GENERAL SCIENCE

# Slowness Wastes Billions

**There is no adequate bridge for the critical gap between theoretical research and actual application, Dr. Bush charges in annual report of Carnegie Institution.**

➤ WORTH NOW three billions of dollars a year, the development of hybrid corn was ten years late because "practical" men failed to appreciate and develop the fundamental work carried out about three decades ago by Dr. George H. Shull in the Carnegie Institution of Washington's genetics laboratory.

This was charged by Dr. Vannevar Bush, president of the Institution and war-time head of U. S. research, in his annual report.

"We have no effective organization in the country as a whole for bringing the fruits of disinterested research to the point where they invite industrial development," Dr. Bush warned.

The most critical bridging of the gap between theoretical research and application at the present time, Dr. Bush said, concerns how to cash in on the discoveries that the green algae *Chlorella* will produce 56% dry weight of protein, of which the world is very short for food purposes.

## North Pole Shifting

The North Pole will not stay put; it has shifted 12 feet in 30 years, to the perplexity of scientists.

But now Dr. E. H. Vestine of the Department of Terrestrial Magnetism of Carnegie Institution has hit upon the answer. From studies of the earth's magnetic field, Dr. Vestine said that the field has been drifting steadily westward, and that there is a corresponding westward movement of the upper layer of the earth's liquid core that accounts for it.

Besides this large westward drift, Dr. Vestine also found smaller crosswise drifts of the liquid core that exert a force on the earth's axis.

Dr. Vestine explains it this way: the North Pole acts like a spinning top. The irregular forces from the transverse drifts act like a finger pushing against the base of the top. When this is done, the upper part of the top will move in the opposite direction from the push. Thus when the drifting earth's core pushes against the earth's axis, the pole shifts its position to oppose the force.

The momentum, or "push" of these transverse movements is adequate to explain the year-to-year variations of the pole's position, said Dr. Vestine.

## Ages of Minerals

The atomic calendar, holding the key to the age of the earth, has revealed more of its secrets during the last year.

Improved methods of radioactivity dating, being worked out at the Institution, have led to the measuring of the oldest rock known so far to man. The lepidolite mineral in rock from Manitoba, Canada, was found to be 3,500 million, three and one-half billion, years old.

Other ancient minerals dated by rubidium-strontium radioactivity measurements were from rocks in: Bikita Quarry, Southern Rhodesia, 3,300 million; Jakkalswater, South Africa, 2,400 million; Ingersoll Mine, South Dakota, 2,100 million.

Drs. L. T. Aldrich and G. R. Tilton of the Department of Terrestrial Magnetism, and Dr. G. L. Davis and L. O. Nicolaysen of the Geophysical Laboratory, reporting their joint work, told of promising new techniques in radioactivity dating.

Finding the age of rocks by their radioactivity depends on the constant rate of break-down of radioactive materials into various decay products. Uranium 238, for instance, will, through billions of years, finally decay completely into a lead isotope. Age of the material, then, can be found by comparing the ratio of it to its end product in a rock.

Up until now, only rarely-found concentrated ores could be used in dating. But by the new techniques, very small quantities generally distributed through granite rock can be measured and the rock dated.

Where only one or perhaps two determinations could be run on a single rock sample before, now, using the latest methods, many different substances can be analyzed from the same sample — thorium, uranium, lead, rubidium, strontium and potassium—each a check on the other.

This is made possible by separation of very small amounts of istotopes with ion-exchange resin columns, and their accurate measurement by the isotope-dilution technique and the mass spectrometer.

The resin columns are able to extract the smallest amount of an isotope from a mass of crushed granite. This tiny bit of material, which could not be easily or accurately measured by itself, is added to a larger known quantity of the same isotope. The effects of this small addition are then comparatively easy to observe and measure with the mass spectrometer.

This new method will allow far more different rocks to be dated than before possible, because it is not restricted to highly concentrated ores. It will also allow more samples of a single rock structure to be taken, thus affording a check. Furthermore, it is believed that radioactive materials distributed generally in granite show fewer age discrepancies than materials from ores.

Most of the previous work has been done with uranium and its lead end-products. More emphasis is now profitably being

*LOADING URANIUM SLUGS—Ten pounds of the precious fissionable material are being put into the holes of an atomic reactor at the Oak Ridge National Laboratory of the Atomic Energy Commission. Openings in the shield are round, but each channel in the graphite cube itself is diamond shaped, giving a passage for cooling air. From such an atomic power producer come radiations that are being used in a variety of promising ways.*