end of the book, furnish a good introduction to these subjects.

Then follow the chapters embodying the 'biological treatment' comprising the greater part of the text (183 pages). Their titles are the following: Adaptations of Aquatic Insects, Color and Coloration, Adaptive Coloring, Origin of Adaptations and of Species, Insects in Relation to Plants, Insects in Relation to Other Animals, Interrelations of Insects, and Insect Behavior. While these subjects are not new to entomological text-books, they are here given a new treatment and merited prominence, and entomologists will appreciate having them brought together for discussion in one place.

Then follow chapters on Distribution, and on Insects in Relation to Man, the latter being a discussion of the mission of the economic entomologist and a historical sketch of the evolution of that species in America. The economic entomology of the book is mostly in the title, where it, perhaps, serves the publisher's purpose. There is no mention of many of the most important economic species, nor of the most important methods of economic procedure. The book concludes with a good bibliography, of 57 pages.

The typography and press work are excellent. Mistakes are few; but in the short chapter on adaptations in aquatic insects the following are noted: The figure of the hind leg of the diving beetle *Cybister* on page 187 fails to show the inferior spur greatly widened—the character by which this genus is most readily recognized; the figure of *Simulium* larva on page 190 does not show the anal gill tuft, although illustrating a paragraph on gills; it is doubtless by oversight that the larvæ of Ephemeridæ are mentioned on the same page along with those of the Odonata as having a highly developed rectal respiration. The style is never prolix, and although verbal infelicities are rather too frequent, the meaning is rarely obscure. The illustrations are always appropriate, and generally of a high order. The book as a whole is excellent, and will be most useful to the general student.

J. G. N.

The Elements of Geology. By William Harmon Norton. Ginn and Co. 1905.

This volume has been written, the author tells us, to fill the need of a text-book that shall knit cause and consequence in geology together, 'to treat land forms and rock structures in connection with the geologic processes causing them,' abandoning the traditional division of the subject into departments, dynamical, structural, physiographical and historical. As a matter of fact, he preserves the last of these, so the new departure must be looked for in the rest of his book, 'External Geological Agencies and Internal Geological Agencies.' We readily obtain an idea of the treatment attempted by comparing Professor Norton's book with a well-known predecessor. For this I have put equivalent parts of LeConte's text-book and this on the same lines of parallel columns. It thus appears that our author has omitted the 'Structural Geology' and some of the 'Organic Agencies' and put the rest under slightly different heads:

Norton.	LeConte.
I. External Geological Agencies.	I. Dynamical Geology.
II. Internal Geological Agencies.	1. Atmospheric Agencies.
	2. Aqueous Agencies.
(Touched in I.)	3. Igneous Agencies.
(Touched in I. and II.)	4. Organic Agencies.
	II. Structural Geology.
III. Historical Geology.	III. Historical Geology.

Of LeConte's organic agencies, peat is described by Norton under river deposits, lime accumulations under offshore and deep sea deposits, and the bog ore, silicious and phosphatic deposits that get a brief mention in LeConte are not here referred to.

Of the structural geology, general form and structure of the earth are omitted as far as I have been able to learn, sedimentary rocks are treated in several places, one half page in the Introduction, five pages in the Work of the Weather, twenty pages in Offshore and Deep-sea Deposits, six pages in River Deposits and about three pages in the Work of the Wind. Igneous and metamorphic rocks are treated under internal agencies, joints under the work of the weather and movements of the earth's crust, faults under movements of the earth's crust, mineral veins under work of ground water and metamorphism and mineral veins,

while denudation comes under rivers and valleys. In general the chief novelty has been the omission of structures as a separate group. The result is separations as well as connections. We learn of river deposits in connection with the study of rivers as agents, but to learn about sandstones we must go to three or four separate parts of the book. If there are gains there are losses to set over against them.

From the reviewer's point of view this is a very beautifully illustrated volume in which physiography is unusually prominent. Omit the historical third part, the weakest part of the book, and add a little here and there about man, plants and animals and the book would fall perfectly into a class of recent text-books of physical geography, all with some general similarity to Davis's 'Physical Geography,' but lacking its classification and evolution of the forms of the earth's surface. The physiographic half-tones are mostly very beautiful both in appearance and in teaching value. 'A Lake well-nigh effaced, Montana' and 'A level Meadow, Scotland,' pages 71 and 72, seem to me unsurpassed as illustrations. All localities are rather vaguely referred to as here, though it is hard to see why. Professor Norton evidently knows where these places are and students would certainly find some interest in sharing his knowledge. There are practically no references to other books, either. The presswork is of course admirable, though a beginner will wonder at a 'parted laver' (p. 217). The diagrams are less satisfactory, some of them stiff and difficult to read. The map of Niagara gorge at page 60 has evidently been copied from Gilbert's paper in the National Geographic monographs though it is not so credited. Unfortunately, it has been redrawn and badly redrawn, so that it quite conceals the variations in width that are very marked in the original and afford even better evidence of varying erosion by the river than the depth of the gorge does, as Taylor has shown. A similar thing appears to have been done with the cut of the silurian scorpion at page 339. It strongly suggests the woodcut figured 347 in Geikie's manual, but redrawn with the omission of the artist's name, which in Geikie shows very plainly. There is no acknowledgment to any one, though about one third of the cuts are acknowledged borrowed, a dozen from the author! Most of the illustrations in the 'Historical Geology' have a familiar look. Dana and Geikie come quickly to mind at sight of figures 331, 338, 339 and 336. None of them, however, are credited.

The historical part does not seem to have received so much of the author's attention as the earlier portions of the book, nor even so much attention as its importance merits. This undertreatment disappears when we come to the Quaternary and the Ice Age. The physiographic is everywhere the part best developed. In matters of fact the work seems painstakingly accurate. That it is somewhat dogmatic is, perhaps, pardonable in an elementary text-book. Yet, if alternative views had been stated occasionally it would help the student avoid the 'common error' referred to by Professor Davis in his godfatherly note, of thinking 'authorities' have a private road to information. Thus 'lateral secretion' appears to be the only view of the origin of mineral veins that Professor Norton cares to entertain. For him Posepny does not exist, nor waters from the depths. Yet Professor Gregory has just been returning from Australia, stating that the so-called artesian waters of New South Wales are all deep waters soon to be exhausted. At page 331 Professor Norton calls the waters artesian that ascend in borings after gas has given out! There is no doubt that many teachers could find this volume helpful in giving students interest in earth science without necessarily appreciating at the author's estimate the particular need he has sought to fill.

MARK S. W. JEFFERSON.

YPSILANTI, MICH.,
October 17, 1906.

SCIENTIFIC JOURNALS AND ARTICLES.

The Botanical Gazette for October contains the following leading articles: George F. Atkinson gives a detailed account of the development of *Agaricus campestris*, illustrated by six photographic plates. William Crocker publishes the results of an investigation of