GENERAL SCIENCE

Study Science Innovation

Progress in science depends on providing the scientist with the environment conducive to innovation, one that allows him the highest degree of individual freedom.

➤ CREATION of scientific knowledge and technique is a process that, unlike technologic development, cannot necessarily be hurried along by organizing it and enlarging its scope, Dr. Caryl P. Haskins, president of the Carnegie Institution of Washington, warns in his annual report.

Our society is likely to fail "to understand how rare and precious" is the process of scientific innovation although it has high respect for the fact of scientific progress, Dr. Haskins observes. Innovation is "rare and precious" and "essentially individual" in its nature.

"It is a terrible misconception to assume that the effectiveness of innovation, like that of production, can be doubled simply by doubling the scale of effort. Other and far more subtle elements are involved," Dr. Haskins reports. "One of these is the environment of the worker. Since innovation is and must always remain an individual experience, the investigator must be adequately shielded from the dangers to which he is exposed. His working environment must be unusually unconventional and malleable, with ready, yet penetratingly astringent, tolerance—and indeed welcome encouragement—for the long preliminary phase of apparently rambling and aimless effort that so often precedes the great discovery, while the ground is being canvassed and a mass of divergent material mastered and consolidated. Such an environment must allow the highest degree of individual freedom to the worker. It is of a very special kind, little susceptible of organization. It is best provided in our universities and our research institutes."

Among the reported highlights of research conducted by the Carnegie Institution of Washington were:

The age of the universe, now estimated at seven to 13 billion years, and its size have been increased markedly in the past decade of use of the 200-inch telescope on Mt. Palomar. (See SNL, Dec. 27, 1958, p. 403).

An electronic computer was used to process photoelectric astronomical observations, speeding by ten times the handling of the data.

Investigation of sources of radio waves from outer space showed that only a small fraction can be identified with optically observable objects.

The decline of the pre-Columbian Mayan City, Chichen Itza, was found to have occurred with the rise of another Mayan City, Mayapan.

The radio emission of the sun was studied with the result that active spots with radio output on 340 megacycles in small bursts of a second or less were discovered.

An intense band of electric current, the "electrojet" circulating in the upper atmosphere in the region of the earth's equator, was studied in relation to magnetic storms.

Explosions set off in open-pit copper mines in the South American Andes show that the crustal thickness there may be six to 12 miles greater than previously found in North America.

An apparatus that attains 65,000 times atmospheric pressure at a temperature of 1,100 degrees centigrade is being used to study minerals that might exist 80 miles below the earth's surface.

The methods of synthesis of proteins and nucleic acids in microorganisms were studied, and fine structures in living cells, including lipoprotein membranes and ribonucleoprotein particles of molecular weights of one to four million, were found essential in the synthesis of protein.

The amount of light required to form a molecule of chlorophyll in photosynthesis in the living plant was studied.

The mechanisms of heredity were studied in viruses and bacteriophages, leading to better understanding of the mechanism of the duplication of chromosomal material, the most fundamental of all properties of life because it controls the stream of inheritance.

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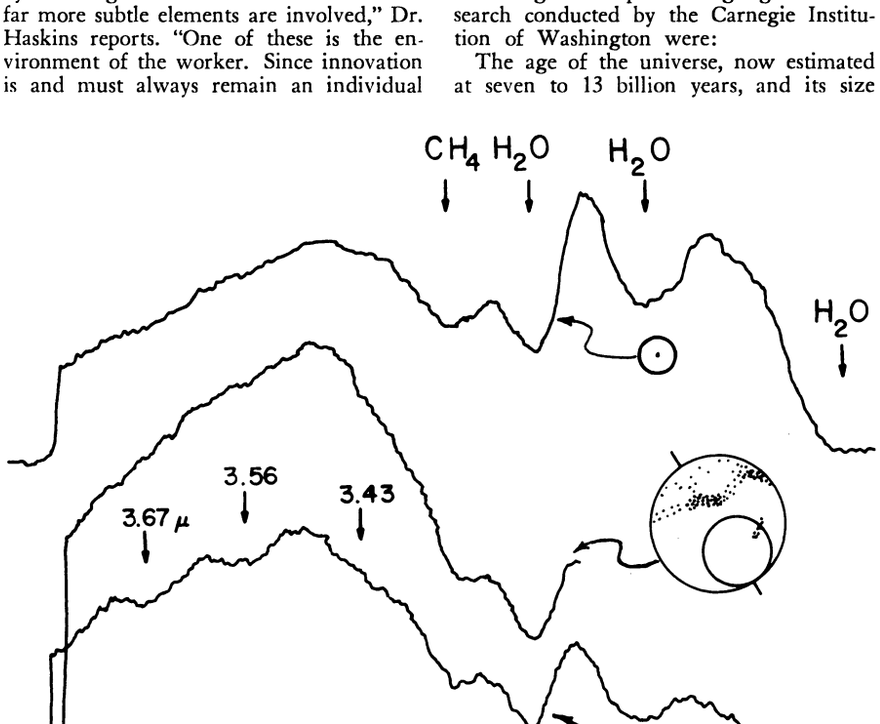

MARTIAN VEGETATION—The upper curve shows a spectrum of the sun. The depressions are caused by absorption by methane and water vapor within the earth's atmosphere. The middle curve is a spectrum of the desert area within the small circle projected on the diagram of Mars at the right and is similar to the solar spectrum. The lower curve is the spectrum of the area (including Syrtis Major) between parallel lines on the diagram of Mars at the right. It shows the absorptions due to organic molecules at the three wavelengths 3.43, 3.56, and 3.87 microns.

ASTRONOMY

Find Further Evidence For Life on Mars

➤ TESTS FOR the presence of large organic molecules, such as those in vegetation, confirm their existence chiefly in the dark regions of the planet Mars, Dr. William M. Sinton of Lowell Observatory, Flagstaff, Ariz., reported.

Improved equipment used in conjunction with the 200-inch Hale telescope at Mt. Wilson and Palomar Observatories made possible more sensitive absorption studies of the different regions, Dr. Sinton told the American Astronomical Society meeting in Gainesville, Fla.

"Growth of vegetation certainly seems the most logical explanation for the appearance of organic matter," he concluded.

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