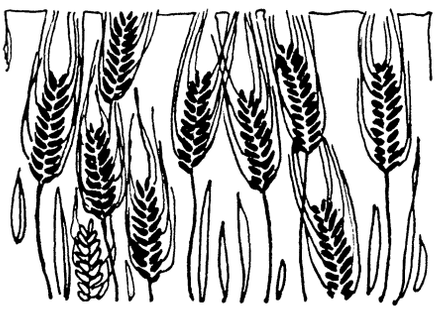
GEOLOGY

NATURE RAMBLINGS by Frank Thone



Ice, the Soil-Maker

➤ SOILS of the earth's cooler lands were made to a major extent by the action of ice on rock. And since all food comes ultimately from the soil, it is fair to say that winter ice helped to make our bread.

Ice acts in many ways to break rock into stones, and then to grind the stones into the silts and sands that are the mineral basis of the soil. Of the entire complex story, we can select only one or two phases for brief examination.

We have of course all heard the story of the great Ice Age many times: how the outcreeping edges of the continental ice sheets acted as a gigantic combination rock mill, bulldozer and plow, to grind boulders to gravel and crunch gravel to fine soil; then how the vast outpourings of water caused by the melting of the ice carried, sorted and laid down the various types of soil where we find them today. It is a very dramatic story, and it happened long ago.

Less dramatic, but still in process wherever winter gets really cold, is the rock-breaking action of ice that takes place whenever water freezes, and again when ice thaws. It is slow, but it goes on year after year, until even the most stubborn of stones at last yields bread.

The power of ice to rend rock depends on its unique property of expanding, slightly but powerfully, just below freezing-point. Thus a thin film of water in a chance fissure in granite, or between layers of sandstone or shale, becomes a spreading wedge of irresistible force when it solidifies, and again as it warms up from sub-zero temperatures towards the thawing-point.

In regions where there are alternations of thawing and freezing at the beginning and end of winter, or even throughout the cold season, each decisive rise or fall in temperature means myriad silent rock-breaking pressures. Sometimes, indeed, they are not so silent, and you can hear an old rock split with a report like a cannon. But most of the work is done without thus proclaiming itself; incredibly slow but inevitably sure.

The greater part of this ice-weathering of rock occurs under thicker or thinner mantles of soil already formed by the same process; it is difficult to tell where bedrock ends and soil begins. But much rock-splitting also takes place on mountain slopes, and here the fragments sooner or later slide and roll into the stream-courses at the base, there to be tumbled and hammered against each other until the big boulders are ground into gravel and their silt-fine fragments are carried far downstream, to be built into sandbars or left on the flood-plains after spring freshets.

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METEOROLOGY

Hard To Control Weather

➤ DON'T expect scientists to control the weather when they are not able to harness the raging flood waters of the Mississippi River, a U. S. Weather Bureau meteorologist cautioned.

Dr. Harry Wexler, chief of the Weather Bureau's Special Scientific Services Division, explained that typical air currents from the poles or tropics which give us cold or hot weather are 4,500 times as large as the flow of the Mississippi under flood conditions.

"Since man cannot control the relatively sluggish, shallow Mississippi River during floods, even with the aid of natural and man-made river banks, it is not likely that man can control on a global scale the fast and deep rivers of the atmosphere which determine our weather," the scientist argued.

Dr. Wexler discussed weather control as a guest of Watson Davis, director of Science Service, on Adventures in Science, heard over the Columbia network.

"A typical current of polar or tropical air is 1,000 miles wide, 10 miles high, moving at an average speed of say 20 miles an hour.

"This means that 1,000,000,000,000 (one trillion) tons of air per hour is sweeping over certain places," Dr. Wexler said.

By contrast, he pointed out, the Mississippi's top flow during floods is only 225,000,000 tons per hour.

This gloomy picture of weather control on a global scale does not prevent doing something about the weather in a small, local area, however, the meteorologist said. Although rainmaking with dry-ice and other materials dropped on clouds from planes is a recent development, local weather control of different types has been successfully achieved in other ways for many years. One method is the burning of fuel to protect orchards.

Rainmaking is still in its early stages, Dr. Wexler cautioned. One of the big questions is how much rain can be produced by dry-ice bombardment of clouds. This may be answered by experiments now under way at the Clinton County Air Base in Ohio. The Weather Bureau is cooperating with the Air Force, Navy and the National Advisory Committee for Aeronautics in experiments to measure actual rain from clouds which have been showered with dry-ice and other materials.

Radar will be used to check up on when a cloud is changed from a non-precipitating to a precipitating one and the position of the plane dispensing the seeding agent.

Even local rainmaking may not solve the drought problem, a major threat to food production in a hungry world.

"Rain simply cannot be made in a current of air either too dry or too stable to produce clouds," the scientist explained.

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