

PHYSICS

Earth's Current Balanced

Thunderstorms supply the necessary reverse current to keep a charge of electricity amounting to 1500 amperes on the earth.

➤ ONE of science's major puzzles, what keeps a charge of electricity on the earth, has been solved, Dr. Vannevar Bush announced in his annual presidential report of the Carnegie Institution of Washington in Washington, D. C.

The thousands of thunderstorms active at any instant all over the earth counter-balance the current of 1500 amperes that has long been known to be dissipating from all the fair-weather areas of the earth.

Proof that the thunderstorms supply the necessary reserve current was obtained by extensive researches by the Carnegie Institution's Department of Terrestrial Magnetism since the end of the war. More than 20 years ago the suggestion that this was the cause was made in England. But it took many hours of flight at record heights by cooperating U. S. Air Force planes to prove the theory. The clear air high above the flashing thunderheads showed that the electric current between the upper atmosphere and the earth is reversed in sign to fair-weather current and stronger in intensity.

A new hint that the continents of the earth may have drifted from some earlier arrangement to their present pattern is contained in other research reported by Dr. Bush. Rocks in the Blue Ridge mountains of Virginia have been magnetized, Carnegie Institution scientists found, as though they had been originally laid down in South Africa. Possibly the magnetic north has been unstable through the long period of geologic time or there have been large-scale magnetic disturbances from electric current systems inside the molten earth. But another possibility is that the earth's crust has actually moved, a hypothesis that has been suggested in the past because of the way that the continents, now widely separated by oceans, fit into each other.

How the compass pointed more than 350,000,000 years ago is being discovered by studies of rocks laid down in ancient seas in past geologic times. The little particles of the rocks are found to line up like compass needles, telling the field of the earth in these ancient times. The investigations have been extended this past year to sandstones in Maryland and Virginia which have been folded and contorted by mountain building. When the geophysicists laid out the rock samples the way they must have been before the structural changes occurred, the particles were oriented as they should have been by magnetism. Such fossil magnetism shows that the compass direction in those ancient millennia

was quite different from what it is now.

Yeasts and algae can become sources of the protein and fats that the world must have to support larger population, Dr. Bush declared in telling of controlled experiments on *Chlorella* algae cultures. Given generous supplies of carbon dioxide, these

plant growths double themselves every day and can be made to yield varying proportions of fat or protein depending upon the conditions under which they are grown.

New knowledge of the heredity of corn showed that a bearer of heredity, called a gene locus, may control several reactions within the organism, some of which may have several biological effects.

In another research the chromosomes that carry the genes or units of heredity were dissected with biological preparations to determine their structure. This showed that no single protein or nucleic acid may be considered the basic structural component of the chromosome.

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ENGINEERING

Better Cake and Bread

➤ YOUR cake and bread may taste better soon because of a new method for drying the flour you use.

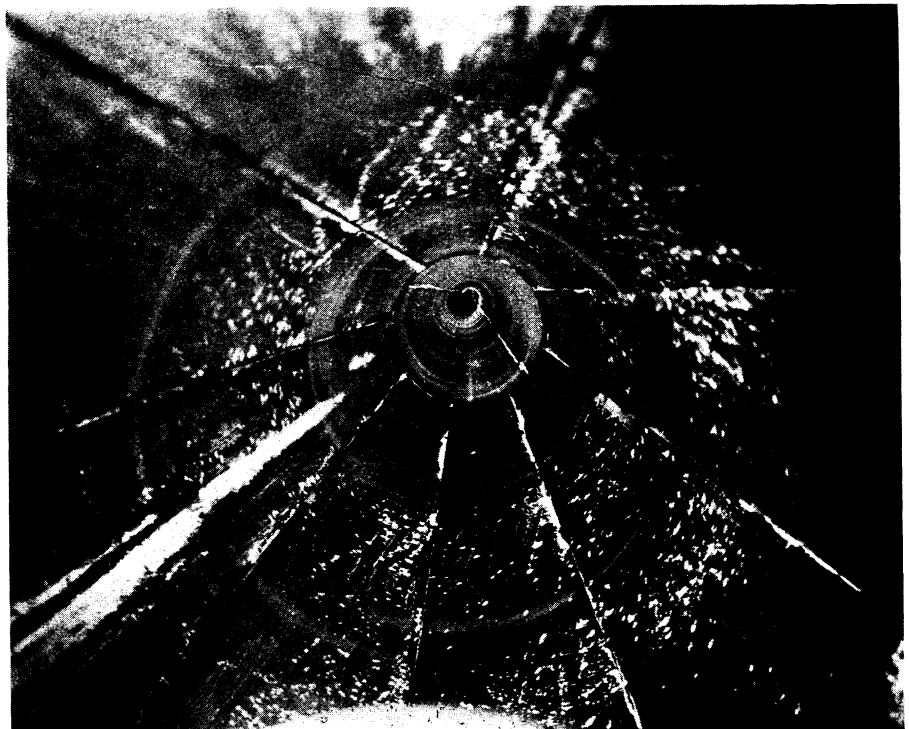
Flash-drying reduces the amount of water normally found in flour, about 14%. With moisture reduced as low as desired, flour can now be stored for long periods of time without spoiling. Bacteria and fungi are attracted to moist flour.

This low-moisture flour will be especially valuable to the Armed Forces. It will also be used in cake mixes. The pro-

cess was developed at the Industrial Research Institute, University of Denver.

"Of course, you can get low-moisture flour by drying it in an oven," explains Prof. Dent C. Davis, chemical engineer and supervisor of the research project. "But flour dried this way doesn't have any good baking properties. When heated to 170 degrees Fahrenheit or more, there is a damaging change."

With the flash-drying process, Prof. Davis stated, the water is "flashed" or



"FLASH-DRIED" FLOUR—Swirling with centrifugal force from the top towards the bottom of the giant cone, flour particles are "flash-dried" in two seconds.