sidered; as, for example, how and where to cut to make out the anatomy of the special parts, and their relations to one another. The directions are clear and concise, and the student will have no trouble either in dissecting or identifying the various parts. We think the introduction of clear woodcuts an important and legitimate aid to the student, and a great improvement thereby over Huxley and Martin's 'Biology.'

The book, in short, is admirably adapted for laboratory work, and furnishes to the student who will take specimens in hand, and dissect with care, a sufficient guide in making out the essential points in vertebrate anatomy.

RECENT PHYSIOLOGICAL TEXT-BOOKS.

HUTCHISON'S physiology has been before the public for some time, and apparently has met with considerable success as a school text-book. The revised edition that is now offered has but few changes. The book as a whole is commendable as a collection of facts, physiological, anatomical, and hygienic, a knowledge of which will be useful to people of all callings in life. But it is questionable whether it is a book that a thoughtful physiologist would like to see generally introduced into schools as a text-book. No chemist at the present time would wish to have an elementary text-book of chemistry merely a collection of facts or receipts, however interesting and useful such facts might be. The demand is being made in that branch of science for text-books of a higher order, which shall make the facts presented, as far as possible, illustrations of the more important general laws of chemical action. Some such reform should be attempted in elementary text-books of physiology. Physiology is worthy of being taught, in part at least, as a branch of human knowledge, or for the sake of mental training, and not simply for the purpose of preserving health, or enabling a person to conduct himself properly in case of an accident.

The remarks upon personal hygiene in the book are in the main well chosen and to the point; but, in regard to the action of alcohol, the author's prejudices, or desire to do good, have evidently biassed his statement of facts. The book contains a number of errors which should be corrected; such as, "sugar changes to fat in the body," "the acidity of the gastric juice is due to lactic acid," and the rather incomprehensible statement that albumen gives 'smoothness and swift motion' to the plasma of the blood. Another error common to both books under review is, that the proteids of the blood are spoken of as albumen and fibrine. There is no such thing as fibrine in circulating blood; and, if it is necessary to mention at all the chemical constituents of the plasma, something a little more in accord with what is actually known might be given.

Tracy's book aims to be a more scientific presentation of the facts of physiology and hygiene than is usually met with in elementary text-books; but whether the result has fulfilled the author's expectations is one of the things that might be doubted. It is scarcely scientific, for instance, to speak of alcohol as a 'rank poison,' without any qualification whatever. While such language is expected from a temperance orator, it is somewhat out of place in an elementary book supposed to give generally accepted facts. Quite enough can be said truthfully against the use of alcohol without making statements which are not borne out by the facts of physiology.

The book has some serious defects, such as the failure to say any thing at all of the function or structure of the kidneys, except in a purely incidental way. It contains also numerous errors or badly emphasized statements; such as the origin of lymph (p. 88), the action of the sympathetic nerves (p. 175), the mechanism of the reflex secretion of saliva (p. 178), the statement that all bones are at one time cartilaginous, etc. Some of the chapters — that on respiration, for instance — are well written, in clear and accurate language; and the remarks on hygiene form, probably, the best part of the book. But, as far as its physiology is concerned, the book bears evidence of having been written by one not thoroughly conversant with the subject.

A treatise on physiology and hygiene. By JOSEPH C. HUTCHISON, M.D., LL.D. New York, *Clark & Maynard*, 1884. Illustr. 8°.

The essentials of anatomy, physiology, and hygiene. By ROGER S. TRACY, M.D. New York, *Appleton*, 1884. Illustr. 8°.

A TEXT-BOOK OF PHYSICAL GEOLOGY.

THE author of this small volume has made a step in the right direction, for the plan of his book involves the wise omission of historic geology and paleontology, — subjects into whose full meaning the beginner makes but little real progress. The book would have been further improved by the omission of much of the sec-

The student's handbook of physical geology. By A. J. JUKES-BROWNE. New York, *Scribner & Welford*, 1884. 12 + 514 p., illustr. 8°.

tion on lithology, not from fault to be found with the treatment of the subject, but because lithology has now become too serious a study to be treated in so compressed a form. The student who uses this book without previous acquaintance with the rock-forming minerals that are here briefly described cannot obtain from the forty-six pages given to this section the knowledge that they are intended to give; unless, indeed, there is so liberal a supplement of personal instruction as to make the text practically unnecessary. We are familiar nowadays with the reaction against the mere verbal teaching of physics and chemistry, zoölogy and botany. The same spirit of reform should exclude brief treatment of lithology from an elementary book on physical geology. And, if the student protests that he wishes to gain at least a superficial knowledge of lithology, let the teacher confidently assure him that there is no such thing, but only a superficial ignorance. Better admit full ignorance than pretend to scanty knowledge, and use the space in the book and the time that would be given to it for fuller discussion of other subjects. The open admission of the author's own lack of expertness in modern lithology, by his acceptance of a chapter on the igneous rocks from Professor Bonney, is evidence enough that the section in question should not have been inserted in a book of this title.

The rest of the work is more satisfactory, because the elements of the subjects that it professes to teach can really be learned from it. It is characteristically British in fact and example, although some illustrations are taken from other countries. Its figures are hardly so good as they should be in this day of dry-plate photographs and easy reproduction of pen-and-ink diagrams. The chapter on earthquakes needs a good revision, and a terminology might be improved that allows such expressions as 'mass or weight,' 'ridge or mesa,' using these words apparently as synonymes. But, as a whole, the book gives brief, correct, and well-arranged mention of the more salient geological facts and theories, under the headings of 'change by internal causes;' 'surface agencies, destructive and constructive;' 'petrology and physiographic geology.' The description of the effects of faulting is exceptionally full; and unconformity, overlap, and overstep receive more than the usual share of attention. Under fluviatile agencies, Powell's expression, 'base level of erosion,' is accepted as the most fitting to describe this important and commonly neglected plane of reference; and, after definition and illustration, the author pertinently adds, that it is mainly because the early advocates of river-erosion neglected to insist on the control which elevation or depression exercised on river-action, that many observers have been unable to believe that rivers have had any significant share in the excavation of their valleys. There is to our mind an unnecessary scepticism as to the subglacial origin of bowlder-clay. The small and now old glaciers, which have long ago swept their beds so clean, afford only imperfect illustration of what went on beneath the ice-sheet just after its conquest of a land covered with the waste of secular disintegration; and there is nothing inconsistent in the belief that till was accumulated at one place, while moderate-sized lake-basins were excavated at another, as Geikie and Helland have fully shown. The localities selected for illustration are so largely English, that the book would require re-making to prepare it for American schools. We wish that some of our geologists who are broadly acquainted with the country east and west might undertake the task.

A TEXT-BOOK OF MICROSCOPICAL PETROGRAPHY.

AT this time, when the interest in microscopical petrography is so steadily on the increase, the need of a concise, accurate, and recent text-book on the subject is daily becoming more apparent. That such a one does not exist in English is to be much regretted; but this very fact will cause information regarding an admirable one, which has just appeared in Germany, to prove all the more acceptable to geological students. Dr. Hussak's book is short and elementary; but it contains the results, even the most recent, which have thus far been attained by the many workers in microscopical mineralogy and lithology, stated in a clear manner.

The first part treats of methods — optical, chemical, and mechanical — which are now applied to the study of rock-constituents, as well as the general morphological properties which characterize them. Part second consists of a tabular arrangement of all the rock-forming minerals, with their characteristic microscopic appearance, chemical reactions, associations, decomposition products, and all other peculiarities which might serve in their accurate diagnosis, arranged in parallel columns. This is all given in a very small space; but the copious and excellent references furnish

Anleitung zum bestimmen der gesteinbildenden mineralien. Von Dr. EUGEN HUSSAK. Leipzig, 1885. 196 p., 103 figs. 8°.