

THE ENGINEERING SCHOOL*

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There is some embarrassment in being selected to talk on the subject, the School of Engineering. I am almost the baby member of the Engineering School teaching force. In fact, this is only my second year here at the University of Delaware. These two years have occurred, however, at a time when one may learn a great deal about the School and the University. We have been putting up a new Engineering Building on funds that were estimated very closely, have been making a complete revision of the Engineering curriculum, and have been moving. At such times, one becomes well acquainted with the students, the other members of the teaching force, the President of the University, the Board of Trustees, the Legislature, and the various friends of the University.

The students of the Engineering School, *make* the School. I have found them a happy, industrious and satisfactory set of young men with which to work. The last two years have been trying for our student body. For classroom work, they have been moved from pillar to post, from Mechanical Hall to the Engineering shacks, from the shacks to various classrooms in Recitation Hall and Old College, from these classrooms to temporary quarters in the new building, with air hammers and other noises of construction going on overhead, and finally to our permanent quarters in the new building. Such an upset state of affairs gives the students who are so inclined an excellent excuse for slighting their studies and letting things go. There has been little of this. As a matter of fact, the student body completed more work last year than the year before, and this year we covered more ground than last year. Our laboratories have all

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been in a state of construction for two years and are still in a state of construction. We hope to get them finished this summer. We have called on the boys to do construction work in the laboratories and shops, and at the same time we have been trying to carry on regular laboratory courses. It is very gratifying to see the way almost all of our students, especially the Juniors and Seniors, have responded and worked with enthusiasm for their Alma Mater.

The teaching force has been through a strenuous period, and has been everything that could be desired. In laying out and installing the equipment, many have been obliged to give up their personal ideals. This has been done cheerfully for the good of the school as a whole. Many have put in very strenuous and long hours doing a mechanic's work in the shops and laboratories. As you shake hands with the members of our teaching force, you will find that their hands are calloused. This did not come from playing golf.

Radical revision of the curriculum has been made. Many have given up pet courses and have been obliged to teach courses in which they were not particularly interested; this for the good of the complete curriculum. It has been done cheerfully.

The Engineering School teaching force turnover has been nothing, except in the case of one young man in the department working for an advanced degree, and planning from the beginning to leave as soon as the degree was received. This does not mean that our men have not received other offers, for they have, quite flattering offers, but they have all elected to see the thing through.

We respect his achievements and are glad to work with enthusiasm with our leader, President Hullihen. We have found him a man heartily in sympathy with our efforts in Engineering. During the past two years we have not asked him for one single necessary thing which has been refused. We have been very careful in making our requests to tell him frankly what is necessary and

what is desirable. We have obtained everything that is necessary and a good deal of the desirable.

The Board of Trustees has stood enthusiastically behind the efforts of the Engineering School teaching force. They have given us even more than we asked for. We can only hope that the results of our efforts have warranted their confidence.

This beautiful building indicates the way the General Assembly of the State of Delaware stands behind the Engineering School. No more needs to be said.

Perhaps one of the most gratifying things about work in the School of Engineering is the encouragement that we get from our industries and our friends. Prominent among these is Mr. Pierre S. du Pont, who has given us \$30,000 to build a much needed Hydraulic Laboratory, and The du Pont Engineering Company, from which we have received the most valuable machines in our Machine Shop. The General Electric Company has been very generous to us. They have given very special prices on all their equipment put in the building and, in addition, have given a cash allowance of \$1200. The Union Carbide and Chemical Company has called and seen the spirit of progress of the Engineering School, and as a result installed our entire Gas Welding Laboratory, at not one penny of expense to the University. The Remington Machine Company gave a one-ton refrigerating plant for installation in our Mechanical Laboratory. The Lincoln Electric Company of Cleveland installed an arc welding machine. Westinghouse Electric and Manufacturing Company and many others have been very generous with information and machine parts. These represent the financial support the industries have given us. More gratifying, perhaps, are the words of commendation of the spirit of progress of our Engineering School we receive from industrial executives, men who know what the training of young engineers should be. Gratifying are reports we hear of what industrial representatives tell each other and other Engineering Schools of the excellence of our equipment and courses. Still more

gratifying is the fact that industrial executives are sending us their sons to train.

The University of Delaware was founded under charter of the General Assembly of Delaware in 1833, under the name of Newark College.

Engineering was first taught in the University of Delaware in 1892 in two courses—one, Civil Engineering and the other a combined course in Electrical and Mechanical Engineering. Before this time many of our graduates holding the degree of Bachelor of Science had gone into Engineering practice. Among these is Mr. Andrew J. Wiley, of the class of 1882, a man whom we feel privileged to honor at Commencement time this year. Electrical Engineering was taught as a separate course in 1911, and Chemical Engineering in 1916.

The Engineering School curricula cover the four basic branches of engineering:—Chemical, Civil, Electrical, and Mechanical. We have carefully avoided specialization; such as Automotive, Aeronautical, Industrial, Railroad, etc. With thorough grounding in basic engineering our graduates successfully enter the specialized branches; the converse cannot be true. Specialized branches develop rapidly. We fear that most specialized instruction, which we might give our students, would become obsolete before they graduate. Specialized courses have great romantic appeal, but we feel that, being a state college, it is not necessary for us to resort to this method of advertising for students. Furthermore, we feel sure that industries prefer young men of basic engineering training, leaving it to the industries themselves to furnish their own specialized training in the manner which to them seems best.

The Engineering School was given its first home in 1898 when the west wing of the present Mechanical Hall was built. Additions were made to this building until it reached its present form in 1911. By 1919 the Engineering School had outgrown Mechanical Hall, and it was found necessary to provide three temporary, one-story, wooden buildings on the green between Harter Hall and

Delaware Avenue. These unsightly but quite useful buildings housed the work in Civil and Electrical Engineering. But by 1927 these temporary shacks were rapidly falling to pieces and the General Assembly appropriated funds to build the first floor of Evans Hall. The Assembly of 1929 provided funds to complete the building as it now stands.

This is the present home of Engineering, very appropriately named Evans Hall in grateful memory of George G. Evans, who served the University faithfully for 48 years as trustee and treasurer. This man, the father, together with Charles B. Evans, the son, gave to the University efficient service on the Board of Trustees for 88 continuous years.

Some of you are interested in cost. This building cost \$360,000, including the \$30,000 donated by Mr. Pierre S. du Pont. The \$360,000 covers not only the building as you see it, but also a \$15,000 addition to the boiler house, necessitated by the building, from 7 to 8 per cent architects' and engineers' fees, approximately \$8,000 for grading and drains around the building, and the moving and installing of all the equipment which you will find in the building.

The building is designed for 250 students, hence cost \$1,440 per student. By doubling our teaching force so that we could teach classes all day long instead of the morning only and teach laboratories and shops all day long instead of in the afternoon only, we can, by crowding the building, take care of 400 students. It would then cost \$900 per student.

There are 40,000 sq. ft. of floor space in the building, 20,000 in the front portion, three stories high, and 20,000 in the rear portion, which houses the laboratories and shops. The building thus cost \$9.00 per square foot.

There are 670,000 cu. ft. of volume in the building; 270,000 cubic feet being devoted to the classroom and office section in front, and 400,000 cubic feet to the laboratory and shop section in the rear. The building thus cost 53 cents per cubic foot of volume.

This structure houses all the offices, classrooms, laboratories, and shops for the departments of Civil Engineering, Electrical Engineering, and Mechanical Engineering. Chemical Engineering remains in the top floor of Wolf Hall. The future plan is to place two small buildings, one on the right and one on the left, one for Chemistry and one for Physics. This will form a little sub-quadrangle devoted largely to Engineering and its supporting sciences.

You will visit the building, but there are several features which I should like to point out to you so that you will look for them. In the first place, we are all under one roof. This means very close association between departments, and avoids duplication of equipment. If Professor Koerber in Electrical Engineering wishes to run a test on a prime mover driven generator, he comes from the Electrical Engineering Laboratory over into the Mechanical Engineering Laboratory and uses the machine there. If Mr. Lindell, in his Mechanical Engineering Laboratory courses, desires to run a test on a steam pump he steps over into the Hydraulic Laboratory and there he has the steam pump with all the finished apparatus necessary to measure accurately the amount of water pumped. If Mr. Coyle, in his work in welding, desires to make specimens and test them, he can make them in his shop and step fifty feet away to the Materials Laboratory and pull them on a testing machine.

In the individual laboratories there are several unique features, some of which will be found in no other set of Engineering School laboratories in this country. We run 2300 volts into the Electrical Laboratory, so that we have available for test purposes all voltages up to 2300. An underground conduit in the Electric Laboratory carries current stepped down to 220 or 110 volts to all machines in the laboratory. The switchboard is so arranged that we may plug in on any current, but there is no possibility of cross connecting.

There are several unique features in the Mechanical Laboratory. For one thing, every steam-using machine

in the laboratory is equipped to be operated on either saturated or superheated steam and the superheat can be held definitely at any point between 0 and 100 degrees. Every steam-using machine in the laboratory can exhaust against pressure or vacuum, and the back pressure can be held at any pre-determined point from 28-in. vacuum to 30 lbs. per sq. in. pressure. All prime mover sets in the laboratory are prime mover generator sets as in a central station. The generators are loaded in four ways. We may parallel the main line current, may furnish electrical power to the Electrical Laboratory, may run our own shops and laboratories, or may absorb the power on a resistance grid.

We are very proud of our welding shop. Here we have one of the finest gas welding equipments in the country. We are also equipped to demonstrate effectively electric arc welding.

There are some features in the machine shops which are unique. In the first place each machine has its own individual motor drive. There is no overhead belting. In many cases, instead of the ordinary belt and cone pulley transmission, automobile gear shifts are used to give the required speed variation.

The Hydraulic Laboratory will not only contain all the equipment usually found in a Hydraulic Laboratory conveniently arranged, but all pumps will be installed here. This includes both steam and motor driven pumps. This laboratory is closely interconnected with the Mechanical Laboratory, so that the heat consumption of all the steam-using machines may be definitely and accurately determined without any change in the standard hookup.

This is our building and this is our equipment. You will find uncompleted portions. I hope there always will be uncompleted tasks. Engineering is a rapidly progressing profession. Should we cease to build and make changes we should quickly fall behind the procession.

Our greatest hope for the future is the establishment of an Engineering Experiment Station. We are doing all

we possibly can to make the University of the very greatest assistance to the industries by providing adequately trained young men, but we firmly feel that with an Engineering Experiment Station established, we should be able to do considerable research which would be of very great value to the industries of Delaware, and to the Engineering profession as a whole.