COSMOLOGY

Speculation Is Important

➤ "IDLE SPECULATION" has no place in science, but "speculation" is its very lifeblood, a well-known physicist believes.

"The more fundamental and far-reaching a scientific theory is, the more speculative it is likely to be," Dr. Michael W. Ovenden, author and lecturer at the University of Glasgow, Scotland, states in his book "Life in the Universe." It is published as part of a science study series by Anchor Books, Doubleday & Company, Inc. See p. 76.

Dr. Ovenden says it is erroneous to believe that science is only concerned with "pure facts," for mere accumulation of facts is a primitive form of science. A mature science tries to arrange facts in significant patterns to see relationships between previously unrelated aspects of the universe.

A theory that does not suggest new ways of looking at the universe is not likely to make an important contribution to the development of science. However, it is also important that theories are checked by new experiments and observations.

Dr. Ovenden discusses recent discoveries in biology, chemistry and physics that give clues to the possibility of life in the solar system and other star systems. He discusses conditions on Mars, Venus, Jupiter and Saturn, and considers whether or not the same conditions may be found on planets of other stars.

Only the planets Venus, earth and Mars lie within the temperature zone, about 75,000,000 miles wide, in which life can exist. Venus is covered by a dense layer of clouds which permits no observation of the surface, and the surface temperature of the planet is not known.

Mars is colder than earth, the average temperature being about minus 40 degrees Fahrenheit, compared with plus 59 degrees Fahrenheit as the average for earth. However, near the Mars poles during the summer season, temperatures may rise to as much as 70 degrees Fahrenheit, whereas winter temperatures may fall to minus 130 degrees Fahrenheit.

Because of the extreme difference in the Martian seasons, the only life forms expected to exist, without a built-in temperature control such as warm-blooded animals and humans have, are those which would stay inactive most of the year.

These life-forms may be a kind of vegetation that opens its leaves to the sun in the daytime, stores water and closes its leaves in the night for protection against the cold.

Attempts have been made to detect in the spectrum of the dark markings on Mars the absorption lines due to chlorophyll. So far the test has not succeeded. But the infrared spectrum of the Martian markings has been found to be very similar to the spectrum of earth vegetation when studied at high altitudes.

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METEOROLOGY

Thaw Occurs Earlier

➤ THE TRADITIONAL January thaw now occurs earlier in the month than it did at the beginning of this century.

The thaw breaks winter, which weathermen consider the months of December, January and February, into halves. This is true for at least two-thirds of the last 36 years, Dr. Robert T. Duquet of Pennsylvania State University, University Park, Pa., told SCIENCE SERVICE.

Dr. Duquet said a quantitative study of weather records from 1926 through 1961 showed that there is a peak in midwinter temperatures all across the country. The high in the average weekly temperature occurs first on the West Coast, then over the Midwest and lastly on the East Coast. It is not always on the same date every year.

However, on the average, the first two weeks of January have temperatures higher than either the preceding or the following two weeks.

Records for the last 90 years show that for the first few decades this warmer temperature pattern occurred during the third week in January. The shift to an earlier time, Dr. Duquet believes, is tied in with a change in the general circulation of the atmosphere.

He said there are two reasons why the January thaw appeared to be more pronounced in the Northeast, when actually it affects the entire country. One is that the Northeast was more heavily populated at an earlier time than the rest of the country and temperature records have therefore been kept there longer. The other is that the average temperature at this time of the year in the Northeast is very close to freezing so that a slight change of a few degrees is sufficient to make a very noticeable change in the snow cover.

Dr. Duquet said that the January thaw was due to a surge of warm air ahead of a long wave high in the atmosphere. As this shifts slowly across the country, cold air pours down behind it, giving a very pronounced cycle of warm and cold temperatures during the two halves of January. The January thaw in 1961, he said, was the biggest ever. Its only rival since records were kept was in 1936. During the last ten years, Dr. Duquet has found, the time of the January thaw has shifted, often occurring at some time other than during the first two weeks of the month.

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TROUBLE SHOOTER—An ultrasonic "gun" which detects corona, or leakage of high-voltage electricity causing static and loss of electric power, has been developed by Westinghouse Electric Corporation, Pittsburgh, Pa. W. E. Pakala tests a transmission line with the device.

PSYCHOLOGY

Fingertips Measure Electrical Response

➤ YOU CAN ACT as bold as two big lions, Mr. Milquetoast, but your fingertips will find you out.

Measuring the electric responses from the fingertips of school children, Robert Neal Willis of Florida State University, Tallahassee, has been checking up on personality tests—"fingerprinting" personality.

A machine the researcher has been using works something like a lie detector. A subject is asked questions similar to those used on personality tests, and electrodes attached to the tips of his fingers convey electrical responses indicating the subject's emotions to a small box.

Mr. Willis, who is assistant educational research officer with the State Board of Control, constructed his own machine for the study. He tested it out on 50 female and 47 male 11th and 12th grade students from two northwest Florida high schools as part of his research for a Ph.D. degree.

"Although the link between the galvanic skin reflex and the emotions has been established for well over 30 years, only a few investigators have related the reflex to the field of personality assessment," he said.

One of the criticisms of personality tests, according to Mr. Willis, has been their lack of dependability because of the difficulty in relating the test scores to the behavior of the individuals taking the tests.

"The galvanic skin reflex technique can aid in identifying items which will be more likely to bring about responses which conform to actual behavior," he said.

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