PROSPECTUS OF ENGINEERING AT THE UNIVERSITY OF IOWA.

AFTER the disastrous fire of March 10th, 1901, which completely destroyed two of our buildings, in one of which was located the Department of Civil Engineering, a question naturally arose in the minds of our friends and patrons as to what would be the immediate and future effect on the Engineering Courses at the University. We address ourselves to these and like queries.

Earlier in the year presentations were made to the Board of Regents relative to the development and more liberal support of our Engineering Courses, which resulted in the passage of the following resolution:

"*Resolved*, That it is the sense of the Board that the Engineering Depart- should be especially encouraged, and that in the near future it should receive such financial assistance as the finances of the University will permit. On vote said resolution on Engineering was unanimously adopted."

This resolution was published in the University News-Bulletin and sincere expressions of approval were immediately heard from all over the state, and additional students made application for entrance. But a loss of $150,000 to $200,000 such as was caused by the fire was not contemplated when the resolution was passed. Nevertheless the Regents were not dismayed. Appeal was made to the State Executive Council for an appropriation from the Providential Emergency Fund and was received. From this appropriation the first expenditure made was for the construction of a temporary Engineering Building on the foundations of South Hall. This work was entrusted to the Engineering Department and was undertaken and prosecuted in such an earnest manner that in just 14 working days after its commencement, classes resumed work in it.

The first floor contains 4,700 square feet, divided into a library and reading room (a catalogue of the books in which is printed in this issue of The Transit and reprints of same may be had on application) two offices, blue print and dark rooms, recitation rooms, and instrument cases; two large well lighted drawing rooms, the combined capacity of which is sufficient to accommodate sixty drawing tables. The ground or basement floor contains 4,300 square feet for laboratory purposes. In it will be established at once a demonstrating hydraulic laboratory, cement laboratory, testing laboratory, wood-working and model room, and a large machine room, 14 feet × 104 feet. In the north end of the machine room is already set a 35-horse power Lansing automatic cut-off engine which will be connected with a line shaft running the entire length of the room and from which will be operated, besides the testing machines, several machine tools including four lathes, a shaper, a milling machine, a planer, a drill press, an universal grinder, one or more dynamos, etc. In the south end of this room will be located our 5-horse power gasoline engine as an auxiliary source of power when needed. High pressure steam for the larger engine will be taken from the high pressure main which runs along the north end of the building, and power will be therefore available at all times. There will of course be the necessary supply of benches and bench tools.

It has been evident for some time past that the increase in attendance, due to the raising the requirements and standards of our Engineering Courses and the increasing success of our alumni, that our equipment was becoming inadequate for the needs of the University; this machine equipment will therefore be chiefly used in the near future in the manufacture of additional equipment to supplement what we already have and that to be bought and installed at once, as well as the electrical equipment afforded by the new heating, electric power and light plant. Aside from shafting, belting and a Riehle cement tester, practically no engineering equipment was lost by the fire. Only the moment arm of the 100,000 pound testing machine was broken and is now being repaired.

The Hydraulic Laboratory will be ample for the complete demonstration of all of the more important hydraulic laws. Water will be drawn from a sump by a Worthington 8″ × 10″ × 12″ Duplex pump and forced through a 4 inch pipe line, on which will be located a 4 inch Venturi meter and a 4 inch Worthington meter, into a receiver which is capable of withstanding a pressure equal to 1,000 feet head of water. From this receiver the water will be conveyed to a weir tank where it will pass through arresters and baffle plates to the weirs, where observations are made. From thence it will flow to an accumulating tank or reservoir from which it passes to the weighing scales and finally returns to the sump from which it repeats the cycle. Then by knowing the piston displacement of the pump and noting the number of strokes on the automatic counting machine, the quantity of water flowing in a given time may be determined in five different ways. There will also be attached to the system an orifice tank, ejector, impulse wheel having plate glass sides, turbine wheel, etc., and systems of pipe lines for illustrating the loss in head due to right angle, quick returns, curved bends, etc.

It will be noticed in the design of the Hydraulic Laboratory that the pump selected is much larger than the service in the laboratory would require. The reason for this is that the pump is also to serve as part of the auxiliary fire protection system for the University's property on the campus. This system contemplates a line of 6 inch pipe through the campus, north and south, back of the Old Capitol building, with a 6 inch connection running to the water chamber of the pump in the Hydraulic Laboratory. By this arrangement the pump will be fed with water at the ordinary fire pressure furnished by the city and will add to it from 75 pounds to 150 pounds per square inch, as the exigencies of the case may require, and water may be thrown over the flag staff on the dome of the Old Capitol. Means will also thus be furnished for the study of fire streams and nozzles under various conditions of pressure.

The Electrical Engineering equipment being connected with the physical laboratory was in no way affected by the fire. The department of physics and electricity occupies the basement and first floor of the North Hall. The general library of the University, which now occupies the upper story of this building will be moved during the summer to the new Hall of Liberal Arts, and the department of physics will then gain possession of the entire three stories of the building, which will afford about 15,000 feet of floor space.

Among the appliances and apparatus of the laboratory available for the practical study and illustration of electricity may be mentioned a dozen motors and dynamos of up to six horse power capacity. These machines illustrate nearly all types of direct, alternate, and polyphase machines. There are also a number of small experimental machines constructed by instructors and students in the laboratory, and illustrating a number of problems in electrical practice. All machines, batteries, and principal instruments are wired to a switchboard of unique design and construction. There is a battery of some 60 accumulators, furnishing valuable exemplification of the storage of electrical energy, and giving practice in tests and management of secondary batteries. There are also examples of transformers, both stationary and rotary.

A photometer room is furnished with a complete set of apparatus, including a Kruess photometer with the different standards of light, screens, lamp holders, standard gas meter, etc. There is a full line of ampere and voltmeters of the best makes and the different types. Rheostats are mostly of special design and made in the laboratory shop. Electrical testing and measuring instruments of all grades and delicacy and accuracy are available. Mention may be made of a Crompton potentiometer, Kelvin balance, resistance boxes of American and foreign manufacture, a large number of bridges of all types, portable testing sets, galvanometers, standards of resistance, capacity, etc. The laboratory, in short, has ample facilities for the practical exercises and training demanded in an undergraduate course in electrical engineering.

The library of physical and electrical literature is not only select but full, so that the student has access to the standard manuals and treatises as well as to a large number of the best periodicals and the most important works of reference.

Available to the student is also the electrical equipment of the new heating, lighting, and ventilating plant, a detailed description of which appears in this issue of THE TRANSIT,* which includes an Ide engine direct coupled to two generators, transmitting energy by the three-wire system, and driving three motors used in the ventilation of the large Liberal Arts building, besides furnishing light for this building and eventually to supply light to other buildings and power to a number of motors in different laboratories.

The student also has the privilege of studying and making observations and tests on the apparatus of several outside installations within easy reach, such as the local electric lighting and power company, and several manufacturing concerns, and the local telephone exchanges. There is thus, in the laboratory and in these various installations, offered the student the opportunity of becoming familiar in a practical way with the best modern practice in the different branches of electrical engineering.

It is planned to increase the electrical equipment in the very near future by the addition of a number of experimental machines and the installation of apparatus to illustrate with considerable fullness telephone and electric railway engineering as well as the latest practice and construction in distribution and transmission of energy over long distances.

In the development of its engineering courses it is not the object of the University that her students shall attain proficiency in any of the mechanic arts. Engineering is the SCIENCE of Applied Physics, and not simply the Art of the Application of Physics. Engineers design, originate and

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* A copy of a reprint of this article may be had on application.

direct. Mechanic artists execute. But in order that the engineer may design structures which may be cheaply and efficiently constructed, it is necessary that he have a knowledge of the difficulties to be confronted by those who will have to execute his plans. The engineering laboratories of the University may therefore be considered as demonstration or investigation laboratories in distinction from work or practice shops.