

color vision, it is exactly an even blue-green, which looks to the yellow-blue visioned individual achromatic. In this case, of course, there was no occasion for trying blue-green, since the rats could not be shown to have any color sense at all—a result which there are several reasons for having anticipated. Nevertheless, it remains true—what v. Frisch's discovery confirms—that you can not, as a matter of fact (nor in my theory), draw simple inferences from the unitary colors to the color-blends.

Professor v. Frisch has sent me specimens of the blue-greens to the chroma-quality of which his bees are insensitive; I should be glad to share them with any one who can proceed to test the blue-green sense of any animals which are already known to be blind to red.

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November 7, 1913

NOTES ON A CHESTNUT-TREE INSECT

WHILE in the employ of the Pennsylvania Chestnut Tree Blight Commission, last winter, my attention was called to numerous burrows almost always present in the bark of the chestnut tree, particularly in the smooth-barked trees. These are the burrows that Metcalf and Collins referred to in the U. S. Farmers' Bulletin, No. 467, as the work of *Agilus bilineatus*. As we were sure the burrows were not made by this species, the commission force referred to the insect maker as the *Bast Miner*. Not much was accomplished on the study of this insect until the spring season advanced. Then much effort was directed to the solving of the life-history of this insect and what relation it bore to *Endothia parasitica*. When the work stopped in July, the life-history was nearing completion, and a number of experiments were in progress which would have given some interesting results. A detailed account of the description of the larva and its work, etc., was prepared for publication, but the only adult obtained was injured irreparably and probably can not be named. Because the adult insect emerged after July 1 (the time of my leaving Penn-

sylvania), it has been impossible to work out the egg-laying habits. The larvæ hibernate in the burrows in either the second or third instar. During the winter months they are inactive, but, as soon as spring opens, activity commences. When finished, the burrow is not very extensive, the longest not being more than six inches and extending longitudinally. In width, it extends only over a very short distance.

While the insect is living within the trees, the burrow can not be detected externally. After the emergence of the larvæ, however, the bark swells over the burrow, often cracking and making a conspicuous wound. The larvæ leave the trees during the first part of June through minute exit holes, dropping to the soil, in which they spin a seed-pod-like cocoon, characteristic of some of the Microlepidoptera.

Under insectary conditions, the adult insect emerges during August. The injured specimen was sent to Mr. W. D. Kearfott, but of course could not be named.

The number of exit holes made by these insect larvæ is enormous in any given area of chestnut forest and as these holes are made just at the time of year that the blight spores are very abundant, and conditions generally are favorable for their development, it is believed that this species of insect has an important bearing upon the spread of *Endothia parasitica*.

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A CONNECTING TYPE?

AN illustration of how completely a student may become confused in a written examination is shown in the accompanying figure, which is an exact tracing, somewhat reduced, of the figure drawn by a freshman in an examination in elementary zoology.

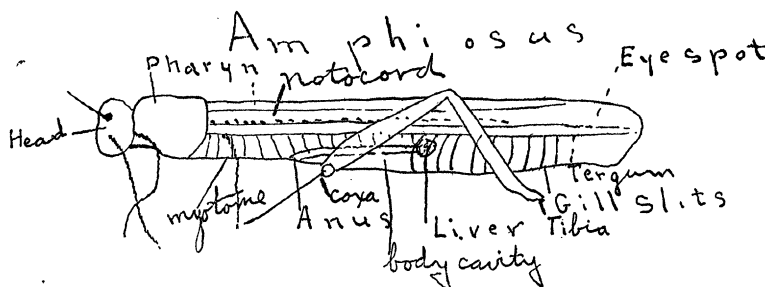
The question was to make a sketch, from memory, of course, of the anatomy of *Amphioxus*, as seen in lateral view.

At first glance the sketch appears to be a fairly good representation of a lateral view of

a grasshopper; but more careful examination will show that there are various parts of *Amphioxus* mixed into the grasshopper in a most remarkable way. These structures are so inconspicuous in themselves that they might have escaped notice if they had not been so plainly indexed, and if the question had been upon the anatomy of the grasshopper instead of the other animal.

the book is not dominated by the conception that, notwithstanding details, there is a clear path of advancement in biological thought.

The preface, and his estimate of some of the more prominent men, indicate that the author had this conception in mind, but it is not clearly carried out. The observations of capital importance are not separated from those of subordinate interest, nor are the chief



That the figure was not drawn as a joke seems evident from the fact that the student failed to pass the examination, and would not, of course, take the chance of having one question thrown out completely. Perhaps the joke is on the instructor, after all.

A. M. REESE

SCIENTIFIC BOOKS

The Early Naturalists: Their Lives and Work (1530-1789). By L. C. MIALl, D.Sc., F.R.S. London, Macmillan & Co. 1912.

This book, by a practical naturalist of honorable attainment in the field of research, is a useful book of reference. It has the merit of being written from a thorough examination of the original sources and is a work of great industry and patience. It covers the period from 1530 to 1789 during which the sciences of organic nature were in the process of making. Many of the contributions of the time were mixed, and, taken together, they are more in the nature of vague foreshadowings of what was to come rather than specific additions to any science that had already taken definite form. This circumstance makes it most difficult to convey to the general reader a unified picture of progress, and it is to be said that

results of investigation sufficiently emphasized to exalt them above those of secondary significance.

In its method the book is analytical rather than synthetic, and does not exhibit the selective and combining power that is necessary to convert the details into a lucid story of progress. Dr. Miall gives, with thoroughness and accuracy, summaries of the researches of the naturalists of the period and of their views on a variety of questions. His volume is a compendious reference rather than an illuminating treatment of tendencies and currents of thought, and seems, to the reviewer, to be of greater service to the naturalist than to the general reader.

His section on "The Minute Anatomists" is the most interesting and the best assimilated part of the book. Here, the author writes with an evident command of the subject, as might be presumed from his familiarity with insect anatomy, as well as his excellent account of Malpighi, Swammerdam and other devotees of minute anatomy, in Miall and Denny's "The Cockroach."

The title "The New Biology" for the first section of the book is suggestive and inviting, but it does not appear to be a happily chosen