

Engineering purposes

ENGINEERING has made a place for itself among the learned professions of the day. It is not a trade, nor an "occupation," but occupies a high place among professions. Engineers of yesterday worked their way up by unusual ability and hard self-training. Today, the engineer has so much development behind him and has so much ahead of him he must lay a foundation for his work and not hope to come to the top of the profession, or even succeed fairly, without a thorough training in the fundamentals and principles underlying his particular branch. The almost universal testimony of engineers and employers is that the graduate of the technical school has in the long run a great advantage over his self-educated competitor.

Civil engineering

Civil engineering includes the following branches: surveying and geology, railroad, highway, structural, municipal and sanitary, and hydraulic engineering. The field is broad and provides an excellent opportunity for effort and talent.

The civil engineer establishes boundaries, prepares maps and makes surveys for construction work. He is interested in transportation of people and commodities. He locates railroads and highways and assists in their construction, operation and maintenance. The structural field is important. The civil engineer erects private, public and industrial buildings and other structures such as bridges, elevators, dams, retaining walls, tunnels, etc. He dams streams, stores water and provides for its purification and distribution for industrial purposes and human consumption. The safe disposal of waste from communities is his responsibility. He establishes sewage disposal plants and sanitary regulations for cities and towns. City planning requires his services. A modern city is the civil engineer's goal. In hydraulic engineering he applies his talent to the reclamation of swamp lands, irrigation of arid sections, and the improvement of rivers, harbors and docks. Truly the civil engineer's daily task is related to the welfare of people. It is his challenge to direct the forces of nature into channels that are beneficial to man.

At the University of Oklahoma the curriculum has been carefully arranged. The faculty is composed of teachers with scholastic training and practical experi-

ence. They are in a position to be of assistance to young men interested in engineering. They are eager to meet students and guide them with suggestions.

The student has the opportunity to develop his professional contact by membership in the student chapter of the American Society of Civil Engineers—the national body in this field. Graduates of civil engineering enter practice in Oklahoma, adjoining states and foreign countries. Employers find them competent and well-trained. Our graduates are successful and bring prestige to themselves and to the university.

Electrical engineering

The professional course in electrical engineering leads to work in the design and manufacture of electrical machinery, to the installation and operation of this in steam and hydro-electric power plants; to work with electric railways and other transportation; to communication both by wire and radio; to transmission and distribution of electrical power and the commercial applications of vacuum tubes.

Forty-three per cent of the course is arts and science work in mathematics, physics, chemistry, economics, and English. Thirty-nine per cent consists of general engineering courses in other engineering departments such as engineering drawing and mechanics. Eighteen per cent is devoted to strictly professional electric courses.

Locally the school supplies men to the telephone, power, and transportation companies of Oklahoma; men for the electrification of the oil fields and mines of the state, electrical superintendents of oil companies, men for geo-physical work in the Southwest, and men for engineering work, consulting, designing, application and sales engineering in many industrial fields, hospitals, and research laboratories.

Mechanical engineering

The members of the faculty of the school of mechanical engineering will welcome the opportunity to explain the work covered in the courses offered in this school and the possibilities in the profession after graduation. In the past our students have been unusually successful in obtaining employment with companies that have deemed their work so satisfactory that their advancement

has been rapid, many of them now holding executive positions. Our school is co-operating with the American Society of Mechanical Engineers in doing some of the major research projects of that society. This co-operation is of such an extent that our school has received national recognition on the work already completed and is at this time doing more co-operative research through the senior engineering students than any other university or college west of the Mississippi river. Such work as this brings the student in direct contact with problems of the industry and he becomes acquainted with a large number of men who are interested at all times in the employment of outstanding students.

Mechanical engineering is not a narrowly limited trade or craft, but a broad profession with varied specialized activities, merging into other fields of engineering and business. The mechanical engineer is concerned with problems which involve inventing, designing, manufacturing, distributing, installing, and operating of machinery, also the scientific analysis of problems encountered in the generation of power in: steam, oil, gas, or hydraulic power plants; its transmission by any except electrical means; its utilization in manufacturing and industries; its application to transportation on land, water, or in the air. Mechanical engineers also cover the broad field of: heating, ventilating, air conditioning, refrigeration, technical writing and teaching, sales engineering, industrial consulting engineering, and executive work. The mechanical engineer has his place in the oil and gas industry. A man with mechanical engineering training is continually planning for future developments, doing research and experimental work along lines that will contribute to fundamental scientific knowledge and to industrial progress; he is afforded ample opportunity to develop the pioneering instinct.

Aeronautical engineering

Aeronautical engineering is offered in the school of mechanical engineering. In addition to the fundamental preparatory work required in the curriculum of this course a number of specialized aeronautical courses are offered. The laboratory work given in this is interesting as well as instructive, as wind tunnel tests are made on miniature airplanes and stream-lined automobiles which are designed by students.

Natural gas engineering

The first and only natural gas engineering course offered by any university or college is given at the University of Oklahoma. The men who graduate from this course will be prepared to go into all phases of the natural gas industry which covers the distribution, com-

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EL SOL, Madrid—As a political history it "is the most complete and systematic we know. No significant event in the general history is forgotten but it is the movement of ideas which specifically interests" the author.

KANSAS CITY STAR—".... a cyclopedia of information, detailed political history of modern Spain, written with freedom from that bias which vitiates so many otherwise valuable historical works, with respect for all shades of opinion. The excellent index is a mine of information."

TULSA DAILY WORLD—"It is written in such a way as to be interesting to the lay reader as well as to the student of history. Mr. Brandt has a keen appreciation of the drama of the periods of which he writes and he frequently resorts to dialogue to focus dramatic climax."

NORTH AMERICAN REVIEW—"Readers who wish to familiarize themselves with the course of events in Spain will find the whole revolutionary movement presented in great detail in *Toward the New Spain*... the most complete account of the sort available in English."

by JOSEPH A. BRANDT, '21

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pression, measurement, sales, administrative and executive work in connection with the natural gas utilities. The courses offered in the curriculum of the natural gas school are especially adapted and the laboratories of this school are not equalled elsewhere in the United States. The character of work offered in this course is known to thousands of men in the natural gas industry who have had an opportunity to make personal contact with both faculty and students through attending the Southwestern Gas Measurement Short Course which has been held annually at the University of Oklahoma.

Chemical engineering

Analysis of manufacturing activities reveals a large group of industries in which certain raw materials are converted into entirely different substances. For example, paper is made from wood, lye is produced from salt, aspirin comes from coal as do many other medicines and many dyes. Industries in which such transformations are conducted are classed as chemical engineering industries. Their magnitude is illustrated by the fact that the value of their products comprise approximately twenty per cent of all manufactured goods in the United States, and the capital invested in them amounts to about twenty-five per cent of all the capital invested in factories in this country.

These industries, in normal times, are constantly expanding and developing new products, and require the services of many technically trained men. The course in chemical engineering is planned with a view to providing the fundamental training necessary for engineers in these industries. The course of study includes academic, economic, technical, and scientific subjects, with emphasis, of course, upon the scientific subjects. Indeed, all branches of applied engineering are based upon the fundamental principles of mathematics, physics, and chemistry. Obviously, for one to attain proficiency in this field, he should possess an inherent aptitude for the scientific subjects mentioned above.

Remuneration in chemical engineering is, on the average, no better or no worse than that in any comparable field of commercial endeavor. One should be guided in the selection of his vocation by his own personal abilities and not by the prospective earnings in that vocation. From a financial point of view there are many highly successful chemical engineers, but usually they have attained success because of outstanding ability.

Engineering physics

In 1930 more than 260 industrial laboratories in the United States included on their payrolls employees classed as physicists. In these laboratories as well

as in others, are many employees who are trained physicists but who appear on the payrolls as "engineers" of one type or another.

The curriculum for engineering physics is designed for the student who wishes to prepare himself for basic research and development work in industrial laboratories such as those of the Bell Laboratories, American Telephone and Telegraph Company, General Electric Company, Westinghouse Electric Company, Eastman Kodak Company and Goodrich Rubber Company; and in scientific laboratories such as the United States Bureau of Standards, United States Weather Bureau, United States Bureau of Mines, United States Coast and Geodetic Survey, Carnegie Institution and Smithsonian Institution. Recently the exploration for petroleum and minerals has required the services of men well trained in physics; in such work, now termed Applied Geo-physics, are employed gravitational, seismic, electrical and magnetic apparatus and methods.

The curriculum includes a selection of basic courses in physics—mechanics and properties of matter, heat and thermodynamics, acoustics, electricity and magnetism, optics, x-ray, radioactivity, ions and electrons, electrical conduction through gases, photoelectricity, applied geophysics, vacuum tubes, atomic structure—mathematics, chemistry, and electrical engineering. Provision is made for some choice in the selection of courses so that a student may better satisfy his own particular needs.

Many of those students who show a special aptitude for physics and mathematics continue work for a master's or a doctor's degree, after which they become eligible for advanced research positions in industrial laboratories as well as teachers in engineering schools, in colleges and in universities.

Architectural engineering

The modern architect plans, designs, and superintends the construction of buildings for a specific purpose. He has charge of letting of contracts and during construction he checks the contractor's requisitions issuing payments and finally certifies to the completion of the building. As a co-ordinator of activities involved in designing and construction he correlates the various engineering services which insure that the building will function properly such as heating, ventilating, sanitation and electrical engineering.

For these diversified activities the training of the architect should involve training in art, in engineering and in business. The university is exceptionally well qualified for this training. The college of engineering is excellent, the school of art enjoys national prominence

as does the college of business administration.

The school of architecture thus has these very great advantages to offer the prospective student who may specialize in any one of these or obtain a general knowledge of each. Courses leading to each phase of this training is offered. The B. F. A. in architecture is offered for the student who has aptitude in the application of art. The degree B. S. in architectural business is offered to the student who wishes to qualify himself in the business of building or building materials. The degree B. S. in architectural engineering gives special training in the structural and engineering side of architecture. A general course in architecture is also offered for the student who wishes to generalize as an architect, giving him fundamental training in architecture, art, engineering and business.

General engineering

The course in general engineering is designed especially for students who wish to secure a fundamental all-around training in engineering without overspecialization in any one field.

The work is so planned as to give emphasis to training in mathematics, physics, chemistry, English history, public speaking, and economics together with selected fundamental courses in mechanical, electrical, civil, petroleum, and chemical engineering and mechanics. A number of elective hours are available in the senior year enabling the student to specialize to some extent in any selected field. About forty-four per cent of the studies offered in this course are taught by the technical group of the college of engineering faculty and fifty-six per cent by teachers in the arts and sciences and other colleges of the university.

Geological engineering

Although geology was a part of the university curriculum since the early days of the university's history the application of the principles of geology to the discovery and development of oil and other natural resources in the state did not assume major importance until about 1912. From 1912 until 1930 oil and the other natural mineral resources attracted a great amount of attention and reached a high stage of development. By 1918 it seemed desirable that a geologist should be given an opportunity to acquire the valuable training offered in the college of engineering so the school of geological engineering was originated.

At that time the University of Oklahoma was offering no work whatever in mining engineering or petroleum engineering, and the newly created school of geological engineering served as the training school for all of those students who expected to enter engineering work connected with the development of natural mineral resources. The demand

for students with this specialized training was so great during the period from 1915 to 1925 that very few of them remained in school to complete the full course, but left at the end of their sophomore or junior year to be employed by various companies.

With the enlargement of the college of engineering and the development of the school of petroleum engineering, the course in geological engineering has been developed along slightly different lines, and at present is designed primarily to give the student a thorough training in the fundamental principles of geology, no matter which line he expects to follow, together with enough of the engineering subjects so that he may be able to put into practice the principles of engineering that relate to the development of any of the mineral resources he may become interested in.

Petroleum engineering

Petroleum engineering consists in the application of the principles of engineering to the petroleum industry.

The petroleum engineer must understand the general principles of physics, chemistry, mechanics and geology. He must understand fuels, the elements and operation of steam engines and boilers, internal combustion engines and electric motors. He must also understand the technique of the petroleum industry, such as the drilling of wells, production methods, the elements of the refining of crude oil and general business principles.

The petroleum engineer may be engaged in the drilling and development branch of the industry where his duties may require that he pass upon the merits of areas to be prospected and developed, and decide where the wells should be located and the most suitable method to be used in drilling them.

The petroleum engineer may be engaged in the production branch of the industry. Here he must understand production methods and equipment.

The petroleum engineer may be engaged in the natural gasoline department of an oil company. He must understand the equipment and methods used in the extraction of natural gasoline from natural gas, such as the compression and the absorption methods.

The petroleum engineer may be engaged in the refining branch of the industry where he must understand all of the steps in refining crude oil and producing gasoline, kerosene, lubricating oils and other refined petroleum products.

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"Oklahoma Boys"

Harcourt-Brace will publish in August a book of short stories by George Milburn, '30ex, a contributing editor of *The Sooner Magazine*. The book will be entitled *American Boys*. Mr Milburn is living in Provincetown, Massachusetts.

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