

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.

MANY 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.