● RADIO

Saturday, March 29, 1952, 3:15-3:30 p.m. EST

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. M. H. Trytten, director of the Office of Scientific Personnel of the National Research Council, and A. C. Monteith, vice-president of Westinghouse Electric Corporation, discuss "Scientific Manpower."

OPTICS

Gunsight Proves Good for Centering TV Action Shots

See Front Cover

➤ A MILITARY gunsight has been found to be the television cameraman's best bet for fast pin-pointing in rapid action shots.

Known as the polaroid optical ring sight, the finder looks like an ordinary polaroid camera filter. But when the cameraman looks through it, he sees a pattern of concentric circles "projected" on the scene, such as shown on the cover of this week's SCIENCE NEWS LETTER.

Once lined up with the camera, the sight is accurate, and the cameraman does not have to line up his eye with the sight, for anything he sees inside the center ring will be accurately centered on the television screen.

The sight was developed for anti-aircraft gunnery. It consists of a single glass-faced disk so constructed that a set of concentric rings appears at target distance in the field of view, and no lighting or other accessories are needed.

Science News Letter, March 22, 1952

ELECTRONICS

Deflecting System Developed for TV Tubes

➤ AN ELECTRON deflecting system which simplifies television tube construction was described to the Institute of Radio Engineers meeting in New York.

Consisting of interleaved metallic patterns deposited on the inside of a hollow rectangular box by photo-engraving and electroplating means, the unit has only four terminals and does the same job as conventional deflecting elements in present-day use.

Conventional deflecting plates, two pairs of them, have presented problems to manufacturers. One pair of plates must be aligned and mounted horizontally; the other, vertically. They must be suitably shockproofed.

Because the electrostatic fields of the two pairs of plates interact with each other, they must be situated far apart in the tube's neck. The new system occupies only one-half the space filled by conventional electrostatic deflecting apparatus.

Science News Letter, March 22, 1952

BIOPHYSICS

Vision Process Duplicated

Chemical steps that make it possible for us to see have been duplicated in the laboratory. Only four substances necessary for this process.

➤ YOU SEE because light bleaches light-sensitive pigments in the retina of your eye. The chemical changes that result are accompanied by electrical variations in the retina. Conveyed to the brain by the optic nerve, these electrical signals are there translated into visual images.

The chemical steps that make vision possible have been duplicated in the laboratory by Dr. George Wald, of the Biological Laboratory of Harvard University and were described in Peoria, Ill., to the Bradley University Club of the Society of Sigma Xi, national society for the encouragement of scientific research. The lecture is being repeated by Dr. Wald at various other colleges and universities throughout the country.

When you step out onto a sunny street, light bleaches the pigment in your eye and you become used to the brightness—less sensitive to light. This is light adaptation. Then step into a darkened movie theater. At first you can see nothing. But the chemical changes in your eyes are reversed by darkness and gradually your eyes become more sensitive to the faint light. The color of the pigment is restored. This is dark adaptation.

Two kinds of cells exist in your eye's retina, each with its own distinctive pigment. The cone cells, which operate in daylight, have the violet pigment called iodopsin. The other type of cells, the rods, by which you see in the dim illumination at night have a red pigment, rhodopsin.

Only four chemicals were necessary for Dr. Wald to duplicate, in the laboratory, the process of light and dark adaptation. Important among the substances necessary to re-create both pigments is vitamin A; that is why nightblindness is one of the earliest symptoms of vitamin A deficiency.

But vitamin A exists in various forms, and not all forms will work in this visual cycle. The ordinary synthetic vitamin A will not do. The necessary form is that known to chemists as a cis-isomer. This form is present in liver oil.

In addition to vitamin A, the necessary chemicals for the rhodopsin cycle are: cozymase, alcohol dehydrogenase and opsin. Opsin is the only one of these which must be obtained from the retina.

When light strikes the red rhodopsin, it is spontaneously bleached out into a yellow mixture of opsin and a carotenoid protein called retinene. The retinene, in the presence of the enzymes, alcohol dehydrogenase and cozymase, is changed to vitamin A.

In dark adaptation, vitamin A and opsin are changed back to rhodopsin. In the dark, and aided by the influx of additional vitamin A from the circulation and from certain cells of the eye, the opsin "traps" retinene, removing it to form rhodopsin. What happens, therefore, is that the vitamin A is re-converted to retinene by oxidation in the presence of the enzyme and then the retinene is condensed with opsin to form rhodopsin.

Science News Letter, March 22, 1952

PSYCHOLOGY

Study Cur Dogs for Light on Man's Heredity

➤ THE DESPISED cur dog can tell man something about his own hereditary past and future. Scientific study of hybrid dogs is suggested by Dr. William T. James, of the University of Georgia, Athens.

"Man is largely a hybrid animal in which different types have been intermingled," he told a meeting of the New York Academy of Sciences section of psychology.

Different breeds of dogs differ greatly in behavior pattern. Hybrid animals are likely to be well balanced between the extremes. Greatest range of individual differences in emotion and behavior is found among the hybrids. And so is the greatest variation in physical form.

Some breeds are much more active and alert than others. In one series of experiments, a signal was given the dogs for a five-second period and then the signal was accompanied by an electric shock applied to the right front leg during the following five seconds. The dog could avoid the shock by lifting his leg at the proper time. The active and excitable dogs soon caught on and were careful to avoid the shock. They lifted the leg promptly and held it up until the signal stopped. Inactive dogs either do not lift the leg in time or fail to hold it up long enough and so are shocked.

Differences were also found between the different breeds in energy, tolerance of frustration, emotionality and aggressiveness or timidity.

Emotional disturbance may help or hinder learning, it was found. Some animals are so disturbed by the procedure that they cannot be trained. Others are undisturbed and learn quickly. But still others are unemotional and yet are unable to learn what to do.

Science News Letter, March 22, 1952