Another improvement in the air lift system that I wish to mention briefly is what is known as the booster pump. This pump, or tank, is located on the well top and automatically separates the air and water as it is discharged from the well, retaining just enough pressure from the separated air to force the water to the point of discharge. This is indeed a great improvement when the water must be transferred long horizontal distances toward the point of discharge. This point may be at the surface or at an elevation. Hitherto when horizontal distances had to be considered, unless the water was delivered to an elevated tank and allowed to flow by gravity, the air would get ahead of the water in the discharge line, thereby materially reducing the efficiency of the system. However, the booster very efficiently overcomes this condition.

I have given no tangible data on the air lift, but from the varying conditions that exist in all wells, any statements regarding the air lift system as a whole must be of a general nature. Some manufacturers have, at no little

## U.S. ENGINEERING COUNCIL'S COMMITTEE ON CUR-RICULA OPPOSES PRESENT ADOPTION OF SIX-YEAR ENGINEERING COURSES

UNDER date of August 21st, 1919, the secretary of the American Institute of Electrical Engineers referred to the U.S. Engineering Council a portion of a report presented at a meeting of the Development Committee of that institute. The portion of the report so referred to the Engineering Council read as follows:—

"There is a universal recognition of the fact that engineers do not participate as actively or as prominently in public affairs as they should, and that both the public welfare and their own individual advancement would be promoted if this condition could be rectified. There are two general reasons believed to be responsible for the existing condition: One, a lack of any general organization of engineers which would facilitate their co-operation; and second, too great technical specialization in the engineering curricula of our technical schools and colleges, which tends to narrow the vision of the engineering student and start him on his career with an exaggerated idea of the importance of specialization and an insufficient appreciation of the part he must play in public affairs. The second reason, namely, a possible modification of the engineering curricula of our technical schools and colleges, while perhaps of underlying and fundamental importance, was nearly crowded off the Lake Placid program by the press of other matters. It was, however, the unanimous view of the members attending the sessions that this matter should receive early and thorough consideration by the institute, and the following preamble and resolution were presented and adopted :----

"'As the individual engineer cannot look for greater public recognition or individual advancement than his training and fitness warrant;

"'And, in the belief that the bigger development of the profession consists in broader social and public service by publicly minded engineers;

"'Recognizing that on the one hand young engineers are employed for too long a period at work which does not stress their capabilities, and, on the other, that the demands of industry for ever-increasing numbers of technicians must be supplied:

"'And having in mind the excellent precedents established by the medical and legal professions;

"This committee would welcome the establishment at the earliest date practicable of a normal six-year collegiate course in engineering, two years of which at the least should be devoted to training in the humane arts and sciences, including, for example, political science, economics, history and general letters, the last four years being devoted to sound training in the sciences and in only the fundamentals of diversified engineering. trouble and expense, conducted exhaustive systematic tests in natural wells, or in artificial wells constructed for the purpose of maintaining any desired submergence by feeding water into them. The data that they thus gained is authentic for the conditions under which it was gathered. However, in the field nature does not make a habit of supplying her wells with water by pouring it in at the top. So we revert to the same premise from which we started. That is, each well presents a separate problem.

Another thing that has materially aided in the efficiency of the air lift system is the perfecting of air compressors by the various manufacturers. The standard compressors now offered on the market in nearly every instance operate on from one-third to one-fourth the horse-power that was required by the machines built some ten or twelve years ago. Not only is the economy of these machines much greater, but also the mechanical parts have been greatly simplified, thus bringing the air compressor into the realm of most economical machines.

"'With or prior to such a development we would endorse a program for the marked extension of vocational training in the industrial centres in order that the needs of industry may be met.

"'To the accomplishment of these ends this committee requests the appointment of representatives to serve on a Joint Committee of Engineering Organizations to promote such a national educational program as shall provide for the future necessities of the engineering profession consistent with the needs of society.'"

This report was referred by Engineering Council to its Committee on Curricula of Engineering Schools. At a meeting of that committee held October 15th, the recommendations of the Development Committee of the American Institute of Electrical Engineers were considered, and the following report was sent to Secretary Flinn of Engineering Council:—

"While your committee is not prepared to recommend a six-year course for the colleges of engineering, your committee calls particular attention to the fact that a six-year course was inavgurated at Columbia University some few years ago, practically on the same plan as in the case of the schools of law and medicine, the technical studies of the engineering portion of the course being concentrated on the last three years and based upon three years devoted to studies leading to the B.A. degree.

"The Massachusetts Institute of Technology is also conducting a six-year course in engineering, this being in addition to, and without interference with, the regular four-year course. A somewhat similar program, although perhaps less formal, is followed by the majority of the students in the Harvard University Engineering School, who first take their bachelor's degree in Harvard College, followed by two years in the engineering school. This problem is also being studied and experimented on by other universities.

"Your committee suggests that, as these practical experiments with the six-year course will furnish information not now available, any final recommendation can well be deferred until the results of these experiments can be studied and appraised.

"Your committee is now prepared to report unfavorably on the proposition to substitute the six-year course in place of the four-year course generally in the colleges.

"Your committee strongly endorses the proposition to extend and enlarge the facilities for vocational training, particularly in the great industrial centres; this educational work, however, to be carried on without interfering with the courses in engineering.

"Your committee also favors universal military training under proper regulations.

"Your committee does not agree that military training and vocational training should be combined, except so far as the vocational training would be found to be naturally involved in the military training."