



**EDWARD DRINKER COPE, 1840-1897**  
*Professor of geology and paleontology at the University of Pennsylvania. He studied many North American fossils, particularly those of reptiles, amphibians, and the hoofed mammals.*

sally swamp lovers and livers. So we are told are the lower existing *Perissodactyla*, the tapirs and rhinoceroses. The higher types of both orders are dwellers on plains and in forests. We do not know the habits of the Eocene *Perissodactyla*, but I doubt their having inhabited muddy ground to the same extent as the hogs and hippopotami, the lowest of the *Artiodactyla*. Now in progression on dry land, any preëxistent inequality in the length of the digits would tend to become exaggerated. Such an inequality exists in the *Amblypoda*, the third digit being a little the longer. In rapid movement on hard ground the longest toe receives the greatest part of the impact, even if its excess of length is but little. The harder the ground the larger the proportion of impact it will receive.

The fact that the *Perissodactyla* did not develop the solid ungulate or equine foot, until a late geological period, or in other words, that the orders so long retained the digital formula 4-3, would indicate that it did not adopt a habitat which required great speed as a condition of safety, so early as the *Artiodactyla*.

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## PHYSICS—PHYSIOLOGY

## Muscular Physiology Studied By "Artificial Rainbow"

**B**EAMS of white light have been broken up into their many-hued spectra, or "artificial rainbows" by shining them on the surface of a frog's leg-muscle, and something learned of the physiology of muscular contraction by this unique means. Researches in which striated muscle tissues have been used as diffraction gratings were reported to the American Physical Society by Arthur Adel and David M. Dennison of the University of Michigan.

It has long been known that white light reflected from a finely ruled metal or glass surface would break into its constituent colors, or spectrum, just as though it were projected through a triangular glass prism. The alternating fine bands of dark and light markings that characterize ordinary body muscles have been found to act in the same way. These lines number about ten thousand to the inch.

The two Michigan physicists found that when muscle is lengthened by stretching, or shortened by stimulating

it to contract, the width of the bands changes by the same percentage as the change in total length of the muscle. A study of the spectral changes in light reflected from muscle stimulated to contract but prevented from contracting indicated that the region of active contraction in striated muscle is situated in the dark bands.

At the same session, Miss Rachel Franklin, A. J. Allen and Dr. Ellice MacDonald of the Cancer Research Laboratory of the University of Pennsylvania reported their observations on the effects of ultraviolet light on living protozoa, one-celled primitive animals. Ultraviolet radiation beyond a certain wavelength causes immediate cessation of all motion, followed by marked internal changes and in some cases a complete breakdown of the cellular structure. The researchers photographed these phenomena through a microscope equipped with all-quartz lenses to permit the passage of the short-wave radiations to which glass is opaque.

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## ENDOCRINOLOGY

## Few Drops of Extract Gives Goiter to 200 Guinea Pigs

**T**HE "CHEMICAL DISSECTION" of a gland has been reported by Drs. J. B. Collip, D. L. Thomson, H. Selye and E. M. Anderson of McGill University at a recent meeting.

The gland is the pituitary, located at the base of the brain, and apparently possessed of far greater powers than hitherto supposed. This gland secretes a number of hormones, powerful chemical regulators of body activity.

One investigator estimated that twenty-two pituitary hormones had been reported by various investigators. Dr. Collip and associates are working to get clean hormone extracts from this gland, each separate from the other, and to determine the exact effect of each on the human body.

In his pocket, Dr. Collip carried a

tiny bottle containing a clear, colorless fluid. One cubic centimeter, or about 20 drops of this particular pituitary hormone is sufficiently powerful to produce exophthalmic goiter in two hundred guinea pigs, Dr. Collip said.

The fact that a substance secreted by the pituitary gland can produce this disease of thyroid gland over-activity is the latest discovery of scientists both in America and Europe.

Animals lacking a pituitary gland and suffering from under-activity of the thyroid gland are restored to normal by doses of this potent new pituitary hormone. Other hormones which scientists are extracting from the pituitary gland affect the sex glands while still others affect the adrenal gland, Dr. Collip said.

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