PHYSIOLOGY

Detect Visual Pigments

A new technique for examining visual pigments in the living eye has helped to explain further the type of color blindness in which red and green are indistinguishable.

➤ AN INDIRECT way of detecting the visual pigments in the intact eye of a living, seeing human individual was described to the National Academy of Sciences meeting in Washington, D. C., by Dr. W. A. H. Rushton of Cambridge University, England.

Every motorist is familiar with the way the light of his headlights is reflected by the glowing eyes of a cat or of a wild animal along the roadside at night. Although the human eye does not reflect light as well as does the cat's eye, the same principle made possible a study of the visual pigments in the human eye.

The eye has two kinds of visual receptors, rods and cones. The rods are used in twilight or night vision and are predominant in the eyes of nocturnal creatures. The cones, which are used in day vision, are found in the eyes of creatures that roost or go to sleep at night. Thus, the rods are used mostly by owls, the cones by fowls, Dr. Rushton explained. Only the cones have color vision.

The visual pigment that has been found in the rods of the eye is rhodopsin.

Examination of the eyes of chicks showed the cones have another pigment known as iodopsin. The chick's eye has ten cones to one rod, but it has twice as much rhodopsin as iodopsin.

Examination of cones of the human eye usually has failed to reveal the presence of any iodopsin or any other visual pigment. But by shining a colored light into the living eye to bleach out the iodopsin, information about the presence of the pigment was revealed.

Tests on color-blind persons of the type known as "protanopes," who confuse red and green, were particularly interesting when compared with tests on the normal eye. The protanope sees no difference between red and green light. And when a light which would bleach out red and another which would bleach out green were shone into the protanope's eye, the same result was obtained, indicating that there is only one pigment in this colorblind eye.

When the same test was applied to the normal eye, it was found that it has two visual pigments. One pigment is bleached out by a deep red light and the other is the same as that in the protanope's eye.

Dr. Rushton used his own eye as the normal eye.

In the red-green confused protanopes, Dr. Rushton concluded, the red pigment is replaced by green. Thus, although they see either red light or green light as being green, they are completely unable to see red.

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ANTHROPOLOGY

Find First Surgery Case

Discovery of a 45,000-year-old skeleton of a Neanderthaler may have brought the earliest known example of amputation to the attention of anthropologists.

➤ WHAT MAY very well be the earliest known example of surgery was reported to the American Philosophical Society meeting in Philadelphia by Dr. T. D. Stewart, Smithsonian Institution physical anthropologist.

The 45,000-year-old skeleton of a Neanderthaler found in remote Shanidar Cave in northern Iraq had its right arm amputated just above the elbow.

This ancient primitive "uncle" of modern man had had an injury to the right arm before the amputation. It may have been a birth injury. Whatever it was, the arm bone and also the collar bone and shoulder blade were atrophied. The arm bone went on growing to a normal length but in thickness it was only the size of a little finger.

After consultation with orthopedic surgeons, Dr. Stewart concluded that the original trouble looked like what is now called Erb's paralysis, a form of birth injury. There is a possibility it may have been caused by polio.

The birth injury must have caused the paralysis. Then at around puberty or young manhood, the useless arm was again injured, this time fracturing the bone just above the elbow. The Neanderthaler was at least 40 when he was killed by a rockfall in the cave.

The forearm must have dangled, useless and in the way. It is quite possible that Shanidar Man, or one of his fellows, may have intentionally cut it off just as a dog or other animal will sometimes chew off a dangling, useless paw.

If this is, indeed, the first known case of surgical amputation, the operation must have been performed with a chipped stone tool because Neanderthal Man did not have any better kind of surgical knife.

The Neanderthal skeleton was found in the Shanidar Cave by Dr. Ralph Solecki, also of the Smithsonian. Dr. Stewart went to Iraq to study the bones under a grant from the American Philosophical Society.

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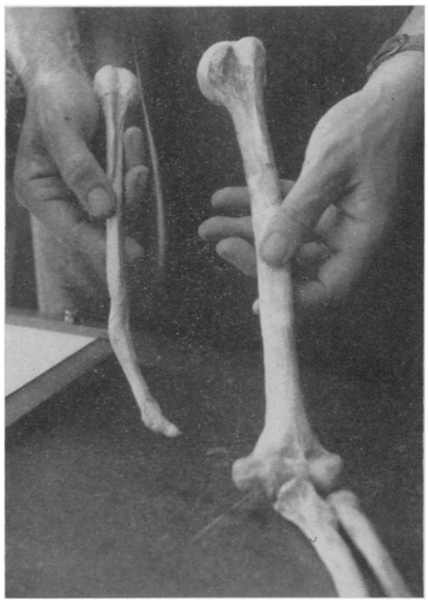

SURGERY CASE—The amputated right arm of a Shanidar Man appears next to the normal arm (right).

MANPOWER

America Said in Need of More Women Physicists

➤ THE UNITED States should train more women physicists, according to Dr. Janet Ramage, an attractive blue-eyed blonde who is the first woman physics instructor at the University of California at Los Angeles.

A native of the Isle of Wight, Dr. Ramage studied at the University of London and joined the UCLA faculty this year.

"Both American industry and the teaching profession could use many more women physicists," she says. "It is a wide open field for any coed with a liking for science and mathematics."

She points out that in European countries, and even some Asiatic countries, girls are proportionately more numerous in science classes than in the United States.

What accounts for this poor representation of women students in the most scientifically advanced country in the world?

"American girls get too little science in high school, and by the time they enter college they are frightened of the subject," says Dr. Ramage. "I have studied nothing but science since I was sixteen years old—and got over my fright early."

She adds that not only must girls get over their fright of science, "but also of boys' fright of girls who study science."

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