

## CHEMISTRY

## Find Cancer-Causing Chemical By Rebuilding Molecules

A NEW cancer-causing chemical, discovered by experiments with chemical architecture, was reported by Prof. Louis F. Fieser of Harvard University to the American Association for the Advancement of Science.

Associated with Prof. Fieser in this research were his wife, Mary Fieser, and E. B. Hershberg, A. M. Seligman and, formerly, M. S. Newman. Animal studies with this and other compounds were conducted by Dr. M. J. Shear of the U. S. Public Health Service.

Discovery of the new compound simplifies the problem of cancer research of this type and makes it easier to determine the mechanism of cancer production by chemicals of the hydrocarbon group, Prof. Fieser explained.

The new compound was discovered

in the course of attempts to find what features in the structure of another chemical compound, methylcholanthrene, made the latter the most powerful cancer-causing hydrocarbon known. The new compound is also a hydrocarbon, which means it is made up exclusively of hydrogen and carbon. But the new compound, while sharing the remarkable cancer-causing power of methylcholanthrene, is far simpler in its chemical architecture.

Results of this research detract somewhat from the theory that some forms of cancer result from the formation of methylcholanthrene in the body, Prof. Fieser pointed out. He added, however, that his research group is not yet prepared to say that this theory is excluded.

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son, would be simulated by an idealized cylinder 35 kilometers (21.7 miles) in length and 11 kilometers (6.8 miles) in diameter. Its mass is 10,000,000,000,000,000,000 grams, or about 100,000,000,000,000 tons. Thus it has only about 1/10,000,000 the mass of the earth. Its light is slightly redder than sunlight.

The observing period of 1937-38 will be a favorable one, stated Mr. Watson, and it is hoped that more accurate observations will clear up additional mysteries about the tiny object.

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## PSYCHOLOGY

## Study Attitudes Toward Communism and Fascism

THE effect in America of the war-crises of European nations against "communism" will be assayed scientifically in science's latest drive to put psychology to work.

A person-to-person survey is planned by Dr. Delos D. Wickens, University of North Carolina psychologist, to determine changes in attitude toward two social and economic ideologies—fascism and communism.

The inquiry is part of a nation-wide program under which scientists of the United States are banding together for a united front against problems now confronting society in the present world crisis.

Involvement of the United States in a future world war may depend upon how the attitudes of individual Americans are now changing toward these two isms, Dr. I. Krechevsky, of the University of Chicago, emphasized, in making announcement of the new research program. Dr. Wickens' survey is authorized by the newly organized Society for the Psychological Study of Social Issues. Dr. Krechevsky is secretary of this organization and spokesman for its scientist-members.

Nations in Europe now seem to be lining up according to their attitudes toward the fascist-dictator type of government of which Germany with its Hitler and Italy with its Mussolini are outstanding examples, or toward the communist type, of which Russia is the recognized symbol. The possibility of a war in which fascist nations will lead a crusade against communism is obvious, Dr. Krechevsky indicated.

Groups selected as representative samples of the general public opinion of the nation will be tested at intervals under Dr. Wickens' direction to find out

## ASTRONOMY

## Three More Chemical Elements Identified in the Sun

THREE new chemical elements—Osmium, iridium and thulium—have been added to the positively identified elements found in the sun during 1936, declared Dr. Charlotte E. Moore of Princeton Observatory before the meeting of the American Astronomical Society.

Out of the 92 chemical elements of the earth, 61 are surely present in the sun; three are doubtfully present; on two there are insufficient solar data, on seven insufficient laboratory data, and 19 are absent.

Method of identifying the solar elements, explained Dr. Moore, is to obtain spectrographic plates from the sun's light and then try to duplicate those characteristic spectral lines by experiments in the laboratories.

During the last year, she said, Dr. Walter Albertson of Massachusetts Institute of Technology thus identified osmium and iridium. Dr. W. F. Meggers, noted scientist of the National Bureau of Standards in Washington, obtained the spectrum of the rare earth thulium in his laboratory and thus aided in its solar identification.

Strangely absent, so far, are identifications of the gas neon and the rare-earth caesium in the solar spectrum. Both have long been identified in the laboratory.

### Physical Nature of Eros

The physical nature of the earth's neighbor in space—the tiny asteroid Eros whose diameter is probably only about 15 miles—was described by Fletcher Watson of Harvard Observatory.

Travelling in a very much flattened elliptical path, Eros can come as near as 13,840,000 miles to the earth on some occasions. Thus, although it is very small, it has been most accurately observed since its discovery in 1898.

Back in 1901 the brightness of Eros was reported to show a change of one and a half magnitudes in the short time of five and one quarter hours, explained Mr. Watson. At other times its variation has sometimes been small, sometimes large and sometimes zero. Its perplexing changes have intrigued astronomers.

The motion of Eros, said Mr. Wat-

whether the attitudes of Americans are shifting in either direction and what that direction is.

Another attack on the problem of individual attitudes on political and economic questions is being launched at the University of Akron under the direction of Dr. Ross Stagner. He is attempting to find out whether men and women tend to break away from the political affiliations and prejudices of their parents as they grow older and acquire more education. Beginning with college students and their parents, but extending soon to high school pupils, this program

calls for a comparison of the attitudes and opinions of fathers, mothers, sons and daughters.

Dr. R. A. Irwin of the University of Nevada is attacking another objective. He will rate the attitudes of persons toward various social and economic institutions from one extreme of strong approval to the other of strong disapproval. This rating will then be compared with the individual's information on current politics, with the amount of his reading in various fields, and with his general interests.

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#### FOR THIN FILMS

*Dr. Irving Langmuir's apparatus for securing thin layers of oil on water for study through colors. This was a part of his demonstration at the meeting of the American Association for the Advancement of Science.*

#### CHEMISTRY

## Invisible Films on Water Give New Research Tools

By DR. IRVING LANGMUIR

*Dr. Langmuir, Nobelist in chemistry, of the General Electric Research Laboratories, explains his latest researches on thin films that promise to allow scientists to learn more about the cell and detect extraordinarily small amounts of chemical impurities. He exhibited at the Atlantic City meeting of the American Association for the Advancement of Science.*

**M**ANY oils placed in minute amounts on water spread out over the surface to form layers one molecule thick. A convenient substance to illustrate this phenomenon is stearic acid, which is the acid constituent of beef fat.

Films of this substance are one ten-millionth of an inch thick and are completely invisible. Nevertheless by an ingenious technique they may be transferred in successive layers to a glass or metal plate which is repeatedly dipped into water covered by such a film.

When 35 or more layers are built up in this way on a chromium-plated slide beautiful iridescent colors are produced like those of soap bubbles. A study of the colors makes it possible to measure accurately the thickness of the film.

The exhibit showed numerous glass and metal slides covered with films of stearic acid and proteins which have been treated in various ways to demonstrate their remarkable properties. By using polarized light it is shown that a single layer of stearic acid molecules on chromium can be distinctly seen by the change in the intensity of the reflected light.

If a single layer of protein egg albumin, for example, is placed on part of a film of 41 layers of stearic acid, the change in color is very striking, so that in this way the dimensions of protein molecules can be measured.

Other slides illustrate skeleton films. By spreading stearic acid films on water containing barium salts the built-up films consist of a mixture of barium stearate and free stearic acid. By dipping a part of the slide covered by such a mixed film into benzene, the stearic acid can be dissolved out. This completely changes the color of the film. The thickness of the film is not changed. The stearic acid molecules when removed leave pores or holes so that the film becomes a barium stearate skeleton. When an oil drop is placed on such a skeleton the oil fills the pores and the film returns to its original color.

By covering a mixed film with a blanket consisting of a number of layers of protein or of pure barium stearate, the rate at which the underlying stearic acid is removed by benzene and the rate at which oil can be made to return into the pores are greatly decreased. In this way the permeability of molecular layers for many different substances can be measured.

This method should be of great help to the biologist in understanding the permeability of cell walls. It also provides a means of measuring the sizes of many molecules since the skeleton film is a kind of molecular sieve. The monomolecular films on water and the multimolecular layers formed from them are tremendously sensitive to minute traces of various substances in the water.

A study of these films thus provides the chemist with an extraordinarily sensitive method of detecting and even measuring the amount of many chemical substances.

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#### PSYCHOLOGY-PHYSIOLOGY

## Closed Circuit in Brain Between Cortex-Thalamus

**A** CLOSED circuit between two parts of the brain was described by Prof. J. G. Dusser de Barenne of Yale University to the American Association for the Advancement of Science.

The idea that these two parts of the brain, the cerebral cortex, commonly thought of as the thinking part of the brain, and the optic thalamus, through which all impulses from the outside of the body pass, are in close mutual functional relation was suggested many years ago.

At the meeting, Prof. Dusser de Barenne presented the first experimental proof of the validity of the theory. His experiments showed that the cortex, after receiving impulses from the thalamic nerve cells, sends impulses back to the thalamus. The thalamus and cortex, therefore, form a closed circuit in which impulses circulate all the time.

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A Chinese engineer has invented a teletype machine to transmit China's thousands of character words by wire, thus avoiding the need to send each word in Chinese messages by a code number.