

Exploring the Mysteries of Science

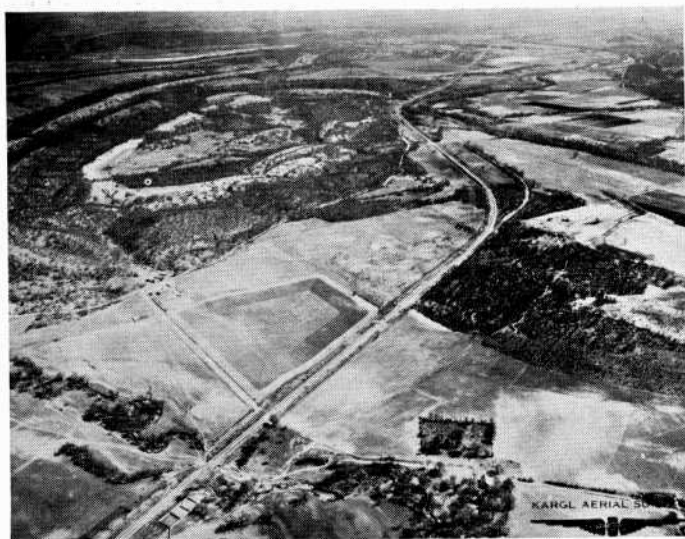
THE possibilities of seeking oil in an airplane, detecting earthquakes in Oklahoma, developing new nitro compounds to inhibit gun formation in gasolines and oxidation of rubber, and the identification of narcotics through crystalline angles are a few of the significant problems being studied by scientists at the University of Oklahoma.

The public hears little about the research projects carried on at the University by faculty members and graduate

Dr. Melton, over a period of eleven years and with cooperation of many of the aerial photographers of the United States, has built up a large collection of vertical and oblique aerial photographs which form the nucleus of new courses in "interpretation" of aerial pictures from the viewpoint of geology.

Imagine the swamps of the lower Mississippi River and the Red River of Louisiana extending into eastern and southern Oklahoma. Try to visualize the cypress

of two earthquake-type seismometers that were obtained from the geophysical department of an Oklahoma oil company. Eventually, the physics department expects to have a seismograph station that will detect and record "near" seismic disturbances which are too weak to be recorded at stations in the surrounding states. It will also cooperate with the surrounding stations in the study of near earthquakes and with the stations of the nation in the study of distant earthquakes.



The two aerial views above (one an oblique view and the other a nearly vertical view of Scott's Dome in the Arbuckle Mountains) are typical of those being studied by Dr. F. A. Melton in research into the possibilities of aerial surveys for geological exploration

students. Occasionally a discovery has a sensational application and receives newspaper attention. More often, the projects simply extend the borders of knowledge in certain fields where more information is badly needed. Almost always there is, somewhere in the distance, a practical objective to be attained, if possible, through the results of the research work.

There is intellectual adventure with plenty of thrills in this exploring of unknown fields of knowledge. Always there is a chance that the very next experiment will reveal new scientific information, or some new scientific method.

No one maintains that the use of aerial photographs can replace geological field work in locating possible oil structures, but Dr. F. A. Melton, associate professor of geology, has developed methods by which the process of geological exploration can be speeded up greatly and the quality of the exploratory work can be improved, through aerial surveys. New techniques are being developed to make use of those geological features that are most conspicuous on aerial photographs—such as faults and fracture zones.

trees, the dense undergrowth, the thick soils, the bayous, the ox-bow lakes, the alligators and even floods similar to those of the lower Mississippi submerging the sites on which Fort Smith, Tulsa, Sapulpa and Muskogee now stand.

Mapping the swampy area which existed in this area an estimated 500,000 years ago is being attempted by National Youth Administration workers under the direction of Dr. Melton.

Oklahoma would hardly be classed as an "earthquake state," but Dr. William Schriever, professor of physics, has found that earthquakes of great interest do occur both in this state and in adjoining states. In one city in Oklahoma a recently constructed public building is being cracked by a seismic disturbance—the result of one part of the earth moving suddenly with respect to an adjacent part. Fortunately, the relative movement of the two parts of the earth's crust in the Oklahoma area is occurring so gradually that the seismic disturbances have been so weak that they have not been felt by human beings.

Dr. Schriever is directing the installation

Mr. Schriever also has recently developed a new form of inertia balance, now being manufactured by the Central Scientific Company. This new inertia balance is capable of measuring the mass of a single or several objects, regardless of shape. The body is placed on a horizontal shelf, supported by horizontally-mounted strips of spring steel. The shelf is started oscillating, and the period is measured.

The purpose of the apparatus is to assist the student of physical science in obtaining correct concepts of inertial mass or *inertia*, and gravitational mass or *gravitation*. These, in turn, enable the student to acquire easily and correctly all the basic concepts of mechanics.

Scientists have a habit of speaking in technical terms, which is natural since they think in the language of their special fields. However, they can usually be persuaded to translate their meaning into every-day language.

Dr. J. C. Colbert, associate professor of chemistry, is supervising research into the separation and identification of the products resulting from mononitration of 3-

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EXPLORING

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Hydroxydiphenyl, the theoretical objective of which is to determine the directive and inhibitory influences at work in the diphenyl nucleus.

Translated, this means that there is some hope that eventually a nitro-compound comparable to picric acid in explosive power may be developed, and also that the reduction products of these nitro compounds may have some value in inhibiting gum formation in gasolines and in inhibiting oxidation of rubber. The latter two problems are of obvious importance to every motorist.

Graduate students under the direction of Dr. A. C. Shead, assistant professor of chemistry, are doing research on the profile (silhouette, plane, edge) angles of crystalline substances with a view to positive analytical identification.

Efforts are being made especially to devise simple, sensitive and positive identifications for those drugs and powerful poisons likely to be involved in professional chemical practice in connection with criminal cases. In many such cases, the accurate identification of a chemical substance is a life or death matter.

Gratifying progress has been made in the positive identification of meconic acid which is characteristic of the presence of opium, laudanum, and other forms of this drug which is said to be perhaps the most important single drug involved in enforcement of the narcotic laws. This work has attracted national attention.

Dr. Lloyd E. Swearingen, professor of chemistry, is analyzing twelve samples of clay from different sections of the state to determine the suitability of each for use in decolorizing oils, solutions and so on. He is also doing research into the factors involved in destruction of emulsions, a problem of considerable importance in numerous industrial operations.

In the School of Geology, C. J. Bollinger is continuing his research work on the influence of Gulf and Caribbean water temperatures on climate in Oklahoma. Through an arrangement made with the federal government an automatic recording instrument has been installed on one of the ships that traverses the Gulf of Mexico at regular intervals and this information is supplied weekly. He has already discovered some striking relationships between spring and summer precipitation and winter temperatures of the Gulf areas.

Dr. C. E. Decker, paleontologist, has been carrying on research work for several years on the microscopic fossil known as graptolites. He has been able to prove the physiographic relations that existed between Oklahoma and parts of the earth as far removed as New York, China and the British Isles during some of the earlier period of geologic history. He has also subdivided some of the older strati-

graphic units of the Arbuckle Mountain area and the Wichita Mountain area and his work is accepted as the most authoritative work that has been done on some of these stratigraphic units.

Mankind has always known that the child resembles the parents, but the exact way this comes about is still something of a mystery. The Zoology Department under the direction of Dr. A. Richards has been working for eight or nine years on a major research project concerned with the embryological development in vertebrates.

A rather complete paper on the fish of Oklahoma is being prepared by Dr. A. I. Ortenburger as a result of years of research. The University has a collection of more than 85,000 specimens of fish. In 1924, only some twenty to twenty-five forms of fish were known to occur in Oklahoma, but actual specimens shown at the University now represent 166 different kinds of fish found in the state.

The paper being prepared is to have keys for easy identification of all of the numerous forms of fish found in Oklahoma.

O.U. scientists hope to discover what part the various cells take in development. The method of approach consists first in an attempt to discover the centers of differentiation as indicated by the regions of more rapid development in the embryo, and second, in following the history of these areas up to the stage where the organs of the embryo are laid down.

In the School of Pharmacy, Lena J. McArthur has been investigating the effectiveness of sulfanilamide in combating infection due to streptococci. Research in odors, which has both theoretical and practical applications, has been carried on by Dr. Ralph Bienfang. Dr. Loyd E. Harris has made a study of *Physallis Mollis* (Smooth Ground Cherry), a small weed growing in Southwest Oklahoma which is used in making fly poison.

The examples cited in this and preceding articles are not presented as being a complete survey in any sense. They are examples of research selected more or less arbitrarily because they could be most easily interpreted into laymen's language. There are numerous other research projects under way on the campus in various fields of natural science that probably are equally as important as those described.

This intellectual pioneering is taking place in basement rooms, cubby-hole laboratories, and in many cases with makeshift equipment because of the University's lack of sufficient funds and adequate space for research work. But it is going ahead nevertheless, and it's a highly important function of the University of Oklahoma.

EDITOR'S NOTE—This is the second of two articles on natural science research projects under way at the University.