

PHYSIOLOGY

# Vitamin A Found to Aid in Formation of Visual Purple

## Linking of Vision With Fat-Soluble Vitamin Found in Milk Is First Evidence of Such Direct Action

**F**IRST definite evidence of a vitamin participating directly in a physiological process has been found by Dr. George Wald, of the Harvard University Biological Laboratories, who has conclusively proved that the fat-soluble vitamin A found in milk and fish liver oils is present in the retina of the eye and is active in vision.

In the course of this research Dr. Wald also discovered a heretofore unknown yellow pigment which he has named retinene. Like vitamin A, this substance is related to the carotenoids, the coloring matters of many plant and animal tissues. Retinene, he found, is liberated by the action of light on the eye.

For some time science has known that insufficient vitamin A in the diet results in so-called "night blindness," a lowered ability to see in dim light. Since the retinal rods are used principally in dim vision, it has been believed that the vitamin must be associated in some way with these organs.

The discovery of free vitamin A in the retina tended to substantiate this theory. Dr. Wald has now found that the vitamin participates directly in the formation of visual purple, a pigment contained in the retinal rods. The bleaching of this pigment by light is the initial step in the visual process.

When the visual purple is thus bleached an orange material called visual yellow is formed. This process is accompanied by the liberation of a large amount of retinene, to which the color of visual yellow is due. Following bleaching, the orange color slowly fades, the retina finally becoming colorless. At this point it is found that the retinene has disappeared, having been transformed entirely into vitamin A.

In the living animal the vitamin is re-synthesized to visual purple, completing the cycle. This cycle is not a perfect one, however, since some vitamin A is apparently lost in the process. This appears to be one reason why it is necessary to provide the animal with a continuous supply of new vitamin.

In the original experiments with frogs,

Dr. Wald reported observations made principally with a pocket spectroscope. Recently he has been able to obtain objective records of each detail of these results by the use of a recording spectrophotometer, designed by Prof. Arthur C. Hardy of the Massachusetts Institute of Technology.

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PSYCHOLOGY

## Feeble-Minded Girl Paints "Stone Age Art"

**A** FEEBLE-minded girl, who paints pictures like the famous cave man's art, has attracted interest of German archaeologists.

It is believed that this girl with ill-developed brain offers an unusual glimpse into the lost world of the Old Stone Age 25,000 years ago, when cave men adorned walls of European caverns with scenes of hunting and magic rites.

The feeble-minded girl, like the cave artists, displays no interest in structure or composition, and is inventive only in use of color. This is the verdict of G. A. S. Snijder, who has studied the pictures. The girl is also what psychologists call "eidetic," meaning that she retains in her mind so vivid a picture of what she sees that she can paint it weeks later as if it stood before her. This

may have been one of the Stone Age artists' traits, and would partly account for their lively and accurate paintings of bison, wild horses, and other animals of the chase. Mentality of the cave dwellers, it is pointed out, was not high, judging by their skulls.

The girl's paintings also show resemblances to the painting style of the civilization of ancient Crete, it is maintained.

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PHYSIOLOGY

## Pituitary Gland Makes Skin Grow to Fit Body

**T**HE PITUITARY, tiny and powerful gland in the head, not only makes the body grow but makes all the parts of the body grow the right size in relation to each other, Dr. C. R. Stockard of Cornell University Medical College told members of the National Academy of Sciences.

Dogs with skin so much too big for their bodies that it fell into loose, flabby wrinkles were described by Dr. Stockard. These dogs had other symptoms that showed the pituitary was not functioning properly, although the gland was not causing over-growth of the bones or gigantism.

Examination of the pituitary gland in these dogs showed very abnormal arrangements and proportions of the cells within the gland. The condition was not one of overactivity of the gland, Dr. Stockard pointed out, but of another kind of abnormal activity.

From his own observations and those of other investigators, Dr. Stockard has concluded that the growth-controlling hormone made by the pituitary not only stimulates growth but also controls growth by a checking process. It is this



### HIS SKIN DOESN'T FIT

Ever notice how "loose-skinned" a bulldog is? These two museum specimens demonstrate it most vividly. The skins were from dogs of the same litter, bred by Dr. C. R. Stockard of Cornell University. One was filled up until all folds and wrinkles were stretched out; the other mounted in normal condition.

latter activity of the gland and its hormone that keeps the skin, for example, from outgrowing the rest of the body. When the skin becomes thick and wrinkled because it is too large to cover the body smoothly, as happens in diseased

conditions, the skin has been freed from the growth-regulating factor and just goes on growing and growing, as tissue does when removed from the body and kept alive in a test-tube.

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## PHYSIOLOGY

## Finding New Lung Function Solves Human Blood Puzzle

**S**TUDIES which clear up a fifty-year old puzzle about human blood were reported by Dr. William H. Howell, emeritus professor of physiology in the Johns Hopkins University, at the autumn meeting of the National Academy of Sciences.

The puzzle was to find where the platelets of the blood are formed. These platelets are little flattened disks which are important because one of their functions is to make blood clot after it has been shed.

The platelets are formed in the lungs, Dr. Howell found.

This is an entirely new idea. Although the platelets were discovered more than 50 years ago and there have been all kinds of theories as to their origin, function and fate, no one has ever thought of looking in the lungs for their birthplace. Until now medical scientists have thought these important platelets were formed in the marrow of bones where the red blood cells and many of the white blood cells are made. The generally accepted view, proposed by Wright, is that they are produced in the marrow from a species of giant cell, to which Dr. Howell many years ago gave the name megacaryocyte.

Now Dr. Howell comes along with the experimental proof that the platelets are made in the lungs. The first evidence was finding that as the blood flows through the lungs it picks up platelets. The arteries always contain more than the veins.

Further evidence was obtained by examining bits of lung tissue under the microscope. By a special technique, the platelets were stained intensely, so that they showed up clearly under the microscope.

"I have been able to show," Dr. Howell reported, "that they are produced, as a sort of solid secretion, by the giant cells, megacaryocytes, of the lungs.

"Megacaryocytes," he explained, "have been found in the lungs by many investigators, but they are usually sup-

posed to be sort of accidental constituents, cells that have escaped from the bone marrow and have been caught in the capillaries (tiny blood vessels) of the lungs, there to undergo degeneration.

"But my observations show, on the contrary, that they are actively growing cells whose cytoplasm is composed of platelet material and which branches out into the blood capillaries sometimes for quite a distance. Then processes break off and are carried off in the blood stream and break up by fragmentation into the tiny platelets."

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## PHYSICS

## Hot Stars Provide New Evidence For Einstein

**V**ERY hot stars, with surface temperatures around 40,000 degrees, have provided the latest evidence in favor of the Einstein relativity theory.

Dr. Robert J. Trumpler, of the Lick Observatory, has found that the lines appearing in the spectra of those stars after their light has been analyzed through the prisms of a spectroscope, are shifted towards the red. This shift is greater than that shown by other stars closely associated with the hot ones. Dr. Trumpler expresses the view (*Publications of the Astronomical Society of the Pacific*, October) that this shift is similar to one found previously in the sun and other stars, and which was predicted by Einstein. It is believed to be due to the fact that the light waves are lengthened slightly when they leave such a massive body.

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The sturdy oak tree has more than 300 different insect enemies.

Until recently, Ethiopia's emperors always went to the holy city of Aksum for coronation.

## MEDICINE

## Find Highway For Germs Along Tongue Into Throat

**D**ISEASE germs that enter the mouth with food, drink or air are not all swallowed, Drs. Lloyd Arnold and Carroll W. Stuart of the University of Illinois College of Medicine have discovered.

Some of the germs stick in the mouth, and they have a definite preferred highway where they travel. Brushing and gargling with antiseptic washes won't budge them from this travel zone. They persist there, seeding themselves over and over again until they all finally die of anemia, which requires from two to four hours, depending on the species.

### Self-Disinfecting

The mouth has a good mechanism for defense against disease, Drs. Arnold and Stuart find. The cheeks and the edges and middle of the tongue can disinfect themselves. When foreign germs come in contact with these areas, they disappear within a few moments. But the surface of the gums near their juncture with the teeth, the palate, and the space between the edges and the middle of the tongue have no self-disinfecting ability. It is on these latter parts that the germs are retained and which they use as a highway for their travel into the throat.

They always travel down this highway, never up and forward of their own accord. If they come up from the throat, it is an involuntary projection, as in the sputum of a cough.

It was established several years ago in Dr. Arnold's laboratory that the line of the lips where the outer skin meets the lining skin is also a non-sterile area. The present investigation shows that foreign germs on this area likewise keep seeding themselves for several hours.

### Live on Lips

Consequently, if your lips touch the rim of an infected glass or other object, the germs stay on your lips for several hours and your tongue, coming in contact with the lips, provides another seeding place for the germs to pass down your throat. If the resistance of your body is depleted, then these germs may cause sickness.

When a tuberculosis patient coughs up germs, these germs likewise stay on the tongue and lips for several hours, and any one or anything coming in contact with the lips of such a patient in that time is liable to be contaminated.

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