

OPTICS

Seeing Violet Light

► THE VIOLET light that is often noticed to pervade the early moments of twilight may be explained by a new discovery about the human eye reported in *Science* (Sept. 10) by Drs. Edgar Auerbach and George Wald of the Biological Laboratories, Harvard University.

Among the cones of the eye, they found, are some that are particularly sensitive to violet light. The cones are the cells located predominantly in the center of the retina that are responsible for bright daylight vision.

When you step from a brightly lighted room into the darkness, your eyes gradually become accustomed to the dark. During the first few minutes, your eyes rapidly become more sensitive until your vision reaches a plateau. This is due to the adaptation of the cones of your eyes.

Later, there comes another even more striking increase in visual sensitivity due to the adaptation of the eye's rods. The rods are the cells responsible for night vision. In general, the cones are especially sensitive to yellow, orange and red light; the rods see best in the violet end of the spectrum.

However, after adaptation to orange light, the Harvard scientists found, something very different occurs. At first, the cones of the eyes are more sensitive to violet light than to orange. After about two minutes in the dim light, a change takes place and the eye then becomes more sensitive to orange than it is to violet. This is the reverse of what scientists call the Purkinje shift.

After about 15 minutes of dark adaptation, the rods take over the task of vision. Then comes a true Purkinje shift and the eyes are again more sensitive to violet.

Study of the special sensitivity of the cones to violet light during the first two or three minutes of dark adaptation was stressed by the Harvard scientists. They exposed their subjects repeatedly to intense orange-to-red light and then measured their sensitivity to light of various wavelengths from 405 millimicrons to 546 millimicrons.

After one minute of adaptation, they found, the eye is most sensitive to violet light, but there is another wavelength to which it is more sensitive than to others; that is at about 555 millimicrons, which is yellow light. After ten minutes of dark adaptation, the yellow light alone is seen best.

In another experiment, the investigators measured the sensitivity to light of various wavelengths in a period of dark adaptation after exposure to orange-to-red light or to blue light.

The red light, they found, spared the cone receptors sensitive to violet. After one minute of dark adaptation, the eyes were especially sensitive to violet light and also slightly less sensitive to orange-red light.

After exposure to the blue light that

dulled the sensitivity of the violet receptors, the sensitivity after one minute of dark adaptation showed only a single peak for the orange-red light.

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MEDICINE

Earnings Increased For Polio Patients

► EARNINGS OF a group of poliomyelitis patients was increased more than ten times through rehabilitation, Dr. Chester S. Keefer of Washington reported at the Third International Poliomyelitis Conference in Rome.

Dr. Keefer is special assistant to the secretary for health and medical affairs in the U. S. Department of Health, Education and Welfare.

Annual earnings of the group of 3,801 polio patients before the rehabilitation was estimated at \$728,000, Dr. Keefer reported. Of the group, 85% were unemployed, 31% had never worked, 69% were dependent on their families and six percent were on public welfare rolls at the start of the program.

The following year, their earnings totaled \$7,400,000.

Dr. Keefer cited these figures to show that rehabilitation, although long and costly, pays off in dollars and cents as well as in happiness for the individual.

Keeping the public informed about the disease and everything known that can be done to control it is "essential," Dr. Keefer declared, if the total problem of poliomyelitis is to be solved.

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BIOLOGY

Spadefoot Toad Breeds Only During Hurricanes

► ALTHOUGH HURRICANE warnings send people in Florida scurrying for cover, at least one group of state residents looks forward to a good heavy storm.

The spadefoot toad, known scientifically as *Scaphiopus holbrooki*, is the strange little animal that needs the death-causing hurricanes to bring new life to its species, for it can only breed during heavy storms.

Scientists are still baffled as to what the triggering mechanism is that tells these toads when a storm is approaching or is upon them. Some speculate that the toads have a pressure-sensing device, and others believe that they come to the surface of the ground only after their holes have become filled with water.

So adapted are the young to this way of birth that the tadpoles will not survive in an ordinary pond, but will only live in a storm puddle. As the puddle dries, the tadpoles are also equipped to speed up their development into adulthood.

This particular toad has some cousins in the desert that apply this storm-breeding technique to take advantage of flash floods.

Since Florida has escaped a heavy storm or a hurricane so far this year, the spadefoot tadpole has not made its annual appearance.

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ORNITHOLOGY

Always Spring for Birds in Tropics

► HOW DO birds in the tropics, where there are no seasons, know when it is time to find a mate?

In temperate zones, the problem is solved by the seasons: all members of a bird species nest at the same time, and then rest the rest of the year. Where it is forever summer, birds get no guidance from the weather.

Some answers to the dilemma of the tropic bird have been found by Dr. Alden H. Miller, professor of zoology at the University of California and president of the American Ornithologists' Union.

Dr. Miller revealed his findings, made on a trip to the Magdalena River Basin in Colombia, South America, at a meeting of the union in Madison, Wis.

The tropic birds, he said, just nest all the year round. The breeding cycle appears to be determined by the time each individual hatches. When the bird becomes of age no matter what time of the year, he finds a mate. Then he rests for an appropriate period before breeding again.

So in the tropics individuals of a single species may be found nesting at any time of the year, while others of the same species are resting instead.

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"TORCH" SWEATER — Testing a sweater for its flammability is Janet Rountree, 17, of Evanston, Ill., a 1954 Science Talent Search winner who worked this summer at the National Bureau of Standards.