

SCIENCE NEWS

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THE PRE-TRAINING OF AVIATORS

STREAMLINING of college courses in mathematics, physics, astronomy and weather science to offer pre-training for the 450,000 new aviation personnel required this year and next for President Roosevelt's expanded aviation program is recommended in the report of a committee appointed by the Secretary of War. This committee, which was nominated by the American Association for the Advancement of Science, consists of Dr. William L. Hart, University of Minnesota; Dr. W. M. Whyburn, University of California at Los Angeles, and Dr. C. C. Wylie, the State University of Iowa. They studied the problem of the ground training and preliminary training that might be given in high schools and colleges to insure an adequate flow into the armed forces of properly trained pilots, navigators, bombardiers and other aviation personnel. They observed the training in progress at Maxwell Field and other fields in the Southeast Air Corps Training Center.

The magnitude of this job facing educational institutions is emphasized in an announcement by Dr. F. R. Moulton, permanent secretary of the association, of the planned streamlined curriculum for colleges. He says:

"The program of production of military planes which President Roosevelt announced two or three weeks ago (50,000 planes in 1942 and 125,000 in 1943) calls for at least a trained aviation personnel of 150,000 men this year and 300,000 next year. An unknown fraction of these requirements will have had a considerable part of the necessary college training and will enter the service directly.

"It will be of very great aid to the national defense to give as many of the remainder as possible most of their pre-training in educational institutions. If the numbers to be trained in schools should be half the total required, or 75,000 and 150,000 in the two years, the number of classes would necessarily be enormous and the facilities of the universities would be taxed. Consequently, it is important to start the courses at once in as many institutions as possible, partly to prepare men for the air service as rapidly as possible and partly to gain experience for a greatly increased effort. It is likely that many changes and improvements will be made in present plans under the teachings of experience."

The committee believes that the new college course as outlined by the committee can be telescoped into 11 or 12 weeks for students who have had advanced high-school algebra and some solid geometry. Emphasis throughout is on practical applications and manipulation. Theory is kept to the minimum necessary for understanding of the work.

In the plane trigonometry course, students will use a slide rule and each is expected to possess a cheap one of his own. In solid geometry, proofs will be held to a bare minimum; great emphasis will be placed on the drawing of figures and making simple paper models for three-dimensional situations. In spherical trigonometry, em-

phasis will be on problems of latitude, longitude and the astronomical triangle on the celestial sphere; examinations will be of the "open book" type, the object being to give the student confidence later in the use of navigation tables. Problems of the navigator will be kept in mind in the astronomy and weather course. The physics course will not be of the theoretical type.

CRYSTALLINE SOLIDS AND LIQUIDS

"GHOSTS" of ice lurk in water, and all liquids have some slight residual structure which is like a memory of a former crystalline solid state. This latest finding of science was described at the University of Minnesota by Dr. John G. Kirkwood, professor of chemistry at Cornell University. Dr. Kirkwood spoke under the auspices of the Society of the Sigma Xi.

When a solid melts, the long-range crystalline order, that extended throughout the mass of the solid, disappears completely, but some trace of the short-range local organization persists, he explained. Each molecule in the liquid tends to retain some of its former neighbors about it.

That liquids are mobile and solids are rigid does not adequately describe the distinction. For glass is to be regarded as an undercooled liquid that failed to crystallize on solidifying. Yet it has great rigidity while crystalline solids may show plastic flow at high temperatures. The real distinction is the degree of orderliness in the arrangement and distribution of their molecules. In the crystalline solid, the degree of order is high and extends over wide domains. In the liquid, it is slight and confined to local groups. Nevertheless, some remains, both in liquids and gases. This residual orderliness in liquids is revealed by x-ray scattering, the same technic that has so precisely determined the crystal structure of solids.

Dr. Kirkwood has reduced "degree of local order" to a mathematical expression, the "radial distribution function." X-rays determine the value of this function, and conversely, if the function is known, some of the properties of the liquid can be predicted.

THE DISCOVERY OF A RED STAR

A FEW weeks ago the Harvard College Observatory received a radiogram from Professor Jean Bosler, director of the Marseilles Observatory in France, announcing the discovery by the astronomer R. Jonckheere of a "remarkable red star" and asked for its spectrum.

No spectrum of this star was to be found on any of the existing Harvard photographic plates, so Robert Fleischer made one with the observatory equipment on a red sensitive plate.

The star turned out to be truly red. Its spectrum was confined to the red end of the rainbow sequence of colors, the end which does not photograph at all on a blue sensitive plate. The spectrum, examined by Dr. Dorrit Hoffleit, was declared to be of type Nb, to which only the reddest of the red stars belong. The star itself was also photo-

graphed one night, both on a red and on a blue sensitive plate. It showed up brightly on the former, not at all on the latter.

However, the star was found on 120 Harvard plates taken during the past several years. Examination of these plates disclosed that the star varies—blinks—but takes about 500 days between blinks. At its brightest, it is about three magnitudes, or 16 times, brighter than at its dimmest. But even at its best it is around 16 times too faint to be seen with the unaided eye.

The star is in the constellation Monoceros, which lies between Orion and Canis Minor, the Lesser Dog.

BLOOD PLASMA

FROZEN dried blood plasma, which is saving lives of soldiers wounded in the present war, offers new hope to patients with hemophilia, the hereditary disease in which the slightest cut or injury may cause dangerous or even fatal bleeding. This appears from a report by Dr. John B. Johnson, of the University of Rochester School of Medicine, in the forthcoming issue of the *Journal of the American Medical Association*.

Weekly injections into the veins of about four ounces (125 cubic centimeters) of plasma enabled a patient totally disabled by hemophilia to do light work. For the previous three years his activity had been greatly restricted because of recurrent bleeding.

Because of the limited supply of plasma Dr. Johnson has not attempted to give all his patients injections of it at regular intervals, but he considers intensive treatment of incipient hemorrhages with plasma the most practical method of attempting to rehabilitate patients with hemophilia.

Transfusions of fresh whole blood have heretofore been considered the most effective treatment. Plasma, Dr. Johnson says, has the same ability as whole blood to shorten the clotting time of the blood, which in hemophilia is so prolonged that the patient is in danger of bleeding to death from small injuries. In addition, plasma has the following advantages: It is more readily available than whole blood, since it can be stored after suitable processing without losing its ability to reduce clotting time. It does not need to be typed or matched with the patient's blood.

One of the most satisfying results of the type of management under discussion has been the elimination of the fear of tooth extractions in patients with hemophilia. The removal of two or more teeth on three occasions in two patients was managed by the use of plasma alone.

ITEMS

FOSSILS showing that life existed half a billion years ago, in a shallow sea where the Appalachian Mountains now rise, have been found in a series of limestone strata long thought to be barren of such evidences. The formation is described in a new publication of the Smithsonian Institution, by Dr. Charles E. Resser, paleontologist of the U. S. National Museum. The strata constitute what is known as the Maryville formation. It crops up in many places in the long chain of Eastern mountains. Geologically, it is classified as of mid-Cambrian age. The

fossils, mainly of ancient relatives of crabs and crayfish known as trilobites, are related to similar forms found in the Rocky Mountains.

THE Adirondack Mountains are half as old as the earth itself. New measurements of the age of these northern New York uplands, based on the relative amounts of thorium and lead in one of the minerals found in them, indicate an antiquity of 1,100,000,000 years. This confirms an earlier estimate, made in 1939, based on a different mineral. The Adirondacks are of the same age as the Laurentian highlands, a much larger ancient mountain mass in Canada, on the other side of the St. Lawrence River, and separated from the Adirondacks by a wide zone of much younger rocks. The new age determination was made on a mineral known as allanite, specimens of which are in the U. S. National Museum, by Dr. J. P. Marble, of a committee of the National Research Council, on the measurement of geologic time. The 1939 determination, made on a uranium-containing mineral known as uraninite, was carried out in a laboratory in Vienna, now inaccessible because of the war.

HOPE that diphtheria toxoid, the substance that protects against diphtheria, would prove a cure for leprosy is dispelled by its failure so far to improve the condition of leprosy patients at the U. S. Marine Hospital, Carville, La. The treatment aroused wide-spread interest when an American medical missionary to Thailand, Dr. D. R. Collier, reported favorably on his results with the treatment which was first suggested by a German physician, Dr. Manfred J. Oberdoerffer. Trial of the treatment was started at Carville in 1940. Of 11 patients given the treatment for more than a year, one is slightly improved, three are in a stationary state and the rest are in a worse condition than at the start of treatment. Dr. G. H. Faget and Dr. F. A. Johansen, of the U. S. Public Health Service, describe these results in the current issue of the *Public Health Reports*. In a more extensive and carefully controlled study, for which seventy-one patients volunteered, diphtheria toxoid was given to half the group and the broth from which it was made was given to the other half. The latter, control group, did better than the group given the toxoid. The experimental treatment will be continued for another two months. After three months of further observation a final report will be made.

THE dangers of allowing mice and termites to inhabit airplanes is the subject of a safety bulletin issued by the Civil Aeronautics Board. A recent fatal accident, in which a mouse was prominent, "presents a good object lesson by which to focus attention on the importance of watching out for insect and animal pests around your plane." During a normal maneuver, the covering on the right wing failed. The plane crashed nose first in a plowed field. The right aileron fabric was found to be badly deteriorated along the piano hinge; the work of a small animal, probably a mouse. During the removal of the wreckage from the scene of the accident a mouse jumped from the fuselage. Other incidents are on record of wood-eating termites and rodents inhabiting aircraft.