expertness of the dextral sensory and muscular organs of the body; the union of right-handedness, right-eyedness, right-earedness and right-footedness. The innervational centers of the more expert organs are located in the left side of the brain.

Sinistroexpertness.—Conjoint and superior expertness of the sinistral sensory and muscular organs of the body; the union of left-handedness, left-eyedness, left-earedness, and left-footedness. The innervational centers of the more expert organs are located in the right half-brain.

Mixed Dextrosinistral Expertness.—Some of the centers of the more expert organs in conjoint action are located in one, and some in the opposite half-brain. What was once meant by the really meaningless term "ambidexterity," as applied only to the hands.

Trailing Hand, "The Trailer."—In synchronous writing of both hands, that upon which the attention, visual or central, is not fixed.

Visual Attention.—That existing when the eyes consciously observe a fixed or moving object; during the act central or mental attention is fused with it.

Central Attention.—The "imagination," or mental remaking, of the image, by the mind or central mechanism when the peripheral visual attention is abrogated.

Single-stream Visual Attention.—That form of visual attention existing when the eyes follow a linear concatenation of single or unitary macular images to the exclusion of all others.

Single-stream Central Visual Attention.—That when the central visual attention, without objectively forming images, follows the passing of imagined single or unitary images in single file.

Multiple Synchronous Visual Attention.—That when the attention recognizes two or more discrete sets of retinal images at the same time—as when the musician reads several staffs of music-notes, observes key-boards and pedals, the indications as to stops, tempo, expression, etc.

Multiple Synchronous Central Visual Attention.—The imagining or mental reproduction of multiple synchronous visual trains without the objectively formed images.

Single-stream Auditory Attention.—That when a monotone, a sound, or concatenation of single notes or sounds, is listened to, exclusive of others.

Single-stream Central Auditory Attention.—That without the objective audition.

Multiple Synchronous Auditory Attention.—Two or more synchronous tones or sounds, or lines of such tones or sounds, are recognized by consciousness, as in the case of the orchestra-leader who gives attention to a large number.

Compound Synchronous Attention.—In this the consciousness recognizes and correlates or combines multiple streams of synchronous and diverse stimuli, visual, auditory, etc. Illustrated by expert telegraphers, locomotive engineers, musicians, etc., seeing, hearing and feeling consciously at one instant.

GEORGE M. GOULD

COLOR VARIETIES OF LOCUSTIDÆ

IN SCIENCE for August 16, 1907, Mr. A. Franklin Shull publishes some notes on a pink form of *Amblycorypha oblongifolia* and calls attention to the rarity of records and data relating to such specimens. Mr. Shull's communication touches upon a most interesting subject that has been but little investigated, namely, the direct influence of food upon the coloration of certain phytophagous insects. The following remarks may stimulate some investigator to take up this neglected subject.

A live specimen of the pink form of *Amblycorypha oblongifolia* was recently presented to the National Museum by Dr. J. N. Rose, who captured it at the New York Botanical Garden on August 15, 1907. This specimen is perhaps the most richly colored one that has come to notice and it was captured in surroundings that suggest a derivation of this unusual coloration from food. The following descriptive notes were made from the living insect. The color is a deep rose, which could almost be called a crimson; it shows a delicate but distinct violet tinge. This violet

cast is most pronounced upon the more delicately colored soft parts—the mesothorax, metathorax and abdomen. This coloration hardly agrees with that of the two specimens described by Scudder, the female as "pale coral-red verging on magenta" and the male as "orange red." The present specimen is a female and the green color of the common form is replaced by red throughout. There are only a few dark brown markings: on the pronotum the lateral carinæ are heavily marked with deep brown and the tegmina have a patch of the same color on the apical portion of the dorsal field; at the sides the tegmina show three rows of more or less confluent brown spots, the upper row longest and heaviest. There are many indistinct whitish maculations on the sides of the prothorax and particularly dense upon the cheeks and the face. The ocelli are opaque white. The eyes are light gray, creamy white along the inner margin and in the middle, with irregular dark blotches suffused with red. The tegmina show many indistinct creamy maculations. The corneous portion of the wings, which projects beyond the tegmina, is red, the membranous portion hyaline with the network of veins rose-red. The ovipositor is brown at the tip. The legs are a slightly fuller crimson than the body, the tibiæ and tarsi deeper colored than the femora. The hind tibiæ are a very dark crimson-brown.

It should be noted that brown specimens of Locustids occur occasionally and in some of these there is a trace of pink, as it were, showing through the brown. Some years ago the writer took a specimen of *Amblycorypha oblongifolia,* near Springfield, Mass., of a pale brown color suffused with pink. There is a similar specimen in the National Museum collection, taken at Dorsey, Md., August 20, 1904, by Miss R. Jones. It is such a specimen that Mr. Shull describes in his article.

It is a well-known fact that color variations of the same character occur in many green lepidopterous larvæ. Caterpillars showing these variations in color may be found upon the same food plant under the same conditions; these colors apparently do not depend upon any particular environment, but are directly due to the insect's food. Incidentally they are protective in most cases. Poulton in his statement "that some of the colors of certain Lepidopterous larvæ are made up of modified chlorophyll derived from the food-plant" refers to this green or brown general body-color.[1] Through experiment he reached the conclusion that "etiolin, no less than chlorophyll, can be transformed into a larval coloring matter, which may be either green or brown, and is so disposed as to form a ground color.'"[2] It should be added that the processes which produce the change from green to brown or red in chlorophyll are understood to be of a very subtle nature. The colors of the Locustidæ are in all probability of the same origin. These insects are almost wholly phytophagous and their coloration strongly resembles in character that of the lepidopterous larvæ in question. In both cases, through the rapid assimilation of food, the plant juices are taken into the organism practically unaltered. With the Lepidoptera these colors are eliminated during the pupal period; in the Locustidæ, which reach maturity by a series of molts and continue feeding in all stages, the colors persist to the adult insect. Scudder has already pointed out that season or temperature are hardly admissible as agents in these color variations.[3] The pink or brown specimens appear at the same season with the green ones and they occur among the Locustidæ of the tropics as well as with those of temperate regions. Dr. Rose has called my attention to the fact that at the New York Botanical Garden, where the above-described red specimen was taken, there is an abundance of crimson foliage. It is, therefore, not improbable that in this specimen the crimson color is due to a coloring matter contained in the foliage upon which the insect fed.

Two methods of investigating these colors of the Locustidæ may be suggested: One is by comparative spectroscopic tests of the coloring matter of the insects and plants, the other is

[1] *Proc. Roy. Soc. London,* Vol. 54, p. 41, 1893.
[2] *L. c.,* p. 426.
[3] *Entomological News,* Vol. 12, p. 131, 1901.

by rearings of the insects in separate lots, fed upon green and red foliage respectively.

FREDERICK KNAB

U. S. NATIONAL MUSEUM,
WASHINGTON, D. C.

CONE IN CONE

SIMILAR limestones of same geological age are seen high in the Missouri bluffs from the Platte and Buchanan County line to the Andrew County line. Beyond the Nodaway River we find these beds lower in the hills and within two miles are seen near the railroad grade.

These limestones are No. 150 and 152 of my section of the Upper Coal Measures, published in the Missouri Geological Report entitled "Iron Ores and Coal Fields," 1872, in part 2, page 92.

No. 150 occurs in strata of irregular thickness. Near Amazonia certain beds of it have been reported to make a good quality of hydraulic cement. Twenty feet is the total thickness of No. 150.

No. 152 lies above and is separated from 150 by two feet of clay shales. No. 152 is sometimes oolitic and also shows cross lamination. It furnishes an excellent building stone. Lander's quarry, a few miles north of Savannah, Andrew County, is of this rock. Overlying No. 152 we sometimes find a two-inch bed of cone in cone.

At only one other horizon in Missouri has cone in cone been obtained. It is found at Henry Kunkel's, on Nichols Creek, in Holt County, occupying a position approximately 175 feet above the other I have mentioned. Very fine specimens have been obtained from Nichols Creek, where it is about three inches thick.

The finest specimens of cone in cone I obtained from a branch of Dry Fork, in the northwest part of Bond County, Illinois, near James Valentine's and probably in Sec. 19 T. C. N. R. 4 W. Pocahontas is probably the nearest town. We found here twenty feet of argillaceous shale beds with flattened ironstone concretions resting on three feet of gray fossil-bearing limestones. The cone in cone occurs twenty feet above the limestone and is about two and a half inches thick. In composition it is an argillaceous limestone and shows perfect cones interlocking from each surface. It was traced along the branch for several hundred yards. [See Vol. VI., Ill. Geol. Surv., p. 133.]

In Geological Survey of Wisconsin, Iowa and Minnesota D. D. Owen, Phila., 1852, p. 112, mention is made of "Tutenmergel" being found in Iowa near certain briny springs. He states that in Germany its origin is thought to be from shrinkage of strata. But Owen speaks of it in Iowa and refers it to the imperfect crystallization produced by mineral matter filtering through marly beds. Dr. B. F. Shumard, who was much with Owen, informed me that Owen's tutenmergel was cone in cone. I think the former probably due to imperfect crystallization under pressure. Its origin and that of arragonite may be the same. Von Cotta speaks of it as "Tuten-nagel."

Stylolite structure, so common in many of our Lower Carboniferous limestones, may have a similar origin, but the cone is wanting.

G. C. BROADHEAD

COLUMBIA, MO.,
July, 1907

QUOTATIONS

EXTERNALISM IN AMERICAN UNIVERSITIES

IT is but natural, where organization is so important and the office of administration is magnified, that the presidency should fast lose its connection with active and advancing scholarship. There is so much governing to be done—because in our universities we trust so much to government—that in but few places can a president continue a scholar's life. So the old type of leader, learned and temperate, fast yields to the new type,—self-confident, incisive, Rooseveltian. And with the coming of the new type, there seems to be an increasing stress upon rapid accomplishment, upon "doing things," with grave risk that our places of learning will preserve a less clear vision of what is catholic and enduring.

The constitution of our universities is an