is one bas relief which Mr. Smith has recorded which is a surprise. It shows a profile of classic sweetness. Whether the Indians thought their fierce gods and heroes beautiful, Mr. Smith points out, we cannot know. They may have placed other goals far ahead of beauty, in their art.

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PUBLIC HEALTH

Public Health Officials Battling Flu Epidemic

No Satisfactory Control Measures Available But Pneumonia Can Be Effectively Fought with Serum

PUBLIC HEALTH officials, engaged from the beginning of the outbreak in battling the epidemic of influenza, which began on the Pacific coast, have little hope of stopping its spread.

They will, however, work intensively to learn more about the disease and the viruses that cause it.

"Influenza travels as fast as transportation," Dr. Frank L. Horsfall, Jr., Rockefeller Foundation flu fighter, said, "That means the speed of airplanes," he added.

A large supply of the new double-virus vaccine against influenza, developed by Dr. Horsfall and Dr. Edwin H. Lennette through a lucky accident in which influenza-infected ferrets got distemper at the same time they got flu, is available in California, and is being used, but results are not yet available. The vaccine has not yet had a trial-by-epidemic of its protective value.

Vaccinating in the face of an epidemic may not provide such a trial, nor be effective as control measure even if the vaccine turns out to be effective in protecting against influenza. The reason for this is that influenza travels so quickly that it is difficult to get people vaccinated before they are exposed to the disease.

Dr. John W. Oliphant, U. S. Public Health Service, is in California, but not for the purpose of controlling the epidemic. No satisfactory methods of controlling this disease have yet been developed.

Dr. Horsfall is not going to the present scene of the influenza epidemic in California, either, nor is Dr. Lennette. The Rockefeller Foundation, Dr. Horsfall explained, has a well-trained group of influenza investigators, under the leadership of Dr. M. D. Eaton, already established in Berkeley with the California State Department of Health. No word has been heard from these men since first notice of the epidemic on Nov. 30, presumably because they are too busy, "working day and night," to find time for official reports.

The most important thing to do first in an influenza epidemic, Dr. Horsfall pointed out, is to find which virus is causing the cases.

Two viruses that cause epidemic influenza have been discovered. They are called Influenza A virus and Influenza B virus. The B virus was identified by Dr. Thomas Francis, Jr., of New York University College of Medicine. This virus was the cause of epidemics near New York City and in North Carolina early this year. It also was the cause of an epidemic early in 1936, Dr. Francis discovered.

More strains may exist. Difficulty in developing protective vaccines against the disease may be due to the fact that there are so many strains. There might have to be a separate vaccine for each strain of virus. Fundamental knowledge of this sort is what Dr. Oliphant and other flu fighters are seeking, so that efforts to control the disease can proceed more effectively.

Like Dr. Horsfall and the others, Dr. Francis is eager to know which virus is causing the present California epidemic. He does not plan, however, to go out to California.

Dr. Francis considers that just because there is war in Europe is no reason to expect a big influenza epidemic this winter. He pointed out that the world-wide influenza epidemic of 1918 was one of the few in history to come with a war. We had a war in this country between 1861 and 1865, but nothing like influenza accompanied it, he pointed out. The year 1890 saw another big influenza epidemic but there was no war then.

In 1918, unlike the present situation, the influenza epidemic in general affected the eastern part of the United States first and traveled more or less rapidly from east to west and from north to south.

Crowded conditions in army camps and naval training stations were believed to play an important part in the spread of the disease in 1918. Such conditions are not likely to prevail this winter. Army officials now receiving the first contingents of men for training under the Selective Service Act are well aware of the importance of avoiding crowding in order to cut down the spread of influenza and other diseases.

Health measures advised in case of an influenza epidemic are the same this winter as they have been for the past 22 years or more: Avoid crowds. Keep up resistance by proper diet, rest and outdoor exercise. Go to bed at the first sign of an influenza attack and call a doctor. Stay in bed until the doctor says it is safe to get up.

The most cheerful feature of the present situation is the fact that pneumonia, the great killer in past influenza epidemics, can be effectively fought by prompt treatment with serum or one of the new sulfa drugs or a combination of these.

There is some possibility that the Pacific Coast outbreak will be localized there, several points in the East early this week reporting no increase in influenza.

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ASTRONOMY

Find New Super-Dense Star In Constellation of Cygnus

AN ADDITION to the rare class of white dwarf stars, which have densities as much as a million times that of water, is announced by Dr. G. P. Kuiper, of the McDonald Observatory of the University of Texas and the University of California.

It is in the constellation of Cygnus, the swan, just above the top of the familiar "northern cross," visible in the western evening sky. The star, known by its catalog number as Ross 198, is of the fifteenth magnitude, and not visible except with the largest telescopes.

The faint companion to Sirius, the "dog star," now seen in the evening to the southeast, was the first white dwarf to be discovered. Though it has as much stuff in it as the sun, this is concentrated into a globe about as big as the planet

Uranus, one-thirtieth of the sun's diameter. Thus, a pint of its material would weigh about 20 tons.

Explanation of this super-density is believed to be that the atoms are completely ionized, or broken into bits, by the extreme temperatures that prevail inside, around two billion degrees Fahrenheit. Thus, the wood in a pile of boxes, corresponding to the atoms and like them containing a great deal of empty space, takes up a lot more room than if the same boxes are broken into small pieces.

Just how dense is the newly discovered white dwarf, Ross 198, remains to be determined. However, another star of the same class that Dr. Kuiper discovered a few years ago is estimated to be a thousand times as dense as the companion of Sirius.

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GENERAL SCIENCE

Supernovae, Rarest Phenomena, Found To Be Of Two Types

Even Members of Fainter Group are a Hundred Times As Bright as Ordinary Novae; Others 1,000 Times

EXPLODING STARS, known to astronomers as "supernovae" and described as "the rarest and most spectacular phenomena recorded in the study of the observable region of the universe," are of two types. This is shown by a survey conducted jointly by the Mount Wilson Observatory of the Carnegie Institution of Washington and the Palomar Observatory of the California Institute of Technology.

Some results of this investigation, of which the exploratory phase is now completed, are shown in the Carnegie Institution of Washington's annual exhibition, which opened on December 13.

Ordinary "new" stars reach a maximum brightness only about 100,000 times that of the sun. Such a star, says the Institution's catalog of the exhibition, "becomes unstable, swells up, and blows off its cover." Several of these occur each year in our own Milky Way system, and presumably they are about as frequent in the millions of similar systems observed by astronomers. In the more distant ones, even when brightest, they are not sufficiently brilliant to be apparent.

Until the joint investigation was inaugurated, six years ago, only fragmentary information about supernovae, which are far more brilliant, was available. Now it is found that one appears in each star system about once in three to six centuries. The last in our system was in 1572.

"All well observed supernovae seem to follow closely one of two patterns," it is announced, "and are distinguished as groups I and II. Those of group II are the fainter (average maxima about 10,000,000 suns) and their spectra, that is, analyses of their light, resemble the spectra of normal novae on an enhanced scale. Practically all the features in the spectra have been identified. The spectra of group I (average maxima about 100,000,000 suns) are quite different, and so strange that scarcely a single feature has yet been identified with certainty. These spectra evidently reflect the sudden release of energy on an enormous scale, and their final interpretation should contribute information concerning the behavior of matter under extreme conditions."

Machines Develop Pressures

PRESSURES in the laboratory as great as three million pounds per square inch, which duplicate those at a depth of 300 miles below the earth's surface, or about a twelfth of the distance from surface to center, are proving a powerful new tool to scientists in their studies of what is happening in the earth itself.

First results of researches made with such pressures in the Geophysical Laboratory of the Carnegie Institution of Washington are revealed as part of the annual exhibit of the Institution.

To obtain such pressures it is necessary to have a material that will withstand them. Tungsten carbide, known as carboloy, is one that has been widely used, but even with this the trick of "a bomb within a bomb" is needed.

"A carboloy piston 1.13 inches in diameter (roughly one square inch in cross section) will support a load of about 375 tons before rupture," it was stated. "It is one of the strongest known materials. This compressive load thus appears to set up an upper limit to the pressure obtainable in a single-stage apparatus. If, now, we support this piston laterally by a pressure of, say 250,000 pounds per square inch, on the basis of ordinary elastic theory we can expect the piston to support a load of about 500 tons as an upper limit. Actually, however, it will withstand much more than 500 tons, because the lateral confining pressure acts also to increase its strength. A piston supported in this manner withstands a load of as much as 1500 tons.

"This phenomenon has been utilized in the apparatus for work at very high pressures. The apparatus consists of a two-stage or cascaded arrangement of pressure vessels, that is, a bomb within a bomb. A pressure of 300,000 pounds per square inch developed in the first stage or outer pressure vessel acts on the second stage or inner pressure assemblage to support and also to strengthen it, and thus allows the generation of a pressure about ten times that in the outer vessel. The advantage of this two-stage cascade apparatus, therefore, lies not only in the circumstance that the second stage immediately doubles the pressure range, but also, in the great increase of strength caused by the confining pressure on the inner bomb. The pressure in each stage is developed by means of a piston, and the mechanism is so designed that the pressure in either stage may be varied independently of the other."

Plant Fossils Evidence

EVIDENCE that the continents have "stayed put" during the past 60 million years, and have not been drifting slowly around like rafts on a millpond as one theory holds, is presented by successive deposits of plant fossils representing various periods in American geological history. These are illustrated in exhibits arranged by the Institution's division of plant biology, with the collaboration of the Museum of Science and Industry of New York.

If all present continents are fragments of one original super-continent, that broke up about 60 million years ago and let its fragments go a-drifting, then we could expect lines of distribution of plant fossils to have no necessary relation to the distribution of plants today. As a matter of fact, however, Institution paleobotanists have found, given species in past ages were distributed very much as plants of today are distributed: push-