

SCIENCE NEWS

Science Service, Washington, D. C.

LONG-RANGE WEATHER FORECASTS

LONG-RANGE weather forecasts, a peacetime dream that seemed unrealizable, have become a working actuality because fighting men, especially winged fighting men, simply had to have them. Pictures of what the weather will be like at the end of, two days, 10 days, 30 days are now possible, "with sufficient accuracy to permit of making preparatory plans for future operations," is stated by General H. H. Arnold, in command of the Army Air Forces, in his report to Secretary of War Stimson.

At the beginning of the war, 48-hour forecasts were common enough. But that little time is insufficient margin when plans for a continental-scale invasion of hostile shores are being made. Insistence on working long-range forecasts "at first met considerable opposition both inside and outside the Army Air Forces," General Arnold comments. By pooling all meteorological information of the United Nations, together with some further knowledge captured from German sources, the job was done, and put on a world-wide scale.

Forecasting weather for the Army Air Forces is often as perilous a job as flying through that weather at its worst. The story is told of one group of meteorologists who undertook to set up an observing station on a narrow ledge in an ice-jammed fjord at Prince Christian Sound on the desolate, uninhabited southern coast of Greenland. The buildings have to be tied down to the rocks with cables, to keep from being blown off by the winds of 90- to 175-mile-an-hour that prevail there.

There has been a tremendous increase in Air Weather Service, as in all other branches of the fighting forces. For this particular work, the personnel has been multiplied ninety-fold.

INFLUENZA

THOSE who have been worrying, as most persons have each fall and winter since the war started, over the possibility of a world-wide influenza epidemic as devastating as that of 1918, may be reassured by a statement by the editors of the *New England Journal of Medicine*. It states that any epidemic in the near future is likely to be much less severe than was the pandemic of 1918. This, of course, is only speculation, but is based on significant observations. The observations are:

1. The influenza of the last war had a high mortality, but the deaths were accounted for chiefly by complicating pneumonias in which the hemolytic streptococcus was the germ most frequently encountered. The same was true of the epidemics of measles in Army camps during the last war.

2. During the 1940-1941 epidemic of influenza, the staphylococcus played an important role in complicating pneumonias, but intensive treatment with the sulfa drugs gave quite encouraging results. The results, in fact, were so good that it was suggested that in the event of another influenza epidemic it might be well to use sulfa drugs early in severe cases. This is especially recommended for

patients with severe prostration, signs of tracheobronchial and lung involvement and presence of appreciable numbers of hemolytic streptococci and staphylococci in the sputum.

3. Another encouraging omen comes from recent reports concerning measles. Outbreaks of this occurred in the Army during 1943 but, unlike the 1918 experience, deaths were rare. This is attributed to wide-spread use of sulfa drugs in all cases with lung involvement.

"It is not unreasonable," the medical authorities comment, "to expect a similar low fatality rate from influenza occurring under like circumstances."

For the future, there is even more reason for confidence when supplies of penicillin become large enough for large-scale use, since this chemical from mold is especially efficacious in infections with the staphylococcus. This germ is being found in increased frequency in surgical conditions and in complications of other respiratory diseases, so may be expected to play a considerably greater role in future influenza epidemics than in any previous ones.

PURE TUNGSTEN OBTAINED DIRECT FROM ORES

PURE tungsten, much used in war metals, may be produced directly from tungsten ore by a new method successful, at least, in the laboratory. The new process, in which crystalline tungsten is produced electrolytically from a fused borate or phosphate bath, using tungsten ore as the direct source of tungsten, was developed by Dr. Colin G. Fink, of Columbia University, and Chuk Ching Ma, of the Westinghouse Lamp Company, Bloomfield, N. J., and reported by them to the Electrochemical Society.

In the process the tungsten in the ore used does not require preliminary transformation into alkali tungstate as in older processes. The new method may be applied to low-grade ores as well as to high-grade or concentrates ores. The method is technical, but is commercially usable and economical.

Tungsten to-day occupies a major position among strategic minerals. Few metals have so rapidly increased in importance within the past twenty years. It is used as a pure metal, as an alloy constituent in hard steels and other metals, and in chemical compounds. Tungsten is used in high-speed tool steels and in cemented carbides. Tungsten carbide tools, used in thousands of machine shops producing war equipment, have extreme hardness, being surpassed only by boron carbide and diamonds. Tungsten is used for filaments in incandescent electric lamps, as electrodes for hydrogen welding, electric contacts in automobile engines, and has many other uses.

This metal has a fortunate combination of physical properties. These include tensile strength, hardness, ductility, corrosion and erosion resistance, and a very high melting point, 3,370 degrees Centigrade, the highest of any metal.

The United States mines tungsten ores in Arizona, California, New Mexico, Colorado, Idaho, Nevada, Montana, and Washington. Its principal supply has been imported. In 1940, China furnished 46 per cent. of the imports, Bolivia 20 per cent., Argentina 10 per cent., and Australia and Portugal 6 per cent. each. With much of the China ore no longer available steps have been taken to secure increased amounts, particularly from Bolivia and from local reserves. The new process, in which low-grade ores may be used, will undoubtedly increase the use of local minerals.

ORGANIC CHEMICALS FROM COAL

ORGANIC chemicals, now extracted principally from petroleum, will probably be derived more largely from coal in post-war days as the oil reserves become more and more exhausted. The extraction of simple individual chemicals from coal is a difficult process at present because of its highly complex composition. Intensive studies at the Coal Research Laboratory of the Carnegie Institute of Technology in Pittsburgh may result in methods to make the process more simple and economical.

Chemicals are obtained from petroleum by relatively simple processes because the crude oil secured from the earth consists of many individual compounds easily separated and processed. They are now obtained from coal principally as a coke by-product. This by-product is a mixture of aromatic compounds called coal-tar. Coke and gas are the objects of the coking process; the coal-tar is incidental, and normally only about half of it is used to obtain pure chemicals.

As a wartime measure all the coal-tar products are now used, mostly to obtain the essential toluene for TNT, benzene for aviation fuel, and styrene for synthetic rubber. The plastics industry also is a consumer of coal-tar compounds.

Production of coal-tar now is dependent on the amount of coke needed in the trade. The steel industry is the principal user of coke. To increase the output of coke and coal-tar, additional uses of coke must be found either as a fuel, or to furnish pure carbon for many commercial purposes. Coke is principally carbon. Present studies are concerned with how coal-chemicals production can be economically separated from coke production.

ITEMS

Two stars have been found to compose AE Aquarii, a faint star in the constellation of the Water Carrier, where only one was believed to exist before. This star is of the eleventh magnitude and therefore invisible to the naked eye. Examination of photographs of the star by Dr. A. H. Joy, of the Mt. Wilson Observatory, revealed the presence of a close companion revolving around the main star, with a period of less than two days. This is the first time that the binary character of these particular stars has ever been recognized. The photographs also show the presence of bright clouds of hydrogen, helium and calcium gas surrounding one or possibly both of the stars. Seven photographs of the spectrum taken during September and October of this year were studied by Dr.

Joy. His work introduces a new line of attack in the study of certain variable stars that in their sudden outbursts of luminosity resemble novae.

COLD winter winds spell doom for potential attackers of stored grain is reported by the U. S. Department of Agriculture. Few insect eggs or other forms of insect life, enemies of the granary, can survive low winter temperatures. And, as grain is an excellent insulator, even the summer heat takes a long time in making its way into the main body of the grain. The autumn chill usually arrives before any harm can be done. To make the most of this natural refrigeration, painting the outer surfaces of granaries and grain tanks white in order to reflect the sunlight and absorb a minimum of heat is recommended. Mild winters in the South make the problem much more difficult in that area. Granary enemies must be attacked in the balmy climates by means of fumigation, oiling or heating.

To assist harried South American farmers who are losing as much as 50 per cent. of their corn crop because of insects, but are unable to obtain fumigants to combat them, a new method of attacking by heat is under investigation by the Institute of Inter-American Affairs at Iowa State College. Now being developed by Paul Douglas, associate engineer of the food supply division of the institute, the solution to this problem calls for the construction of a brick storage building, fourteen feet high and six feet wide, in which can be stored 160 bushels of shelled corn, the harvest from about ten acres. Through the center of this building, a wood furnace and flue are built to furnish the temperature of 120 degrees Fahrenheit which is needed to kill the pests. Detailed plans for the structure, method of operation, handling of the corn at harvest, preliminary drying for storage and determination of moisture content are expected by Mr. Douglas to be available for the South American farmers upon completion of the present research project.

RATS are saboteurs of the most destructive sort, it appears from figures compiled by biologists of the U. S. Fish and Wildlife Service. The damage they caused last year is estimated at more than \$200,000,000. Rat damage went up during 1943 not so much because there were more rats as because the cost of commodities in general had increased. Higher cost of living means higher cost of keeping rats on the premises. Men experienced in rat control estimate the over-all rat population of American farms at around 60,000,000. The farm is the rat's great stronghold with plenty of hideouts and plenty of food he can steal. Cities harbor fewer of the vermin: improved ratproof construction, better clean-up of garbage and the vanishing of the city horse are cited as factors in the rats' back-to-the-farm movement. In addition to their role of thieves, rats are incendiaries. They steal matches, gnaw wire insulation, cause leakage of chemicals. Worse still, these vermin harbor smaller vermin (fleas) which in turn are carriers of two much-feared diseases: the American form of typhus fever and bubonic plague.