IN THE FIELD OF ELECTRICITY

The Trade of the Age.

THE universal adoption of electricity throughout the world has already opened numberless avenues for skillful, studious, energetic workers. Its future possibilities are beyond calculation. What of the present? An electrical worker reviews in the Chicago Tribune present conditions in the electrical field and the opportunities awaiting young men of brains and energy. He says, in part:

To the young man with a good common school education and an inclination and ability to study, the trade of the electrical worker opens up a field of opportunity undoubtedly as good, if not better, than that offered by any craft. It is a trade, however, where the qualifications for success are not dependent upon the brawn and strength of the worker, but almost entirely upon his brains and the ability to use the same. It is one of the finer of the crafts, wherein brains are at a premium and wherin the worker will meet in the day's work problems whose solution would tax the mind of a student.

The electrical workers are divided into three classes of workmen, and apprentices to the trade are accepted in the three classes upon different systems.

The first class of electrical workers, the A class, consists of competent journeymen who are engaged in construction work. To enter this apprentice class the beginner must be between the ages of 18 and 21. There is no examination for him in order to enter. The time which he will have to serve before he becomes a journeyman is three years here, as in all classes. In class B the beginner may be 16 years old or over. This class consists of what is termed "house electricians," and includes the men who have charge of power plants and shops and factory workers. Class C consists of telephone men, and to enter their ranks the apprentice must be, as in class A, between 18 and 21 years old.

The work of the apprentice who enters class A will take him to outside work where the journeymen are employed, in newly constructed buildings, or wherever electrical light or power apparatus is being installed. His duties will be that of general helper to the journeyman. He will at first run errands and help in the rough work of the trade, but as he learns he will be allowed to do his share of the electrical work. He will be initiated here into the practical side of the work, the wire laying, soldering and other mechanical details. This is the work of the journeyman electrician.

For the first year of his services there is no regulation to govern the pay of an apprentice. If he is large and apt at the work, however, he will probably receive $8 or $9 to begin with. The second year his wages in this class are fixed at a minimum of $2 per day, and for the third and last year he will be paid not less than $3 per day.

While he is working he will be required to attend the school which the organized electricians have for his instruction. This school holds classes once every two weeks. There the apprentice will listen to lectures by competent instructors and receive other instruction. Also at each meeting of the class he will receive a set of examples which he will take home to study and work upon until the next session of the school. In this way he will in his three years' service as apprentice acquire ability as a practical worker as well as training in the theoretical side of his trade. At the end of his three years an examination is held to determine his knowledge of the trade. The examination is for the most part practical, but the apprentice who has been negligent toward his work or the lessons given him at the school will find it hard to pass. If he does pass he will be a journeyman. As such he will be paid $4.50 a day for an eight hour day.

For the young man under 18 who wishes to enter the trade class B is open. Here he may be two years younger, as the work he is expected to do is not of the character required of the apprentice in the other classes. He begins as errand boy in a shop or at similar work, and his wages at the start are $6 or $7 a week. The young man who learns this branch of the trade will be taught the manufacturing end of the business and the handling of dynamos, motors and electrical plants. His wages will not be regulated, but he may easily make himself so valuable to his employer that he will be paid as much more during his apprenticeship as if he were in class A.

Armature winders and the men engaged in other branches of shop work receive $3.25 per day. But to the young man who has studied during his period of learning there is always the chance to secure a position in charge of an electrical plant, and there his wages will not be regulated by any rule, but will be dependent upon his ability and the position he holds. From $80 to $225 per month is the range of the salaries received by the competent men in this class of work. There is practically no limit to the position and wages that he may work up to in his line.

The third class of electrical workers, class C, are telephone men. The wages of the journeymen in this department of the trade are $3 per day, and it does not offer the field for advancement the other lines do.

To achieve success in the higher lines of electrical work the young man should be studiously inclined. He will, while employed as an ordinary worker at his trade, receive wages quite equal to those received by other trades, but his opportunities for advancement will be so many and generous that it will be sad negligence upon his part if he does not study and learn the things that will help him to rise to a superior position in his craft. He should strive while working to read books and journals that bear upon his trade, and otherwise keep himself informed in regard to the latest things in electrical equipment.

There is probably no branch of skilled work in which the progress is so rapid as in this, and it is extremely necessary for him who wishes to rise in it to keep abreast of the times. If he does this, and is a capable workman, he can work into the class of experts in a short time. These men who have perfected themselves in one particular line of work are paid from $6 to $7 per day.

If he goes into the ranks of the "house electricians," and takes charge of a plant, he can earn a great deal more. This is all within the reach of the practical workman who has not acquired more than a cursory knowledge of the technical part of his trade.

To the young man who has studied for two or three years after becoming a journeyman there are even greater possibilities within easy reach. He may become an estimator, superintendent, or even an electrical engineer, and in many of these the pay is much higher.

New Electric Automobiles.

United States Consul Haynes, reporting from Rouen, France, sends the following, which is copied from a Paris newspaper:

The trials which were made yesterday morning at Longchamps with a new electric carriage constructed by the Electromotion company, whose headquarters are in the Avenue Montague, give every promise of creating a revolution in the automobile world.

Like all the firms which are interested in the construction of electric carriages, the Societe Electromotion has, up to the present, employed for the transmission of power to the wheels motors of high speed, with 800 to 1,000 revolutions a minute, these acting with the intermediary of chains and pinions or pinions and gearing. This method has been adopted up till now in order to avoid the weight of the electric motors. The drawbacks to this system are as follows: The pinions, chains and gearing absorb no small amount of force, this loss beginning at 25 per cent and increasing with wear. The battery also progressively weakens.

Then the gearing, pinions or chains have to be changed periodically, causing expense and the laying up of the carriage for repairs. The use of pinions, chains and gearing, however carefully the vehicle may have been constructed, always produces a grinding noise, which increases with wear, and this grinding detracts from the charm of electric carriage riding. Again, the overheating of the motors limits their action. Thus in existing systems high-power batteries, which render the carriage heavy, are absolutely necessary.

The Electromotion company's new method of transmission has been tried over and over again, but this is the first time that the inventors' dreams have been realized, and so satisfied is the company with the perfected invention that it has obtained patent rights for all countries.

The system is simple. The motors and the wheels are one and the same thing, working together, running at the same speed and without any kind of intermediary. The "live axles" can be placed in front or behind. They receive their motive power direct from the accumulators, and the chains, pinions and gearings are things of the past.

A carriage with live axles can travel 20 to 30 per cent farther than the ordinary carriage, for the reason that it is relieved from lost energy and has no impediments. In a word, weight is reduced, power increased, heating diminished, and absolute silence obtained, while wear and tear are brought to a minimum.

This invention can be applied to any kind of vehicle, although at present the private carriage is receiving all attention. In the trial the new system, although primitively mounted, worked admirably at five speeds, varying between four and a half and nineteen miles an hour, and with perfect silence. There was no jar in starting or in changing speed. The general appearance of the carriage is improved, as the motor being removed from under the vehicle, the body can be built low. It may be said that the wheels on which the motors are placed look clumsy compared with those on the present-day carriages. This is simply a matter of first sight.

Sending Pictures by Wire.

During several decades a number of methods for reproducing simple pictures, drawings and hand writings electrically at a distance have been proposed and partly carried out, but none of them has led to a result of technical importance. This seems not to be the case with the improved system of Prof. Korn of Munich, whose success is due principally to the employment of a vacuum tube as an adjustable source of light at the receiving station.

The essential arrangements are well known from previous attempts. Two cylinders, one at the sending and one at the receiving station, run in synchronism. On the former is the picture to be transmitted, preferrably on a film, and on the latter is a sensitave photographic film. A fine ray of light, concentrated by lens from a suitably arranged Nernst lamp, penetrates the first film and strikes a selenium cell inside of the hollow glass cylinder. The selenium cell is connected in series with an accumulator battery, the line wire and a current indicator at the receiving station. Upon rotation of the hollow cylinder the light ray describes a spiral line of very small pitch on the film, like the stylus of the gramophone. In proportion to the blackening of the film the light ray is weakened more or less, the resistance of the selenium cell raised accordingly, and the current in the transmission line shows corresponding reciprocal changes.

The time required for reproducing a photograph is at present half an hour. The transmission line may, of course, be used at the same time for telephony. Photographs have been successfully transmitted over a four-fold line between Munich and Nuremburg, the resistance of the complete loop being 3,200 ohms. The time of transmission may be considerably diminished by increasing the deflecting and indicating powers of the galvanometer. The time required for the transmission of handwriting or drawings is only one-twentieth of that necessary for pictures. At present 500 words can easily be transmitted in one hour. By operating the high tension relay directly by the line current an improvement can be effected.

Notable Discovery by Accident.

It was by an accident that an important discovery was made at Stockton, Cal., recently. It has always been held impossible to synchronize electric currents on the same wire. Not only was this done, but there was no explosion when the heavy load of two currents was imposed.

Also, power was sent from the plant of the Bay Counties company at Colfax to the Standard Electric company at Mokelumne Hill, a distance of 550 miles. Stockton city is supplied with power by the Standard company, but there was a break in the service, and the Bay Counties power was turned on.

When the Standard plant was placed in operation again the two currents met somewhere on the long line of wire, and the synchronizing occurred. There was no accident resulting from the heavy load of 550 volts carried by the wires during the night. The discovery is of the greatest importance to all interested in electric power plants.

Operating Problem Solved.

The day when all railways will be operated by electricity instead of steam has been brought a great deal closer, it is claimed, by the successful inauguration of an alternating current electric car service on the Ballston extension of the Schenectady railway.

The new line has an overhead trolley, is double-tracked with rails weighing seventy-five pounds to the yard, is gravel ballasted, and has a maximum grade of 1.8 per cent and a maximum curvature of 4.25 degrees.

The type of car in service on this line is unique not only in that it is equipped with alternating current motors, but in that these motors can be run either from an alternating current of 2,600 volts, stepped down in the car to 460 volts, or from a direct current of 600 volts. This makes it possible to run cars by direct current on one part of that road and by alternating currents on another part.

The development of large power stations and transmission systems has been principally with alternating current, requiring rotary converters or other commutating devices for changing the alternating current into a direct current of about 600 volts, suitable for the operation of electric railways.

Obviously, there would be a great advantage in railway motor equipment that could be operated from an alternating current of high voltage, without the necessity of intermediate commutating devices. Of still greater advantage would be such equipment if it could be operated on systems having in part the alternating current of high voltage and also having the direct current trolley in part. For years electrical engineers have tried to devise such a motor, and it is now claimed they have solved the problem, as demonstrated by the results achieved on the Schenectady line.

The commercial development of the alternating current motor is opportune, as steam railway managements throughout the country are displaying great activity in acquiring competing electric roads and in electrically equipping portions of their systems now operating at a loss with steam locomo-