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PHENOLOGY

NATURE RAMBLINGS
by Frank Thone

Life Begins at 40 Degrees

LIFE in the woods, meadows and marshes begins at forty degrees or less. The soil may still be solid with frost, beneath a thin top layer of mud thawed only since morning; a crust of crisp ice may still seal the shallow puddles, yet skunk cabbages push their impudent purple noses up, alder bushes hang out their drooping catkins, and soft-maple flowers burst forth.

How do they get that way? Shouldn't the nights, still hard-freezing, paralyze their sap into ice? Where do their roots find any available water in the still-solid ground?

The answer to this riddle of precocious plant activity is far from being completely known. The factors involved are many and complex; it is highly probable that many of them have not yet been discovered or even guessed at.

One such factor, however, almost indubitably is the fact that sap is not water, and does not freeze as easily as water. While water in the puddles and in the crevices of the soil is still frozen solid, plant saps have already become fluid. Their freezing points are quite definitely lower than the 32 degrees Fahrenheit that marks the immobilization of "straight water" as ice. So sap is free to move in response to the warming of the sun, as it falls on the dark stems of plants or on the good black earth, while water must remain at a standstill.

What makes sap thus fluid while water is still solid?

You can find the answer, in part, in your own electric refrigerator. Everybody knows that ice cubes form nicely, while ice-cream or sherbet mixes, and fruit and vegetable juices, show considerable resistance to freezing.

All sorts of things are in solution in these defiers of refrigeration. The fruit and vegetable juices may interest us most for present purposes, for they are most nearly like the saps that flow in plant stems. They contain mineral salts, a good deal of sugar, usually some acids, and practically always some mucilage-like substances which chemists learnedly call "higher carbohydrates."

Now, practically any solid substance dissolved in water will make it harder to freeze. That is the secret of the now almost universally used solid anti-freeze compounds in automobile radiators. Just so, these various solids dissolved in the watery basis of plant saps enables them to become fluid while water on and in the ground still remains frozen solid.

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GEOLOGY

Mineral Veins in Rockies Younger Than Mountains

RICH mineral veins of the Rocky Mountain region of Colorado were formed shortly after the mountains were upraised, Drs. T. S. Lovering and E. N. Goddard, of the U. S. Geological Survey report. (*Bulletin of the Geological Society of America,* Jan.)

Dinosaurs were dying out 75,000,000 years ago when the Rocky Mountains started to push their way out of the Pierre Sea, and slowly, during hundreds of thousands of years, rose to their present height. Long afterwards, volcanoes erupted in the mountains, throwing out vast clouds of dust and spewing forth great sheets of lava. From the depths beneath these volcanoes minerals of value to man were carried upward by hot water, and deposited sixty million years ago in the veins from which they are now mined.

Early in the ore-making age, barren iron minerals were brought in, then came fool's gold carrying a small percentage of real gold. Later came lead-silver ores, followed by gold-silver-tellurium minerals, and lastly came ores of tungsten.

While the ores were being deposited from hot mineral-bearing solutions, the surrounding rocks were cracked several times by the stresses of mountain-building, making new cavities for the minerals to collect in. From a study of the minerals in these cracks, many of them now ore veins being mined for the valuable minerals in them, and from the breaking up of some of the veins, Drs. Lovering and Goddard were able to determine which veins were old, and which were younger.

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RADIO

March 10, 4:00 p. m., E.S.T.
HOW FAST DO BIRDS FLY?—Miss May T. Cooke of the U. S. Bureau of Biological Survey.

March 17, 4:00 p. m., E.S.T.
ROOTS WITHOUT PLANTS—Dr. Philip R. White of the Rockefeller Institute for Medical Research.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.