

## SCIENCE NEWS

*Science Service, Washington, D. C.*THE CARNEGIE INSTITUTION OF  
WASHINGTON

WAR work now absorbs the major part of the research staff and laboratory facilities of the Carnegie Institution of Washington, is disclosed in the presidential report of Dr. Vannevar Bush.

Dr. Bush has taken on wartime duties as director of the U. S. Office of Scientific Research and Development and chairman of a joint committee on new weapons and equipment in addition to his permanent position as president of the institution. His example has been followed by many members of the research staff, 34 of whom have taken leave of absence to devote full time to wartime tasks in the government, while 145 others who remain on the institution payroll are devoting all of their time to the furtherance of the 23 research projects covered by 48 contracts with the government. In addition, these war tasks have necessitated the hiring of about 150 new employees.

All the physical facilities of the institution have been placed at the disposal of the government, including practically all of the space in the administration buildings in downtown Washington. The executive work of the institution itself is now carried on in a few offices in part of the old building.

This concentration on war effort does not mean, however, that the many peacetime research programs have been altogether discontinued. Some of the work carried on requires uninterrupted series of daily observations, on such things as variations in terrestrial magnetism, and these must not be stopped because no subsequent effort could ever fill in the gaps. Other projects are so near completion, and have already involved so heavy an investment of time and money, that it seems advisable to carry them through. One group of projects, the excavation and restoration of remains of ancient Mayan and Mexican civilizations, are being continued with direct government approval because of their value in the strengthening of inter-American cultural relations.

While the great majority of war-connected researches are necessarily secret and confidential, a few examples, out of many scores discussed in the report, include:

Efforts to develop varieties of hemp for the new fiber-production program that will yield little or no marihuana to would-be drug bootleggers. An apparent correlation between double or triple chromosome numbers and high marihuana concentration has been found.

Improvement of the Russian rubber-yielding dandelion, *kok-saghyz*, by breeding methods, especially by treatment with colchicine.

Discovery that there is more than one kind of chlorophyll in plants, and hence more than one kind of photosynthesis, the basal food- and fiber-forming process. The new food-making pigments have been found in certain of the lower water-plants known as algae, which are the ultimate food of fish and which may have had something to do with the formation of the world's oil pools.

Discovery that children in such diverse racial and cultural groups as the Dutch and Navajo show "a significant trend toward increase in weight and height among the children of to-day as compared with children of the same age group ten years ago."

Finding of four more of those rarest of anatomical specimens, human embryos in their first few days of existence. None of these was more than a sixteenth of an inch in diameter.

Observation of the still-scattering fragments of an exploded star that was first observed as a nova by the pioneer astronomer Kepler in 1604.

Confirmation of the rotation of those vast island universes known as spiral nebulae. The arms of these great aggregations of stars trail as they rotate.

RARE LUMINOUS CLOUDS OF GAS ON  
THE SUN

Two interacting solar prominences in eruption, a rare sight on the sun, were photographed on October 3 by Dr. Edison Pettit, of the Mount Wilson Observatory, it was announced in a report published on December 19 by the Astronomical Society of the Pacific.

Solar prominences are the luminous clouds seen projecting above the edge of the sun during a total eclipse. Interactive prominences are those in which two or more are pulling material away from each other in the form of streamers. They are of great theoretical interest since such interaction indicates that both positive and negative electrical charges may exist within the same prominence.

The photographs were taken with a motion picture camera through a special device called an interference polarizing monochromator, an instrument only recently perfected for astrophysical use. Through the monochromator the sun appears as a cherry red disk of moderate brightness upon which markings can be seen totally invisible when viewed by a telescope in the ordinary way. The camera and monochromator were attached to a six-inch refracting telescope mounted in Dr. Pettit's backyard observatory. Dr. Pettit, who was among the first to discover Nova Puppis on the morning of November 10, made the first accurate photometric measurements of the nova's brightness.

When first seen upon the edge of the sun at 9:39 A.M., Pacific War Time, the object consisted of two small prominences, of which one 22,000 miles high was pouring streamers into another 9,000 miles high about 37,000 miles away. Although Dr. Pettit suspected that an eruption might be in progress, he hesitated to use the motion picture camera owing to a thickening sky and a limited supply of film. By 2:26 P.M., however, the character of the activity was no longer in doubt, the prominence then having risen to an elevation of 62,000 miles. Photography was commenced with the monochromator and continued until 4:24 P.M., when forced to halt by clouds.

The early exposures show the prominences blended into a single triangular shaped mass. This developed into a

column which, as it rose, bent over like a whip and tended to return to a center of attraction in the near-by solar surface. Exposures made through rifts in the clouds reveal the column reaching down nearly to the sun's limb.

Measurements of the film showed the prominence first rising with a speed of 23,400 miles per hour which changed abruptly to 46,800; and then from 46,800 to 93,600. Between changes the motion was uniform, the sudden increases occurring within less than a minute.

These jumps in speed are a characteristic of the motion of eruptive prominences. Why the motion should change suddenly rather than by a gradual increase as is generally the case in nature is merely one of the many unexplained features connected with these mysterious solar appendages.—ROBERT S. RICHARDSON.

### THE WHIPPLE COMET

A NEW comet has been discovered by Dr. Fred L. Whipple, of Harvard Observatory. It is a faint object far dimmer than the faintest object the unaided eye can see. Dr. Whipple discovered it on a patrol camera plate taken at Harvard's Oak Ridge station on December 7. It was located about six degrees south of Jupiter.

Once the comet was found, Dr. Whipple was able to detect it on 20 plates taken as far back as November 1, but it does not appear on photographs taken during October. The next step in the investigation will be the computation of an orbit from these positions. This will tell whether there is a chance that the comet will become brighter.

The comet was sighted by Professor G. Van Biesbroeck of Yerkes Observatory, Williams Bay, Wis., and observations made on several nights show that it is approaching the sun, and thereby coming closer to the earth. On November 17 its brightness was reported as 12th magnitude. On November 29, the brightness had increased to the 11th magnitude. The comet itself was then diffuse with a central condensation or nucleus.

On December 13 and 14 the brightness had increased to the 8th magnitude, still too faint to be seen with the unaided eye, although it can be seen with a fair-sized telescope. This new comet, discovered by Dr. Fred L. Whipple, of Harvard Observatory, has now developed a short tail with a length of 40 minutes of arc.

### INFLUENZA AND MENINGITIS

INFLUENZA cases increased in two widely separated parts of the country but no signs of a nation-wide epidemic appear in the summary reported by State health officers to the U. S. Public Health Service for the week ending December 12, latest on which figures are available.

Total cases for the country were 2,604. This figure is lower than the five-year median and lower than the figure for any year since 1938. Of the total, Texas reported the largest number of cases, 732. South Carolina reported 517, Virginia 371 and Oklahoma 185. Apparently these states are having localized outbreaks.

Big influenza epidemics usually start earlier in the fall, in a year when a high number of cases the previous winter has continued through the summer. We have not had that situation this year.

Cases of meningococcus meningitis increased sharply, from 88 to 103 for the week ending December 12. This is a higher figure than for the same week any year in the past five years. Meningitis cases have been running higher lately than for any year since 1937, but the total for the year to date, 3,387, is nevertheless lower than the 5,146 total for the year to date in 1937.

The death rate for large cities of the country again increased. During the week ending December 12 it was 13 per 1,000. For the previous week, excluding the mortality from the Boston night club fire, it was 12.8; the three-year average is 11.9. Since the death rate is calculated on the 1940 population figures, it may not actually be so high, because shifts in population since 1940 may have increased the number of people in many of the large cities.

### THE HEALTH OF THE COMING GENERATION

RECRUITS for the Army of 1962 (if we need one then) will have sound teeth and solid bones if farmers and dairymen of 1942 put the right fertilizers on their fields and take proper care of the soil. The health and strength of the coming generation lies in to-day's fields and pastures, was pointed out by Professor W. A. Albrecht, of Cornell University, in an address at Chicago before the National Industrial Chemical Conference.

Soils are the halfway stage between rock in the mountains and silt on the bottom of the sea; mankind seizes upon this geologically brief interlude in the endless cycle of erosion to extract a living from this mass of mineral particles plus humus added to it by other living things. If his use of the soil is wise, man can slow down the erosional cycle to his own advantage; if he abuses the soil it takes revenge by hastening the erosional process and leaves him hungry and faced with a stone-bare cupboard.

When soil "goes into a decline" it shows any number of warning symptoms before it is really ready to die. The speaker pointed out rising soil acidity, changes in the type of plants the soil will support, and various debilitating diseases in livestock pastured on the thinning range. A declining soil will not produce good crops of muscle- and bone-making plants; if an attempt is made to maintain total tonnage without regard to quality the new crops will have to consist more and more of "roughage" plants—bulky stuff with lots of woody tissue in it, but less and less of real food.

Professor Albrecht suggested that one agricultural college's motto: "Our national wealth lies in the soil," might well be amended by the change of one letter: "Our national health lies in the soil."

### SHORT VACATIONS ADVISED FOR TEST PILOTS

TEST pilots should be given frequent short vacations with at least one week of rest in each seven weeks, to prevent chronic exhaustion, is urged by Dr. Jan H. Tillisch and Dr. Maurice N. Walsh, of Rochester, Minn., in a report to "War Medicine," published by the Ameri-

can Medical Association in cooperation with the Division of Medical Sciences of the National Research Council.

Chronic exhaustion occurs more often in test pilots than in transport pilots, a finding which it is pointed out is not surprising in view of the nature of the test pilot's work.

Most common symptoms of chronic exhaustion in the test pilot are: chronic fatigue, a feeling of inward tension and uneasiness, anxiety, difficulty in concentration, insomnia, irritability, headache, gastrointestinal disturbances and a generally increased awareness of and a preoccupation with bodily processes.

Flying, even high altitude flying, is not enough by itself to cause the chronic exhaustion. Long hours of hard work and the emotional strain of flying a new and at times hazardous airplane are the factors that bring on the exhaustion in the test pilot.

Several things can be done to prevent this chronic exhaustion state. Good physical condition should be assured by frequent medical examinations and correction of defects. At least eight hours of sleep a night should be obtained. A pilot should keep himself in good physical condition by regular exercise. More than two or three high altitude test flights in succession should be avoided.

The importance of hobbies in securing mental relaxation is emphasized. A pilot should be encouraged to cultivate some. The most satisfactory hobbies are those which are not related to one's every-day occupation and which involve making something with the hands or forming collections, so that a person can enjoy the feeling that he has created something worth having. The indiscriminate use of sedative agents by pilots in an effort to dissipate nervous tension can not be condemned too strongly. A sedative should be taken only when it is prescribed by a physician, and while under its influence a pilot should not fly. The continued use of stimulants, such as alcohol or amphetamine sulfate, is dangerous, as either one may lead to errors of judgment.

#### SCIENCE DEVELOPMENTS OF THE YEAR 1942

THE ten most important advances in science made known during 1942 as picked by Watson Davis, director of Science Service, are:

1. Discovery of a giant planet outside our solar system, a satellite of a star in Cygnus.
2. The brightest "new star" in 25 years, Nova Puppis.
3. Building of a 100,000,000 volt electron accelerator for x-ray production.
4. Shipbuilding, especially by assembly line methods and welding, producing largest annual tonnage.
5. Research developments that allowed production of airplanes flying much faster than 400 miles per hour.
6. The synthetic rubber program.
7. Lowest U. S. A. death rate in history and all-time record low in smallpox cases.
8. Disease fighting antibodies of the blood manufactured artificially.
9. Smaller and simpler electron microscopes to magnify 10,000 to 100,000 times.
10. Quicker treatments for syphilis, six to ten weeks clinically and one day experimentally.

#### ITEMS

SCIENTIFIC men who are prisoners of war in Britain will receive from their British colleagues copies of scientific journals, reprints and other reading matter that will enable them to keep their trained minds alive until peace brings them the opportunity to return to their homelands. In a fairly recent issue of *Nature*, it reports the formation of a small organization for this purpose. An appeal is issued for contributions of back issues of scientific publications; for most of the prisoners have not had a chance to see the results of British or American research that have come out since the war began, so that there is a good deal of lost time to be made up. The leader of the movement is John R. Baker, who lives in the country near Oxford. He states that the work of supplying scientific reading matter for British prisoners of war in enemy hands has been carried on for some time by the British Red Cross and the Order of St. John of Jerusalem.

NEW GUINEA'S most primitive people were shown on December 17 in motion pictures to a Washington audience by Matthew Stirling, chief of the Bureau of American Ethnology. Mr. Stirling made the films when he visited New Guinea at the head of an expedition some years ago. These people are pygmies who are still in a neolithic stage of cultural development. They have no metal tools, and until the expedition reached their country, in the jungle-covered plateau of Netherlands New Guinea, they had never seen a white man. They proved very friendly and hospitable, however, and cooperated readily, giving much information and contributing many scientific specimens.

GEOLOGISTS of the U. S. Geological Survey helped Eisenhower's men in Africa to find water, according to the annual report of the survey. Besides telling Army engineers where they would be most likely to find wells of good water, maps giving the lie of the land were furnished and information regarding mineral resources in the newly occupied territory.

PROFESSOR ALEXANDER SILVERMAN, of the University of Pittsburgh, stated in an address at the Franklin Institute, Philadelphia, on December 16 that glass is proving one of the most versatile of all war materials. It has taken over jobs formerly monopolized by such diverse materials as steel, silk and cork. It functions very much like steel in bullet-proof windshields and turrets on airplanes; glass sutures are replacing silk and gut in certain surgical uses; and a new material, bubble-filled masses of glass foam, has replaced cork in much new heat insulation. This glass foam promises to take up cork's job in life preservers also, for it is practically as light as cork and even more resistant to waterlogging. Unlike air-inflated rubber floats, it is indifferent to puncture; if a bullet passes through it, only the cells in the immediate path are destroyed, and the block floats serenely on. In addition to these more or less novel uses, glass serves the war effort in a hundred of its long-established and more conventional forms, all the way from medicine bottles and factory windshields to accurately ground lenses for telescopes, rangefinders and periscopes and carefully colored photographic filters.