nounce it, 1938 style, as well. This was prepared by Dr. John T. Harrington, of the Smithsonian Institution, and has caused much comment and interest among students of our language.

It is impossible, of course, to detail here all the studies and reasoning which led to the construction of the Time Capsule and selection of its contents. We have undertaken with humility the enormous task of leaving this message to the future, realizing well that no selection of ideas and materials, no matter how large, could really do justice to the astonishing variety and vigor of our age. Whether, in the end, the project can achieve its purpose depends on ourselves and our posterity. The engineering difficulties of removing the Time Capsule from its resting place can probably be counted upon to protect the capsule from vandalism. We feel that the good instincts of the human race may be relied upon to preserve word of its whereabouts for the generation to whom it is addressed.

We are often asked whether the Time Capsule will not be beneath the ocean when 5,000 years have elapsed. This question is raised because there is a general belief that the eastern coast of the United States is slowly sinking, and that as a result the ocean will rise higher and higher, finally covering these parts. The best answer to that comes from the U. S. Coast and Geodetic Survey, which has repeatedly surveyed bench marks along the Atlantic coast. They tell us that no evidence can be found that the coast is either rising or sinking. If it should be sinking, the rate of motion must be as slow as an inch a century, or else the sensitive instruments would long ago have detected it. At the rate of an inch a century, 5,000 years would see a sinking of only about four and a half feet. Since we are at this point 25 or more feet above sea level, we feel that the capsule will be safe from the ocean during its appointed time.

In addition to all the other protections that have been thrown around the Time Capsule, we are now about to place one more. The capsule rests at the bottom of a well which was made by driving a twelve-inch pipe into the soil until it reached solid ground at the bottom. Inside that pipe a ten-inch steel pipe has been welded. The second pipe was inserted in order that the well might remain dry. At the bottom of the inner pipe has been placed a three-foot plug of waterproof concrete and two feet of sand mixed with tar. The Time Capsule, at present, rests upon this base. Last night, in preparation for this ceremony, the capsule was straightened up and a small layer of our sealing material was poured around the bottom to hold it upright in the pipe. We shall presently pour in upon the Time Capsule 500 pounds more of this material, a substance consisting of 58 per cent. petroleum pitch, 17 per cent. chlorinated diphenyl, and 25 per cent. mineral oil. This material has been specially chosen because of its resistance to electrolysis and other characteristics. Our engineers tell us that this compound alone should last for thousands of years. All the materials used have been made from coal or oil products which were in the earth for millions of years before they were put to work.

Thus, when this sealing-in is performed, the Time Capsule will be protected from the earth and elements by two thicknesses of steel pipe and an inch layer of highly resistant plastic. Even without these protections, our engineers believe that the Time Capsule would be quite capable of lasting more than 5,000 years safely. With this additional protection, its potential life will be greatly prolonged.

SCIENTIFIC EVENTS

THE SOCIETY FOR THE PROMOTION OF ENGINEERING EDUCATION

THE fifth annual "Progress Report" of the Society for the Promotion of Engineering Education was released by Professor C. F. Scott, chairman of the committee, prior to the Berkeley meeting in June. The report is based on about sixty letters from officers and chairmen of the society. Items indicating progress were selected, condensed and epitomized.

The report states that increase in enrolment is significant, undergraduate students in approximately 150 engineering schools in the United States and Canada now numbering about 106,000, an increase of nearly 30 per cent. in three years. There were in 1939 4,700 candidates for the master's degree and for the doctor's degree 850, both having more than doubled in three years. The report states that this "undergraduate increase is presumably due partly to the employment situation, but mainly to the growing regard for engineering training as a preparation for careers in industry, business and public service." Mechanical engineering enrolment, which shows the greatest increase during this period, 89 per cent., "may be traced to the character of this curriculum and to the recent publicity given to aeronautics, Diesel engines and air-conditioning. Most mechanical engineering curricula stress management and labor problems, which may be an added explanation."

It is pointed out that "a notable trend in engineering education has been in the field of chemical engineering, which is maturing rapidly, and becoming more and more a mathematical, quantitative kind of

engineering; its technical literature is growing; the quality of instruction and the physical facilities of the schools are improving; and a younger generation of teachers is putting it across."

After recounting the advances being made by engineering schools in the teaching of physics, English, aeronautics, surveying, geodesy, mathematics, hydraulics and fluid mechanics attention is called to the subject of research. The report states that "prior to 1933 over half of new process and new product development came from Central Europe; in 1938, less than five per cent. Totalitarian influence on education is forcing American industry to a new dependence on research carried out in the United States."

The committee on aims and scope of engineering curricula in its contribution to the report presents the new conditions, trends and attitudes which necessitate a new study of the subject; it specifies objectives and stresses the fact that the normal basic course should prepare engineers for a wide range of technical, administrative and executive responsibilities. Some of the views it has considered include (a) the lengthening of the undergraduate curriculum to five or six years, (b) requirement of a period of preliminary study in a school of liberal arts preceding admission to the school of engineering, and (c) the trend in the direction of dividing the curriculum in the junior and senior stages.

The past year brought to completion the second stage in the accrediting program of the Committee on Engineering Schools of the Engineers' Council for Professional Development, of which the Society for the Promotion of Engineering Education is a member body. The first stage had to do with organizing the program of inspection and with developing principles and procedures. The second stage involved carrying these plans into operation. Consequently, there is available to-day an essentially complete list of accredited curricula of the engineering schools of the country for the guidance and use of state licensing boards for engineers, the national engineering societies and the thousands of high-school students contemplating an engineering career. A by-product of the investigations incident to accrediting is the interchange of information which has given opportunity for all schools, large as well as small, to improve their educational programs.

GRADUATE WORK IN CHEMISTRY AT COLUMBIA UNIVERSITY

THE adoption of a new program of studies leading to the degree of doctor of philosophy in chemistry at Columbia University has been announced by Professor Harold C. Urey, head of the department of chemistry.

Under the new system students need not enrol in a definite number of formal courses, although they are expected to register in certain classes in order to prepare for their dissertation and examinations. Hitherto candidates for the Ph.D. have followed a prescribed curriculum in much the same manner as undergraduates. Provision has also been made for greater financial assistance to those undertaking graduate work in chemistry.

The new program has been made possible through arrangements put into effect last year for exercising a greater selectivity in admitting graduate students and limiting the number matriculated for a Ph.D. degree. Students who wish to matriculate for the degree are advised that full-time rather than part-time work is desirable under the new plan. The following regulations have been made:

> In order to become candidates for the degree, students are now required to pass a matriculation examination after one full year of graduate work. Their acceptance will be based largely on the result of the examination and not upon any accumulation of undergraduate and graduate credits.
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> Candidates will also be required to have a good reading knowledge of both French and German. Within one year after being accepted they must submit to the faculty three theses, each containing an original conclusion drawn from reading and laboratory work. These theses must be defended before an examining board comprised of faculty members in the department.
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> The final awarding of the degree will depend upon an exhaustive dissertation prepared by the student on some original research project. The dissertation must be submitted for approval to a committee composed of members of the faculty of pure science. Although a limit has not been imposed upon the length of time necessary to carry out the research, the fact that the great majority of those accepted in the future will be students who will devote full time to their studies will automatically reduce the average time required to obtain a Ph.D. degree.

In describing the plan Dr. Urey said:

> Plans have been made to increase the amount of assistance given by the department to properly qualified students who are unable to continue graduate work without financial aid. Formerly students who were awarded teaching assistantships paying $1,000 for the academic year were required to teach twenty-four hours a week. Under the new plan this has been reduced to sixteen hours. As a result of lowering the number of teaching hours required, there has been a decided improvement in the caliber of those applying for assistantships. It was found possible to accept only a fraction of the number of excellent students who requested such aid this year.
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> In building an outstanding graduate department it is as necessary to have a strong student body as it is to have an adequate faculty. However, despite the presence of the latter, the department can not attract competent graduate students unless a proper amount of financial support is offered by the university.