ASTROPHYSICS

Endless Life Foreseen

➤ OTHER PLANETS capable of supporting life as earth does will occur endlessly in the future, a Nobel Prize winner believes.

Dr. P. A. M. Dirac of St. John's College, Cambridge, contends that habitable planets will continue to occur indefinitely and therefore the existence of life need never end. An opposing view is held by Dr. R. H. Dicke of Princeton University, Princeton, N.J., who believes that habitable planets exist in the universe only for a limited period of time. The scientists discuss their differences in Nature, 192:440, 1961.

Their differences are based on contrary interpretations of three numbers relating to the cosmos: the gravitational constant, a number determining the age of the universe (considered to be at least several billion years old) and the number of particles in the visible limits of the universe. These numbers are related in that the gravitational constant is roughly the reciprocal of the age of the universe, and the number of particles in the universe is roughly the square of the number determining the universe's age.

Nobelist Dirac believes that these relations are not by chance but correspond to something fundamental in nature. If the universe is now evolving, as many scientists believe, then the other two cosmological numbers are also changing as time passes.

Dr. Dicke, on the other hand, believes that there is a fundamental relation between the gravitational constant and the number of particles in the universe, but that the age of the universe is independent. Therefore the universe would have to be roughly at its present state of development for habitable planets to exist.

"There is no decisive argument for deciding between these assumptions," Nobelist Dirac said in commenting on Dr. Dicke's theories. However, he prefers the one that allows the possibility of endless life.

Dr. Dirac suggests that some day the question may be settled by direct observation. This would require measuring the gravitational constant to an accuracy of one part in ten billion, then repeating the measurement a few years later to see if there had been any change.

The numbers they use for the cosmological constants are: for the gravitational constant, five times ten raised to the minus 39th power, or 0.000,000,000,000,000,000,000,000,000,000,000,000,005; for the one determining the age of the universe, ten raised to the 42nd power, or 1,000,000,000,000,000,000,000,000,000,000,000,000,000,000; and for the mass of the universe, ten raised to the 40th power and squared.

• Science News Letter, 80:333 November 18, 1961

TECHNOLOGY

New Glass Film Technique Protects Tiny Diodes

See Front Cover

➤ A PROTECTIVE FILM of glass, only one ten-thousandth of an inch thick, can now seal microminiature diodes or transistors from moisture and other contaminants.

The diodes shown on the cover of this week's issue are on a greatly magnified portion of a small silicon wafer. The eye of a small sewing needle frames one of the diodes.

The Components Division of International Business Machines Corporation, Poughkeepsie, N. Y., developed the technique, using intense heat, more than 1,500 degrees Fahrenheit.

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ASTRONOMY

New Evidence Found Of Expanding Universe

➤ THE UNIVERSE is expanding, then collapsing again after a long time, evidence from photographs taken with the 200-inch telescope atop Mt. Palomar indicate.

Dr. William A. Baum of Mt. Wilson and Palomar Observatories, Pasadena, Calif., said that present-day observations are not compatible with a steady-state universe in which matter is continuously being created. The observations were made on very distant galaxies belonging to clusters of galaxies, he told the Royal Astronomical Society meeting in London.

The observations are based on the red-shift of the light from these galaxies. This is the amount the light has shifted toward the red end of the spectrum. The red-shifts are obtained by measuring each galaxy photoelectrically in six colors ranging from ultraviolet to infrared.

The largest red-shift so far observed indicates that the distant galaxy is receding at nearly 44% of the speed of the light, or at a speed of 81,840 miles a second. This cluster was found by Dr. Rudolph Minkowski of the University of California, Berkeley, to be in the position of a source emitting radio waves.

Dr. Fred Hoyle of Cambridge University, one of the proposers of the steady-state universe, pointed out that the problem of the age of the universe still remained. One difficulty, he said, is that the Milky Way galaxy, in which the earth and sun are located, is about ten billion years old, whereas the age of the galaxy with the greatest red-shift so far observed is about three billion years.

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ARCHITECTURE

"Hangar" Will Shelter Old Aircraft Collection

➤ LONDON'S Science Museum has provided suitable atmosphere in the form of a hangar-like structure on top of the main building, which is to be the new home of the museum's aeronautical collection.

Tubular steel arches carry the metal roof, made of aluminum inside and copper outside. At the places where the arches pass through the glass walls are bellows joints of copper designed to take up any expansion or contraction that might occur.

Among the famous aircraft to be shown will be a full-scale replica of the plane flown by the Wright Brothers at Kitty Hawk in 1903. The replica was presented to the British Museum when it returned the original Wright biplane to the Smithsonian Institution some years ago.

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MUSEUM "HANGAR"—This hangar-like structure on top of the Science Museum in London was built for the aeronautical collection.

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