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In today's edition of the Nebraskan, devoted to the interests of the electrical engineering department, it may be fitting to call attention to the remarkable success of the graduates of that department in the great world of business, as shown by the s ment presented. A careful investigation shows that practically every former student of the department who properly prepared himself, is now drawing good wages and is doing work in a responsible position. The conclusion can fairly be drawn from the data given that there is work along these lines to be done by all who fit themselves for it. Probably there is no other calling in life in which there is better opportunity for advancement afforded to the ambitious young man.

The universal success that has fallen to the lot of the graduates of the department can not but be a criterion of the work done in that department. We commend to our readers, and especially to those who are contemplating a course in electricity, a careful perusal of the matter presented herewith.

"The Young Man and the New Force."

(Abstract from article by Prof. Francis B. Crocker, in Saturday Evening Post.)

Speaking of the quick success of electrical engineers, Professor Crocker says:

I have personally followed the careers of several hundred men who have entered the field, and am convinced that in most instances they have gone ahead more rapidly than would have been possible in any other line of human effort. Where the men possessed exceptional ability, their advances have been much more rapid than that likely to occur in any other pursuit.

There are probably two reasons for this. In the first place the business is so new and has expanded so enormously that opportunities for promotion have been created almost more rapidly than they could be filled. Thus many men have actually been forced ahead by circumstances. The other reason is the fact that electricity is a peculiar subject. In its pursuit general intelligence or knowledge is not sufficient for pronounced success. A man possessing special taste for it soon differentiates himself from the others working alongside who may not be endowed with the same advantages. Such a man will forge ahead of his fellows at a rate that is absolutely impossible in any other calling in the world.

The successful electrical engineer has more than mere ability. He is gifted with a special talent, like the successful artist or the musician. Electricity is to my mind the only mechanical pursuit which has "soul." The successful electrician is born. Many of the qualities that are his are intangible, just as the fine musician's qualities are.

But there must also be tangible qualities, certain fixed mental traits. He must have great mental alertness, the ability to think quickly, to grasp a given situation at once. He must be of the analytical turn of mind—that is, able to reason from cause to effect, or vice versa. In electricity one thing follows from another with absolute certainty. For example, it is possible to calculate within a fraction of a per cent, before an electrical machine is built, exactly what it will do. This is impossible in any other branch of mechanics. The idea so common, that electricity is vague and not capable of being definitely controlled, arises from the fact that we do not know what electricity is. But in point of fact, we know as much of the ultimate nature of electricity as we do of gravitation or heat.

We know already what are the laws of both electricity and gravitation, as well as the results that they produce, and it is very doubtful if our ability to control, measure, and utilize these agencies would be improved even if we understood their exact nature. The laws and applications of hydraulics would be just as definite and successful even though the facts were not known that water is composed of two atoms of hydrogen and one of oxygen. It is possible that methods of generating electricity may be advanced when its real character is discovered, but it is not likely that this knowledge will greatly affect the methods of handling and using it.

But in the popular mind the absence of the ultimate knowledge, has left the impression that electricity is not only something unknown, but unknowable. Its subtlety, extreme rapidity of action and astonishing achievements make it appear most mysterious and occult in comparison with the ordinary forms of energy. The experience of the electrical engineer is supposed to consist of a series of surprises and shocks to his mind as well as to his body. This notion is not confined to the ignorant, but is possessed by many educated persons, including non-electrical engineers. This idea has sometimes been the cause of actual harm to the progress of electrical engineering. The profession has been considered to be hardly legitimate, those who practiced it being regarded as either wizards or charlatans, or a combination of the two.

Yet, as I have said, there is hardly another science or profession where the conditions are so exact as in electricity. Known results are figured out with a decree of accuracy that is truly amazing. Many of these results are so unique and astonishing that we still regard them with wonder even after we have become familiar with them. Some of the most striking of these examples are the locating of faults on submarine cables, telephoning a thousand miles or more, transmitting power over one hundred miles, sending simultaneously a number of messages on one wire, utilizing the power of Niagara, producing the Roentgen ray, and telegraphing without wires. These and hundreds of other wonderful feats are not accomplished by chance, or by groping in the dark.

And, great as these facts are, new and almost equally startling results are coming up almost every week. It is the first duty of an electrical worker to fall in with rapid advances and radical departures. Therefore, a necessary qualification for the successful electrician is an interest in things that are new because they are new. Any one with a strong conservative tendency would be at a disadvantage in the electrical field. This is probably the reason why Americans have got along faster than any other nation in the development and use of electricity. An American prefers a thing that is new, whereas a foreigner considers newness in itself an objection. The man who is interested in ancient literature or in archaelogy cares little for electricity. This is a fact I have observed among my own friends.

Those who have gone into electricity with the idea of saving themselves labor have made a great mistake, because electricity requires fully as much application and intensity of purpose as any other line of work. Mr. Edison was once asked to advise a young man how to succeed in electricity, and his characteristic reply was, "Don't watch the clock." What he meant was that a time server, one who simply works so many hours a day for so much in the way of compensation, would never rise high in the electrical business. Electricity requires that high order of interest which is the devotion to art for art's sake. Edison considers that his own success is due to the fact that he tried harder and worked more hours a day than his rivals.

In regard to physical qualifications, it is, of course, an advantage to have a strong body, but so long as one is sufficiently well to be able to keep at his work, the mere possession of physical strength is rather less of an advantage in electrical pursuits than in almost any other. This is due to the fact that it is essentially intellectual; it exemplifies the control of mind over matter. One can control thousands of horse-power by an electrical push-button. This is true in no other branch of industry. Even the control of a steam engine by the working of a valve requires a certain strength.

Given the inborn qualities I have mentioned, the next question is in regard to the best preparation or training to be followed. Ten or fifteen years ago there were no schools giving a course of study in electricity except of a very elementary character. Therefore all those who entered the profession at that time were obliged to pick up their knowledge as they went along. At the present time, however, there are many first class institutions all over the world teaching electrical engineering very thoroughly and giving it a prominent place in their curriculum. The large companies, such as the General Electric and Westinghouse, in most cases require, and in all cases prefer, that a young man entering their employ should be a graduate of some electrical course of study. This is in itself a very significant fact.

In engineering departments of the various companies, and in all positions involving the design, construction, installation, and operation of electrical machinery, it would seem that a scientific and technical knowledge is practically essential. There are, of course, many prominent examples of self-made electrical men; in fact, as was pointed out, all the older electricians must have been self-taught. If we look around on the younger men, however, we find with few exceptions those coming to the front are graduates of technical schools. The case is similar to that existing in the relation of West Point to the army. Almost without exception the great generals have been West Point men, but there are a few Funstons and Milses. The bulk of the army officers have been, and are, West Point men, however, and on them we depend.

Of course, success is a somewhat relative term, and it is rather hard to say what proportion of men succeed, as success may be measured in various ways. But it is probably fair to say that nearly all electricians make a good living within a year or two after they graduate. It is probably a fact that at least half of the men make what can be called a substantial success within three or four years after graduation. I have in mind several young men who have reached prominent positions, and won a national reputation in their profession, within five years after graduating from Columbia University. One of them is chief electrical engineer in the Niagara plant, the largest in the world. Another is professor of electrical engineering in a prominent university. Another became chief engineer of a well known manufacturing company in less than two years after graduation.

The large number of startling and valuable inventions that have been made in electricity during the last twenty years have brought many men to the front, and they have been handsomely rewarded for their labors. Even during the present year several important inventions have been brought out and undoubtedly this will continue. But though great progress will be made, it is a fact that many of the fundamental principles have been evolved.

However, the application of electricity will undoubtedly extend even more rapidly in the future than it has in the past. In electric railways there will be constructed not only the present trolley cars for local passenger service, but high speed railways for long distances between large cities. There is practically no limit to the speed of an electric locomotive, since its armature may rotate at a thousand or more revolutions a minute. With steam, on the other hand, it has not been found practicable to run a locomotive faster than about three hundred and fifty revolutions a minute, and, since we are practically limited in the size of the driving wheel, we can evidently expect no great increase in speed with the present steam service. An electric railroad between Berlin and Hamburg is now being designed and constructed, on which it is hoped that the trains will run at a speed of a hundred and fifty miles an hour. Of course, at such high speed there is considerable danger of the train leaving the track, but some positive means to avoid this danger will undoubtedly be provided.

The transmission and distribution of electrical power to motors in mines, factories, and mills is another field which is now being, and will be, rapidly extended. In fact, it looks as if practically all mining, metallurgical, chemical, and manufacturing establishments will be operated by electricity in the near future. The advantages apply to mines of all kinds, iron works, machine shops, cotton, woollen and other textile mills, chemical works, printing establishments, and almost every industry in which power-driven machinery is used. The oppor-