Dr Guy Y. Williams is a graduate of the university, being a member of the class of '06. He is a director of the school of chemical engineering and has long been one of the mainstays of the University of Oklahoma Association. The field for the chemical engineer in manufacturing is one of the broadest awaiting the student

The chemical engineer

BY FORREST E. LOVE, '32

WHEREVER chemical change takes place in a manufacturing process, there is the field for the chemical engineer. The greater our scientific knowledge, the clearer we see that many operations formerly thought to be purely mechanical, are really intricate chemical processes worthy of the closest study. We realize that the manufacture of an automobile tire, the production of gas and coke from coal, the conversion of wood to paper pulp, and the transformation of that pulp to a great variety of articles from silk underwear to alcohol and brilliant lacquers for our automobiles all demand the services of a chemical engineer. But not so many of us understand that when a blacksmith tempers a cold chisel, he is conducting a delicate and complicated chemical process, as is also the workman mixing cement and the brickmaker when he dries his product and burns it in a kiln.

A rude awakening awaits the manufacturer who does not have a thorough understanding of his manufacturing processes and thinks that the experience of the past will give adequate guidance for the future. A thorough knowledge of the principles of the unit processes and constant research into plant problems must be attained if the plant is to succeed. In a time like this when changes are being made rapidly, unless the course is laid with knowledge and foresight, the thriving factory of today may be the junk-heap of tomorrow.

Chemical engineering which has as its bases *chemistry, physics* and *mathematics,* plays a vital part in many industries that the layman does not ordinarily associate with these fundamental sciences. It is much broader than chemistry alone, and utilizes that science together with physics and mathematics, through the medium of the so-called *unit processes* which in proper sequence and co-ordination constitute an industrial process.

A chemical engineer was once a combination of a chemist and a mechanical engineer, but we find that many processes once thought to be purely mechanical are a part of the field of the chemical engineer. These unit processes include: grinding, crushing, filtration, separation, evaporation, drying, distillation, absorption, and extraction. In addition to studying and using these processes, the chemical engineer is familiar with the principles of plant design, stoichmetery, heat flow and fluid flow, with which he is able to utilize them to the greatest advantage. In almost all industries these processes are used either alone or in combination and the chemical engineer with a thorough knowledge of the principles involved is able to use them to the best advantage of the industry.

Since practically all factories and industrial plants are users of these processes the chemical engineer finds his field to be almost unlimited. By his knowledge of the *principles of chemical engineering* and the *unit processes* a chemical engineer is equally versed in problems on fluid flow, regardless of whether it concerns the transportation of oil or chlorine gas. By being familiar with the principles of evaporation and distillation, he is equally adept whether distilling petroleum or liquid air. Such specialization as the study of the problems and processes peculiar to a specific industry is then somewhat a waste of time to him because he knows that by the proper application of these unit processes he is able to solve the problems of practically any industry.

Although the scientific training of a chemical engineer cannot be under estimated, it is necessary that he become familiar with the facts, that the making of a profit through increase in wealth is the fundamental proposition upon which all legitimate business is founded. Obedience to economic laws as well as to those of any natural science is essential to the permanent success of any industry. Regardless of how well a chemical reaction works in the laboratory, unless the reaction can be used to make money for the company it is a failure as far as the chemical engineer is concerned. Here indeed is the vital difference between a chemical engineer and a chemist.

If, under ideal laboratory conditions, a reaction runs rapidly and with a good percentage of yield or product, it is by no means certain that the process can ever be conducted on a commercial scale. There are many points to consider in developing a plant process from laboratory experiments in pure science, chief among which, particularly in chemical industries, is the cost of heat. This is so because the chemical plant not only needs power but also because

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Dr Cecil T. Langford, '18 sc., M.S. '20, professor of chemical engineering, was formerly head of the chemical research department of the Marland Oil Company

TRUBY

ministration building, has an interior finish of lovely carved oak. It is a great thing that the young people of the state can work in such an atmosphere.

The observance of Washington's birthday was characteristic of the leadership of the university under the inspirational direction of President W. B. Bizzell. It was made a notable patriotic day. Outside speakers were brought in, including such distinguished scholars as heads of the American history department of Rice Institute, Houston, and the University of Chicago. The influence for good citizenship of such occasions is evident.

A state is fortunate when its human resources can be enriched year by year by the graduates of the great educational institutions which the people have established.

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THE CHEMICAL ENGINEER

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the speed of any reaction is accelerated by raising the temperature of the reacting substances. We find, therefore, that many processes developed in the laboratory, where the cost of heat energy is of no consequence can not possibly be operated commercially because of large and expensive heat requirements. Processes development, which is adapting laboratory experiments to plant practice, calls for a different kind of training than that needed for the laboratory research. It is decidedly the field for the chemical engineer.

The great assets of this country, its fertile soil, abundant timber, coal, iron ore and oil deposits are being seriously depleted. We have used the cream of our resources. If it were not for the scientist and engineer, we would, as a race, be facing the prospect of a more laborious life and lower standards of living. If however, our problems are attacked, scientifically and energetically, utilizing modern methods of research, our people may not only maintain their present standards of living and leisure, but also enjoy a more healthful and pleasant life as the result of new discoveries in whose development the chemical engineer will have played an important part.

«Doc» Langford

Ask any chemical engineer concerning the faculty of the Chemical Engineering school and the chances are he'll start out at once talking about "Doc" Langford, '18 sc., M. S. '20. If a chemical engineer has a problem of any sort, regardless of whether it concerns water analysis and treatment, oil refining, pipeline flow, rayon manufacture or the shifting of an equilibrium constant with an increase in temperature, it's a safe bet that he'll soon find his way to Dr Cecil T. Langford's office where his problem will be solved. That's why the chemical engineers believe what he says, because he demonstrates his practicability and knowledge in a way that is clear to them.

Doctor Langford received his B. S. in 1918, and his M. S. in 1920 from the University of Oklahoma. After he had received his B. S. degree he was employed for a time with Dupont Chemical Company. He received his Ph. D. from the University of California in 1926. Returning to Oklahoma he was employed as research chemist and head of the chemical research department for the Marland Oil Company at Ponca City; subsequently he became director of the entire research department for Marland and retained this position until the fall of 1929 when he returned to accept the position of professor of chemical engineering at the university. While attending the university Doctor Langford was elected to Phi Beta Kappa and Sigma Xi and he is a member of Alpha Chi Sigma, professional chemical fraternity.

The chemical engineers swear by what Doctor Langford says, and with his professional and academic training, he is indeed a vital and important part in the training of the chemical engineers of the University of Oklahoma.

FORREST E. LOVE

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SOCIETIES

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There are now over sixty one chapters at the leading engineering schools of America which have initiated more than eighteen thousand members. In the spring of 1926 the petition of Tau Pi, a local honorary engineering fraternity, was accepted and Tau Beta became a coveted honor on the campus.

The first and primary qualification for membership is scholarship, while other requirements are capacity for leadership, character, and social qualities. In the line of scholarship, the upper one fourth of the senior class and the upper one eighth of the junior are eligible. However, this is further restricted to those having a two point average or better. It is felt that the above requirements qualify one to become a leading engineer.

The officers of the local chapter are: Scott Hammond, president; Bob Feemster, vice president; James Callahan, recording secretary; Gerald Billyeu, corresponding secretary; J. L. Forbis, student treasurer; H. V. Beck, faculty treasurer; and Robert Ratliff, cataloger.

Sigma Tau

Sigma Tau, a national honorary engineering fraternity founded at the University of Nebraska February 22, 1904 has at the present time twenty three chapters located in various parts of the United States.

Mu chapter at the university was established May 13, 1916. The motives that guided the founders sprang from a general desire to be of service to engineering educators in colleges and universities where chapters are located. The membership is selected from those men who rank in scholarship among the upper one third of the juniors and seniors of a recognized engineering school. Selection of members from those men who qualify scholastically is made on the further basis of practicability and sociability.

Honorary membership may be granted to members of the engineering faculty ranking higher than instructor or to prominent practicing engineers.