

## AERONAUTICS

**Internal Cooling Liquid Adds Take-Off Power**

► **MORE TAKE-OFF** power and a greater load for planes is possible with the use of an internal cooling liquid in the engine, wartime research of the National Advisory Committee for Aeronautics disclosed. The discovery was made public with the release from military security of a report on research conducted by Addison M. Rothrock at the Aircraft Engine Research Laboratory, Cleveland.

Ammonium hydroxide was the liquid coolant inducted through the inlet manifold of the plane's engine. Its use permits 25% more take-off from the fuel. This means an approximate usable increase of 8.5% in the take-off load and increases the plane's rate of climb.

The increase in load is equivalent to an increase in the weight of gasoline carried of between 30% and 65%.

Water used alone as the cooling agent might freeze in cold weather or at high altitudes, so ammonia was mixed with the water to lower the freezing point. Mr. Rothrock says that other coolants may be used depending on availability and ease of handling as well as engine performance.

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## PSYCHIATRY

**1930 Depression Caused Mental Illness Today**

► **MENTAL CRACK-UPS** today are not necessarily due to the stresses of the atomic age. They may be caused in many cases by the depression of the 1930's, in the opinion of Dr. Robert Felix, mental hygiene chief of the U. S. Public Health Service.

Children of the depression had their emotional make-ups warped by the frustrations and stresses of that experience. They developed faulty patterns of living which make them unable to meet the strains of present day life. Men and women who were young adults at the time of the depression and cracked then but somehow kept going are now on the down grade because they have reached the middle years of life when early emotional stresses often take their toll.

Better mental health for prosperity or depression if it comes again can be achieved through the National Mental Health Act. By this mandate from Congress we are to have mental health

clinics, personnel to staff them and a public educated to use them at first attack of butterflies in the stomach or any other sign of beginning mental illness.

Training not only of more psychiatrists, but of general practitioners, nurses, social workers, clergymen, lawyers and teachers in the mental health aspects of their work is another aim of the program as Dr. Felix outlined it to the Women's National Press Club.

Given a few years in which to get the program well under way, Dr. Felix thinks we can get through another "recession" without havoc to the mental health of the population. But if the recession comes soon, Dr. Felix said he would "sit in a cell and pray" because there would be nothing else he could do with the present pitifully small handful of clinics and personnel to handle the load of mental illness such an experience would bring.

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## BACTERIOLOGY

**Germs Won't Get Resistant To All Antibiotic Remedies**

► **FEAR** that penicillin, streptomycin and other antibiotic remedies will sooner or later become useless is somewhat allayed by studies carried on in the laboratories of Ohio State University.

As germs get used to penicillin through repeated contacts in the patient's body, they grow resistant to it. But if the test-tube studies reported in the journal *Science* (Oct. 25) are verified in living animals, doctors can switch from penicillin to other antibiotics, or the reverse, and cure the patient in spite of the germs' resistance.

In the research, resistant strains of two bacterial species, the boil-causing *Staphylococcus aureus* and the colon bacillus, *Escherichia coli*, were built up by exposing successive sub-cultures to increasing concentrations of each of the three drugs, penicillin, streptomycin and streptothricin. Then each kind was exposed to various concentrations of the two compounds not included in its "ancestral conditioning." With only a single exception, all of the resistant strains proved non-resistant to both of the other drugs to which they had never had a chance to become accustomed.

The research was carried on by a team consisting of Miss Marguerite Sullivan, Prof. Grant L. Stahly, Prof. Jorgen M. Birkeland and Dr. William G. Myers.

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**IN SCIENCE**

## RADIO

**FM Sets Will Be Made For General Public**

► **BECAUSE** the Federal Communications Commission has decided to make no further changes in the wavelengths assigned to FM (frequency modulation) radio broadcasting, watch for these developments:

Manufacturers will start making FM sets for the general public.

Radio broadcasters will build and erect transmitters.

Until the freezing of the FM frequencies, manufacturers were afraid to start manufacturing and broadcasters were not sure what kind of stations to build.

FM broadcasting differs from the standard kind mainly because it operates on very high frequency portions of the radio spectrum. The principal advantages of these frequencies is that they are practically static-free. The range of FM stations is the same day and night, but the range is limited under ordinary conditions to about 100 miles.

Frequency modulation was developed before the war. There are now over 60 FM broadcasting stations, and nearly 600 more have been authorized by the FCC. The band now assigned by the FCC to FM broadcasting is from 88 to 108 megacycles.

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## GEOPHYSICS

**War Helped, Retarded Knowledge in Geophysics**

► **WAR GREATLY** speeded the development of certain branches of the science of geophysics, but hampered others, Dr. James B. Macelwane, S. J., of St. Louis University, told the meeting of the National Academy of Sciences. Greatly increased facilities for weather forecasting were needed for military purposes, and meteorology was pushed into correspondingly accelerated development. On the other hand, knowledge of earthquakes and their causes had little immediate practical value, so that seismological reporting and research was perforce neglected.

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# E FIELDS

## NUCLEAR PHYSICS

### Double Weight Neutron Believed to Exist

► THE EXISTENCE of a double weight neutron, twice the mass of the neutron that sets off the atomic bomb, is suggested in a report to the American Physical Society by two University of Texas physicists, M. Y. Colby and R. N. Little, Jr.

Not yet discovered, the heavy neutron might result from the action of double weight hydrogen upon triple weight hydrogen. This reaction has not yet been tried because tritium, as triple weight hydrogen is called, is just now becoming available in sufficient quantities. Double weight hydrogen is called deuterium, and it is the hydrogen that heavy water is made from.

Discovery of the dineutron would result in the possibility of obtaining new and important knowledge of the binding energies that hold the nuclei of atoms together. This would be of extreme importance in all further advances in nuclear or atomic energy.

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## ASTRONOMY

### Astronomers Continue International Cooperation

► WHILE MILITARISTS were setting the stage for World War II, scientists in their respective countries carried on the tradition of international cooperation. And now that the shooting has stopped, they have resumed their interrupted programs and initiated new ones, Prof. Harlow Shapley, director of Harvard College Observatory and president of Science Service, told the meeting of the National Academy of Sciences.

As a concrete example, he pointed to the work of astronomers of 24 countries, with Germany, Japan and Italy very prominent on the list, in making precision observations on the erratic asteroid Eros during the prewar decade. Calculations based on their data, completed in 1941 by the Astronomer Royal in London, determined the distance from earth to sun with a new degree of precision.

As an example of the new international cooperation, Dr. Shapley men-

tioned the action of authorities in Eire and Northern Ireland, who have joined with Harvard to set up a telescope of new and unique type on a kopje in South Africa. Harvard now collaborates in astronomical work in the Netherlands, Denmark, Mexico, Eire, Northern Ireland, the USSR, and on the Cape of Good Hope. The Harvard Observatory staff itself is a highly international body, with scientists from 15 nations at work; three more nationalities have to be added when the over-all payroll is considered.

Future international cooperation is already under way along several lines. All American astronomical observatories are working together to restore the astronomical libraries in Poland, which were totally destroyed during the war. The International Astronomical Union, badly disrupted during hostilities, is being reconstituted. The United Nations Educational Scientific and Cultural Organization is being urged to replace with a great international observatory all ruined and damaged European observatories.

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## MEDICINE

### Two Types of Common Cold Follow Exposure to Germs

► DISCOVERY that there are at least two types of the common cold, just as there are two or more types of influenza, is announced by Dr. John H. Dingle and associates of Western Reserve University School of Medicine.

One kind starts in the nose, developing 24 to 48 hours after exposure. The other begins with a sore throat five to seven days after exposure.

Hope of a vaccine to protect against colds seems limited at present to the sore throat kind. The conscientious objectors who volunteered as human guinea pigs for the studies developed immunity to the sore throat virus after having this kind of a cold. But they "caught cold" again when inoculated with the virus of the nose cold after a previous attack of nose cold. Having one kind of cold did not build up immunity, or resistance, to the other kind.

Dr. Dingle's studies were made at Fort Bragg, N. C., while he and Drs. Charles H. Rammelkamp, Jr., George F. Badger, Alto F. Feller and Richard C. Hodges, were members of the Army's Commission on Acute Respiratory Diseases.

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## OPTICS

### Molding Process Makes Optical Lenses in Bulk

► SMALL OPTICAL lenses of eyeglass size can now be produced in quantity, as finished articles without grinding and polishing, by a molding process which is carried out in an atmosphere of hydrogen.

The products of the new method, while satisfactory for many uses, do not have the optical quality of high precision polished lenses. An improved press, however, is expected to yield a product accurate enough for some telescope systems. The present lenses produced by this method are less than two inches in diameter.

The process was developed by scientists of the Eastman Kodak Company, and a report has been prepared by them which has become available from the Office of Technical Services, U. S. Department of Commerce.

Before this method was discovered it had not been possible to mold suitable lenses which were free from defect due to the uneven chilling of the hot slug of glass on contact with the mold.

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## PHYSIOLOGY

### Electric Thermometer Measures Blood in Vessels

► BLOOD temperatures may now be measured directly in the blood-stream itself by means of a new electric thermometer, announced by the Office of Technical Services, Department of Commerce.

The minute sensitive part of the apparatus, known as a thermistor, is embedded in a glass bead only one twenty-fifth of an inch in diameter. This in turn is encased in the tip of a rubber tube so slender that it can be pushed through a hollow needle inserted into a blood vessel.

From the thermistor a pair of slender wires lead back to a small box containing apparatus for measuring changes in electrical resistance. From these changes, the blood temperature can be determined within a range from 97 to 133 degrees Fahrenheit.

The new blood thermometer was developed during the war by William G. Fastie and Louis F. Drummeter, Jr., under a contract with the Chemical Warfare Service.

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