

GRADUATES OF COURSE II

What They are Doing and What They Studied.

By PROF. J. C. RILEY.

The average man coming to the Institute to study engineering knows very little of the different branches of that profession. His choice of a course is usually governed by the wishes of his parents and by the more or less incorrect notions he gets from the few other students and teachers with whom he becomes personally acquainted during his first year. From that time on, until he graduates, his time is fixed in rounding out his liberal education and in studying the fundamental sciences with their application to a few selected examples of engineering. He has little opportunity of meeting men actively engaged in engineering and knows but little of the work they do.

After graduation he must usually begin earning money at once. There is no difficulty in his obtaining a position, but the number of situations available is not so great that he can afford to let a reasonably good opportunity slip by, so very often he takes the first chance that comes, and begins work in a business about which perhaps he knew almost nothing a week previously. During his first five years out of school he may change his position several times. Very likely he makes a radical change in the nature of his occupation, sometimes from dislike for the old vocation, sometimes through a distinct preference for the new, but oftener through events over which he has little control. After about five years, however, he has generally located permanently, and thereafter his changes are mainly advances or promotions to positions of greater responsibility.

Let us see what are the professions of those graduates of Course II who have passed through this period of change and settled down to their life work. The following table was compiled from the Register of Graduates, published in 1908, and includes 653 men who graduated before 1905.

GRADUATES OF THE COURSE IN MECHANICAL ENGINEERING.	
	Per cent.
1. Mechanical engineers in the employ of corporations or private firms	32.1
2. Managers, superintendents or proprietors of engineering works or establishments ..	7.2
3. Managers, superintendents or proprietors of manufacturing establishments	13.6
4. Secretaries, treasurers, financial or cost managers and "production engineers"	7.0
5. Teachers	7.5
6. Designers and draftsmen ...	5.2
7. Lawyers and patent examiners	2.5
8. Consulting engineers	2.9
9. Insurance engineers and inspectors	3.4
10. Civil and electrical engineers, contractors and architects .	3.4
11. Sales or purchasing agents for engineering firms	3.4
12. Business men and others whose work is quite apart from engineering	5.5
13. Not known, or not classified .	6.0
	100.0

It is difficult to estimate a man's duties from the short statements of his occupation which he sends for publication in the Register. Nevertheless, let us take the above list as fairly correct, and consider the probable qualification and daily work of the men.

The first and largest group, about a third of all Course II's graduates, includes men under salary, who have charge of design, construction, maintenance and operation of many differ-

ent kinds of mechanical plants, machinery, and processes. Probably more than half have administrative or executive duties too, but the criterion which places them in this group is that in their daily work they must apply a knowledge of scientific principles and practical engineering. They originate, investigate, or develop the ideas on which successful completion of their firm's engineering work depends. They differ from the men of group 2, in that usually they are subordinate, and as such are responsible for details from which managers are often free. The work of these men as a class differs greatly, and so may the work of each man, from day to day. Perhaps today, the engineer may be comparing the cost and general desirability of several plans for enlarging the plant without interfering with the product; tomorrow he is sent to conduct the acceptance test of an engine which the firm has erected; and next week he may be called suddenly, to say what immediate steps shall be taken to repair a breakdown, and then to design a new part to replace the old so that it cannot break again. His duties are varied and call for sound technical training, good judgment, and all the ingenuity and general experience he possesses.

Group II includes older men of longer experience, who have advanced to the management of engineering work, or whose fortunes have enabled them to go into engineering for themselves. These men are superintendents of motive power, managers and owners of machine shops, pump and engine works, and the like. In their present position, many of them have forgotten most of the scientific, and a good deal of the general information they once possessed. For questions of detail, in all but the most important matters, they accept the figures and designs of their assistants of Group I, but for management of the business and its employees, and for decision of engineering questions of great importance, their wide experience and business training makes them really of greater value than the engineers. Problems involving material things and the laws of science are often difficult; but problems involving the human element too, are more difficult still. The engineer who studies and tests the turbines built by his firm until he finds wherein and why they are less efficient than those of a competitor, and then re-designs and perfects his own until the results are satisfactory, is a valuable man to his firm; but the manager or superintendent with sound judgment and good executive ability, who shapes the general policy of his firm or his department, who makes prices, directs the work of his subordinates and perhaps by a just and tactful management avoids or settles a strike, is worth more than an engineer, and usually he gets more.

Group III includes men to whom engineering training is not so valuable as to the previous groups. The work which they control is mechanical, but the product is usually some small article or some material manufactured by wholesale, and each day's work is a repetition of the day before except in so far as the product or process can be improved. A Tech man with one of the large hardware factories recently stated that his firm would not accept orders for hinges of a special pattern in lots smaller than a hundred thousand dozen. Improvements lessening the cost of production of even the cheapest articles, made in such large numbers, are of great importance, and worthy the efforts of the best mechanically trained men, but such work usually falls to the inventor or the designer rather than to the technically educated engineer. Technology's Course II men are well represented in the management of firms in the United States, Canada, and Europe, engaged in the manufacture

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CHAS. T. MAIN

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