BIOCHEMISTRY—GEOLOGY

Life Universally the Same

➤ LIFE IS LIKELY to be the same anywhere in the universe because all living organisms are most probably made up of the same four elements: carbon, oxygen, nitrogen and hydrogen.

Only these four elements have suitable properties for sustaining life, Dr. George Wald, biology professor at Harvard University, told the American Philosophical Society in Philadelphia.

He said that it is doubtful if life can arise without water or progress very far without oxygen. Nor is it likely that life can exist anywhere without radiation—such as the radiation the earth receives from the sun that excites molecules electronically and so activates photochemical reactions.

Therefore, it is possible to consider universal physical relationships, Dr. Wald said. The relationships in the periodic system of the elements may be assumed true everywhere in the universe; so also the laws of chemical combinations and dissolution; and the effects of temperature, pressure and radiation on the rates of chemical reaction.

It may be possible to discover the widespread association of certain types of organic molecule with special functions in organisms, by studying the evolution on earth, Dr. Wald said.

When widely separated groups of living organisms independently select the same type of molecule for the same function, they may as well be on different planets. There are examples to show that such independent choices have been made on earth, and they are governed, not by availability, but by suitability.

These considerations are of general interest, but, in addition, they open up a new frontier of universal biochemistry, Dr. Wald said.

• Science News Letter, 78:343 November 26, 1960

History From Sediment

➤ SEDIMENT from the bottom of a small lake north of Rome has provided scientists with a history of events dating back as much as 25,000 years ago.

Prof. G. Evelyn Hutchinson, Yale University zoologist, reported to the American Philosophical Society meeting in Philadelphia results of an intensive pollen analysis she made with Dr. Ursula Cowgill of two three-meter cores taken from the bottom of Lake Monterosi.

The deepest layer of the sediment was laid down, Prof. Hutchinson reported, in the interstadial between the second and third episodes of the Wurm glaciation, an event dated by geologists as in the neighborhood of 25,000 years ago. At that time, the pollen analysis indicated, the surrounding country was practically treeless and tundralike.

A species of Artemisia, a genus that includes the sagebrush and shrubs of the aster family, was the principal pollen producer at that time.

After about a third of the sediment had been deposited, a pioneer hazel community developed, followed by fir and then mixed oak forest.

In the top quarter of the core, the scientists found plantago pollen, giving evidence of agriculture in a region archaeologists believed to have been uninhabited at that time.

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ENTOMOLOGY

Spider-Eating Fly Reverses Common Order

➤ A SPIDER that eats flies is no news, but a fly that eats spiders is worth attention and is getting lots of it, a book-full, from the Smithsonian Institution, Washington, D. C.

The attention-getting insects are the acrocerids, two-winged flies with very small heads, that pass the larval stage of their lives inside spiders, devouring the tissues of their hosts, without any obvious awareness on the part of the doomed spiders, which keep spinning webs to catch flies.

How the fly gets into the spider is not known. But once a fly eats its way out, it leads a normal adult existence, presumably even getting caught by spiders.

A book revising the largest genus of these odd insects, the Ogcodes, has been written by Dr. Evert L. Schlinger of the University of California, published by the Institution. It contains descriptions of 78 species of these creatures, 14 of them new.

The spider-eating flies are essentially world-wide in distribution, although little known, and rarely a collector's item except for spiders.

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BIOLOGY

"Living Light" Crystallized

➤ THE "LIVING LIGHT" chemical, luciferin, which makes a glowworm glow, has been crystallized from a glowing South Pacific fish known in Japan as kinme modoki by a Princeton biologist and two Japanese colleagues.

Bioluminescence, sometimes called "living light" or "cold light," occurs in many marine dwellers, including luminous bacteria that may live in or on a fish, making the host appear luminescent.

Glowing land dwellers include a spider found only in the High Sierras and a rare luminous beetle. Perhaps the weirdest creature of all is the "railroad worm," which has evenly spaced yellow lights down either side of its body and a red light out front.

Recent studies of luminescent systems in living organisms have clarified biological processes in general, Dr. Frank Harris Johnson, biology professor at Princeton University, said. Changes in the intensity of "living light" emitted in response to variations in heat, cold, pressure and chemicals can be measured easily.

Since the chemical processes of luminescence are basically similar to those that control reactions in living cells generally, their study has helped to show how other cells can be expected to behave in various circumstances. With pure luciferin now available, the same system can be studied under simpler, more easily controlled conditions than would be possible inside a living organism.

Citing one of many examples, Dr. Johnson said experiments with luciferin, which reacts to enzymes, could indicate basic aspects of how human cells react to narcotics, anesthetics, analgesics and antibiotics.

Dr. Johnson and Dr. Yata Haneda of Tokyo's Jikeika Medical College separated kinme modoki luciferin compound in 1957 in Japan.

Dr. O. Shimomura isolated luciferin from the cypridina or "sea firefly" in 1957. Dr. Shimomura, a Fulbright scholar, is now with Dr. Johnson as research associate.

Dr. W. D. McElroy, director of the McCollum-Pratt Institute at Johns Hopkins University but formerly a Princeton student, isolated luciferin from the firefly in 1957. Drs. Johnson, Haneda and Shimomura dissected more than 4,000 of the luminous organs of kinme modoki and crystallized the pure chemical.

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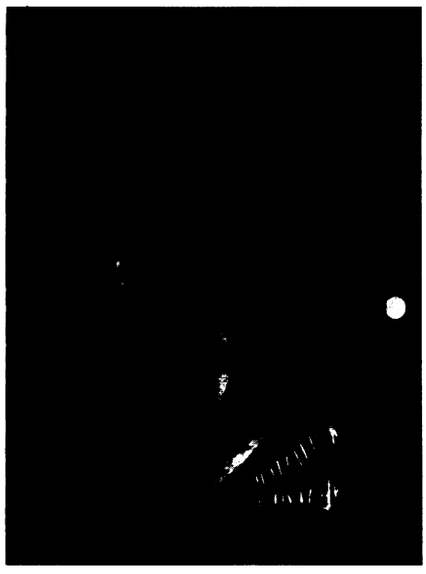

BUILT-IN LIGHT—The lantern-bearing sea-devil, Melanocetus johnsoni, *carrying a light in front of its mouth, is one of the luminescent fishes shown as a model in an exhibit of deep-sea fishes, opening Dec. 1 at the Cranbrook Institute of Science, Bloomfield Hills, Mich.*