

Do You Know?

Crops have been *irrigated* in the northern section of the Po valley in Italy since the 13th century.

Twelve miles from the earth the *temperature* is lower over the equator than it is over the North and South poles.

The only known place in the United States where *crude oil* production can be substantially increased is in West Texas.

Workers wear *gloves* when packing metal war instruments because sweaty bare fingers leave moisture that may cause rust.

The *air route* from San Francisco to Japan via the Aleutian Islands is over 1,700 miles shorter than the route via the Hawaiian Islands.

Perennial *range plants* thrive and spread only as they are able to store up food in stem bases and roots, with which to start new growth the following year.

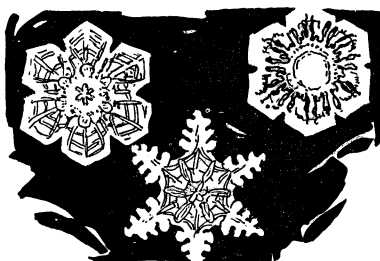
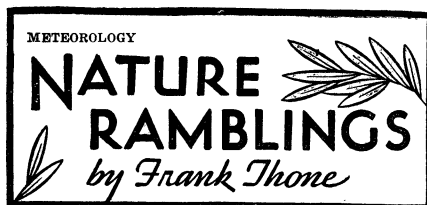
The Alaska male willow *ptarmigan* is white in winter and brown in summer, excellently camouflaged for winter snow and summer tundra; in the spring the bird has a bright scarlet comb.

Sweet *lupines*, a striking recent achievement in plant breeding in Germany and Russia, produce seed rich in digestible protein which is of a high biological value, said to rank next to soybeans.

New high-tension electrical ignition *cable* is made of monel metal wires twisted together and covered with a synthetic rubber compound which is reinforced by a braid of glass fiber to add tensile strength.

Transparent *fused quartz* articles for chemical, medical and industrial apparatus are shaped by quartz blowers from pure crystals obtained mostly from Brazil; skilled human blowers produce better products than machine blowers.

Pigeons were used as messengers by King Solomon and the ancient Persians, it is claimed; in 560 B.C. they spread news from the Olympic games and in 43 B.C. they were used by Brutus, besieged at Mutinia, to summon aid.



No Two Alike

See Front Cover

➤ SNOW CRYSTALS are always hexagons, but there their resemblance ceases. Within that simple basic geometric pattern there are literally infinite variations of outline and pattern and despite the many thousands that have been minutely examined and photographed by scientists and amateurs, no duplicates have ever been observed. It is quite within the realm of possibility that every snow crystal that has ever fallen, since the time millions of years ago when the earth's atmosphere became cool enough to permit snowflakes to float through it at all, has been unique and distinct from all others.

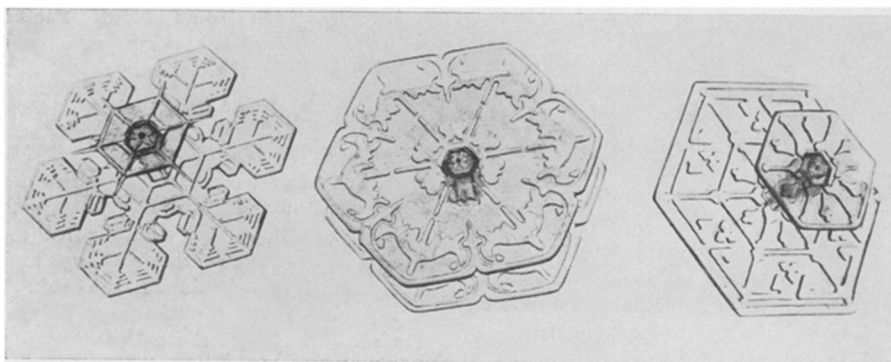
Formation of snow crystals begins in the same manner as the formation of raindrops, with the attraction of water-vapor molecules to an electrically charged solid particle of some kind—a microscopic dust grain, perhaps, or an invisibly tiny fragment of salt. If the temperature is low enough for ice for-

mation without an intervening liquid-water phase, the eventual result is a snow crystal. Since millions upon millions of water molecules assemble themselves into the growing pattern, it would be astonishing indeed if we were to find any exact repetitions.

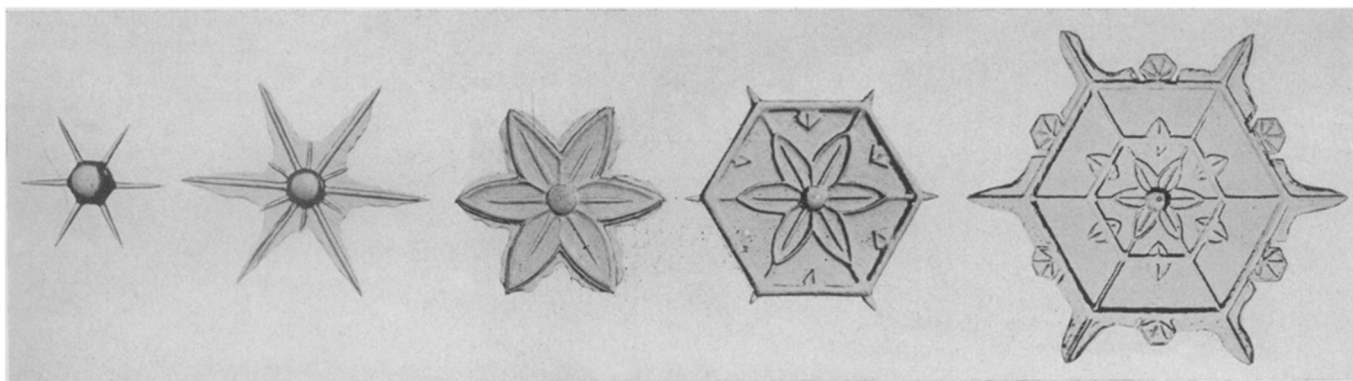
One general observation has been made by meteorologists on the outlines and degree of sculpturing or "ornamentation" in snow crystals. Those formed at low altitudes, where air humidity and temperature are both relatively high, have finely divided, feathery patterns, while those that form in very cold, relatively dry air at great heights have simpler, straighter outlines and less surface sculpturing.

Sometimes twinned crystals are observed, one tiny hexagonal plate at either end of a short connecting rodlet of ice—the so-called dumbbell or stud pattern. It is noteworthy that even here, though the crystals are Siamese twins, they are still not identical twins. Once in a while you may think you have found a triangular crystal instead of the usual hexagonal type. A closer look, however, will always show that the corners of the triangle have been clipped off, so that the pattern after all is a hexagon—a regular, but unequal-sided hexagon.

Photographing snow crystals used to be a difficult job, requiring great skill and devotion, as well as willingness to work for long periods in the outdoor cold. Recently, however, a researcher in the laboratories of the General Electric Company, Vincent J. Schaefer, showed how to make perfect molds of their patterns by carefully placing selected crystals on a thin plastic solution known by the trade name of Formvar 15-95. After the crystal melts and the water disap-



NATURE'S COLLAR-BUTTON—These rare, stud snow crystals with a hexagonal plate on each end of a hexagonal column were photographed from models by Edwin H. Reiber. These are travelers from a great height and frigid temperature.



pears, a perfect and permanent record of its shape remains in the hardened plastic, which may be studied and photographed at leisure and in indoor comfort.

The illustration on the front cover of

this SCIENCE NEWS LETTER is from a photograph of a glacite model of a snow crystal, made by Edwin H. Reiber of Webster, N. Y., for the Buffalo Museum of Science.

Science News Letter, January 15, 1944

EVOLUTION—A snow crystal, born in the cold regions of the upper air, begins with the nucleus of frozen water molecules, the first six radiating arms shown at the far left prophesying the final hexagonal form shown in the cover picture. This series of pictures of models, made by Edward H. Reiber for the Buffalo Museum of Science, shows the various stages of development through which this snow crystal passed.

METEOROLOGY

Long-Range Forecasting

Timing the establishment of a new European front will be greatly aided by weather predictions for a month ahead, General Arnold's report discloses.

➤ 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," Gen. H. H. Arnold, in command of the Army Air Forces, states 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 information in United Nations meteorological brains, together with some further knowledge captured from German sources, the job was done, and put on a world-wide scale, at that.

Forecasting weather for the Army Air Forces is often as perilous a job as flying through that weather at its worst, the report indicates. 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 90- to 175-mile-an-hour winds that prevail there.

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

Science News Letter, January 15, 1944

● Just Off Press ●

AMERICAN GEOPHYSICAL UNION TRANSACTIONS OF 1943: Part I. Reports and Papers, General Assemblies and Sections of Geodesy, Seismology, Meteorology, Terrestrial Magnetism and Electricity, Oceanography, Volcanology, and Tectonophysics—*National Research Council*, 330 p., illus., \$3.50, paper.

AMERICAN GEOPHYSICAL UNION TRANSACTIONS OF 1943: Part III. Reports and Papers, Joint Regional Meeting, Section of Hydrology, Western Snow-Conference, Corvallis, Oregon—*National Research Council*, 99 p., illus., \$1, paper.

THE EMBRYOLOGY OF LARIX—James Morton Schopf—*Univ. of Ill. Press.*, 97 p., illus., \$1.50, paper.

FOOD AS AN IMPLEMENT OF WAR: The Re-

sponsibilities of Farmers—Joseph S. Davis—*Stanford Univ.*, 20 p., 10c, paper.

HANDBOOK OF HEALTH FOR OVERSEAS SERVICE—George C. Shattuck and William J. Mixter—*Harvard Univ.*, 228 p., illus., \$1.25, 2nd ed. rev.

INSECTICIDES AND EQUIPMENT FOR CONTROLLING INSECTS ON FRUITS AND VEGETABLES—N. F. Howard & C. A. Weigel—*Dept. of Agr.*, 52 p., illus., 10c, Misc. pub. No. 526, paper.

LABORATORY MANUAL OF SPOT TESTS—Fritz Feigl—*Academic Press*, 276 p., illus., \$3.90.

LEND-LEASE: Weapon For Victory—Edward R. Stettinius—*Macmillan*, 358 p., illus., \$3.

MYXOPHYCEAE OF EASTERN CALIFORNIA AND WESTERN NEVADA—Francis Drouet—*Field Museum*, 30 p., 15c, Vol. 20, No. 7, Paper.

THE OUTDOORSMAN'S COOKBOOK—Arthur H. Carhart—*Macmillan*, 211 p., \$1.95.

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