

ECOLOGY

Study Species Relations

► A NEW THEORY may unravel some of nature's most complex secrets.

The presence of a type of plant or animal may depend more on other life in the same area than on soil and climate, Drs. John E. Cantlon, Michigan State University, and H. T. Odum, University of Texas, report.

Dr. Cantlon, associate professor of botany and plant pathology, said the theory stems from the scientifically well-known observation that the approximate number of types or species of life in a given wild area is predictable because they increase in a definite pattern.

"One section of an area," he explained, "may have 100 plants of ten species. A bigger section may have 1,000 plants and 20 species. A still greater section may have 10,000 plants and 30 species. If this pattern continues, we can predict that whenever the number of plants is multiplied by ten, the number of species is increased by ten.

"This proportion may not hold true for another area but a similar ratio will. In all cases, the number of species will increase in small quantities as the total life increases in large amounts."

Drs. Cantlon and Odum claim this proportion of species to total wild life is too constant to be mere chance; it must be due to dependence of some plants and animals on others. They call this a "quantitative dependency relationship."

Similar reasoning formed an earlier theory, claiming that a quantitative dependency relationship is involved in the fact there are more plants than plant eaters and more plant eaters than flesh eaters.

Drs. Cantlon and Odum go further by maintaining that there are dependency relationships among species as well as larger categories of wild life.

"The most common plants and animals probably have the least dependency relationships," Dr. Cantlon said, "but rare ones may rely on many species in order to exist."

Dr. Cantlon explained the theory by comparing it with the way men depend on other men.

"In a small community, there are fewer occupations than there are in big cities. Before a specialized person can make a living, he must have a certain number of patients, clients or customers.

"Therefore, a village may not have a lawyer but a city will have many. Lansing can not support a subway engineer but New York needs several.

"Since there is a similar proportionate relationship in nature between species and total life, we are theorizing that different species depend on each other in much the same manner that humans depend on other humans."

To avoid the complexities of an overall study, Dr. Cantlon confines his research to

statistical sampling of plants in specific natural areas.

He collected data in northern Alaska last year under the sponsorship of the Arctic Institute of North America.

The climate and topography of vast amounts of wild land there are ideal for his studies. Within an area of a few square feet, he can find a great variety of growing conditions and plant groups.

He studies these groups to determine the amount of plants, number of species and the frequency with which two or more species grow in the same area.

"If two species tend to grow together more frequently than similarities in environment would infer, there may be a dependency relationship," Dr. Cantlon said.

"There may also be many indirect relationships where two species are linked through their relationships to several other species."

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CHEMISTRY

Exotic Fuel Ingredient Helps Make Older Fuels

► THE BASIC ingredient of modern "exotic" jet fuels can make possible faster and easier production of a more conventional fuel known for many years.

Diborane, a gaseous compound of boron and hydrogen and the starting point for exotic boron-based chemical fuels, has been found to increase considerably the speed and ease of conversion of natural acetylene to benzene. This is a chemical often used as an aviation fuel, as an ingredient in other fuels, and as a starting point for many important plastic and synthetic rubber processes.

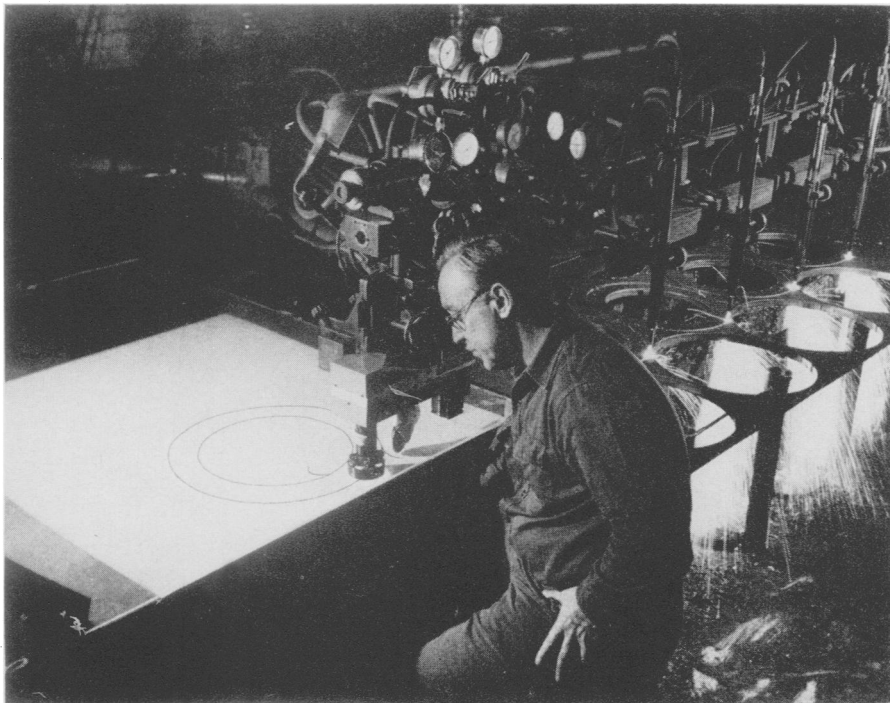
By itself, diborane has no catalytic or rate-changing effect on the process, but alters the normal silica-alumina catalyst so it is much more effective, H. G. Weiss and Dr. Isadore Shapiro, Olin Mathieson Chemical Corporation research laboratory, Pasadena, Calif., report in *Journal of the American Chemical Society* (July 5).

A catalyst is a substance that alters the normal rate of a chemical reaction without the appearance of having entered directly into the reaction. The positive, or "rate-increasing," catalyst usually used in converting acetylene to benzene is a silica-alumina mixture that may be considered a mixture of purified sand and aluminum ore.

Silica-alumina often is "poisoned" by accumulations of process ingredients on the catalysts. The presence of diborane apparently eliminates poisoning, allowing the catalyst to last longer, besides speeding the reaction rate. The presence of diborane also allows this important reaction to take place at temperatures much lower than normal, the chemists report, thus making the process easier to conduct on a commercial scale.

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Astronomical *longitudes* and *latitudes* are obtained by observing the positions of celestial bodies with respect to the direction of gravity.



ELECTRONIC EYE—An electronic tracer that can automatically direct a battery of gas cutting torches through intricate cutting patterns is being operated by Carl Anderson, a Westinghouse Electric Corporation worker. The device utilizes a vibrating photo-sensitive cell to follow accurately a pencilled drawing or pattern. It is capable of following any pattern at speeds up to 30 inches per minute without loss of accuracy.