

PHYSIOLOGY

Heads and Tails Determined By Electrical Polarity

Orientation of Organs in Animals Depends on Way
Chains of Molecules Are Marshalled by Charges

HEADS and tails in the animal world, and all the complex structures in between those opposite bodily poles, may possibly be due to the polarity, or heads-and-tails configuration, of the protein molecules that are the ultimate building-blocks of living matter.

This bold simplification of the problem of polarity in living organisms is offered by Prof. Ross G. Harrison of Yale University. Prof. Harrison was led to the formulation of this theory by the phenomena which he has observed through many years of experimentation on very early embryo stages of spotted salamanders. Salamanders are little amphibian animals shaped like lizards, but really closer relatives of frogs and toads.

The developing animal egg may seem on casual examination to have no head or tail to it, but long before such organs are externally visible the egg itself develops a decided top-and-bottom internal arrangement, with definite signs of right-and-left orientation as well. "Head" end is chemically different from the "tail" end, and there is a chemical and electrical gradient ranging through the space between them.

Prof. Harrison sees a theoretical picture of the protein molecules, which are known to be long, string-like affairs, and chemically different at their opposite ends, arranging themselves in parallel formation like soldiers in a regiment, so that the effects of their individual polarities become added together, to produce the greater polarity of the organism.

Lateral Organs

Prof. Harrison's theoretical picture goes on to include the development of the differences necessary for the production of lateral organs, by postulating the tacking of other blocks onto the sides of the long, parallel-arranged chains of the protein molecules.

The researches that resulted in this new effort to find a solution for the old riddle of organismal polarity were carried out principally on transplantations of the inner ear, in Prof. Harrison's little animals. At very early stages in

development, when the whole creature was still less than a tenth of an inch long, the scientist patiently clipped off the tiny spot that was destined to become the ear, and transplanted it either to other animals of the same kind, or back on the original owner's head, though sometimes on the opposite side.

In general, he found that at early stages the organism as a whole was boss: Ear material developed into normal ears, no matter how he set it back on the operated spot. Even other skin material would develop into ears. But at later developmental stages, the ear material had grown to a position where it had "a will of its own," and would grow into abnormal ears, backward, upside down, or doubled, depending on how the transplant was set.

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GEOGRAPHY

Arctic Voyager Honored By the Explorers Club

PROF. Otto Yulievich Schmidt, Soviet Arctic explorer and virtual director of an area of the earth equal to two-thirds the size of the United States, has been granted the rare distinction of honorary membership in the Explorers Club. Such membership is limited to 20 men and only the recent death of General Greely opened the vacancy which Professor Schmidt now fills.

The citation read in part: ". . . for his outstanding personal achievements in the field of northern exploration and in recognition of the work of the group of able and courageous scientists whom he has led or directed in the field of Arctic exploration. . . ."

Leading expeditions since 1929 which opened the sea route over the top of Siberia to the East and colonization of the area has been the specific accomplishment of Professor Schmidt.

He has control of land and islands north of the 62d parallel with an area of 5,500,000 square kilometers. His position is somewhat like the job of being governor of Alaska with a touch of Secretary of the Interior thrown in.



PROF. OTTO Y. SCHMIDT

Last year 14 ships made the complete voyage from the Atlantic to the Pacific Ocean via the Northern Sea route. Altogether there are 160 ships employed north of Siberia, carrying 271,000 tons. Airplanes under Professor Schmidt's control did 17,000 hours of flying in 1936 and carried 5,400 passengers. His administration has built schools, established sawmills, prospected for minerals, developed mines and performed other duties in the territory.

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ASTRONOMY

Giant Spots Visible Now On the Face of the Sun

See Front Cover

CLOUDY weather during January has hampered astronomical observations, including those of the sun, but during the month it seems to have had an unusually large number of spots. A picture, taken on Jan. 31 by I. M. Levitt, with the 40-foot focus solar camera of the Cook Observatory, shows more spots than have been seen in more than seven years. This picture appears on the front cover of this week's SCIENCE NEWS LETTER. The large group, near the center, is about 90,000 miles in length and big enough to be visible to the unaided eye, when properly protected with smoked glass. It is so vast that 121 worlds like the earth could be dropped into it side by

side and have a bit of room left over.

The spots are huge tornadoes in the sun's atmosphere. Actually they are brighter and hotter than an electric arc, but appear dark by contrast with the hotter and brighter surrounding regions. (The vertical line is a plumb line photographed on the plate to help orient it.)

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ASTRONOMY

Great Solar Activity Taxes Code for Reports

SO NUMEROUS have sunspots become in the latest bursts of solar activity that the scientists' own radio code, by which far-flung observatories throughout the world communicate with one another, has become ineffectual.

The code of the International Scientific Radio Union, whose code name is URSI and whose messages are called ursigrams, has space for telling the number of sunspots up to 99. Seldom is this number exceeded in any day's observation. But in recent weeks, however, messages have been coming through marked 40 add 100 or 20 add 200, as examples, which mean 140 spots and 220 spots respectively. Peak number was on February 1, when 370 sunspots were observed.

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ASTRONOMY

Sun's Surface Is Stormy At Times of Total Eclipse

GREAT storms sweep the sun's surface at the time of a total eclipse, declared Dr. S. A. Mitchell, director of the Leander McCormick Observatory of the University of Virginia, in a lecture given under the auspices of the Smithsonian Institution.

Evidences of extreme solar activity have been obtained from photographs made during recent total eclipses, especially as shown by the coronal streamers and the lower but more intense flaming outbursts known as prominences. A comparison of all these photographs, said Dr. Mitchell, shows that the great activity of the sun was found not only at eclipse time but persisted throughout the whole period of four days covered by the plates.

Despite all the study that has been lavished on the corona, the great extension of pearly light around the sun visible only during a total eclipse, scientists are still in considerable doubt as to its real nature. That its great

domes and streamers are in some way linked with the flaming prominences of the sun's body itself was suggested long ago, but the nature of the connection is still obscure. Photographs taken during one recent eclipse "demonstrate the fact that the longest coronal streamers, on which the shape of the corona more or less depends, are always located near prominences but are not necessarily exactly connected with the prominences which at the time of the eclipse are of the greatest height."

Astronomers' inability to answer all questions about solar phenomena observable during an eclipse should not be held too hard against them, Dr. Mitchell indicated. If there were now living any one astronomer old enough to have started his work in 1842, when really scientific eclipse observations be-

gan, and if he had "taken in" all total eclipses since that date, with the average amount of bad luck with the weather, he would in that near-century have had only about one hour's observation-time of the totally eclipsed sun.

Typical of the sun's unsolved mysteries on which data obtained with total eclipse observations provide only the merest hint, is the nature of the dark lines which appear in the spectrum of the light from the outer corona. Whether such observed dark lines really are coronal in origin or whether they are produced by the scattering of sunlight in the earth's atmosphere is still uncertain. Probably they originate, indeed, in the corona but the present evidence is not wholly conclusive, said Dr. Mitchell.

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ARCHAEOLOGY

Connecticut Yankee Steps Into Ancient Literary World

Young Scholar Learns To Read Rare Mayan Works That Escaped the Flames of the Spanish Conquerors

A CONNECTICUT Yankee is stepping across the centuries, not into King Arthur's court but into the literary world of the Mayan civilization.

He is having the thrill of reading slowly—but very surely, as he believes—words in Mayan books that were last read and understood by Mayan Indian scholars in their temple libraries in Yucatan, centuries ago.

For one thing, he has learned to tell the words from the pictures, and that is no simple thing in a kind of writing that has often been called picture writing. On the brightly colored pages of a Mayan book, it appears, you can find our own popular modern method of telling a story by pictures and captions.

At the annual meeting of the American Anthropological Association, this young man from Wethersfield, Conn., Benjamin Lee Whorf, surprised his fellow research workers by reading off sentences from two of the famous Mayan books. Various scholars have attempted to read these books. Mr. Whorf's interpretation of the ancient text is entirely different from anything that any one had heretofore found on the Mayan pages. To account for his

reading, he carefully analyzed his method of deciphering no less than 41 Mayan words.

Study of ancient languages began as a hobby with Mr. Whorf, and he has gradually become more and more engrossed in America's own prize puzzle,



BENJAMIN LEE WHORF

He says: "Mayan writing is phonetic."