

PHYSICS

Color Depends on Eye as Well As Wavelength, is Claim

IF THE SKY is viewed through a narrow, blackened tube its usual "blue" appears white, clouds are seen to be yellow, purple turns to pink, and a beautiful sunset becomes a mixture of tawdry colors.

This fact was mentioned by Prof. J. S. Haldane, the noted physiologist, chemist and philosopher, as an illustration of his theory of vision. He explained the theory in delivering the inaugural address to the 197th annual session of the Edinburgh Royal Medical Society.

The apparent hues of a glorious sunset are not "really there." They are an illusion created by the human eye in an attempt to make the sunset conform to the "normal" color-balance in the field of vision. The familiar blue of a clear sky is in part imposed by the eye to balance the brilliant yellow rays of the sun. What we see depends, Prof. Haldane believes, as much on the peculiar reactions of the eye to external stimuli as on the stimuli themselves.

Prof. Haldane formulated his theory as follows:

1. In the perception of either color or brightness our vision as a whole is always active; there is no merely objective cause of color or brightness.
2. In this active perception we can distinguish the coordinated maintenance of color and complementary color, as

well as brightness and darkness, in the field of vision.

If his theory be true, the assumption on which Galileo and Newton founded physics, that "our sense-organs are simply receptive of various kinds of impressions from a surrounding physical world," does not cover the facts. Newton, in his "Opticks," had assumed that the color of any light depended solely on its refrangibility, or wavelength. Prof. Haldane showed with experiments that he could make light which, by the laws of physics, ought to be yellow, turn blue, white, green or any other color, merely by changing the whole of its background.

A small area of a white screen lit by a daylight lamp appeared blue when viewed through a hole in another screen lit by a yellow lamp, and green when the front screen was lit by a red lamp. After a few moments the front screen appeared to be white, although actually it was still lit by the red lamp.

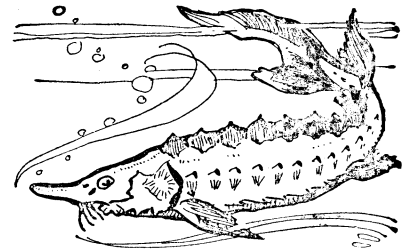
It is necessary for an object to be given the eye's whole attention if its "true" color is to be determined, Prof. Haldane explained.

Science News Letter, November 11, 1933

The principle of the Davy lamp has been applied to prevent passage of flame when gasoline tanks of airplanes are filled.



Evolution



Armored Ancestors

OUR REMOTEST backboned ancestors, certain smallish fishes that lived in fresh-water streams and lakes something like half a billion years ago, wore armor to defeat the ravenous appetites of their enemies. Chief among these predators were creatures that bore a superficial resemblance to lobsters but were more nearly related to modern scorpions. Some of them were giants, six feet or more in length; they were much larger than fishes that lived in the same waters. This group of animals, extinct for many ages, have been given the name eurypterids.

The influence of these eurypterids on the evolution of fishes and hence of backboned animals generally is traced by Prof. Alfred S. Romer of the University of Chicago. A review of all available geologic data, gathered by many research workers, indicates that, contrary to earlier beliefs, fishes originated in fresh water and not in the sea, that their skeletons were bony and not merely of cartilage, and that the armored condition common among early fishes was primitive and not a later evolution from an unarmored ancestry. Even the sharks in those early days were inhabitants of fresh water, and took to the sea later on.

When Prof. Romer looked about for enemies that might have made the burden of armor a necessity for the earliest fishes, he found that the eurypterids were the most formidable aquatic beasts of prey which the fishes would be likely to fall foul of. They were the dominant life forms in fresh water when fishes first appeared, and as the fishes increased in size and number the eurypterids declined, until at last the much diminished predators may have switched roles and become the prey of the fishes.

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