

The Knowledge Bank at The Ohio State University

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Research in the Department of Chemistry

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The Chemistry Building now houses several research projects that are important under the present conditions. This work is under the supervision of Professor Edward Mack, Jr.

The department of chemistry is the seat of the American Petroleum Institute Hydrocarbon Research Project, under the supervision of Professor Cecil E. Boord. This project is now in its fifth year, and plans are being made for the sixth year, although the continuation has not yet been authorized. The chief purpose of the project is to perfect fuels of the gasoline type, particularly for aviation used.

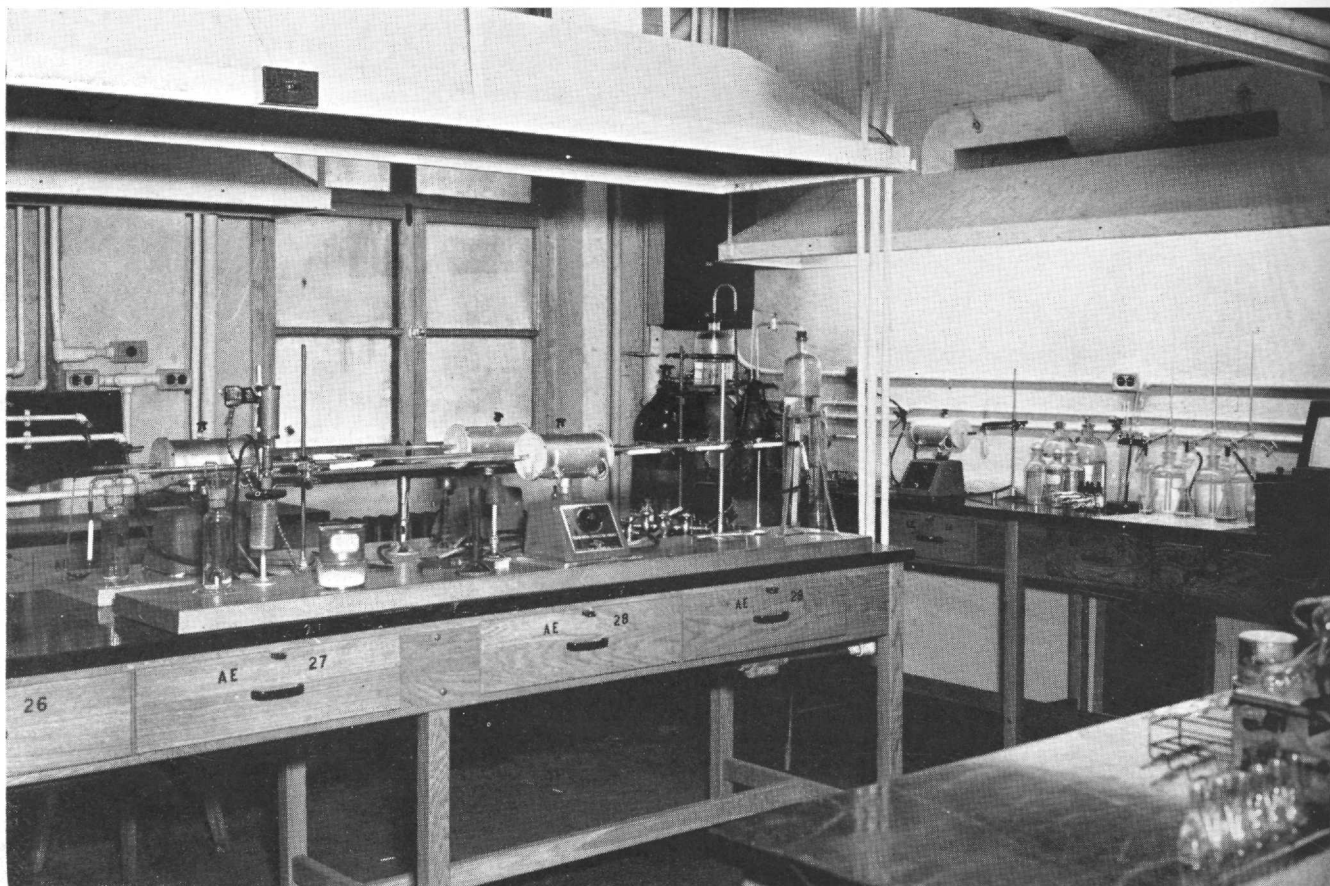
About one gallon of each typical hydrocarbon of the paraffin, olefin, diolefin, acetylene, aromatic, cycloparaffin, and cycloolefin series of 99% purity is prepared for engine tests under four sets of conditions. A "best liter" of this sample is reserved for further purification. This latter product is prepared in maximum purity and distributed to physical chemists and physicists for measure-

ments of physical and thermal constants. While the future value of the engine tests may change in view of the anticipated improvements in engines the physical constants will have a permanent scientific value. The project will be moved to the new War Research Building in the near future.

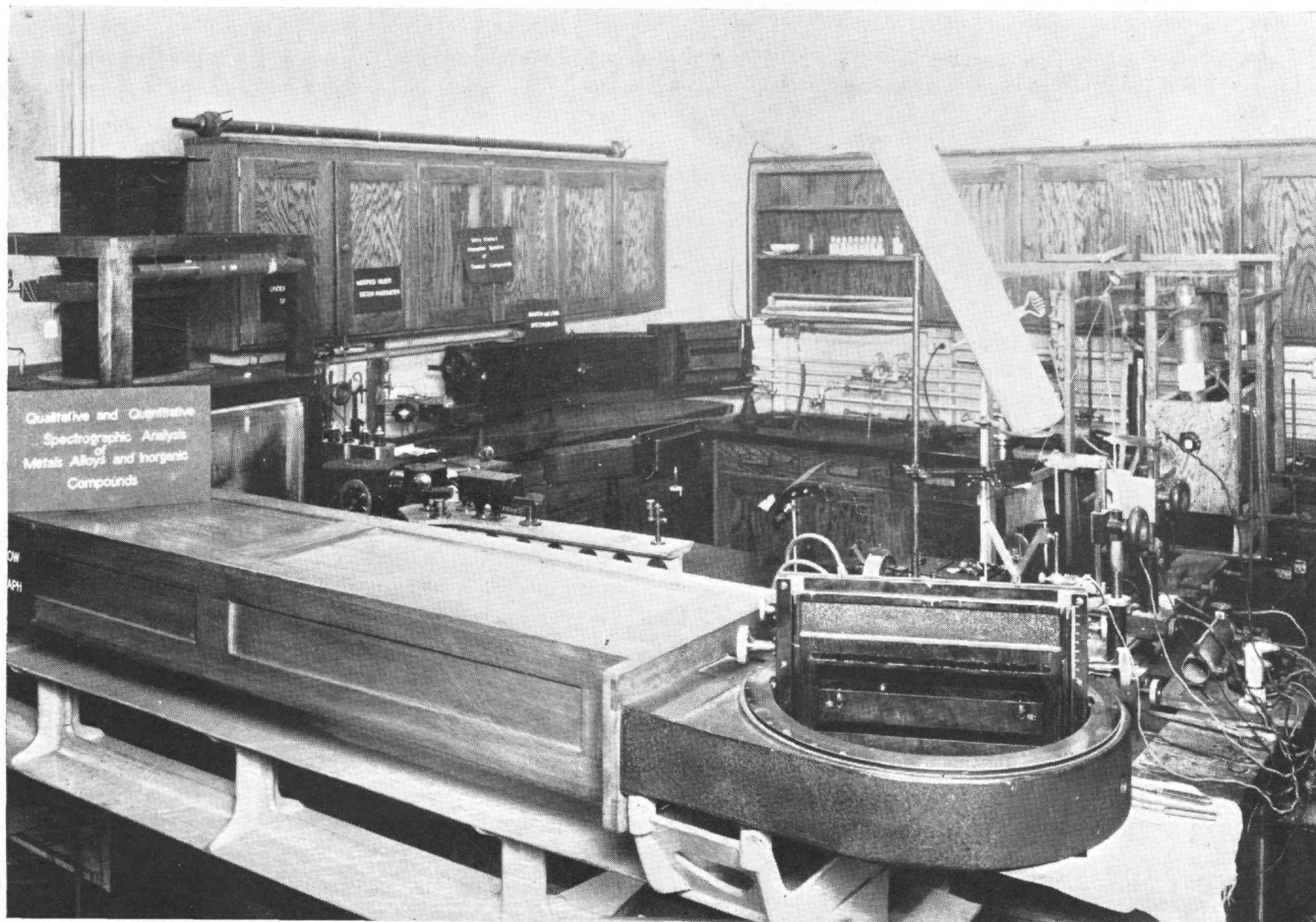
In the field of sugar chemistry there is the research on carbohydrates carried on in "sugar alley" under the direction of Professor Melville S. Wolfrom. Several projects of a confidential nature are being carried on under the Research Foundation on contract with the National Defense Research Committee of the Office of Scientific Research Development.

Research is also being carried on to investigate the chemical structure of heparin, the natural anti-coagulant of blood, with a view toward synthesis. Heparin is significant in blood vessel surgery.

Academic research is being done on the development of new general methods for synthesis of



- This new air-conditioned microanalysis laboratory is located on the fourth floor of the Chemistry Building.



- Equipped for high speed emission and absorption photometry, this spectrographic laboratory is one of the best in existence.

ketoses. The only known general method was recently developed here.

Work has just been completed on the structure of osajin and pomiferin pigments of the fruit of the Osage orange (hedge apple). These relatively complex structures are related to the insecticide rotenone.

Research on colloid chemistry and electro-chemistry is under the direction of Professor Wesley G. France. A study is being made of the adsorption of foreign materials by growing crystals for the purpose of discovering the mechanism of the process and of predicting and controlling the size frequency and crystal habit of crystalline precipitates. This research involves the use of the ultra-violet photomicrographic equipment, the ultra-centrifuge, the electron diffraction camera, and the ultra-microscopes.

The ultra-centrifuge is also used in the determination of the molecular weights of proteins. The size distribution and frequency of colloidal particles and their electrode potentials are measured by means of electrophoresis in ultra-centrifugal fields.

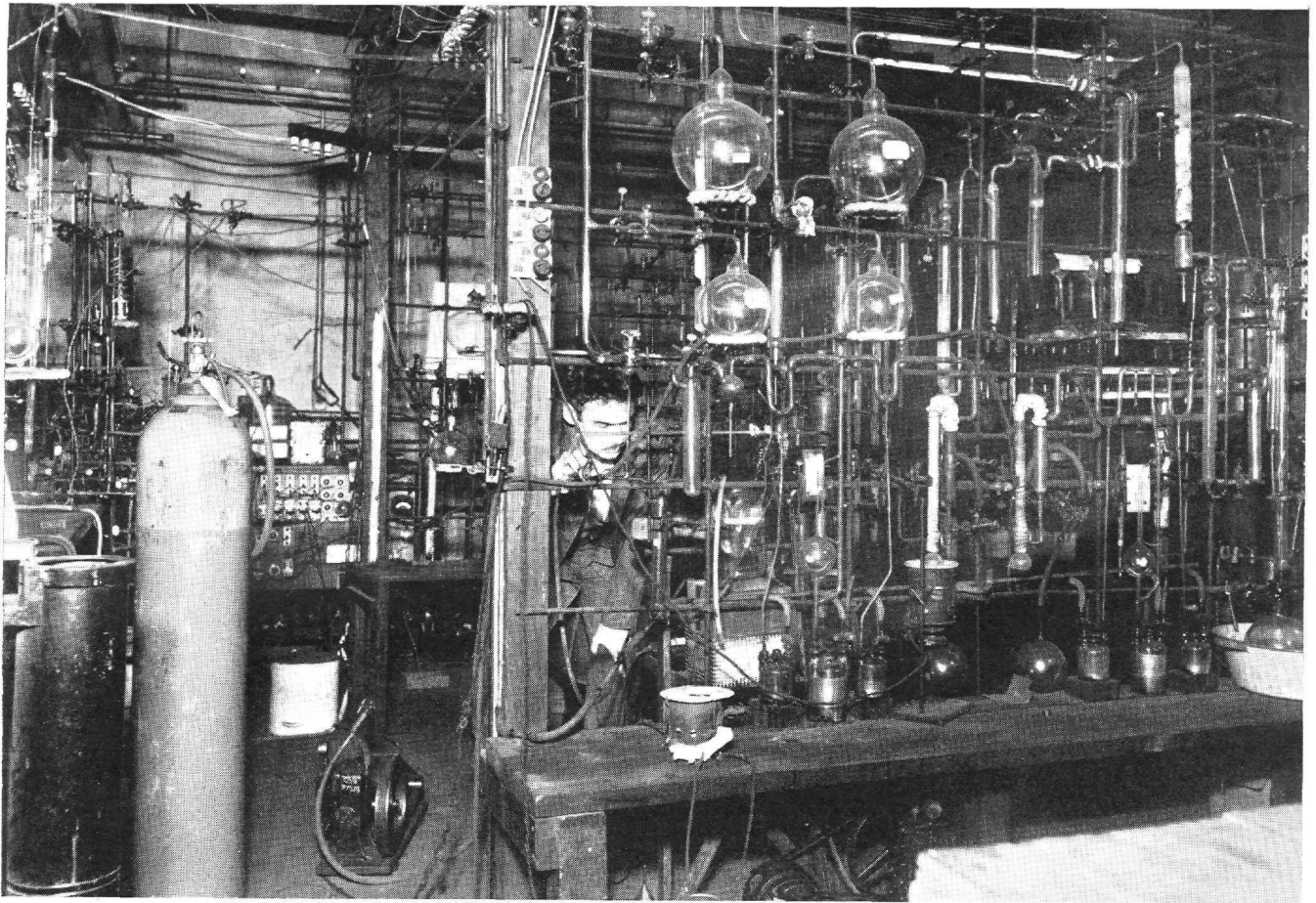
Both industrial and scientific analysis have benefited from the development of micro-analysis.

The advantages of this method are numerous and widespread. Many instances occur in which only a very small sample is available for analysis. This presents a difficult problem for ordinary macro or semimicro analysis. Microanalysis takes such things in its stride. Occasions arise when several years have been spent in the preparation of a sample, which is consequently of great value. Obviously it would be desirable, in order to prevent waste of the precious sample, to use the smallest possible amount for analysis. Microanalysis is much faster than other methods. For example, a carbon and hydrogen determination formerly required an entire day. Now, using modern microanalytical techniques, this determination is run at an average rate of twenty per day.

Dr. William MacNevin is in charge of the micro-analytical work. A new, air-conditioned laboratory of microanalysis has just been completed on the fourth floor of the Chemistry Building.

The department of chemistry is equipped with one of the best spectrographic laboratories in existence. This laboratory is under the supervision of Dr. Wallace R. Brode, outstanding

(Continued on page 30)



- Apparatus for determining the ratios of specific heats of gases in the physical chemistry laboratory.

CHEMISTRY RESEARCH

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authority on chemical spectroscopy and author of *Chemical Spectroscopy*.

The laboratory is well-equipped for high speed emission and absorption photometry. The emission spectra are used in the analysis of elements, particularly metals. The absorption spectra are used in the analysis of compounds, particularly organic substances such as vitamins. Spectroscopic analysis has become an important method of control in industrial processes.

The aforementioned research projects are a part of Ohio State University's contribution to the war effort. Later these same facilities will again work for the advancement of knowledge in the reconstruction period.