

line having been more entitled to the name of 'electrical mechanics' than of 'electrical engineers' being able merely to make repairs and do small wiring jobs. Of course we have many instances of civil, hydraulic and mechanical engineers, and architects, and even land surveyors, who, without the slightest right to do so, have called themselves electrical engineers, and freely advertise their specialties as being electric railways, electric lighting, etc., and actually get work in those lines which they simply hand over bodily to the manufacturing company of their choice; and fourth, that a great deal of such electrical work as there has been, has been more or less of a pettifoggish character—municipal deals, small lighting plants, and so on. I think, however, that a different notion is taking hold of the public, that is rather encouraging to the independent engineer. In the first place, happily, these small plants are about all sold now, and people are getting a little less confident as to their electrical attainments. The evolution of machinery from the old D. C. or single phase alternating type to the latest polyphase development, with all the latest storage battery, inductor type, direct connected side issues, has rather brought electrical engineering, as such, to the front; and as the public begin to read a little more, and hear a little more, and find out that electricity is not "in its infancy," nor yet a matter of unspeakable mystery, but a science to be studied and understood; a profession clearly distinct from civil or mechanical, or hydraulic engineering, and vastly different to architectural or land surveying, so do they think more of obtaining advice from electrical men—more especially as the number and variety of different types of machinery offered to them increase to their great perplexity.

"Briefly—I think that most of the small work is done. During the next several years large works will be promoted—large railways, power schemes, electrolytic plants, etc.; the men interested in them are business men who will not submit to the dictation of any manufacturing company, but retain outside independent engineers, knowing very well that electrical specialists can attain better results than the most experienced general practitioner. Therefore I think there is plenty work to do for electrical engineers who will vigorously insist on recognition, who will keep themselves absolutely free of the influence of any manufacturing company and who will keep themselves abreast of the times. It will be a hard fight, for we have many antagonists: we have the inertia of an ignorant public, the animosity of powerful manufacturing companies, who, in my own experience, will go to any length to persuade customers against calling in independent advice; and we have the jealousy of the other branches of the great engineering profession, who do not care to see electricity defined as a specialty for which they are not professionally qualified. I, personally, shall be glad to welcome any accession to the ranks of the independent electrical engineering profession in Canada, and think that success is a matter of determined effort and co-operation."

Mr. C. E. A. Carr, manager of the London Street Railway Co., writes: "In reply to your inquiry of the 28th November, I should think the chances of success in the electrical field were much better than in any other, for the reason that the uses of electricity are daily becoming broader, which is not the case, in so marked a degree, in any other profession."

Mr. R. A. Ross, mechanical and electrical consulting engineer, Montreal, writes: "Replying to your enquiry as to what are the chances of young men who graduate as electrical engineers in comparison with those who enter the other professions or commercial life, I should say, that without doubt at the present time electrical engineering is overcrowded, and will probably always remain so for the following reasons:

"To a new profession there is always a rush, and in this case the influx has been particularly large, because of the rapid expansion of electrical enterprise, necessitating a large amount of engineering supervision, which has become unnecessary as the enterprise settles down to a rigidly economical basis.

"Again, civil engineering has long been recognized

as an overcrowded profession, and the tendency of those contemplating entering the engineering field has been to avoid the civil and enter the new and rapidly expanding electrical field. This result has obtained in spite of the fact that although there is room for a civil engineer or two in every county, there is not room for an electrical engineer in a dozen counties. Further, electrical engineering will always attract to itself more than its legitimate share of students because of its novel attractiveness, and will tend to remain crowded. A glance at the list of students now entered in electrical engineering at our colleges will give eloquent testimony to above opinions."

Mr. James Milne, Lecturer in Electricity, Toronto Technical School, writes: "The great trouble in these days, I think, is in giving the young man the impression that if he receives a university training and graduates as an electrical engineer, that his services will be in demand, and that he will be looked up to by every one in the business, while the man who has been less fortunate as regards his education, but serves an apprenticeship to some trade, will be inferior in every respect.

"I believe in giving a fair education to all, but after that education has been attained the best thing that can be done is to learn a trade, and in learning that trade care should be exercised in the selection of the proper place.

"A young man who serves his apprenticeship in a small place, that is in a place where there is a scarcity of tools, etc., will in most cases turn out a better workman than the one who serves his time in a very large concern. In the smaller place ingenuity has to be exercised to get the various job done with the tools that are at hand, while in the large place special tools are ready made for almost everything. Therefore, in this respect the proper place to serve an apprenticeship is where a turn at everything may be got, such as pattern-making, fitting, turning, armature winding, etc., etc., and finishing up with the drawing office. This is what a complete apprenticeship should comprise. In these large manufacturing concerns where premiums are paid for instruction, the chances of knowing something at the end of the time are very slim indeed. There is one good thing about the arrangement, however—the money is generally thrown away by those who can afford it, and benefits the electrical concern, but whether or not it benefits the other party is a secondary consideration.

"In the smaller place the young man gets a fair insight into everything, and gets accustomed to the use of tools, and by and by is sent out to do various jobs and gain valuable knowledge and experience, and in a comparatively short time becomes a first-class practical man.

"Our learned brother, the electrical engineer, who has just graduated, finds that before he can be of much use he must gain practical knowledge, and to do this he has to get into some shop. Now here is where the sticker is; he has been led to believe that he will not have to soil his hands, and that his brains will do it all. He never made a greater mistake in all his life.

"For some unknown reasons, parties in charge of shops or branches of any manufacturing concern will almost invariably refuse to employ these graduates, even although their services are offered gratis, and it is right here where our premium system comes in. They pay the money for instruction, and simply put in the necessary time, and that is about the end of it.

"Our man who has served his apprenticeship in the small concern and spent his spare time in reading up, sees an advertisement which reads something after the following: 'Wanted—a good man to take charge of an electric light plant—apply at so and so.' He, of course, applies, and in his application he states his experience, etc., together with all the rest of his redeeming qualities. For the situation we have 100 applications, 99 of which are from electrical engineers, graduates of some university. The parties to whom the applications have been sent read all the applications and comparing all their good points decide to give the situation to our practical man. This, I think, is pretty nearly the universal experience.

"When we bear in mind that what might be termed 'good jobs' are very scarce, and in Canada there