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nore us. Our schools and colleges must lead the way in training our young people, so that our rapidly growing contact with Asia may be freed from the danger that confronts us and may become on the contrary, a source of mutual advantage.

THE INFLUENCE OF THE SCHOOLS OF APPLIED SCIENCE ON PREPARATION FOR CITIZENSHIP

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It has seemed to me that the term "good citizen" ought to have a broader meaning; that it ought to include one's duty to his neighbor, to his business associates, to his professional work, to civic development. In order to get the opinions of some men of affairs in regard to this question, I addressed letters to the mayor of my city, the governor of my state, and the senior senator from the state, asking each of them to give me his definition of a good citizen.

Mayor Baker's letter is as follows:

"I do not know how I can pack all of the attributes which go to make a really good citizen into few enough words to constitute a definition, but the following is the best I can do on the spur of the moment:

"He is a good citizen who is constantly busy training his own mind and conscience in order to apply them cheerfully and rationally to the following purposes: First, to make the most of his own life in intellectual and emotional satisfactions. Second, to be to his family a reliance, a comfort, and an inspiration. Third, to be to his friends a gentle and a just influence, and to be an incentive to high thinking and right living on their part. Fourth, to be to the state a sane and hopeful soldier of peace, fighting always for all good things without too much emphasis upon his own opinions, and with a mind as free from prejudice as his best efforts can make it."

Governor Cox says:

"My definition of a good citizen is a person who makes an honest living and allows other persons to do the same thing, by obeying the laws of the land and conforming to the rules and regulations of society."

Senator Burton writes :

"I would say that I think a good citizen is one who carefully and diligently prepares himself for his lifework, thinks for himself, takes care of his body and habits, takes an interest in public problems and gives them mature and deliberate consideration, and bears constantly in mind the duty that social classes owe to each other."

From these letters three necessary qualifications stand out : a man, to be a good citizen must do honest work in the community ; he must exert a helpful influence upon others ; he must take an interest in public problems and do his part toward their solution. I prefer this definition to those given in the dictionary, and I shall base my paper in part at least upon the interpretation of the term given by these men.

In order to find out what the engineering colleges are doing to promote this kind of citizenship I addressed letters to many of the leading technical schools in the United States asking two questions ; first, what they were doing directly to promote good citizenship, and second, what they were doing indirectly. Replies were received from over sixty institutions and I shall freely use the answers which the presidents, deans and professors of these colleges have given. The answer to the first question was in general, "No" ; that is to say, very little is being done in the technical schools for the express purpose of training men for citizenship. These schools are professional schools whose business it is to train for professional life along engineering lines and they do not make a specialty of giving lectures or class room work directly along lines which have to do especially with training for citizenship. Nearly all of them require courses in economics and special attention is given to those parts of the subject which have to do with railroads, taxation, public utilities, the labor question and other problems of great general interest. In many institutions there are elective courses in political science, sociology, etc. Courses of lectures which are either general for the whole college or university or special for certain departments, take up such questions as the relation of the citizen to the government, the duties of citizens toward public questions, the development of cities through engineering industries, the relation of the engineer to public life, etc. By these means the engineering colleges are doing more or less to promote good citizenship directly ; indirectly all of their work or at least a very large part of it, tends in this direction.

I presume it is not necessary to say that the engineering student is taught to do honest work. As a rule the engineering colleges require a high standard of admission and the courses are very severe.

The second quality that a good citizen must possess is that he must exert a helpful influence upon others. A man exercises a helpful influence upon others when he possesses a high type of character and impresses men by his honesty and sincerity. There is a professional etiquette among engineers which is always taught and always firmly adhered to by those who stand high in their profession. One of the subjects always given in technical schools is that of welfare work among the laborers in shops and factories. Honorable conduct toward and care for others, the others being his fellow workmen, are among the subjects which are instilled into the mind of the undergraduate in the technical school. For many years the question of a living wage has been taught to the students who expect to become engineers. Piece work, the bonus system, prizes for excellence, distribution of stock to employees and the question of co-operation between the office, the engineering room and the factory, are all principles of daily study. Given the opportunity, the engineer has always been ready to devise plans and methods by which the employee should receive better wages and better treatment. The employee who meets with an accident or is taken ill can receive care at once in the factory. In one large factory I was informed that a certain amount of stock was set aside each year so that employees might purchase it. There are hundreds of examples of this kind throughout the country and the young engineering student is making a careful study of them all.

Through Y. M. C. A.'s and other organizations, the religious side of the student receives more or less development. It is doubtful whether there is very much direct moral and religious training given in the engineering schools. There is always more or less moral instruction but it comes chiefly through the example of the faculty and through questions of professional etiquette which are constantly being impressed upon the candidate for a professional degree.

The third part of our definition is that a good citizen must take an interest in public problems and do his part toward their solution. Our engineering colleges are working directly to secure for their graduates this qualification. Preparation for citizenship means fitting for service. Professor Ray, of the Pennsylvania State College says: "A good citizen must be capable of thinking and acting intelligently upon public questions."

The engineer is being brought more and more into contact with great public problems and to him is left the solution of many of them. When the Federal government wishes to know the value of railroads of the United States it selects engineers to make the valuation. Cities depend upon engineers for their water supply, their sewage,

and in a large part for their sanitation. The engineer reclaims barren or swampy land; fixes the boundaries between countries; builds canals; carries out nearly all the physical improvements in cities and in fact is in charge of nearly all great public improvements. He is the man who has the last word to say in regard to most public improvements and his knowledge and his reliability are so well known that his verdict is generally accepted without question. The technical schools, however, do not make young men into experts who can at once assume great responsibility; they simply prepare them through study of principles and long continued drill upon elementary things to begin their work in the engineering profession. The engineering schools train their students to take an interest in the administration of cities and in good city administration because the administration of a city as a rule is a business and an engineering problem. If the administration could be left to technical graduates the cities would soon be free from political domination and the spoils system would become a thing of the past because the engineer picks his assistants not because they are members of a political party but because they know their work and can perform it faithfully and well.

All scientific work is based upon absolute honesty and truth. The student must approach his problem with an unprejudiced mind; must be entirely unbiased; must be willing to have all of his favorite theories overturned, and must school himself to accept results as they are if he is to succeed. Inaccuracy may bring great financial loss upon him or his employer but it will do more than this. it will ruin his reputation in his profession. He is taught to handle material things and to account for them rigidly and honestly.

The technical student must take a fixed course. There are no easy electives; hard subjects cannot be avoided in favor of those which take less time. Fixed courses tend to build up character, according to one of the letters received, and I am inclined to agree with the writer. As most of our engineering students go to college because they wish to, this duty generally becomes a pleasure; but there is always behind it the feeling that they are doing something which they ought to do and which they must do.

The young engineer cannot juggle with his data. If he is to build a bridge or railroad he must use the facts and measurements exactly as they are or he will not get a result which will be received by other men. The engineer's work is constantly being judged by nature, by the public and by his professional brethren, and the student must be taught to carry out his operations in such a way as to

receive the approving verdict of all these judges. All of these things tend to build up character and develop responsibility.

I believe these schools to a certain extent at least teach their students to think and this is the highest aim of any school. The courses and the methods which I have been describing all tend to teach him to work out problems by himself and in his own way; to think intelligently and wisely. The engineer in dealing with the problems which confront him must look at the other side. If he blindly assumes that there is but one aspect to the question and attempts to solve it from that standpoint alone, he will speedily find himself criticized by his professional brethren and not unfrequently by the public.

I have tried to show in what way the technical schools are preparing students for citizenship but I would not wish to convey the impression that these schools are doing better in this respect than other higher institutions of learning. If the technical schools have any advantage at all in this matter it is due to the fact that their students go to college with a fixed purpose in mind. They are working toward a definite end and hence perhaps develop some of those traits of character necessary for good citizenship better than college students who do not have this definite aim. Huxley defines an educated man as follows: "That man, I think, has a liberal education, whose body has been so trained in youth that it is the ready servant of his will, and does with ease and pleasure all that, as mechanism, it is capable of; whose intellect is a clear, cold logic engine, with all its parts of equal strength and in smooth running order, ready, like a steam engine, to be turned to any kind of work and to spin the gossamers as well as forge the anchors of the mind; whose mind is stored with the knowledge of the great fundamental truths of nature and the laws of her operations; one who, no stunted ascetic, is full of life and fire, but whose passions have been trained to come to heel by a vigorous will, the servant of a tender conscience; one who has learned to love all beauty, whether of nature or of art, to hate all yileness, and to esteem others as himself."

Would not this man be a good citizen?