BIOLOGY-ANTHROPOLOGY

Living Photocells Used In Carnegie Institution Tests

New Understanding Gained of Plants' Method of Capturing Carbon Dioxide; Studies of Apes and Men

NOT a glass-and-wire photoelectric cell but a genuine living plant cell was used as an "electric eye" in experiments reported to trustees of the Carnegie Institution of Washington, when President John C. Merriam presented his annual report of the research activities of his far-flung scientific staff.

The work was done by Dr. Gordon Marsh, at the Tortugas Laboratory of the Institution, off the southern tip of Florida. The cells used were those of the strange sea plant Valonia. They are giants among cells. In fact, the whole plant is a single enormous cell, ranging from the size of a pea to that of an egg. Most cells of course are exceedingly tiny, invisible except under a strong microscope.

In the experiments, these huge Valonia cells had wires attached to their opposite ends, leading to a delicate current-detecting instrument. The cells, like all living cells, constantly generate very weak electric currents.

Dr. Marsh kept his cells in a light-tight box, and through an opening illuminated them with light from strong electric lamps. He varied the illumination intensity from zero or total darkness to 7,000 foot-candles. The plants responded by producing more current in response to strong light than they did in darkness or weak light.

Dr. Marsh does not consider Valonia a practical substitute for the artificial photoelectric cells now on the market, but regards his experiment as giving a promising lead for further study of the electrical and other properties of living cells.

Capturing Carbon Dioxide

An important step toward the understanding of how green plants capture the waste gas carbon dioxide out of the air and turn it into food is reported by Dr. H. A. Spoehr, director of the Institution's division of plant biology, with headquarters at Stanford University.

The outstanding fact turned up by this research is that while light is needed for the completion of the food-making process, the first step, which is the capture of carbon dioxide from the air and holding it in solution, goes on independently of light. Leaves kept in the dark, and leaves without green pigment, were alike able to absorb and hold considerable quantities of the gas. Stems and roots also absorb some carbon dioxide, though less than leaves do, and flower petals still less.

Of especial apparent significance is the fact that leaves take in considerably more carbon dioxide than can be accounted for on the simple basis of its solubility in water. This means that the leaves carry on some direct and active process, rather than simply passively soaking up the gas. What this process may be remains for further investigation, though Dr. Spoehr and his associates have a few promising-looking leads.

Man Less Evolved Than Apes

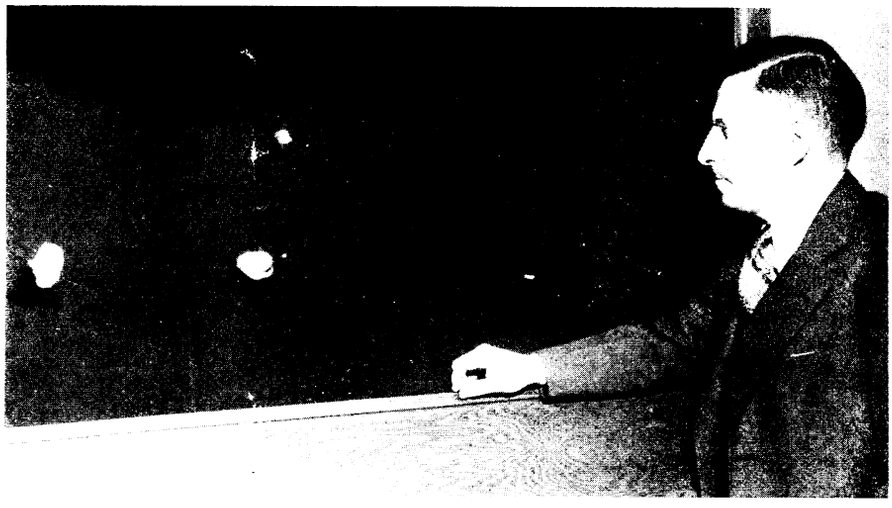
Man is not as highly evolved, in some respects, as several species of the great apes. The newly discovered differences are in the internal organs of the great apes, which have been less studied than their bones and skins because they are more difficult to preserve. The present research was conducted by Dr. W. L. Straus, Jr., at the Institution's laboratory of embryology in Baltimore.

The orang-utan is more highly specialized than man in certain lung structures, and the gibbon is most advanced with respect to the position of the heart and certain of the major blood vessels that rise near it. Man maintains an evolutionary lead so far as certain parts of his digestive tract are concerned, but is more primitive than the gibbon in his heart and the first great arterial branches.

In his study, Dr. Straus finds nothing to indicate that man possesses any peculiarly close affinities with the chimpanzee-gorilla stock as commonly accepted. He finds man just as closely related to the gibbons.

Nose Cartilages

Dr. A. H. Schultz, also of the Institution's department of embryology, has made a special study of the nasal cartilage of the great (*Turn to page* 396)



NEIGHBORS IN SPACE

Dr. Sinclair Smith demonstrating at the annual exhibit of the Carnegie Institution of Washington a model of our own Milky Way and its two neighboring galaxies. The whole Universe is now seen by scientists as a vast space approximately a billion light-years in diameter in which these galaxies are rather uniformly distributed. The galaxies are separated by distances between 10 and 100 times their own diameter, and each contains millions of stars which are themselves separated by large distances.

CENTRAL HEATING

For a modern home of 3000 B. C.—five flues are shown in right foreground with branch flues at right angles, to carry warmth under the brick floor throughout the building.

weights found through the ruins. These weights are mainly cubes, carefully polished and graded to a simple ratio of 1, 2, 4, and so on. Business was supervised, even as far back as the dawn of the Bronze Age, so archaeologists surmise, for similar weights recovered from the two other Indian towns of the age that archaeologists have so far explored, are of similar size. And that means that weighing of goods for sale was strictly supervised, with short measure not allowed.

How far trade of the Indian cities spread is not yet known. Toys from this place may have given pleasure to children many miles away. But did they reach the cities of Mesopotamia—Tepe Gawra, Erech, Ur of the Chaldees, and others—1,400 miles to the northwest? The land of Egypt was even more distant, with the Arabian desert to be crossed.

With only two or three Indian towns of 3000 B.C. unearthed, archaeologists are already convinced that India was not aloof from its great rivals and neighbors in the dawn of civilization. Heretofore, the cradle lands of our civilization have been considered two—Egypt and Mesopotamia. Now, India is revealing itself as a third civilizing power at the third corner of a great sprawling triangle.

Objects proving to archaeological satisfaction that India did have contacts with Mesopotamian cities have already been discovered. And this part of the world's ancient story is only beginning to open up.

Until a few years ago, the oldest civilization in India that was clearly demonstrated was no older than 300 B.C. Yet, the literature of India testified to people far older than this, and mentioned strong forts left by people before 1500 B.C.

Then British archaeologists struck the first discovery of India's real antiquity, and announced finding city ruins at Mohenho-daro as old as 3000 B.C., and since then India has been drawn more and more closely into the tangled pattern of civilization.

The new-found city, Chanhu-daro, had its greatest glory when it was young, so the ruins reveal. The later settlements shrank. After the age of the toy and bead makers, there followed a people who lived in matting houses and walked on rough paving, very different from the old city's substantial dignity. These later people made great quantities of pottery, which archaeologists hope will shed more light on migrations and trade relations of 2000 B.C.

Last on the toy town site were a few primitive folk who made dark gray pottery and marked it with geometric designs. This curious ware is unfamiliar even to archaeologists well acquainted with the clay craftwork of the past. Wandering gypsy-like tribes, Mr. Mackay believes, may have been the last industrialists at the once-thriving town of the toys.

Science News Letter, December 19, 1936

From Page 387

apes, of white men, and of Negroes. He finds:

"In these points the cartilages of the anthropoid apes are nearer those found in the Negro than in white individuals. The cartilages in man are proportionately much larger than in the anthropoid apes as would follow from the difference in the prominence of the noses of the two. In the Negro, however, though the cartilages are much larger than in the gorilla, yet there is comparatively little difference in the prominence of their noses."

Smallest Monkey Embryos

Embryos of the common macaque monkey (the organ-grinder's favorite assistant) in their very earliest stages of development have been studied by Dr. George L. Streeter, director of the department of embryology, in collaboration with Dr. G. B. Wislocki of the Harvard Medical School. Embryos only a few days old, before they had become attached to the wall of the uterus, were found in numbers sufficient to make detailed microscopic examinations possible.

One of the outcomes of this study has been a considerable modification of the classic germ-layer doctrine, which teaches that all parts of the developing embryo originate from three primitive layers of cells: endoderm, ectoderm, and mesoderm. Drs. Streeter and Wislocki have found that while these layers do account for the development of the parts of the body itself, the several membranes in which the unborn infant is wrapped, as well as other accessory structures, originate from primitive initial tissues that are laid down before the three germ layers are formed.

Science News Letter, December 19, 1936

The "Father of Botany," Theophrastus, described many plants so carefully that botanists today can identify these trees and shrubs that grew in Greek gardens.