

From Page 347

but such use would be more novel than of practical significance.

The great sensitivity of the new receiver led Dr. William M. Hall of Massachusetts Institute of Technology to develop electrical circuits with which the equipment might be used for exact, quantitative studies of radiation energy in research problems.

As an accompanying paper in the *Review of Scientific Instruments*, Dr. Hall reports his findings on experiments to test the sensitivity of the device as compared with other standard type of infrared receivers.

Dr. Hall tested the sensitivity of the device and obtained values measured in volts of electrical potential per watts of incident energy falling on a given unit area (one square centimeter) of receiver.

If that sounds technical, do not worry too much about the exact way of expressing sensitivity. Scientists have to have some numerical values in order to compare different instruments built to do the same thing. And these comparison numbers have to be specified in predetermined and agreed-upon units. That is where the volts per watt per square centimeter come in.

Important are the figures themselves. The theoretical maximum sensitivity is .70 for a thermocouple with tellurium-bismuth junctions operating in a vacuum. By comparison the sensitivity of the new Hayes' receiver is 126. Thus, the Hayes' instrument is 180 times as sensitive as the best vacuum thermocouple and 900 times as sensitive as some other types such as the constantan-manganin junction couples.

Science News Letter, May 30, 1936

NAVIGATION

New Type of Sextant Is Suitable for Use in Air

ONLY in the last few years has aviation reached the stage where the pilot could do more than devote his entire efforts to the problem of takeoff and keeping his plane in the air.

With increased mechanical perfection and all manner of automatic apparatus to take over increasing duties of flight, the present era of aviation is marked by increasing attention to duties comparable with those of a captain on a ship at sea. Particularly has navigation—the problem of telling where the plane is over the surface of the earth—become a major job for the pilot. Moreover, navigation is an aviation problem which it seems doubtful will ever be taken over by automaton devices.

As pilots attempted navigation with the mariner's usual device—the sextant—it became immediately clear that the method, while correct, was too slow and cumbersome. Seagoing "water cooled" methods of navigation had to be replaced with speedier "air-cooled" techniques. Typical of changes made necessary is the new equipment in which a small bubble of fluid takes the place of the whole ocean. The new apparatus has been built from plans submitted by the Bureau of Aeronautics and Lieut. Commander P. V. H. Weems.

The new equipment, now used by the Government, is known as the Aircraft Bubble Sextant and is designed for "shooting" the stars and the sun when no horizon is visible.

Bubble for Horizon

A tiny bubble, inside the compact instrument, takes the place of the sea horizon. From simultaneous readings on the artificial bubble horizon and the position of the heavenly body, quick calculation deducts the position of the aircraft even though the whole surface of the earth may be hidden beneath clouds.

While designed primarily for aircraft, the apparatus, produced by Bausch and Lomb, is equally useful for surface vessels during the long period between evening and morning twilight when the stars are visible but there is no horizon, or on occasions when the sun can be seen through rifts in the clouds but there is no horizon from which to measure the angle of the sun's elevation.

To "shoot" the sun or stars with the new instrument, the observer looks through the eyepiece. There he sees the

PSYCHIATRY

Political Control of Mental Disease Hospitals Denounced

AGRUESOME but appropriate punishment for politicians who seek to control hospitals for mental disease was suggested by Dr. Clarence O. Cheney of New York City at the meeting of the American Psychiatric Association in St. Louis. In his address as retiring president of the Association, Dr. Cheney denounced political control of such institutions in the following vigorous words:

"I have been able to imagine no more demoralizing influence to psychiatric hospitals than to have appointments made or persons removed from service because of politics.

"We do not wish to seem too harsh but at the same time we say with a strong conviction that if there is no other way for politicians to keep politics out of psychiatric hospitals, then we can only wish for them that they or their own families, visited by mental illness, would be placed in charge of those untrained, uninformed persons who have come to such a position of authority through political means. Then perhaps they would see the light and know that decent care of the mentally ill who have no votes and cannot speak for themselves is one of the prime functions of government, requiring experience and training no less than decency in those responsible for that care and that whoever has no realization of such prin-

ciples is unfit to represent even the lowliest in the community."

Encouraging is Dr. Cheney's suggestion that the future will see a decrease in the ever-increasing burden of state budgets for the care of mental patients.

The decrease foreseen by Dr. Cheney may come as a result of the increasing tendency to care for the mentally sick in their homes under the supervision of private physicians, clinics and public health nursing and social service. Dr. Cheney also believes that in the future more of these patients will be cared for in general hospitals. All of this will tend to reduce the number of patients to be cared for in the state-supported hospitals for mental disease.

The increase in population of these hospitals does not mean, in Dr. Cheney's opinion, an increase in the number of persons suffering from mental disease. Instead he attributes it to an increasing familiarity with mental hospital care and its possibilities, changes in economic conditions and increase of urban over rural populations.

The idea that the stress and strain of modern living has increased the amount of mental disease was contradicted by Dr. Cheney, who pointed out that there are no actual facts to support this assumption, which was brought forward as early as 1734.

Science News Letter, May 30, 1936



FOR NAVIGATION ALOFT

A new navigation instrument suitable for the aerial voyager is the bubble sextant held by Lt. Com. P. V. H. Weems, of the U. S. Navy. Examining it are George W. Gallasch, of the Bausch and Lomb scientific bureau (left) and Carl L. Bausch, director of research and engineering for that company.

internal bubble as a sharply defined circle to the center of which the heavenly body is brought to coincidence.

For use at night the bubble is illuminated by the light of a small flashlight bulb whose battery is carried inside the handle of the instrument. Filter glasses, to cut down the brilliance of the sun or

moon where necessary, can be quickly swung into place on the equipment by the turn of a knob.

Such well-known aviators as Lindbergh, Gatty, Ellsworth and Goebbel have tested the new sextant in aerial flight.

Science News Letter, May 30, 1936

PHYSIOLOGY

Study of Thyroid Gives New Idea of Gland Mechanisms

NEW experiments on the mechanism by which glands of internal secretion send their powerful chemicals through the body have been reported by Prof. J. F. McClendon of the University of Minnesota to *Science*. Prof. McClendon's studies, which confirm Uhlenhuth's theory, may solve one of the outstanding puzzles of medical science. He has made a 15-year study of the thyroid gland.

In the course of the experiments Prof. McClendon whirled bits of thyroid gland in a centrifuge so that the force acting on the cells was sometimes equivalent to 200,000 times gravity.

The thyroid and other glands of internal secretion control and regulate

growth, development, sex and other body processes by means of powerful chemicals which they produce. Unlike other glands, however, the glands of internal secretion have no apparent ducts or passages from the body of the glands to the rest of the body. They are called ductless glands for that reason. Prof. McClendon's latest study of the thyroid suggests how these ductless glands send their secretions into the body.

The process, in the thyroid gland at any rate, seems to depend on the fact that the cells of the gland which produce the important chemical are loosely held together, so that the chemical itself can escape by finding passages between the cells and thus eventually make its

way out to the rest of the body. To understand this mechanism, Prof. McClendon has discovered, it is necessary to have in mind a picture of thyroid gland architecture.

A slice of the gland looked at under the microscope is seen to consist of many little sacs lined with secreting cells and filled with a jelly-like material called colloid. The reserve supply of the thyroid secretion or hormone is dissolved and stored in this colloid. The entire gland is enclosed in a capsule of connective tissue in which there are lymph spaces and blood vessels. Once the hormone-containing colloid escapes from the cells into this connective tissue, the blood and lymph streams may carry it through the body.

The problem of how the colloid with its supply of hormone gets into the connective tissue is what Prof. McClendon investigated. He placed thyroid gland tissue of animals in a special centrifuge and subjected it to a centrifugal force 10,000 times gravity. This force is not sufficient to make the colloid material pass through the connective tissue capsule at any appreciable rate. It is sufficient, however, to make a number of cells of the thyroid's secreting sacs break loose and fall through the colloid, leaving a hole for the colloid to escape through into the connective tissue with its blood and lymph vessels. Prof. McClendon was able to observe the passage of the colloid through such holes.

The cells themselves are not injured by a centrifugal force 200,000 times gravity although they are separated by much lesser centrifugal force. This indicates, Prof. McClendon says, that the cells are held together relatively loosely, and that the hormone-containing colloid can probably pass out between the cells, although it could not pass through the cell walls.

Science News Letter, May 30, 1936

THE IDENTITY THEORY

By Blamey Stevens

Propagations

All phenomena of the ether are due to propagations, and these in turn depend on a differential equation that expresses the identity of space and time. The detailed nature and path of the propagated entity is determined by the initial conditions. These are only required upon integration of the differential equation, and are therefore unnecessary to the expression of the fundamental postulate of space-time identity.

\$2.00, postpaid. Summary sent on application

Sherratt & Hughes, Manchester, England. Order from author at 438 West 116th St., Apt. 66, New York City.
