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.

Science News Letter, February 20, 1937

GEOGRAPHY

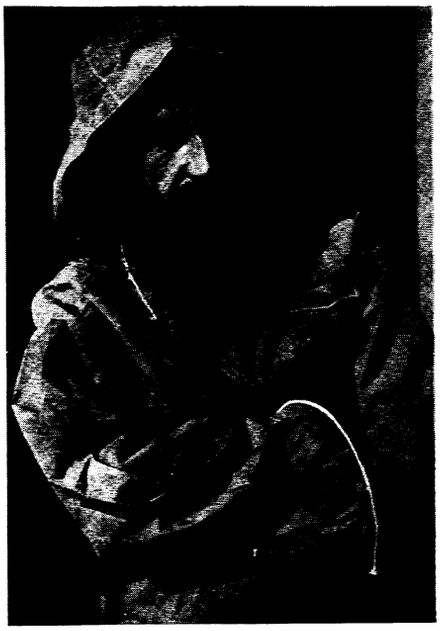
Arctic Voyager Honored By the Explorers Club

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