

Goal of the engineering college

BY DEAN J. H. FELGAR

What is the goal of any educational institution? Is it not to enable and encourage individuals to develop the talents that each may have in the pursuit of happiness so that he may be of service to himself and also to the community? The talents of any individual are developed through the effort to gain knowledge and through experience. An educational institution is charged especially to furnish facilities for obtaining knowledge. Besides making this knowledge available, the institution directs the student in gaining this knowledge and also assists in giving the student a desire to gain this knowledge. No matter what the abilities of a student are, there must be a purpose or a desire on his part to avail himself of these facilities for his development. Any employer of men is desirous of employing one who has the ability to think and will make the effort. A professional engineer is one who has the ability and training to think along the line of engineering technology.

Certain fundamental training is necessary for one to have who is ambitious to become an engineer. This material has to be collected, classified, and presented to the embryo engineer during a period of four or five years, and makes up the engineering curricula. One with ability who has studied this curricula and who has done what he should to assimilate it, will find himself further along than one who has spent the time gaining this information in the school of "hard knocks." If this is not so, a college could not justify itself.

Through a series of years, a group of engineering teachers together with professional engineers and men from the industries have studied this educational problem carefully and intensively and out of this study has come the present engineering curricula. The courses are fundamental and general, built up of training in English and the fundamental physical sciences related to the economic structure of society by basic training in the economic sciences. General technical subjects are included in this fundamental training and finally, specialization in the

field in which the student expects to enter.

The economic demand for men of engineering training will not permit the schools to extend their training over a much longer term than four years. Again, the failure of the public mind to differentiate between the professional engineer, the technician and the journeyman mechanic, makes it difficult for an engineering college to idealize its training. Our graduates request that many things be included in our curricula but when they were going through college they complained that there was too much material for the time they had to spend.

Every college curricula should contain subjects which will help the student to take his position among men; subjects to develop his personality; a background of literary, social and philosophical subjects which would help the engineer to take his place on equal terms in competition with other intellects; training which will help him to co-operate with his fellow-men rather than differentiate himself from them; material which will help a man to talk something else besides "shop" with people he meets outside of business and professional relations. However, educators have not agreed as to what this material should be. If a young man does not get this training somewhere along the line, he is liable to develop into nothing but a technician and however successful he will be in his field, he may become a disgruntled, pessimistic old man unable to entertain even himself. One who is successful in his field may be called in for a good fee, when the information is needed but may never sit in the councils to develop a broader program.

No young man will be able to take his place in life without some social and ethical background. In accomplishing this program, the more driving power that is within the individual, the less driving power will have to be exerted from the outside and the more nearly the young man will find himself able to take his place in the world. The problem of the educator is, how can the lazy intellect of one having ability, be awak-

ened. Surely not by the "take it or leave it" attitude. Glen Frank in one of his syndicated articles calls our attention to this statement, "Oswald Spengler has called the engineer the priest of the machine. A priest is supposed to be concerned safeguarding the supremacy of spiritual values in a material world."

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The chemical engineer

Engineering has been defined as the art and science of using the mechanical properties of matter, in structures and machines. Engineers first gained recognition about the time of the Caesars, by their construction of engines of war and military works. Until about 200 years ago, engineering remained as just one profession, but about that time it separated into civil and mechanical, then a short time later into naval and then mining; the subdivision has been going on ever since.

Although the chemical industry is a development of the last 100 years, chemical engineering did not separate as a branch of engineering until about 1900. Until that time the chemical engineer's place was being filled by an industrial chemist whose knowledge of mechanics was very meager or by a mechanical engineer whose knowledge of chemistry was very insufficient. This new phase of engineering got a large boost by the world war by depleting our supplies of food and through necessity showed the value of synthetic processes. Large laboratories doing research on explosives have been turned into industrial research.

The work of the chemical engineer can best be shown by an example: Suppose an industrial research chemist discovers some new and cheaper method for the hydrogenation of oils. His employer may approve of the method and thinking that it will make him more money, will call upon a consulting chemist to show him the most economical position for the plant as to market and raw materials. Thus the theoretical steps have been taken and the next step is to design the plant. At this point the chemical engineer steps in. The mechanical engineer can not be expected to design it, because he could not choose the right materials that would resist the chemicals nor machinery that would be adapted to chemical processes. Thus we must combine the chemist and engineer in the proper proportion and evolve this new profession to fill an imperative need. But he must know even more than the chemical and physical side, for he must know a little accounting, in order to show a businesslike cost sheet and must have experience with labor conditions, be able to divide labor properly and organize it.

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