisfaction now these many years and Mr. Frank states he is willing to make affidavit that the car has done over 100,000 miles without overhauling. He told Mr. Bond that he had the bearings examined this spring to see if anything was needed and they were reported to have been in perfect condition and in need of no attention. Mr. Frank has another Detroit, a later model, and uses both cars extensively.

Electric Trucks vs. Gasoline Truck in Coal Delivery

By A. Jackson Marshall.

A particularly interesting comparison of the performance of an electric truck and two gasoline trucks was recently shown by a Boston coal company.

Three trucks were employed on a contract for coal to be delivered to the State House on Beacon Hill. The round trip from the loading platform was 3.7 miles, the conditions of loading and unloading were exactly the same, and the time constituted a full day's performance for each truck. The electric was a six-ton unit, while the gas trucks were five-ton and four and one-half-ton respectively. The five-ton gas truck delivered 49 tons of coal in 12 trips; the four and one-half-ton gas truck 40 tons in 13 trips, and the six-ton electric 80 tons in 13 trips. The actual running time of the electric truck was from 7:12 in the morning until 4:40 in the afternoon, with one-half hour out for lunch. It will be noticed from these figures that the electric was consistently overloaded, and that both gas trucks were underloaded. The battery of the electric truck was boosted once during this period.

It is interesting to note that the two gas trucks hauled practically the same amount of coal during the day that was hauled by one electric truck. That this was not a freak performance of the electric is evidenced by the fact that the next day the electric carried 12 loads of 78 tons and the following day 12 loads of 76 tons, making a total of 240 tons in three day's work.

This same electric a few days later on shorter hauls delivered 123½ tons of coal in 19 loads, leaving with the first load at 7:12 a.m. and finishing at the garage at 5:05 p.m., with about three-fourths of an hour rest at noon. The loading time was six minutes per load and the actual miles covered were 26½.

The company operating these trucks estimate that their per diem cost on the gasoline trucks is from 50 to 70 per cent greater than it is on an electric.

This performance of the electric truck in coal delivery substantiates the claim put forth in an article recently released by the Electric Vehicle Section, National Electric Light Association, "the electric truck for coal delivery is surely here to stay, and the progressive dealer who must today carefully consider delivery costs should avail himself of the most economic means of delivery—the electric."

A new service station and salesroom has been opened in St. Louis by the Detroit Electric Company of Missouri.
Ohio Launches Winter Campaign
Extensive Sales Expansion Planned

The Ohio Electric Car Company of Toledo is working overtime on its new cars, the first one of which the model 43 is shown herewith for the first time. It has a good many refinements, if such a thing is possible, which are not visible to the eye such as oil-less bearings and the like. The new body has a more pleasing contour than before the coach lines being smooth, continuous curves without any sharp breaks, which gives the car a more substantial appearance. The car however is very light as more aluminum has been used this year than before. The entire body including roofs and fenders is from hand hammered aluminum with sashless windows. The front window is disappearing while a concealed-lowering device is used for the rear one. Easily mechanically operated regulators for the front and door windows enable them to be raised to any height or lowered very easily. A clear vision wind and rain shield is also provided. The painting and upholstering is of the best and is selected to the customer's taste. An elaborate stock is to be had for selection.

The magnetic control and brake are, of course, continued. The tires are of a 34x4½ size of Goodrich Silver town Cord construction.

The equipment contains two side lights, two head lights, two interior lights, a volt ammeter and light, rear light, crystal flower vase, a toilet case, a smoking set, speedometer, license brackets and tool kit, which forms a most complete equipment.

Manager Barnard of the Chicago branch who golfs enthusiastically to keep himself in trim states with a chuckle, "Without a doubt we are going to surprise the public this coming year. With the quality cars and correct merchandising prices, we are prepared to start a drive that will set a record for the sales course." If that's the case the new Ohio manager will need all the golf training he can get. But Barnard is not worried—the Westward Ho Club has kept him fit, while he received his training at the old Selden factory and wound edge of local conditions and his earnest plugging and enthusiasm should result in Bogey for the course.

Shanghai Orders New Town Cars

Announcements of the new electric town car were sent by the company to their dealers in Shanghai, China, and in a very short time a cable was received asking for prices and delivery. This was immediately followed by an order, which is the second order received by this company within the past twelve months, both of which have been of very satisfactory proportions.

The many advantages of the electric are more widely appreciated now than ever before, and their popularity is bound to extend to all countries.
Little Used Batteries Demand Occasional Charging

Internal Discharge and Cold Weather Cut Down Capacity

WHERE electric pleasure cars are operated under conditions calling for a small daily mileage, the batteries must be handled in a somewhat different manner than in service where full mileage is used every day or two.

Many owners average only five to ten miles per day and if a battery is capable of giving eighty miles on one continuous run, these owners find it hard to understand why eighty miles are not obtained on a discharge extending over ten days to two weeks, and why it is harder to obtain full mileage in winter than in summer.

There are two factors which greatly affect the mileage of a battery. These are internal discharge and temperature.

Internal discharge goes on whether a battery is working or not. Although proceeding very slowly, it will ultimately cause even an idle battery to become completely discharged, unless it is compensated for by charging. Very generally speaking, internal discharge reduces the available mileage per charge by one mile per day. If full mileage is used every two or three days, the reduction in mileage, due to internal discharge, is negligible. On the other hand, if but little mileage is used per day and the battery is charged every ten days to two weeks, the reduction in the available miles, due to internal discharge, is large enough to be a considerable factor.

Cold weather also reduces the mileage of a battery. If the capacity of a moderately warm battery (70 to 100°) is eighty miles, the available capacity of the same battery at 32° Fahrenheit will be only about sixty miles. The loss is only temporary. It is a loss, not of actual capacity, but of available capacity. An increase of temperature to 70 to 100° Fahrenheit will automatically restore the battery to its full capacity.

The following is representative of what may happen in service; following a full charge a battery is moderately warm (70 to 100°). However, only twenty miles are used in the first three days. It is winter time and the car is kept on the street or in an unheated garage. The temperature of the battery gradually falls to the air temperature. Its available capacity is, therefore, reduced to sixty or sixty-five miles. The capacity is also reduced about one mile per day by internal discharge. After delivering the first twenty miles, the car averages one to five miles per day. Finally at the end of ten days fifty miles have been obtained. The battery now shows signs of being completely discharged. Our mileage tabulated becomes:

| Mileage actually obtained | 50 miles |
| Mileage lost by low temperature | 20 miles |
| Mileage lost by internal discharge | 10 miles |

Total 80 miles

The figures are only comparative and they will vary with the age of the battery, condition of the roads, and other factors. The principles, however, are correct.

How can these conditions be corrected? Maximum mileage will be obtained if the discharge is taken within two or three days after the previous charge. Should the discharge extend over a week, the available mileage will be somewhat less than the maximum. Therefore, under normal weather conditions, charge at least once a week if normal mileage is to be expected. When the weather is cold, it may be necessary to modify the above.

A battery when taken off charge is moderately warm (70 to 100°), as much internal heat is generated on the charge. If it is used at once, it keeps warm because some internal heat is generated even on discharge. Therefore, a battery used immediately following a charge does not have a chance to fall to the air temperature and the mileage is not much reduced. However, if a battery is kept idle over night in an unheated garage, it may cool down almost to air temperature. If forty miles have been used the first day, the battery will be one-half discharged and will be capable of delivering forty miles more at 85°F. If it cools down to 32°F, this remaining capacity is automatically reduced from forty miles to twenty miles. It is, therefore, desirable in winter to take some steps to insure that a battery is kept moderately warm. Heating the garage will help a great deal. In addition to this, in very severe weather, it is necessary to charge more often.

The charging serves two purposes. It keeps the plates charged so that available mileage is always high and by preventing a battery from becoming chilled it prevents the temporary loss of mileage which accompanies low temperature.

The frequent charging is not uneconomical of current when a battery is charged in a private garage—the current instead of being used a great deal at one time, as when charging every week or two, is used a little at a time, a number of times during this period, and the total current used over the period is the same.

It is not advisable to allow a battery which is more than two-thirds discharged to stand over night in that condition. It is more economical of current to charge as soon as possible after two-thirds of the capacity has been used, unless the remaining one-third is to be used at once.

It is not advisable to attempt to discharge a battery completely, unless the last third of the charge is to be taken out at one time. If an attempt is made to take out the last third over a period extending over several days, there is danger that the effect of internal discharge or low temperature will reduce the available mileage below the figure expected and that the car will run out of power on the road.

That water should be added occasionally is a necessity in order to compensate for the loss of water by evaporation and often enough to prevent the solution level from falling below the tops of the plates. It is only the portion of the plates covered by solution that gives electrical energy, and allowing the solution to fall below the tops of the plates reduces the mileage, besides injuring the plates themselves.

It is also important that overcharging should not be omitted. If a little used battery is given an over-
charge at low current rate every two weeks, the plates will be kept free of injurious sulphation. When the sulphation accompanying internal discharge is allowed to proceed without interruption for a month or more at a time it becomes very dense and hard to remove.

It is more economical of current to overcharge once every two weeks even when the car is used very little than it is to overcharge once a month, and it is much more economical to overcharge once a month than once every two or three months.

The following simple rules as to when to charge will serve to keep a little used battery in the best operating condition.

First. If a battery is not used at all, give it a good freshening charge at least once a month.

Second. If a battery is used with only a small daily mileage, charge once a week if full mileage per charge is desired, and even if a full mileage per charge is not insisted upon, charge at least once every two weeks.

Third. In winter, charge more often, so as to keep the battery moderately warm. This is to prevent undue reduction of the available capacity by low temperature.

James A. Skinner

Tulsa Oklahoma Parks Electrics

We are glad to announce that Tulsa has made a big stride forward for electric motor car progress when the Electric Vehicle & Battery Company, dealer in Detroit electrics reports that through the kindness of A. D. Walker, commissioner of streets and public property in Tulsa, Oklahoma, it was granted the exclusive use of the city market block at Archer and Boulder (just one block from the Convention hall) for the parking of electric vehicles only. R. M. Griffith, manager of the Electric Vehicle & Battery Company, will have several competent men in attendance, who will direct those who wish to avail themselves of this special parking privilege and to care for the cars left in their charge. This will make it extremely handy for all owners of electric cars, as the parking space at Convention hall is limited. This makes the theater-goers doubly happy for they need not worry about starting their cars when they go home and they do not need any chauffeur.

This parking system was patterned after that of the Chicago Electric Vehicle Association.

New 1917 Chicago Models on Display

The new 1917 Chicago electrics, now on exhibition for the first time at the Anderson Electric Car Company's Chicago salesrooms at 2416 Michigan avenue, are attracting many purchasers. A limited number of these fine models are being sold at factory cost and offer a splendid value for the money.

The warranty and service contracts that are being offered with the Chicago electrics are the same as given with the Detroit electrics.

The Chicago branch of the Anderson Electric Car Company can now offer the most complete selection of electric automobiles in the country. In addition to the splendid line of Chicago electrics, a stock of high grade rebuilt cars are carried which gives the purchasing public a choice of the very best for the money, regardless of the amount invested.
Economies in Industrial Establishments

By the Use of Motor Trucks

WITH the history of industrial development before us, in which the supreme effort of good management has been to reduce to a minimum the expenditure of muscular power in manufacturing and kindred operations, it is certainly logical that industrial establishments should be foremost in the employment of machinery for transportation operated by other means than animal or manual power. In such organizations mechanical transportation equipment can be regarded almost exactly in the same light as machine equipment for manufacturing and other purposes. With this attitude assumed on the part of industrial administrations, the whole matter of superseding the old horse equipment, or manually operated shop trucking, with motor driven apparatus, presents a new aspect.

Usually, in industrial operations, the cost of labor is the most important element in the cost of production of a given product or performance. The same principle is true in the performance of transportation service, and where horse equipment is employed continuously in the collection or delivery of merchandise over established routes, the cost of labor annually is fifty per cent of the total cost, and is equal to the capital investment employed in the equipment. Therefore, it is a fair assumption that, if the operatives engaged in rendering the service are supplied with mechanically operated equipment, the cost of this labor can be materially reduced by securing a greater performance per unit of labor engaged, and, consequently, it should gain instant adoption wherever its utility can thus be made manifest.

*In the Engineering Magazine.

The vital element in most of the problems in which the industrial executive is interested is the greatest accomplishment or performance per man per day in the operations in which he may be engaged. The economy of transportation should then be viewed in terms of the man-day cost rather than by the customary units, such as the cost per ton, per ton mile, per package, or per piece. These latter may be regarded as the resultant effects of which the former (the man-day cost) is one of the principal causes, so to speak. Consequently, the executive should commence the general introspection of his existing situation by acquainting himself with his present man-day cost for comparison with any improved method of operation which he may be able to develop with the use of motor vehicles.

To arrive accurately at the daily cost of operating each unit of transportation equipment employed, it is necessary to prepare an analytical statement of the investment in the equipment with its attendant accessories; and a statement of annual operating expense, which will be representative of the cost from year to year, providing for the perpetuation of the equipment as well as for the capital charges on the money which the owner has invested and upon which he might otherwise secure the current rate of interest. If the total of the annual operating expense thus developed is prorated against each operating unit of the equipment, the daily cost of each wagon or truck in the service becomes the most convenient term in which to view its value and to determine the ultimate cost of each unit.
of service which the device performs per day. In this manner, the cost per ton transported, or any other measure of the service, becomes apparent if the equipment is employed in transporting any volume of material. If, however, the work done is of a miscellaneous character, or the equipment only intermittently employed, the daily cost of the service per wagon, per truck, or per man employed is convenient evidence with which to measure the value of the service or make comparison in any proposed improvements.

Most industrial executives look upon the employment of transportation equipment within their establishments, or in the streets in connection with their business, as a necessary expense, or an evil from which they can derive no direct return. As a matter of good management, the employment of a transportation equipment should be regarded in the same light as the employment of machine equipment for production, or any other part of the total equipment employed in the conduct of the business, with adequate charges made against the purchaser of the product or the user of the service rendered. Without proper bookkeeping, or some occasional analysis of transportation cost, as indicated above, no intelligent effort is ever made to collect from the customer or the beneficiary of the transportation service rendered, an adequate return in cash to the organization owning the equipment as constituting a factor of the price to the consumer of the article made and delivered.

If the cost of the transportation service is determined by means of an abstract statement, and this cost pro-rated against the articles delivered, the owner or operator of the transportation equipment will receive payment into his organization for everything relating to the upkeep or maintenance, the fixed charges and operation cost of his equipment; so that this department of his business establishment can be regarded as a self-sustaining one instead of an unfortunate expense without return. He will then be in a position, at any time, to determine the present worth of his equipment as the difference between what he originally paid for it and the fund, or charges, which he has accumulated and collected from his customer to provide for the depreciation of his equipment in the interval of its employment.

If these bookkeeping practices were current in industrial and other establishments, there would be much more readiness on the part of the owners to take immediate advantage of the superior economic value of the motor truck; but under existing conditions, the owner of a horse equipment usually looks upon its sale at its present worth as a decided loss in comparison with what he originally paid for it. As a matter of fact, if his bookkeeping has been properly conducted, the value of his investment in the transportation equipment has not changed, but is represented by the two factors of its present worth and the amount of its depreciation already received from those to whom he has rendered its service.

In superseding horse equipment with motor vehicle equipment, an increased investment is usually necessary, and this increase may be 60 to 90 per cent of the value of the horse equipment. Where the service will permit the employment of the superior ability of the motor truck in performing service, the amount of saving to be made in the reduction of the total cost of the service is such as to wipe out the increased investment within a period of two years. The saving usually accomplished is a reduction of 15 to 40 per cent of the horse cost, depending upon the extent to which the working capacity of the machine equipment can be employed.

Getting back to performance considerations in detail, we find, as a general rule, the driver of a horse wagon, or the operator of a hand truck, is not utilized in an efficient way as compared with other industrial operatives. They are either compelled to loiter by force of circumstances, or else to labor in loading and unloading the vehicles in the crudest fashion conceivable. When we compare these methods with those of industrial operations generally, the contrast should make us recognize how archaic are both the methods and the devices employed.

The hand truck was probably given to us by the Egyptians, and the horse truck by the Romans, with very little improvement made in either apparatus down to the present day. That we should still continue to use them side by side with modern automatic machinery, and to depend so much in their employment upon the attendant crude force necessary, seems a relic of barbarism. The real reason for this is the lack of executive attention to the ways and means by which this class of labor operation could be improved, or could be supplied with such devices and auxiliary utilities as would bring its performance to a par with the economics of modern industrial operations. It is evident that there has been a latent disregard in the executive mind for what it considers an inferior field of endeavor. In fact, trucking operations and stable equipment generally have been regarded in the past with unwarranted contempt by most business organizations, industrial, mercantile or otherwise. This attitude is the real cause for their present existence in a condition of economic neglect.

It must be evident that the tools with which a man is equipped for the service he is to render determines the quantity and quality of his performance. If these tools are supplemented with auxiliary attachments or devices which contribute to the facility with which their fundamental operations may be executed, the daily performance of the operator is usually developed to the maximum of service which the external or surrounding circumstances will permit. This is accomplished without imposing upon the operator any increase of exertion beyond his normal ability; and frequently the exertion of the operator is materially decreased below that formerly required, thus leaving him free to pre-arrange for the performance of his work to the best possible advantage.

This has been the history of development in industrial machine tool equipment, and it is as applicable with the same promise of economic success to the employment of motor vehicle equipment.

The most efficient application of motor trucks, either within or external to industrial establishments, is where the machine can be continuously employed in a transfer service. This requires that delays at both the receiving and delivery ends of the operation shall be eliminated. The principal method for accomplishing this is the provision of auxiliary devices which will permit of the load being prepared in advance and placed mechanically in the machine at the receiving end; and unloaded similarly at the delivery end. Many devices are used for this purpose, and their nature depends upon whether each load can be handled in one bulk package or must be made up in two or more such
packages. When one package is possible, a flat platform about the size of the motor truck platform is used, with removable stakes placed in metal sockets around the sides and ends to retain the load; or the same security may be effected by means of removable side and end racks or slatted frames. The platform itself should be equipped with small counter-sunk caster wheels or other rolling devices, so that it can be moved about the factory floor or freight platform, as well as into and off the motor truck. A power or manually operated winch on the motor truck furnishes convenient means for transferring the load containers to and from the factory and freight house platforms.

Frequently the complete load containing device is suspended from an overhead rail transfer system, so that it can be readily moved between loading points throughout the factory or yard, and on to and off the motor truck. These load containing platforms should be as free as possible from protruding fixtures, so that when empty, or not in use, they can be placed on end vertically, and numbers of them can be stacked together without taking up much room at the railroad freight house or factory shipping department.

There are in employment numerous special cage devices adapted to the peculiarity of the load and the surrounding conditions where the load is collected and delivered. In industrial and mercantile establishments such cages are usually transferred upon low hand trucks, and may be taken from one place to another while collecting the load and transferred as a complete unit to the motor vehicle for re-transfer at the receiving or distributing end. Occasionally, such cages are loaded upon trailers to be drawn by the motor truck, and their entire value can be measured in the time saving which they effect in both the use of the motor truck and the repeated rehandlings at loading platforms which would otherwise be necessary.

When the load cannot be handled in a single unit, it is becoming common practice to have two or more flat platform trucks with full wheels which can be loaded and rolled into the motor truck, and conveniently rolled off on railroad platforms, into freight cars, or into other factories without any attendant mechanical device. Even the common high wheel railway platform truck can be used with time-saving advantage wherever freight is handled from such high trucks at railroad sidings or wagon tracks.

When it is desirable to make use of the motor truck to its greatest advantage in such industrial establishments as do not require its employment continuously in freight transfer service, auxiliary bodies can be employed for placement upon the truck platform by mechanical means which thus extend the range of their utility. There are many cases where the same truck at certain times in the day will be used in freight transfer work, and at other times will haul coal or ashes, or carry tanks of liquids or chemicals, or remove scrap and by-products wherever such requirements exist. Motor trucks are also used effectively to shift or locate rail freight cars, and in this way increase the activity of car loading and unloading at factory freight houses.

Where the motor truck is constantly employed in some particular operation, it has become customary to equip the machine with overhead rail transfer devices for handling the load. Jib-crane and hoisting derricks are sometimes mounted on trucks for the lifting of heavy loads alongside the track between the ground and the machine platform. Frequently, in such service, the machine takes the form of a tractor with the derrick mounted upon itself and operated by its own power, but transferring the load to and from a trailer or semi-trailer in the rear. There are some instances where it is desirable to have the truck in the form of a tractor, and to use a number of trailers which may be loaded and unloaded at the factory or railway freight house, and leave the tractor free for continuous employment in transfer operations.

The introduction of motor trucks and the desire to employ them efficiently has developed a number of outside devices for the loading and unloading of bulk material with the purpose of reducing the standing time of the motor vehicle. For instance, in handling coal from a distant siding there are containers which can be hooked on to the side of the coal car and filled in the absence of the truck. The coal is later dumped from these containers into the motor truck, requiring but a few moments of its time for the operation. In handling sand and similar materials from piles upon the ground to the motor truck, there are loading machines having bucket and chain equipment by which the motor truck may be loaded in the minimum time possible.

In order to indicate, in a general way, the cost of operating motor vehicles over various distances as accurately or as completely as such a general presentation will admit of, the attached diagrammatic illustration of the daily cost of operation, compiled from reliable information, is presented.
In determining the operating cost of a motor truck for each day’s service, it will be readily seen that the more the machine can be made to do in the working day, the less will be the cost of each particular function performed.

If the machine is in operation for only a portion of the day, or its running time is decreased due to the idle time required for loading and unloading, each function of the service performed must bear a higher proportion of the fixed and other inactive charges, which are not direct expense, due to the truck movement, as well as the operator’s wages for the time he is engaged. On the other hand, it should be recognized that even where the motor vehicles can be employed for only a small portion of the day, it may be more economical to employ them than horse vehicles. This will be apparent on consideration of the fact that when the machine ceases to operate, if the driver can be employed elsewhere, the active charges for service, being in direct proportion to the work performed, stop; and the inactive or indirect charges will not be significant, particularly when allowance is made for the longer life of the machine in proportion to its inactivity. When horse vehicles are employed, the direct charges are almost constant, except that the driver may be employed during idle intervals at other work; but whether horses work or not they must be fed, stabled, and cared for, and, therefore, the cost of their performance of limited work may be higher than that of the motor truck. The items to be weighed in such a consideration are whether the fixed and other such charges upon the machine will counterbalance, or be less than the constantly active charges to be made against horse vehicle equipment whether it is idle or in use.

Varying impressions prevail in the minds of executives as to whether the motor vehicle can be economically employed to supersede horse equipment when the idle period of the equipment is a large factor of the working day, but information can be developed by proper analysis of each case which will determine the advantage on either side with fair accuracy. Of course, it is recognized that it is unwise to make investment in motor vehicle equipment capable of transporting its full load capacity over a great distance, and to apply it to such work as demands only a small proportion of such maximum service; but the time is coming when motor truck equipment will be designed with direct reference to such limited performance as is now made or required by horse vehicle equipment, with consequent reduction in its first cost and operating expense. For instance, a five-ton truck, if designed to run at horse vehicle speed and perform no greater service than the latter can accomplish under present conditions, could be made and sold at a price not far from the cost of horse equipment, and would give all the advantage in low operating cost, due to that cost being more directly proportional to the work done, than can exist with horse equipment. At the present time it would be difficult to market such apparatus, for the public mind is accustomed to judge the value of the motor vehicle in terms of its maximum performance; and it will require the trained mind of the industrial executive to realize the value of such minor motor truck equipment, and to create a demand for it to supersede, with economy, the horse vehicle equipment which he is now compelled wastefully to employ.

It should be borne in mind, in judging the utility or economy of motor vehicles, that there are several angles from which a comparison with former methods can be viewed. The motor vehicle may have twice the speed of the older equipment. It may, therefore, be twice as valuable. If it is capable of transporting twice the load in the same running time, it is likewise twice as valuable as the older method. If these two features are combined and the machine can carry twice the load in half the time, it is four times as valuable. Furthermore, there are many cases where the improved character of service rendered by the motor vehicle cannot be measured in terms of actual cost, such as the quick transportation of perishable goods, or the value of the machine in being able to connect the factory up with quicker train and steamboat schedules, or where the machine may be employed to supersede the service formerly rendered by rail transportation between neighboring towns or even over considerable distances.

The surprising impediment to the more general application of motor truck equipment with the economic advantage which would be coincident with its employment is the dilatory attitude of those who should be responsible for promoting minor improvement in large industrial institutions. The market certainly exists for vast quantities of motor truck equipment which will, with a lapse of time, supersede nearly all existing modes of transportation in city and industrial service. On the other side, there are organizations in successful existence equipped and prepared to supply quantities of motor trucks in all the varied form which their diversified application demands. The link in the chain
is the interchange of information and experience on the side of both the producer and the consumer; and just as soon as the attitude of the prospective consumer will change from its present indifference to one of solicitous activity, the situation will materially change. A very gradual transformation is already under way, and is being forced as fast as the producer alone can surmount the difficult of educating those who only casually listen to his importunity; but with the incentive of interest on the part of the real beneficiary as a flux, a revolutionary improvement would be effected within a short period.

Witness for example the railroad organization which is looked upon as the representative of transportation genius and the accomplishments of which are regarded as one of the marvels of our present age.

The operation of its train schedules, both passenger and freight, has the best talent concentrated upon them that the organization can afford. Its operating equipment (or its machinery, so to speak) equally receives the best ability that its administration can give. Its finance and its dealings with the public generally occupy its supreme council. When, however, we examine its freight house operation we find it entirely forsaken by the genius which is prevalent everywhere else.

The building itself is usually a one-story structure of the cheapest and flimsiest kind; without the least vestige of mechanical equipment for labor saving. The Egyptian hand truck and muscular energy are the sole motive power. Yet, nearly all of the railroad tonnage of the country (with the exception of bulk earth products such as ore, coal, grain, and oil) must be handled four times (to and from the shed at both ends) in this crude and expensive manner.

True, remarkably efficient machinery has been devised and applied for the expeditious handling of ore, coal, grain, and oil, but these have usually originated outside of the railroad organization. Their existence and universal employment, however, indicates the accomplishments possible when competent ability is applied to the solution of freight handling.

If, instead of shirking the freight house problems and delegating the difficulties of their operation to minor staff executives, the administration should concentrate its engineering and executive resources upon this branch of its organization, startling developments would soon be evolved, with a consequent reduction of a considerable part of its operating expense, greater utility of the freight car equipment, reduction of yard trackage, and such other obvious advantages as must sooner or later demand and enforce change in the present inactivity or apathy.

The modern freight house, instead of being the neglected dumping ground which it is at present, should be a brilliant example of the utility of the remarkable machine equipment or power-operated me-

Electrical devices, which are abundantly available and efficiently applied elsewhere in the industrial world, to supersede expensive manual labor or sluggish animal power.

This implies improvement not only in the freight house itself, but also in the equipment used on both the rail side and the road side of it. Freight cars should be something more than hollow receptacles, if their expeditions loading and unloading is to be effected. The horse vehicle should certainly be superseded with the motor truck, and these should be equipped with removable freight carriers to permit loading and unloading of the material transferred without congesting the sidings by compelling the trucks to stand inactive during the loading and unloading process.

Such practices in the application of motor trucks are in effective employment elsewhere, and there is no reason why a motor truck arriving at the freight shed should not have its complete load taken off in one operation by an overhead crane and hoisted to the second, third, or fourth story of a new type of freight house for distribution later by the freight house crew; the reverse operation to be performed in the transfer of the incoming freight to the truck.

It requires little stretch of imagination to recognize how many of the practices in use in handling freight to and from steamships with hoisting and transferring devices could be effectively applied to freight house operations, substituting for the temporary rigging of the ingenious sailor the more stable and better developed equipment of the trained engineer.

The aggregate idle time of the freight hauling equipment, and the enormous aggregate cost of crude muscular power in railway freight terminals, should have sufficient incentive in its money saving possibilities to induce railroad organizations to awake to economic activity in this end of their operations.

The freight house is practically the gateway to the commerce of the railroad. It is at present a narrow-necked orifice through which the flow of freight is

The Buda Industrial Truck, Type "A," Hauling Material. It Steers on Both Sets of Wheels and Has a Capacity of 4000-Pound Load. It Uses 16 Cells Edison Battery.
Electrification, once made, is rarely unmade. Inefficiency is the incidental cause of increased investment in freight car equipment, trackage, and terminal real estate. It is the barnacle which not only impedes the railroads’ own progress, but it throttles the activity of the entire industrial world dependent upon railroads for the transportation of its raw material or finished product.

To the engineer, concerned with industrial economics, broad enough to view the possibilities of a problem unshackled from its traditional or inherited encumbrances, the railroad freight house presents a sorry spectacle.

Its existence at the threshold of a type of organization in which the genius of transportation is expected to find its highest expression is a paradox. The condition seems aggravated by the existence on every side of the ways and means of relief in the availability of power-operated handling and transferring devices. Conspicuous examples throughout other branches of the industrial world illustrate convincingly their value in utility and economy. The motor truck and the employment of its numerous auxiliary devices for load handling proves positively that the congestion at the roadway side of the freight house, could be relieved.

True, new methods must be instituted. The shippers must be induced, if not compelled by the resultant economy, to co-operate. Freight car equipment must be improved, gradually, perhaps, at first, but with the same compelling force of the money to be saved. The change would be eventually accomplished, if once started.

There are few opportunities in the industrial world to effect a reduction in the cost of transportation equal to that afforded at the freight house. This is a matter of prime importance, not only to the railroad itself as affecting its management and economy, but, fundamentally, as it concerns the shipper, the merchant, and the public at large. The present congestion and time loss surrounding its operation is a serious impediment to the movement in motor trucks by those who have freight transportation to or from railroads, and no external solution is likely to come to the railroads—the initiative must originate with them, and the reward in view to all concerned should force their action as a necessity.

From the foregoing it should be readily appreciated that the industrial world, at least in many of its branches, has been slow to take advantage of the economy which the motor truck can effect in its minor operations; and that, hence, the motor vehicle industry has not to depend for its sustenance to date largely upon the patronage with which it has been favored by the mercantile world. This may be due to the fact that in the mercantile field the responsible executive is more keenly appreciative of the difference between the cost and the selling price from the competition which he constantly encounters and the frequent repetition of his undertakings in the conduct of business. In contrast with these, the industrial executive is concerned with perhaps larger and more tedious undertakings which do not so frequently recur. Hence, he is not so keen to take advantage of minor operating economy which is enforced upon the merchant.

There is, of course, another vital consideration in the fact that mercantile institutions, and particularly those engaged in retail trade, are compelled to employ large transportation equipment, and this affords them a field for better realization in the volume of economy which they can accomplish when large numbers of horse vehicles are superseded. In making such fleet installations as the modern department store calls for, or as is required in the wholesale and retail delivery of food products to small dealers and final consumers, the superior advantage of the motor vehicle and its lower cost of operation as compared with the equipment formerly employed, as well as the influence which such fleets exert upon enlarging the territorial scope of mercantile operations, has made the value of the machine appreciated and well known in definite terms.

**Kansas City Reports Good Business**

According to Hood, the Kansas City dealers have awakened to the fact that the Milburn electric is especially suited for Kansas City service, which, because of the hilly and rolling conditions of the streets and highways, has long been undesirable territory for the sales of electric vehicles. Dealers are competing against each other for the privilege of representing the Toledo concern in that district.

"The growing popularity of the Milburn car in the Kansas City territory is due entirely to actual demonstrations," Hood told the officers of the company. "Without any special tuning-up or extra equipment, I took my Milburn electric fresh from the factory and drove it 2,000 miles up and down those Kansas City hills at an average of from 65 to 70 miles on a charge. I made no effort to avoid the bad hills, but took them as they came on practically every street in the city, and when I finished the 2,000-mile run I made 67.2 miles on the last charge."
The Case of Measured Service Against Flat Rate

A Study in Garage Service Condition

BY GAIL REED

By the passing of another year, discussions on the relative merits of measured service and flat rate service will be unnecessary, for the garage business is turning to the only practicable basis, measured rate. Those who do not turn to the measured service of their own accord, due to their desire for better and more profitable business, will be forced to do so by competition. They will have the choice of bankruptcy or elimination for various reasons. They will be unable to make the flat rate basis high enough to cover all cases for if they did, they would drive away at least one-half of their trade. In the next place, owners of cars today are waking up to the unfairness of the flat rate basis and are showing a preference for those operated on the “pay for what you get” plan.

It is perfectly natural to assume that the hard user will stick for a flat rate as long as possible, and this means that the flat rate garages will have only the most expensive customers left and by this is meant expensive to the garage, which will spell ruin. A flat rate on anything that is consumed in irregular quantities, is fundamentally wrong. A high enough flat rate can never be established to make such a basis profitable. In the first place competition would not permit and in the second place, its unfairness to the majority of car owners would drive the trade away.

Some garage men may ask “why is more stress today being laid on the matter of measured service relative to flat rate than before?” Fundamentally there is no more reason for such a service than there was five years ago for the theory of flat rate basis was wrong at that time and remains wrong but today there is a specific reason which compels greater attention to this subject, that of “rising costs.” It has been found impossible for garages operating on a flat rate to raise the rates higher. For that reason every garage operated today on the same rates they operated a year ago, is not showing the same income.

The discussion of measured service against flat rate is frequently answered by the garage in this way—“We are not losing money—our business is showing a profit on the flat rate.”

Grant the truth of this statement in many cases, on the other hand many garages are having a hard time making a decent showing on a flat rate.

Let’s give the matter the benefit of the doubt, and grant that all garages on a flat rate are operated at a profit. Does that prove that these same garages do not want to increase their profit? Will any same business man say that he is adverse to increasing his income? Far from it—every business no matter how small nor how large, is on the alert to increasing its business. The business man who sits tight with the policy of “let well enough alone,” soon wakes up to the fact that the energetic fellow around the corner is getting ahead of him.

The discussion which follows applies to all garages, whether operated for gasoline or electric cars and the basic arguments hold good in either case. The electric garage is used in all the examples due to the writer’s greater familiarity with them and their problems. All garages whether gasoline or electric, must give serious consideration today to meeting the problem of rising costs which necessitates first of all, building up the income from their business. There are numerous points brought up in this discussion applicable only to electric garages. There are plenty left, however, for consideration of the gasoline garage operator.

The electric garage men—and this applies to gasoline operators as well—have made it clear that they are desirous of increasing their business—the prime object of this increase being more profit. Please get the distinction. Then why is it that measured service, which means in plain English “pay for what you get” is side-stepped and spoken of as something to be kept far away from? It is a direct step toward more profits. If a garage is paying on a flat rate it is a positive certainty that it will pay better on a measured basis. Every garage man knows that there are a certain number of his accounts that do not show a profit—he is getting enough out of the easy runners to make up for them or his books would show a loss. If every car in his place was showing a profit, as they would have to on measured service, his showing would be just that much better.

What commodity is sold today on a flat rate? Will the coal dealer keep your bin full at a flat rate? Will the gasoline garage keep a car’s tank filled at so much a month? How do you buy your electricity or gas? And what is the answer?—Sound business is not conducted today on such a basis. Because garages were operated on a flat rate basis ten years ago is no argument for today.

Costs in every line of endeavor are higher today than ever and the business that does not keep up with rising costs can not last. It is costing you more to operate your garage today than a year ago. It is costing you more to live today than a year ago. What are you doing to keep up with these rising costs?

Every garage man is no doubt familiar with the fact that his entire service is costing him more today than a year ago. Has he figured how much more? Does he realize that every man in the United States who buttons a white collar around his neck can figure that it is costing him twenty percent more today to wear that article of neatness than it did a year ago? Not only that, but it is costing twenty percent more to keep that collar laundered today. Figures carefully compiled recently, show that this increase has gone right along the line whether they be the luxuries or the necessities of life. Foods, wearing apparel and other material have jumped in cost varying from an increase of twenty per cent up to two and three times the price of the articles a year ago.

With these facts before them, the garage men who desire to retain a profitable and successful business will find it imperative to take the steps that all other constructive business men are taking today. Learn their costs—cut out every penny of unnecessary expense and for every item of merchandise or service, obtain their full and legitimate profit. They must realize that the rules of good sound business apply to them as much as to any other line and one of the first steps they can take to meet rising costs and place their business on the proper basis is by making every customer pay a profit on every thing he gets. In other words, adopt measured service throughout every department.

Guess work, rule of thumb and haphazard methods must go, or the business will stagnate and fail.

Garages operated on the flat rate basis have caused
This is the $1775 Detroit Electric

You will find it the greatest enclosed car value on the market, at less than $2,000.

Built in the great Detroit Electric plant by an organization of skilled mechanics who have specialized on enclosed cars for ten years, it embodies the most modern features and refinements known to motor car construction.

It is a car worthy to the last detail of bearing the name Detroit Electric.

This model 68, at $1,775, in every feature, every refinement, every detail is typical Detroit Electric in quality and workmanship.

Its quickly and conveniently adjustable windows all around have a two-fold advantage.

1st.—The clear vision on all sides that they afford makes motoring far safer and easier.

2nd.—Lowered, they provide perfect ventilation and open car coolness. Raised, they surround you with all the luxury and privacy the costly limousine.
December, 1916.

ELECTRIC VEHICLES

Detroit Electric

Note these fine car features

MILEAGE—80 to 90 miles per charge.

SPEED—5 to 24 miles per hour.

BATTERY—42 cells, 13 plate, standard Detroit Electric battery guaranteed.


TIRES—Goodrich Silvertown cord pneumatic type, safety tread rear. Size 33 x 4½ inches.

WHEELBASE—100-inch wheelbase. Tread, standard 56 inches.

WHEELS—Houk wire.

The big 42 cell, 13 plate, batteries have been lined and developed until they get from 80 to 90 miles on a single charge. This is far more than you will ever use in an ordinary day's motoring.

There's plenty of power for steep hills and heavy going through mud and drifted snow. Three people find ample space on the wide rear seat, and the restful, revolving chair in the front right corner provides for a fourth passenger. Also an upholstered package box placed in the left front corner and may be used as a seat.

Big tires—Goodrich Silvertown cord—33 in. x 4½ in.; deep upholstery; 100 in. wheel base; and long, resilient springs unite to insure you smooth travel over every kind of road. An uncommonly fine quality of exclusive whipcord is employed in the upholstery, which is of the Turkish type. All cushions are of genuine curled hair.

Equipment details include two head lamps, dome light, shedding a soft lustre throughout the car, tail lamp, Klaxette horn, meter, hub odometer, Houk wire wheels, and a very complete equipment of tools.

ANDERSON ELECTRIC CAR COMPANY, DETROIT
Detroit Electric

This is the $1775 Detroit Electric

You will find it the greatest enclosed car value on the market, at less than $2,000.

Built in the great Detroit Electric plant by an organization of skilled mechanics who have specialized on enclosed cars for ten years, it embodies the most modern features and refinements known to motor car construction.

It is a car worthy to the last detail of bearing the name Detroit Electric.

This model 68, at $1,775, in every feature, every refinement, every detail is typically Detroit Electric in quality and workmanship.

Its quickly and conveniently adjustable windows all around have a two-fold advantage:

1st.—The clear vision on all sides that they afford makes motoring far safer and easier.

2nd.—Lowered, they provide perfect ventilation and open car coolness. Raised, they surround you with all the luxury and privacy of the costly limousine.

Detroit Electric

Note these fine car features

MILEAGE—80 to 90 miles per charge.

SPEED—5 to 24 miles per hour.

BATTERY—42 cells, 13 plate, standard Detroit Electric battery guaranteed.


TIRES—Goodrich Silvertown cord pneumatic type, safety tread rear. Size 33 x 4 1/2 inches.

WHEELBASE—100-inch wheelbase. Tread, standard 56 inches.

WHEELS—Houk wire.

The big 42 cell, 13 plate, batteries have been refined and developed until they get from 80 to 90 miles on a single charge. This is far more than you will ever use in an ordinary day’s motoring.

There’s plenty of power for steep hills and heavy going through mud and drifted snow.

Three people find ample space on the wide rear seat, and the restful, revolving chair in the front right corner provides for a fourth passenger. Also an upholstered package box is placed in the left front corner and may be used as a seat.

Big tires—Goodrich Silvertown cord—33 in. x 4 1/2 in.; deep upholstery; 100 in. wheel base; and long, resilient springs unite to insure you smooth travel over every kind of road. An uncommonly fine quality of exclusive whipcord is employed in the upholstery, which is of the Turkish type. All cushions are of genuine curled hair.

Equipment details include two head lamps, dome light, shedding a soft lustre throughout the car, tall lamp, Klaxette horn, meter, hub odometer, Houk wire wheels, and a very complete equipment of tools.

ANDERSON ELECTRIC CAR COMPANY, DETROIT
the owners of cars to acquire a very bad habit, that of wanting service and supplies for nothing. The flat rate basis gives them a long list of attentions and service, all covered in a lump sum. When legitimate charges come up not covered by this lump sum, it is invariably the case of these customers to strenuously object for they have the habit of expecting everything thrown in freely with the flat rate basis.

A garage man is selling service just as the dry goods merchant is disposing of his wares. The dry goods merchant however has a profitable price set upon every item he sells. The garage man on a flat rate merely guesses that he is getting a profit and if his costs were analyzed, he would have no doubt find that much of his service it given without profit. When measured service is mentioned among garage men, many take it for granted that such a service applies only to the gasoline or electricity furnished. Most electric garage men consider that measured service means charging for electricity by the kilo-watt-hour.

Measured service does not apply alone to electricity but to every item included in the garaging of a car. For example, under the flat rate the customer can have his car washed every night—he undoubtedly leaves a standing order to that effect. That means to a garage serving 50 cars—50 washes per night. It is generally conceded that a wash is-worth at least $1.25 a piece—at that rate each customer gets $37.50 worth of washing alone per month. The garage thus gives an average of 1,500 washes per month valued at $1,875.00.

On measured service, a customer knows it costs him $1.25 per wash or whatever the rate may be—instead of a wash every night, he orders this done only when necessary and it is found the average drops to two and three washes per week. Still using 50 cars as a basis on which to figure, we find the garage giving approximately 600 washes per month instead of 1,500 under measured service. The garage can cover its entire washing with less than one-half the help—and the cost of sponges, chamois, soap and water is cut accordingly. Instead of a loss, which according to these figures is undoubtedly realized on the flat basis, the garage immediately cuts fifty per cent of its expenses on this one item alone and for every wash obtains a full profit.

Some may argue that washing all their cars every night is not done at a loss but looking at it in the proper manner, it is clear that it is a loss for it is admitted that a wash is worth $1.25 and many garages will not give one for less than $1.50. The garage quoted gives 1,500 washes or an equivalent of $1,875.00 worth of service and what is received for that service? The amount represented in washing alone exceeds the gross income of that garage on a flat rate. In addition to $1,875.00 worth of washing, and overhead expenses there must be given all the other service items including deliveries, space, current, metal polishing and oiling. Using this basis of comparison, how can a garage operated on such a basis figure it is making money? At the flat rate basis of $35.00 per month per car, 50 cars gives an average gross income of $1,750.00.

Each garage owner should ask himself—"Is advantage being taken of every opportunity for income?" Some will answer this argument by stating that this is no way to look at the subject, but those who make such a statement are avoiding the issue. It is exactly this light that should be turned upon such an argument, for service is being given away on the flat rate basis and the money commensurate with that service is not being returned.

When service or a commodity having a known value is wilfully wasted or given without a commensurate return, some one is losing. In the case of flat rates evidently the car user is not the loser for he is getting the service. The only party to this plan that is losing is the garage man.

The flat rate garage comes closer to customers along; the following lines—adopting measured service would tend to drive away a good many of their hard users provided these users could find a flat rate garage in the neighborhood. They claim that there would be little profit in such items as washing cars if this was cut to only two or three washes a week. In the case of electric garages, they state the cost of installing meters would be prohibitive. In order to graphically answer these arguments, we will take the same garage mentioned above as an example. This is an electric garage of average equipment containing fifty five customers, charging the customer a flat rate of $35.00 per month, which covers a wash every night, including polishing of trimming, cleaning of windows, upholstery, carpet, minor oiling and adjustments, deliveries to and from the customers' homes and all the electricity the customer desires. The figures and rates used here are taken from the average of the rates used by the best measured rate garage. To say the least, the measured rates given here are not excessive. They are accurate enough, however, to illustrate the arguments. Income on fifty cars on measured basis is obtained as follows:

- Washing, allowing an average of 3 washes per week per car which includes polishing of all trimmings $1.25 per wash or an average of a month per car of $35.00
- Storage, including the cleaning of windows and upholstery, curtains and carpets per month per car........ 12.50
- Oiling and minor adjustments, alignments of wheels, flushing of batteries, which does not include packing of bearings or rear axle, per car per month.......... 3.00
- Amount of electricity based on $0.00 miles per year at 9.00 per kilowatt-hour, average per month per car........ 9.00
- Deliveries based on two per day at $0.13 a delivery, average per month per car........ 7.00

Using the above notes as a basis, we get the following:

- Cost measured basis for fifty cars the following income per month:
  - Washington average car........... $15.00  
  - Storage ............ 12.50  
  - Oiling and minor adjustments ......... 7.00  
  - Carper average per car............. 9.00  

Total income .......... $32.50  
Income from same number of cars on flat rate $35.00 per month, $1,750.00. Difference in income on same number of cars $575.00. Under these conditions, the garage man who fears to adopt measured service on the argument that he will lose a number of his customers, is shown that the garage could lose nearly one-third of its customers on the measured basis and still obtain the same gross income as under the flat rate. His net income with the loss of one-third of his customers, would be better than that shown under the flat rate on account of the reduction in operating costs under measured service. Therefore, no fear should be shown in regard to the loss of customers from adopting the measured service. Its hard users would hunt up the closest flat rate man and he would be compelled to carry the additional burden and its consequent loss.

Regarding the other argument against measured service, that of the cost of installing meters, it would appear that the increase in income possible under measured service, would cover this item in so short a time, that it would need very little consideration. In the case of electric cars, most central stations will rent the necessary
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meters at a very nominal sum, which rent can be applied as principal against the cost of the meter.

The increased income under the measured rate does not cover the whole story for the cost of giving the measured service will be considerably lower as was indicated by the example given above on the washing of cars. Under the flat rate the garage has to be prepared to give two or three times as many washings alone which necessitates a proportionately larger force of men. In the case of deliveries, a larger force of drivers must be kept on hand at all times to cover the greater number of deliveries, many of which are unnecessary.

On the measured basis, as each delivery is charged for separately, all unnecessary trips will be eliminated. Consequently after put in operation, less money will be spent by the garage on hire for drivers. The saving in hired help is representative of the cut in operating costs that can be made all the way down the line. For example, an electric garage will find its customers will order their cars charged only when necessary, instead of charging every night—this will save wear on rheostats and charging equipment. Furthermore, in the case of an electric garage, the customer will keep his car and batteries in better running condition by having renewals made promptly. If he does not, his battery will use two or three times the amount of current under normal conditions and as he must pay for all he uses, he will prefer to keep the battery in efficient condition.

Good business is based on fairness. It depends on fairness. Business, large or small, on any other basis, is not good business for it cannot undergo healthy development and even though it should, through clever management, gain development—it cannot live. It is doomed to fail sooner or later. A business must be fair to the customer and fair to itself. Equitable dealings get customers and keep them. The truth of these statements is not questioned by any merchant—and we all are merchants of something. Therefore we must view such matters from the merchants' standpoint.

Granting this truth, let us apply our promise to the subject in hand—measured service versus flat rate from the car-owner's standpoint. "A" runs his car 10,000 miles a month. "B" runs his 5,000 miles a month. "B" must pay as high for his service as "A" but uses his car only half as much. In other words, obtains but half the service. "A" takes his car out every morning and uses it until late every night. "B" takes his car from the garage three or four times a week and his expense to the garage for this service is probably only one-half of that of "A." In spite of this, however, "B" is compelled to pay as much as "A." These two people are neighbors and compare the use of their cars. "A" feels he is getting his money's worth. "B" feels he is being held up. If for the price that "A" is paying is just, then the price that "B" is paying is unjust. If the price that "B" pays is just then the price that "A" pays is wrong. Both cannot be right. What is the solution? Only one answer—each should pay for what he gets and not one bit more.

In setting the flat rate, if the minimum were used, no garage or business house would feel safe, therefore the rate is generally set high enough to cover maximum service. It is true that at least one-half of the motor cars garaged today are not used alike. There are the light runners and the heavy runners. Is it just to the light runners to make them pay as much as the heavy runners? From a sense of equity and fair dealing only, is it right to force the lighter users to support the heavy ones? Is such a policy going to promote a business? The heavy user thinks the garage man an easy mark. The light user feels the garage man is imposing on him. In neither case is a feeling of respect and confidence built up between the garage man and his customers and it is this feeling of confidence and respect based on fair dealings that is the very foundation of a successful business. For this reason the flat rate basis is fundamentally wrong.

Because the first garages in the business happened to start on a flat rate is no more reason why such a basis should be continued today than that we should continue with horse-drawn vehicles simply because we started that way. Our grandfathers fought with the cumbersome muzzle-loading smooth bores and if we applied the flat rate argument, the armies today should be equipped only with a muzzle-loading smooth bore.

The flat rate basis is obsolete so far as good business is concerned, as much so as the smooth bore is compared with the modern high powered rifle. If every business concern presented the argument that they were not open to improvements in their business nor to changes that would visibly improve their business because they had always operated some other way, how far would modern commerce have progressed? The only argument that can be offered for the flat rate today is the fact that it has been used quite extensively in the past.

The foregoing article was prepared by Mr. Reed for the use of the Chicago Electric Vehicle Section N. E. L. A.

New Detroit Service Building

The Anderson Electric company of Grand Rapids announces that it will have a modern salesroom and service station to be opened up as soon as possible. The exact location of the new place is not known, but it will be easily accessible to the residence district and probably located on State street. Present plans call for a building to cost $25,000, which, when completed will be equipped in the most approved manner for giving service on electric cars.

M. S. Gibson, formerly connected with T. C. Reed in the distribution of Detroit electric, has taken over the western Michigan territory and will make Grand Rapids his headquarters. For the present he will be located at 216 Ionia avenue, N. W., in the building occupied by the Western Michigan Paige company.

Oklahoma Proves Fertile Field

The demand for electric automobiles has been small in the southwest, and especially in Oklahoma, in the past, but with the sale of two of them last week in Muskogee W. L. Lindhard, local agent for the Detroit electric, is confident that they are coming into their own in Muskogee.

Another of the electrics was sold in Okmulgee and will be delivered by Mr. Lindhard within the next two weeks.

Mr. Hayden, manager of the Detroit Electric Car company, Oklahoma City, at Seventh and Broadway, says there is more interest displayed in electrics now than during the palmy days of 1910, and a great deal more money to buy them with. He attributes this interest to the vastly increased efficiency of the modern electric and the fact that greater production has enabled the electric factory to put its prices about $600 lower than they were eight months ago. He reports sales to George A. Todd of that city and C. P. Colford of Tulsa.
Quality Stars with Quality Cars

WHEN you go to see the latest screen show tomorrow night and see, say, the "Prince of Graustark," you will get your best girl jealous by watching the heroine too closely—a little perfectly formed blue-eyed blonde—who twinkles so alluringly through the play. For Marguerite Clayton, who is the heroine, will make any male heart thump who admires blondes the way the editor does. That is of course unless he sees Nell Craig in "The Breakers," the new story by Arthur E. Stringer. Then he will waver and wobble in his allegiance, for even an admirer of blondes can't withstand her laughing eyes and charms.

Being unmarried and romantic, I seized upon the glad statement with joy that the young ladies both drove electric cars, dug up a mutual acquaintance and hiked out post haste to interview them and settle in my own mind which was the more attractive. There was an electric in front of the apartment of Miss Craig on Sheridan Road, and as we started up the steps she came out ready to go riding in her car.

The photograph shows her, and her coat, and her Ohio electric ready for her afternoon calls. To say that she is pleased with her car is putting it mildly, for the editor can't put in words Miss Craig's inimitable expressions. During the past year she drove a big gas car of which she was heartily glad to get rid, she stated.

Voting her the most charming person we had ever met—she gave us her own photograph—the photographer and the editor hurried over to the Edgewater Beach Hotel where Miss Clayton sojourned. (One always sojourns at fashionable and exclusive hotels.) Here after some coaxing—can you beat it, coaxing—we prevailed on this young lady to order her electric so we could photograph her. While waiting for her Ohio, we revised our opinion as to charms, and are now strictly neutral, almost. However, we are going to see all the motion picture plays after this that feature these two young stars, for one is only twenty and the other twenty-three. Miss Clayton's car "is just too nice for words."

The ease of operation was the one thing that enabled her to relax in the open after an afternoon or morning of tense dramatic effort, which is so tiring and makes such a heavy drain on her strength. If it were not for her car she would not know what to do for amusement and transportation. Although a gas car driver, she believes an electric has all the speed necessary for her use.

Soprano Drives Her Own Detroit Electric

Dubuque, Iowa, Prosperity Celebration and Exposition brought to that beautiful city one of New York's biggest Detroit electric boosters, the sweet Miss Marianna Conway, the silvery voiced soprano, who thrilled the throngs at the carnival with her wonderful renditions, is an enthusiastic electric car owner.

Miss Conway drives her own car and drives it in all kinds of weather. "The wonderful feature of driving an electric," says Miss Conway, "is that it will take me any place I want to go and my linen is always immaculate when I arrive at my destination. I do not need a dressing room when I sing at concerts for I can dress at home and drive in my Detroit to the concert without any fear of soiling my concert gowns."

Through the courtesy of Mr. Tobin, the company's manager at Dubuque, a Detroit electric was placed at the disposal of the petite New Yorker during her concert work in that city, and even she was surprised at the ease and facility with which the car glided up the steepest hills in Dubuque. "I once walked up Pikes Peak," smilingly stated Miss Conway, "but the hills in Dubuque seem even steeper than Pikes."
Times and Styles Work Big Change

The Electric Car Surprises Conservative Washington

Styles, with their kaleidoscopic changes, invade in motordom—not merely bodies and upholstery. They ride with utter indifference over the conventions of yesterday and romp through the mechanical scheme as regardless.

"Yesterday the electric vehicle was a staid, motherly old soul," writes Monte W. Sohn of the Washington Times. "We were wont to look upon it as a nice thing that invalid ladies and faint-hearted old gentlemen plied from our home in Washington to the library or Rock Creek Park.

"Times change.

"It is style that sets the pace for change.

"And so it is that the electric vehicle of today vies with the gasoline car in various desirabilities and some of its merits are not found in any other type of automobile.

"Heberling—R. L.—demonstrated the new Detroit recently to Washington.

"Of course it was essentially a test of power.

"But power is exactly what was never present in the electric automobile of other days.

"That was why it was a sort of octogenarian's omnibus.

"The ultra folk of Connecticut avenue and Chevy Chase who saw the Detroit electric climb the stiff grade of steps which lead up to the palatial Wardman residence at Woodley road were shocked by the unconventionality of it.

"Why, the idea!

"It was not done—you know.

"An electric was a woman's car—for shopping, you know, and all that sort of thing.

"An electric was not supposed to have power. Everybody used to think it was a fine thing for the wife, but really the car has changed. It really is an automobile.

"Just so.

"And it was no difficult task for the Detroit to climb those steps. There was ample reserve power for a grade infinitely steeper, infinitely more severe.

"To dispel any wrong impressions which may have been gathered by those who saw or read or heard of the Detroit's remarkable climbing feat, let us say that the only reason the steps of the Wardman home were selected for this test was because no hill in Washington presented even remotely the sort of climbing problem that would show its power.

"Another thing.

"The car—after its easy ascent—was turned around and headed back down the steps to Connecticut avenue. The Detroit weighs no less than the average gas car.

"Yet Heberling permitted only sufficient speed on
the return to average three miles an hour.

"Brakes!

"The car merely ambled down.

"And when, after its leisurely return, the Detroit once more stood at the curb below the Wardman residence, the brake bands were not even warm!

"It is hardly likely that the average Detroit, in the hands of the average owner, will ever know the need for its tremendous reserve power. But it must be comforting to that owner to know that it is always there, always available.

"Styles have changed under the beautiful bodies and luxurious upholstery of modern automobiles.

"That nice little electric vehicle of yesterday is gone.

"In its place is a virile, powerful vehicle that moves majestically and swiftly in city traffic and over urban roads.

"An automobile is the modern electric.

"That is a large, unadulterated cinch!"

The Electric Truck Business Booming

The electric pleasure car has been accepted as a necessity and a permanent method of transportation for some time past but it is only within the last year that the electric truck has been given the world-wide recognition for which its manufacturers have so long worked and which it so well deserves. Its recent development has been rapid, due partly to the necessity of getting large numbers of trucks for immediate use and partly because manufacturing methods in connection with it have taken a decidedly modern turn.

The demand for trucks for immediate delivery resulted in the purchase of a great many electrics by firms that under other conditions probably would not have bought them for some time to come. Their inherent advantages were thus brought to light through direct competition with other types of equipment, and the steady increase in their sales to these concerns that had doubtfully purchased one or two for trial, is convincing evidence that these advantages have been recognized. Repeat orders from big concerns tell the tale. Some of the largest firms in the country, whose profits hinge upon economical delivery systems, are rapidly increasing their present large electric fleet installations. This speaks for itself.

While this adoption of the electric by the larger companies has been going on for some time it is only recently that smaller companies have been able to avail themselves of the economies of electric delivery. Heretofore, want of quantity sales and inability to get away from old manufacturing methods have kept the price of the electric truck out of reach of the largest body of concerns that could use it to the best advantage. Among these are the medium-sized department stores, bakers, laundries, grocers, confectioners, and the like. These concerns were unable to build up delivery systems along the most economical lines, so delivery costs when sky high.

To offset these conditions the Ward Motor Vehicle company of Mt. Vernon, New York, about two years ago placed upon the market a high-grade electric delivery car selling well within the range of gasoline trucks of equal capacity. From the start this car was a success, and this success is evidence of the big demand that exists for electric delivery. One hundred per cent increase in the sale of this model in one year was the reward that the Ward company received for their courage in selling a truck at quantity prices. Today this model, known as the "Ward Special," may be found in cities all over this country, and as far away as South Africa and New Zealand, delivering merchandise of all kinds at a lower cost than has ever before been possible. They are operating in many cases in fleets, one fleet being of 120 of these cars, lowering materially the cost of the horse fleets they have replaced, and in many cases doing work for which it was thought only gasoline trucks were suited. There are about 1,000 Wards in the baking industry alone, and this number is constantly increasing. As an evidence of the economies that these cars are effecting in this line of trade we have the experience of a baking concern in the South that finds it costs less for current to charge their fleet of eleven "Ward Specials" than it previously cost them to shoe twenty-eight horses. Many laundries and similar industries are also deriving the benefits that these cars offer in the way of low cost deliveries.

One example of the new kinds of service to which this car has been successfully adapted is found in the case of a large dairy company in New York. This company used two "Ward Specials" for their special delivery work for over a year. This first of these cars covered 7,603 miles in seven months at a cost for repairs of only $13.74. The second car covered 3,514 miles in the first four months it was in service at the same approximate cost for repairs. The cars worked seven days in the week, were never laid up, and covered from 30 to 45 miles daily, replacing four horses and two wagons. This firm decided to secure the advantages of these low operating costs in another branch of their service, namely, their early morning house-to-house delivery, heretofore done solely by horses. Two "Ward Specials" were ordered to start with. They were equipped with side-door bodies similar in every way to those used on their horse-drawn vehicles. These were so satisfactory that another order soon followed so that now a great many customers of this progressive milk concern receive their milk delivered by quiet and sanitary electric vehicles.

All this goes to show that the electric truck is steadily making its way into many new fields where it alone can supplant the horse and render as satisfactory and as economical service. The most progressive firms are now convinced that they cannot afford to forego the advantages and economies of the electric any longer.
Trips Over Arkansas Roads in an Electric

During the month of October a series of six runs over Arkansas roads were arranged by Miss Hope Loughborough, Little Rock, Arkansas, agent for the Detroit electric, to prove that the Detroit had ample speed and mileage for all of the suburban trips the average owner would ever want to make. The most ambitious trip of the series was the trip from Little Rock to Hot Springs.

The car left Little Rock at 1:30 p.m. one afternoon with four passengers and arrived in Hot Springs at 6:30 p.m. The odometer registered 57 miles at the finish of the trip, which is not remarkable taken by itself, but when the character of the roads and grades are taken into consideration, it resolves itself into a real test.

The first 45 miles out of Little Rock the road is Arkansas country road, a good part of which was being worked and was consequently soft the last twelve miles over the Grapevine Mountains. A succession of mountain climbs, coasts and climbs, the first ascent being two and one-half miles, then up and down the remainder of the trip into Hot Springs.

When one takes into consideration the fact that all the very hard work of mountain climbing was performed after 45 miles of country driving, fording rivers, this trip assumes importance as a real demonstration. The actual running time was 4 hours and 20 minutes. The average gas car time for the trip is 4 hours.

The passengers were Mr. and Mrs. J. R. Fordyce of Little Rock, Miss Hope Loughborough, Little Rock agent for the Detroit electric, and W. G. Bottom of the Kansas City branch of the Anderson Electric Car Company. Mr. Fordyce is a mechanical engineer of national reputation. Mr. Fordyce designed and superintended the building of the famous Fordyce Bath, in front of which the accompanying picture was taken. This bath is the finest and most complete in the world.

Prominent Women With Detroit Electric

This snapshot shows Italia E. Evans and her model 57 Detroit, in which she made a record run from Fort Wayne, Indiana, to Bluffton and back, a total of 58 miles, which was made in a running time of 2 hours, 32 min., or 23 miles an hour. Part of the run was in the dark.

Dr. Anna Howard Shaw, the Noted Suffrage Speaker, and the Detroit Placed at Her Service in Norfolk. At the Left Mrs. Valentine, the President of the Equal Suffrage League of Virginia, and Her Detroit.
Fashions for Milady of the Electric
New Winter Garments to Be Seen in Electrics on the Boulevards and Roads

A comfortable and stylish coat of Velour de Nord with large fur collar and belt in front. It has a full sweep.

Coat of brown broadcloth with trimming of beaver mohair plush, with large mohair buttons.

Broadcloth coat trimmed with mohair plush with very full sweep.

The Importance of the Electric Tractor and Truck

The project was recently announced by the Society of Automobile Engineers to amalgamate the technicians of the automobile, the aeroplane, the motor-boat and the tractor under the broad title "Society of Automotive Engineers." It is worth noting that while the electric vehicle is tacitly included under the general division of "automobiles," the electric industrial truck and tractor has no special place in the scheme. The division labeled "tractors" naturally relates to the agricultural variety upon which the internal combustion engineers are working with intense application just now.

The gasoline tractor is essentially an outdoor affair, primarily devoted to the improvement of the soil. The electric truck or tractor, on the contrary, is properly a denizen of the crowded warehouse and railway terminal—an exponent of the highest industrial efficiency. They are alike only in the common use of the term tractor—"an instrument for drawing,"

The agricultural tractor, sordidly mechanical as it is, is nevertheless spectacular. It pleases the popular fancy. The idea of the farmer overcoming the resistance of the stubborn earth by the aid of science gives another excuse for that added respect we have long wished to pay the tiller of the soil.

That is why so few people really appreciate the tremendous importance of the electric tractor and industrial trucks and the vast field that lies before it. The significance of its operations, interesting as it is to the efficiency advocates, is concealed from the public eye by the very nature of its employment. Only a handful of observant men know that the electric industrial tractor is driving along the edge of a usefulness nearly as great as that of the hauler of farm plows and harrows.

In other automotive fields, the internal combustion engine is in direct and active competition with the electric motor and battery, with the advantage now on one side and now on the other, but with each a worthy opponent of its competitor. But in the field of the industrial tractor the electric is supreme and unquestioned. The fact that it is absolutely satisfactory in its work is sufficient explanation for this condition.

The industrial truck and tractor (the adjective "electric" can be omitted for the reason mentioned), is a desirable product from the manufacturers' standpoint. Instead of being sold one at a time to difficult and hesitant buyers they are sold in lots of up to fifty or so to large corporations which have no doubts as to what they want.

The trade circle of the electric vehicle industry in its ordinary functions does not include the industrial tractor. The sequence of the conventional triple play of maker to dealer to customer relates only to the pleasure and business vehicles that ply the streets. The prospective purchaser of an industrial truck seldom appeals to the automobile dealer or the central station. He goes direct to the manufacturer, of whom he has heard through his associates, or more rarely through advertising matter. That makes it difficult to identify the market. The field of prospects is more miscellaneous and so less definite.

The field of the industrial truck and tractor is so promising and it is such a fine example of electricity's usefulness that it behooves the central stations and the associations to co-
operate in giving it a more definite importance in the public eye. The catalog of its possible customers should also be crystallized to a more exact form. In a word, the electric industrial truck should be recognized for what it represents—a big industry in itself; with success assured for its exponents.

The industrial truck and tractor may be the least spectacular of vehicles, but it is destined to become one of the most important, and electricity is the motive power that will benefit by its widespread recognition.

Price Tendencies of the Year

WITH gas car prices showing a positive rise as the year draws to a close, it is interesting to observe that the general tendency of electric passenger car prices is downward. More than one condition is responsible for making the present average figure lower than that of a year ago. While a large part of the drop is due to a determined effort to increase popularity, and consequently production (and so lower production costs), some credit for the increased availability of new models must go to the merging of manufacturing facilities, which has thrown open to the public a number of real “bargains.” The supply of these stock models is insufficient to react upon the regular prices of standard production. Altogether the condition seems rather desirable than otherwise while it lasts.

Another event that promises to bring down the general average of electric car prices is the announcement of a new car of the less-than-one-thousand-dollar class. This model will be exhibited at the coming automobile shows, according to statements issued, and appears to be a serious and substantial effort. Mention of this project has been made from time to time in these pages; for the development covers a period of some two years, starting from figures given out by an electrical engineer of international reputation.

It may be stated that in no instance has the reduction of electric car prices been accomplished by cutting the quotations on regular models. The supply of high-priced and ultra-luxurious cars is continued, and may even be increased; for there is little doubt that the electric is fundamentally designed to appeal to the highest class of automobile trade. The appearance of cheaper models (disregarding those cars, comparatively few, which are offered at a lower figure than was originally intended) indicates merely an enterprising and praiseworthy attempt to expand the field of the electric into the domain of greater production.

Any tendency to disparage the attempt to produce cheaper electrics is, we think, rather short-sighted. The greater the number of electrics in use, the better will be the facilities at the disposal of owners of all classes of electrics. The fact that a great many thousand-dollar cars were in active service would make the path of the three or four thousand dollar car easier because there would be more charging stations and better service all around.

The high-priced electric will always be a luxurious, exclusive car. For that reason its advocates can well afford to look with favor upon the tendency to supply also a low-priced electric that, by the pressure of popular adoption, will force the establishment of new facilities and new recognition for the whole industry.

Accessories for Electric Cars

IT may not be entirely true, but it is a good epigram that “The better the car the fewer the accessories.” At any rate, the low-priced gas cars are so surrounded by ingeniously devised adjuncts that an owner may readily spend more money for auxiliary mechanisms than the first cost of his car. Electric cars, on the contrary, are so complete in themselves and so barren of accessory possibilities that it is hard to find more than a small handful of real necessities in that line.

There are, however, a few accessories that would brighten the lives of electric car owners, and the very fact of their scarcity should double their appeal to owners by concentrating attention upon them. The manufacturers of these few devices have a splendid opportunity.

There is no better way to present the case of the accessory before the electric car owner than through the pages of ELECTRIC VEHICLES, and accessory manufacturers who take advantage of the opportunity to display their devices will not only benefit themselves but will help the industry along by showing the owner what conveniences are at his disposal.
Interesting Stunts with Industrial Vehicles

A Few Industrial Applications

The Mercury Manufacturing Company of Chicago, Illinois, manufactures the tractors shown in the above cut, while the General Vehicle Company of Long Island City, N. Y., supplies the industrial truck adjacent. Some remarkable showings have been made by the tractors. The two top views are of the three-wheeled model Z while the two lower depict model U, an intermediate type X is not shown.

Type U has a 102-inch turning radius with overall length of 104 inches, width 56 inches, height 54 inches, wheel base 63, turning radius of wheel 96 inches, tread 47 inches. It carries a 60-cell A8 or A12 H Edison battery or option.

Type Z is for lighter work. It has a 57-inch turning radius, wheel base of 40¾ inches, an overall length of 71¾ inches, width 39½ inches, height 43½ inches and tread 30.5 inches. It carries 20 Edison A-6 cells or 16 cells 19 plate Hycap Exide or option.

The G. V. Truck has a loading space of 3 feet 7½ inches by 5 feet 9 inches, with a 2000-pound capacity, with an extreme length of 7 feet 6 inches. Its speed is 7 m. p. h. with a 12-cell 17-plate G. V. Exide battery giving a 25-mile charge. The wheelbase is 42½ inches, 3 speeds forward and reverse are obtainable. The tread is 35 inches. Timken roller bearings are used throughout. Turning radius 84 inches.

Simplicity of operation is the keynote of both makes.
General Specifications of Walker Electric Vehicle Trucks

<table>
<thead>
<tr>
<th>Model and capacity, lbs.</th>
<th>M 1,000</th>
<th>K 2,000</th>
<th>L 4,000</th>
<th>D 6,000</th>
<th>E 8,000</th>
<th>N 10,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tires, front, inches</td>
<td>34x3</td>
<td>34x3</td>
<td>38x4</td>
<td>36x3</td>
<td>30x6</td>
<td>36x7</td>
</tr>
<tr>
<td>Tires, rear, inches</td>
<td>36x3½</td>
<td>36x4</td>
<td>38x6</td>
<td>38x4 dual</td>
<td>38x3 dual</td>
<td>38x6 dual</td>
</tr>
<tr>
<td>Wheel base optional standard</td>
<td>90</td>
<td>92</td>
<td>107</td>
<td>126</td>
<td>130</td>
<td>136</td>
</tr>
<tr>
<td>Miles per charge</td>
<td>75</td>
<td>75</td>
<td>65</td>
<td>60</td>
<td>60</td>
<td>50</td>
</tr>
<tr>
<td>Speed, miles per hour</td>
<td>17</td>
<td>16</td>
<td>16</td>
<td>13</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Motor horsepower</td>
<td>3.0</td>
<td>3.5</td>
<td>4.0</td>
<td>5.0</td>
<td>6.0</td>
<td>6.5</td>
</tr>
<tr>
<td>Gear ratio final drive</td>
<td>16.87 to 1</td>
<td>16.87 to 1</td>
<td>16.14 to 1</td>
<td>15.57 to 1</td>
<td>15.57 to 1</td>
<td>18.83 to 1</td>
</tr>
</tbody>
</table>

The chassis frame is an improved design, all steel channel section, securely riveted and braced with steel bumper in front.

Semi-elliptic springs front and rear, made of heat treated steel. A single motor is used of series type, of ample capacity, fully enclosed in hollow rear axle. Large diameter, hollow armature shaft mounted on extra large ball bearings. Immediately accessible.

Self-contained direct-connected bevel gear type of differential with case bolted to flange integral with hollow armature shaft is used. Drive shaft sockets on center line of axle.

Walker patented balance drive is fully enclosed in hollow axle and rear wheels, self-contained, unit power plant transmitting power in a balanced manner through spur gears direct to tire rims.

Front axles, I-beam section with drop forged steering knuckles and arms. Steering knuckles are mounted on Timken roller bearings. Rear axles are of hollow steel, torpedo-shaped tubular section, enclosing motor and differential and securing the drop forged vanadium steel stub axles.

The front wheels are specially designed steel disc wheels mounted on Timken roller or annular ball bearings. Improved design for greater strength and more attractive appearance.

Rear wheels are specially designed steel disc wheels enclosing the Walker balance drive gears; dirt- and water-proof; partly filled with lubricant which is distributed continuously over all working parts; wheels mounted on roller bearings; supported by stub axles secured into ends of hollow rear axle. Wheel gauges, 56 and 62 inches.

Two sets of brakes are used, large contracting, also expanding type, both on rear wheels; operated by right and left pedals. All wearing parts run in lubricants or are lubricated by grease cups.

Steering is done by means of improved wheel steering mechanism, located on the left-hand side. Right-hand steering is optional.

Improved continuous torque drum type controller is used, giving 5 speeds ahead and 5 reverse, located under seat and instantly accessible. Handle operated by driver's left hand.

Two electric dash and one tail light. Hub odometer, Sangamo amper-hour meter, designed to indicate the charge condition of the battery at any time. Safety switch and key. Circuit breaker, designed for automatic opening of circuit when charged.
## Specifications for General Vehicle Trucks.

<table>
<thead>
<tr>
<th>Carrying capacity</th>
<th>1,000 lbs. Delivery Wagon</th>
<th>2,000 lbs. Delivery Wagon</th>
<th>2 tons</th>
<th>2 tons</th>
<th>3½ tons</th>
<th>3½ tons</th>
<th>5 tons</th>
<th>5 tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of vehicle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed in miles per hour</td>
<td>12</td>
<td>10</td>
<td>12</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Mileage travel on one charge</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>40</td>
<td>40</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Wheelbase</td>
<td>89&quot;</td>
<td>104&quot;</td>
<td>112½&quot;</td>
<td>112½&quot;</td>
<td>132½&quot;</td>
<td>132½&quot;</td>
<td>141½&quot;</td>
<td>141½&quot;</td>
</tr>
<tr>
<td>Gauge</td>
<td>56&quot;</td>
<td>60&quot;</td>
<td>61&quot;</td>
<td>61&quot;</td>
<td>65&quot;</td>
<td>65&quot;</td>
<td>69½&quot;</td>
<td>69½&quot;</td>
</tr>
<tr>
<td>Overall length</td>
<td>133½&quot;</td>
<td>151&quot;</td>
<td>181&quot;</td>
<td>167&quot;</td>
<td>203&quot;</td>
<td>189&quot;</td>
<td>223&quot;</td>
<td>209&quot;</td>
</tr>
<tr>
<td>Overall width</td>
<td>66&quot;</td>
<td>72&quot;</td>
<td>75&quot;</td>
<td>72&quot;</td>
<td>79&quot;</td>
<td>79&quot;</td>
<td>81½&quot;</td>
<td>81½&quot;</td>
</tr>
<tr>
<td>Clear loading space length</td>
<td>41&quot;</td>
<td>48&quot;</td>
<td>75&quot;</td>
<td>72&quot;</td>
<td>138&quot;</td>
<td>121&quot;</td>
<td>161&quot;</td>
<td>143&quot;</td>
</tr>
<tr>
<td>Clear loading space width</td>
<td>60&quot;</td>
<td>*</td>
<td>92&quot;</td>
<td>72&quot;</td>
<td>138&quot;</td>
<td>121&quot;</td>
<td>161&quot;</td>
<td>143&quot;</td>
</tr>
<tr>
<td>Height of platform loaded</td>
<td>33½&quot;</td>
<td>36&quot;</td>
<td>41½&quot;</td>
<td>41½&quot;</td>
<td>42&quot;</td>
<td>42&quot;</td>
<td>42½&quot;</td>
<td>42½&quot;</td>
</tr>
<tr>
<td>Chassis weight, no battery</td>
<td>2,065 lbs.</td>
<td>2,885 lbs.</td>
<td>4,050 lbs.</td>
<td>5,815 lbs.</td>
<td>6,510 lbs.</td>
<td>8,200 lbs.</td>
<td>3,700 lbs.</td>
<td>3,700 lbs.</td>
</tr>
<tr>
<td>Chassis with standard G. V. battery</td>
<td>$1,700</td>
<td>$2,100</td>
<td>$2,600</td>
<td>$2,600</td>
<td>$3,250</td>
<td>$3,250</td>
<td>$3,700</td>
<td>$3,700</td>
</tr>
<tr>
<td>Tires, front</td>
<td>36x2½&quot;</td>
<td>36x3½&quot;</td>
<td>36x4</td>
<td>36x4</td>
<td>36x6</td>
<td>36x6</td>
<td>36x7</td>
<td>36x7</td>
</tr>
<tr>
<td>Tires, rear</td>
<td>36x2½&quot;</td>
<td>36x3½&quot;</td>
<td>36x3d</td>
<td>36x3d</td>
<td>36x4d</td>
<td>36x4d</td>
<td>36x5d</td>
<td>36x5d</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Battery</th>
<th>Number of plates</th>
<th>9</th>
<th>11</th>
<th>15</th>
<th>17</th>
<th>19</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of cells</td>
<td>44</td>
<td>44</td>
<td>44</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Number of trays</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Ampere hour capacity</td>
<td>133</td>
<td>169</td>
<td>227</td>
<td>268</td>
<td>298</td>
</tr>
<tr>
<td>Motor horsepower</td>
<td>2.5</td>
<td>3.4</td>
<td>4.6</td>
<td>5.6</td>
<td>6.8</td>
<td></td>
</tr>
<tr>
<td>Total drive gear ratio</td>
<td>10.2 to 1</td>
<td>10.76 to 1</td>
<td>11.61 to 1</td>
<td>13.95 to 1</td>
<td>13.95 to 1</td>
<td></td>
</tr>
</tbody>
</table>

All tires solid; all motors in rear. General Electric make, series wound, 85 volts; all controllers under the seat with 5 speeds and 2 reverse with lever control; motor drives to jack shaft through silent chain; final drive through double chain. All springs semi-elliptical. Front and rear. Wheel steering.
General Specifications of Urban Electrics.

<table>
<thead>
<tr>
<th></th>
<th>Model 10, 1,000 lbs</th>
<th>Model 20, 2,000 lbs</th>
<th>Model 40, 2 tons</th>
<th>Model 70, 3 1/2 tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>1000 lbs</td>
<td>2000 lbs</td>
<td>2 tons</td>
<td>3 1/2 tons</td>
</tr>
<tr>
<td>Axles sections, front</td>
<td>1 3/4 x 2 1/2&quot;</td>
<td>2 1/4 x 3 1/4&quot;</td>
<td>2 3/4 x 1 3/4&quot;</td>
<td>2 3/4 x 1 3/4&quot;</td>
</tr>
<tr>
<td>Rear</td>
<td>1 3/4 x 2 1/2&quot;</td>
<td>1 3/4 x 3&quot;</td>
<td>2 3/4 x 1 3/4&quot;</td>
<td>2 3/4 x 1 3/4&quot;</td>
</tr>
<tr>
<td>Battery</td>
<td>30 cells, 13 MV</td>
<td>44 cells, 15 MV</td>
<td>44 cells, 21 MV</td>
<td>44 cells, 21 MV</td>
</tr>
<tr>
<td>Size of brakes, 2 pairs</td>
<td>2 x 8&quot;</td>
<td>2 x 12 1/4&quot;</td>
<td>2 x 12 1/4&quot;</td>
<td>2 x 12 1/4&quot;</td>
</tr>
<tr>
<td>Clearance</td>
<td>10&quot;</td>
<td>10&quot;</td>
<td>10&quot;</td>
<td>10&quot;</td>
</tr>
<tr>
<td>Clear loading space</td>
<td>72&quot; long x 42&quot; wide</td>
<td>96&quot; long x 48&quot; wide</td>
<td>132&quot; long x 68&quot; wide</td>
<td>148&quot; long x 80&quot; wide</td>
</tr>
<tr>
<td>Height of platform loaded</td>
<td>37 1/2&quot;</td>
<td>37 1/2&quot;</td>
<td>42 1/4&quot;</td>
<td>45 1/2&quot;</td>
</tr>
<tr>
<td>Motor</td>
<td>G. E. 1020, 60v, 28a</td>
<td>G. E. 1025, 85v, 22a</td>
<td>G. E. 1026, 85 v</td>
<td>G. E. 1022, 85v, 40a</td>
</tr>
<tr>
<td>Springs, semi-elliptic,</td>
<td>36 x 2</td>
<td>40 x 2</td>
<td>40 x 2 1/2&quot;</td>
<td>44 x 3</td>
</tr>
<tr>
<td>front</td>
<td>40 x 2</td>
<td>52 x 2 1/2&quot;</td>
<td>56 x 3&quot;</td>
<td>56 x 3 1/2&quot;</td>
</tr>
<tr>
<td>Overall, length</td>
<td>149</td>
<td>153</td>
<td>187</td>
<td>204 1/4</td>
</tr>
<tr>
<td>Width</td>
<td>67</td>
<td>74</td>
<td>81</td>
<td>85</td>
</tr>
<tr>
<td>Tread, front</td>
<td>56</td>
<td>60</td>
<td>61</td>
<td>64</td>
</tr>
<tr>
<td>Rear</td>
<td>56</td>
<td>60</td>
<td>64</td>
<td>68</td>
</tr>
<tr>
<td>Solid tires, front</td>
<td>36 x 3</td>
<td>36 x 3 1/2&quot;</td>
<td>36 x 4</td>
<td>36 x 5</td>
</tr>
<tr>
<td>Rear</td>
<td>36 x 3</td>
<td>36 x 4</td>
<td>36 x 3 1/2 dual</td>
<td>40 x 4 dual</td>
</tr>
<tr>
<td>Weight, chassis and battery, lbs.</td>
<td>3,500</td>
<td>5,600</td>
<td>7,880</td>
<td>9780</td>
</tr>
<tr>
<td>Body allowance, lbs.</td>
<td>500</td>
<td>750</td>
<td>1,000</td>
<td>1250</td>
</tr>
<tr>
<td>Wheel base</td>
<td>86 and 106 optional</td>
<td>102</td>
<td>118</td>
<td>130</td>
</tr>
</tbody>
</table>

Controllers are all drum type continuous torque 4 speeds forward and 2 reverse. Drive is by silent chain from motor to jackshaft and double chain as final. Equipment includes dash lights, tail light, Veeder hub odometer, Sangamo ampere hour meter, bell, foot push button, tool kit and storm curtains.
THE demand in the country districts for better roads has now reached a point where it is necessary for the authorities to act. Many who will read this have a very distinct recollection of the days, say twenty-five years ago, when the country roads were kept in order through the labor of the farmers in whatever township the roads might be situated. The supervisors, who had the upkeep of these roads in charge, were usually farmers themselves and had very little knowledge of the underlying principles of good road construction. They were satisfied, from year to year, to go over the roads carelessly and put back onto them the dirt which had washed off since the last repair period, leaving them usually in not much better condition than when repairs were started.

The makeshift country highway so familiar has had its day and we are now confronted with an insistent demand from both country and city for good roads in the country as well as in the city.

So many today are interested in good roads that it is very evident that what is done should be of a permanent character. In order to make good country highways we are offered a considerable choice as between types. For the purpose of this article, however, we may consider that they can be divided into three main classes: the ordinary dirt or gravel road, the macadam road and the hard-surfaced road, the latter including brick, patent and bituminous pavements of one sort or another, and concrete roads.

That it is clearly possible to make a good highway from the dirt and gravel, which is quite common in nearly all sections will be made apparent by the work which various state highway departments have done during the last five years. This type of road, however, is undesirable where the traffic is heavy, for the simple reason that during the spring when the frost is coming out of the ground and again during the fall when the cold weather is coming on, such highways become almost impassable, and for one or two months in the spring and for the same period in the fall people using them have great difficulty in getting quickly from one point to another.

The macadam road has had its day. As long as there were no automobiles, or very few of them, this class of road gave most excellent service.

The third class referred to seems to be the one that will have the call for the main arteries of travel in the future. Each has its advocates. The preparation for any one of these types is about the same, the cost of the roadway itself varying with the type chosen. However, there seems to be little doubt in the minds of many road engineers today that the concrete highway, when cost of upkeep and first cost are both taken into account, will become the favored type.

In order to have a permanent brick pavement it is necessary that it be laid on a concrete base with concrete grout between the bricks. When laid in this manner, however, it becomes the most noisy roadway known. On the other hand, if the brick is laid on a sand cushion, it seems to be almost impossible to get this cushion uniformly distributed over the entire surface, with the result that we very quickly find the road developing hollows and holding water. This latter condition is very much more apparent when, as is done sometimes, the brick is laid on sand directly on the clay or earth after the road has been properly graded. The first method mentioned of constructing such a road is very expensive. In fact, this type of hard-surface road is probably the most expensive of all those mentioned; it has been quite largely used in Western Pennsylvania and Ohio, where paving brick is manufactured in large quantities. Recently, however, the new mileage even in the districts where paving brick can be most easily procured is about evenly divided between brick and concrete. While it may be that, as engineers become more used to it, the defects so apparent now will be less noticeable, there seems no way in sight whereby the fatal handicap of high first cost can be overcome.

The patent pavement, so-called, is getting to be quite familiar. Such a patent road is known by a variety of names, as, for instance, warrington, amesite, tarvia, etc., and, in addition, we have the bituminous macadam road in this class. These roads are frequently built, and mark, we believe, a distinct advance over the ordinary macadam. Here again, however, if the road is to be a permanent one and the up-keep cost is to be kept down, it is necessary to lay the road material on a concrete base, and even then, if the road is not carefully leveled, we find it very shortly wearing in pockets, and the up-keep becomes extravagant as compared with the concrete type. Moisture seems to have a very detrimental effect on these materials, and no method has yet been devised to prevent small depressions in the roadway in which water collects after storms, the consequence is rapid deterioration of the road. Where such material is laid on the earth sub-base, it is practically certain that in three to five years heavy repairs will have to be made.

The third type of hard-surface roads is the concrete one. This type of road has come into national prominence only within the last four or five years.

The first construction of such roads of any magnitude took place near Detroit, Michigan. The first road there has now been in service something over six years, and each year since the first section has been built, ad-

*President Alpha Portland Cement Co.
ditional sections of concrete road have been laid down so
that Wayne County, Michigan, in which Detroit is situ-
ated, today has over 100 miles of concrete roads. The
engineer in charge of this construction is so thoroughly
satisfied with the results he has obtained that no new
construction is made today that is not of concrete.

The example of Wayne county has been followed in
very many parts of the west, notably in Milwaukee
County, Wisconsin, in which Milwaukee is located, where
there are now in service over fifty miles of concrete roads
and where this year about forty additional miles are being
constructed. The State of Maryland has also adopted
the concrete type of roadway as standard, and has al-
dready put down over 140 miles of concrete roads. Ohio
has many of these roads and New York also. Indiana
and Illinois are just beginning to go into this type to a
marked extent. Everywhere it has been constructed
those who use it speak of it in the highest terms.

That the hard-surface class must become the pre-
ferred type of country highways goes without question,
for, if we consider the disadvantages of the ordinary
dirt, gravel or macadam and then compare them with the
hard-surface type, it will be readily seen why such roads
must be preferred.

One of the great objections to the ordinary dirt road
is the dust that is thrown up by the passage of auto-
mobiles during dry weather. The concrete road is abso-
utely dustless. Either of the other two types of hard-
surface roads mentioned are very nearly dustless, al-
though not to the same extent as concrete. The item
of repair on the dirt road is large, but nothing like as
large as that item is on macadam. It is not an unusual thing
for a macadam road to be resurfaced every two or three
years. Close to us here at Easton, on the road between
Phillipsburg and Washington, New Jersey, we have seen a
resurfacing of a macadam road from end to end twice
within three years, the second resurfacing having been
completed last year and today many parts of this road
are in need of repair. At the time the first resurfacing
was made a sample mile of concrete road was built near
Stewartsville, and this section of the road is today as
good as when first laid and practically no money has been
expended on it during the three-year period.

In addition to overcoming the disadvantage of dust
and high repair cost, the hard-surface road enables those
using it to haul very much heavier loads, and light loads
will move much more rapidly. More markets can be
reached, and in farming communities the necessity for
dependence on commission men will be greatly reduced
because it will be possible for the farmer to bring his
produce directly to the market without the loss of time
and labor necessary where only dirt roads are available.
Above and beyond all else, however, is the fact that such
a road can be used throughout the whole year with full
efficiency. The wet weather in the fall and the frost
coming out in the spring have no effect on these roads.
The result is that it is not at all necessary for the farmer
to take advantage of the good roads in the early fall to
market his products; he can keep it in his warehouse
until later in the season when prices are better.

While freely admitting the advantages of all types of
the hard-surface road as compared with either dirt, gravel
or macadam, the writer must say that he is distinctly in
favor of the concrete road. In its construction this road
is probably 30 per cent more costly than macadam; it
does not require, however, any repairs to speak of, while
brick or patent roads will require considerable repair un-
less they are built with a concrete base, and in that event
the first cost of these roads is very much in excess of the

cost of concrete. While on the subject of upkeep some
quotations from Bulletin No. 136 of the office of Public
Roads, United States Department of Agriculture, are
interesting. "The sum of $525 per mile (per annum)
should, therefore, absolutely maintain macadam roads if
changes and increases of traffic are not excessive." "It
is clear, therefore, that $700 per mile (per annum) is not
an excessive estimate at present for the annual cost of
all repairs and maintenance of bituminous-macadam
roads."

In Wayne County, Michigan, where concrete roads
have been in service for the greatest length of time, fig-
ures for six years show a maintenance and up-keep cost of
$28.43 per mile per annum for a 16-foot roadway.

In building a good country highway, no matter what
type is decided upon, there is one prime necessity and
that is absolutely first-class drainage. It makes no dif-
ference whether the road be of gravel, macadam, brick,
patent pavement, or concrete, unless the sub-base of the
roadway is completely and thoroughly drained, there is
bound to be a great deal of trouble and high repair costs.
Therefore, in comparing the first cost of these different
roads the preparation of the sub-base should be eliminat-
ed in every case. Whatever engineer may be consulted will,
unquestionably, advise that no matter what type of hard-
surface road may be ultimately put down, it will not be
satisfactory unless the sub-base is properly drained.

The conclusion of the whole matter is that good
roads are not only demanded but are necessary to those
communities which would be in the van of progress; that
no roadway will be good unless laid on a well prepared
and well drained sub-base; that hard-surface roadways
are the only ones which can carry the traffic brought to
them throughout the entire twelve months of the year;
that no hard-surface roadway will satisfactorily with-
stand automobile traffic unless it is laid on a concrete
base; that the concrete road is the ultimate type which
will stand all tests asked of it, viz.: low first cost and low
maintenance cost united with 100 per cent efficiency for
twelve months of the year. No dust and no slipping.
Finally, the concrete road is an asset and not a liability
to the community which has built it.

Credit for the article in last month's issue by R. H.
Rogers should have been given to the General Electric
Review.

![Baker 3½ Ton Trucks on a Profitable Short Haul.](image-url)
New Service Station Insures Future

That the Detroit electric organization, its dealers and agents are building for the future cannot be better demonstrated than by the garages and service stations they are putting into commission in two opposite sections of the country, Minnesota and Georgia.

Harry Given, manager of St. Paul, writes:

"Our garage which is 80x150 is of brick and steel construction, absolutely fireproof and up-to-date in every respect. We have ample room to take care of fifty electric cars with the very best of care. Our show room will be 55 feet in length facing Grand avenue. Our location, Grand avenue and Milton street, is in the heart of the city's very best residential district.

"St. Paul is badly in need of a new electric car garage and we do not expect to have a trouble in filling ours when completed which will be between December 15 and January 1."

"We are under the impression that our new service station will mean 'more sales,' 'better service' and 'satisfied owners,' in fact we truly believe that it will boost the business in St. Paul just 50 per cent."

H. E. Warren is in charge of the service.

SAVANNAH'S NEW GARAGE

Several years ago, Savannah, Georgia, could not boast of an efficiently equipped, systematically operated, electric car garage. The insistent demand for electric cars in Savannah, however, during the past year, has resulted in the establishment of one of the most complete electric garages in Savannah.

The garage is owned and operated by H. A. Jacobs, 4-6-8 Abercorn street. At the present time about twenty-five cars are cared for by the Jacobs garage, while all prospects point to the necessity of enlarging the equipment at least 400 per cent in the very near future."
Won by the Electric

Another striking proof of the dominating influence of modern electric vehicles in the closed car field was evidenced by one of the foremost specialists on motor car sales joining Whipple's big Detroit Electric selling organization this week.

Penrose Reed is one of the best known, best liked of Chicago's successful sales managers. His experience dates from the early days of the industry and has covered every phase of the great motor car business.

Reed held a prominent place for many years in electric vehicle circles until the advance of the gas car with a magnetic control. When he left the sales manager electric vehicle field, it was said he had associates that the only reason he was won over to that particular gas car was because it claimed to have a control like an electric.

After a well-seasoned experience with the gas-driven car, it appears that Reed just had to get back home with his true love—the electric.

Speaking of his new position, Reed said: "While reluctant to leave the electric field for many reasons, I was led to believe that a properly designed gas car with a control like an electric should prove an instant and universal success. But my experience has taught me that you cannot change a jug by putting a different handle on it—you cannot make an electric out of a gas car, no matter how many electric starters or stoppers you put on. To my mind the electric has always been the ideal motor car for all city and suburban use, and, if the facts were known, the electric has always set the standard by which all town cars have been judged.

"Inherently the gas car is a very complicated mechanism. To equal the all-round service of the electric, the gas car must, like a locomotive, have an over alert engineman, while the electric has always been the engineer's (and today the public's) idea of simplicity.

"The fact that more Detroit Electrics are sold today than any other make of enclosed automobile, is proof conclusive that the modern electric has reached a degree of practical perfection that the gas car can never equal, in spite of electric starters, magnetic clutches and other electrical auxiliaries."

Reed numbers many friends among owners of Detroit and Chicago electrics, as he was prominently identified with both these cars for many years. He will be able to renew his many acquaintances, as the Detroit electric branch is now the home of the Chicago, due to the recent purchase of the Chicago electric business by the Anderson Electric Car company.

Chicago electric owners are now receiving the same high grade service as users of Detroit electrics, and the new 1917 Chicago electric models are finding a very ready sale.

Announcement cards have been sent by the New York branch of the Anderson Electric Car company that Richard O. Burr, formerly president of the firm of Burr & Co., of that city, has joined the sales department and will be actively identified with the branch at 20 Central Park west. The best wishes of a large circle of friends follow Mr. Burr in his new endeavor.

W. R. Dudley, St. Louis, manager of the Vesta Battery and Equipment company, has been transferred to the Chicago branch as a traveler and is succeeded by F. G. Pulkerson, formerly of Cleveland.

C. S. Baylor of Paola, Kansas, has purchased the garage on West Peoria street, in Frank Gray's brick building, from W. R. Stewart, and has taken charge.

Clayton Culbertson, Laverne, Oklahoma, sold his garage to Messrs. Bennett and Hogan of Wichita. They expect to enlarge their garage considerably in the near future.
Announcement is made in Flint, Michigan, by Gates & Graves Electric company of its appointment as a special service station for the Prest-O-Lite storage battery at 429 Detroit street.

E. T. Cole, manager of the Akron Tire & Rubber company, Baltimore, Md., Ajax distributor, has taken the state agency for the Cleveland Standard Tire & Rubber company. Charles E. Brooks will be in charge of the wholesale business throughout the state.

Harry Gowdy, better known as "Hank," the hero of the 1914 world's baseball series when with the Boston Braves, has taken a position as salesman with the Campbell-Gilchrist Sales company, 13-17 North Fourth street, agent for the Empire and Pennsylvania tires.

Geller, Ward & Hasner Hardware company, St. Louis, is territorial distributor of Prismatic lens.

A. J. Shorrock has been appointed manager of the Auto Tire & Rubber company, Seattle.

F. C. Herschbach of St. Louis has resigned as assistant sales manager for the Commercial Auto Body company of that city for a similar position with the R. Haas Electric & Manufacturing company, Springfield, Ill.

Wallace C. Hood, president of the Wallace C. Hood Service Bureau, Detroit, has enlarged his office space in the Dime Bank Building.

A. E. Hertzog, manager of the Baltimore branch of the Good year Tire & Rubber company, Akron, Ohio, has been appointed manager of the Washington branch of the company and will take care of the territory in both sections. L. J. Gemmill, who was manager of the Washington branch, will look after all of the government business exclusively.

George O. Smalley has been promoted to be first vice-president and general manager of the Round Brook Oil-less Bearing company, succeeding the late Leigh S. Bache. Mr. Smalley has been connected with this company for ten years, for the last four years as assistant general manager and assistant treasurer.

A. L. Edwards has been made manager of the Detroit branch of the Kelly-Springfield Tire company. He is a son of G. D. Edwards, who died recently, and was manager up to the time of his death.

The Goodyear Tire and Rubber company staff met the managers of the southeastern district and their salesmen in Atlanta, Georgia, recently for a three-day convention. The program included five business sessions, a theater party, banquet and smoker. During the meeting it was announced that James L. Taylor, sales manager of the Atlanta branch, had been promoted to a place in a new department of sales promotion at the factory. Mr. Taylor had been in Atlanta four years and Charlotte, North Carolina, three years in Goodyear service. The company has leased 10,000 acres of cotton land near Chandler, Texas, and has engaged E. W. Hudson, formerly government cotton expert, to take charge of the plantation. The company will engage in the raising of long staple Egyptian cotton for the manufacture of automobile tires, it is stated.
Many fleets of Walker Electrics are in the service of such large concerns as the Blue Valley Butter Company. This surely answers the truck efficiency question; satisfies any doubt of haulage and delivery service and offers many good reasons that endorse the Walker.

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