Huxley's Lay Sermons.—Professor Huxley has conferred a great benefit on a large class of the reading public by the collection and republication of the essays which are included in this volume. Although many of them, and notably that “On the Physical Basis of Life,” with what may be termed its supplement on “The Scientific Aspect of Positivism,” are doubtless familiar to most of our readers, every one will rejoice to possess them in their present permanent shape. We shall for the most part confine our attention to the first six essays which, under various forms of lay sermons, addresses, after-dinner speeches, and lectures, constitute a special group bearing more or less on educational topics. The lay sermon “On the Advisableness of Improving Natural Knowledge,” is singularly eloquent and forcible in its style, and some passages in it are almost as trenchant as the author’s well known reply to a high dignitary of the Church at the Oxford Meeting of the British Association. He begins by giving a sketch of the early history of the Royal Society and indicating some of the results due to the labours of the founders. For those who regard natural knowledge as “a sort of fairy godmother, ready to furnish her pets with shoes of swiftness, swords of sharpness, and omnipotent Aladdin’s lamps, so that they may have telegraphs to Saturn and see the other side of the moon, and thank God they are better than their benighted ancestors” he has no sympathy. “I think I would just as soon be quietly chipping my own flint axe after the manner of my forefathers a few thousand years back, as be troubled with the endless malady of thought which now infests us all, for such reward.” For his lucid exposition of the manner in which the improvement of natural knowledge has not only conferred practical benefits on men, but in so doing has effected a revolution in their conceptions of the universe and of themselves, and have profoundly altered their modes of thinking and their views of right and wrong, we must refer to his own pages.

The second essay, on “Emancipation—Black and White,” is mainly devoted to an exposure of the errors of the present system of female education in this country, and hints for an improved

1 Lay Sermons, Addresses, and Reviews. By Thomas Henry Huxley, LL.D., F.R.S. London, 1870.
system. Recognising and accepting the fact that the mind of the average girl is less different from that of the average boy than the mind of one boy is from that of another, he argues that whatever education is best for boys is also best for girls; and so far from imposing restrictions upon the acquirement of knowledge by women, he maintains that every facility should be thrown in their way; not only would he admit "girl graduates" to our ad eundem degrees, but "if obvious practical difficulties can be overcome," by which he apparently means the troubles and duties of maternity, he would allow them to contend with men in the busy turmoil of life, and, if they please, become merchants, barristers, and politicians. He would, doubtless, have added physicians to the above list, if the article had been written in 1870 instead of in 1865. And what would be the result? He believes that with a fair field and no favour it will be that of other emancipations. "Women will find their place, and it will neither be that in which they have been held, nor that to which some of them aspire. Nature's old salique law will not be repealed."

In studying the essay on "A Liberal Education; and Where to find it," the reader must bear in mind that it was addressed to working men. It contains the celebrated parable of the chessboard, which for simplicity of style and fitness in its application is almost unsurpassed in the wide range of English literature. The attention of every clergyman and schoolmaster should be directed to this section of Professor Huxley's volume. With regard to the former class we hardly know whether we should recommend them to avoid the next essay, or whether we should suggest that in studying it they might find something to their advantage. The paragraph that excites these conflicting doubts is one which runs as follows:

"The clergy are at present divisible into three sections: an immense body who are ignorant and speak out; a small proportion who know and are silent; and a minute minority who know and speak according to their knowledge." And this is succeeded, some pages further on, by a suggestion almost as appalling in its way as the above assertion. Why should scientific teaching be limited to week days? "Would there," the Professor asks, "really be anything wrong in using part of Sunday for the purpose of instructing those who have no other leisure, in a knowledge of the phenomena of nature, and of man's relation to nature? I should like to see a scientific Sunday school in every parish, not for the purpose of superseding any existing means of teaching the people the things that are for their good, but side by side with them. I cannot but think that there is room for all of us to work in helping to bridge over the great abyss of ignorance that lies at our feet."

Passing over the address on "The Educational Value of the Natural History Sciences," in which he forcibly inculcates the
necessity of including physiological science in the curriculum of general education, we come to the last lecture of the educational group, "On the Study of Zoology." Our author here employs the term zoology in its most general sense, and consequently as including the subordinate sciences of morphology (embracing anatomy, development, and classification), the distribution of animals, both extinct and existing, and physiology, whose first object is "to deduce the facts of morphology on the one hand, and those of distribution on the other, from the laws of the molecular forces of matter." Taking a lobster as his text he employs it to elucidate all these truths. By dividing it into its various segments, and comparing and contrasting their appendages, he shows that a unity of plan, of the same kind as is discoverable in the tail or abdomen, pervades the whole organisation of the skeleton. By an appeal to morphology he shows that this doctrine of the unity of plan is no mere anatomist's fancy, but that it is the expression of deep-seated natural facts; for careful investigations of the ovum at different stages show that there is a period when by transverse constrictions it is divided into segments, from the ventral surface of which bud-like prominences shoot out, which are the rudiments of the various appendages. The lobster and certain allied animals are thus used to illustrate the terms species, genus, family, order, class, province, and sub-kingdom.

The geographical distribution of lobsters of different species is then noticed, after which the extinct animals constructed, on the same plan, but totally different from the existing lobster, are briefly referred to. In the last place our author shows how a living or just killed lobster may serve to illustrate many of the most important laws of physiology.

Everyone must, we think, agree with the author that the student who has once seen for himself the facts described in this lecture, who has had their relations explained to him, and has clearly comprehended them, has so far a knowledge of zoology which is real and genuine, and which is worth more than all the mere reading knowledge of the subject he could ever acquire.

This lecture, which was delivered to an audience of science-teachers, contains a very plain-spoken exposition of the prevalent errors of the present system. The following concluding remarks have, we fear, a very wide application: "Addressing myself to you, as teachers, I would say, mere book-learning in physical science is a sham and a delusion. What you teach, unless you wish to be impostors, that you must first know; and real knowledge in science means personal acquaintance with the facts, be they few or many."

Three of the subsequent essays are on geological subjects, one being his lecture to the working-men of Norwich "On a Piece of Chalk," and the two others being anniversary addresses to the Geological Society for 1862 and 1869. We regret that his latest
anniversary address — perhaps the most valuable of all—is not included in this volume, which concludes with two review-articles on "The Origin of Species," and an address recently delivered to the Cambridge Young Men's Christian Society on "Descartes' Discours de la Méthode pour bien conduire la Raison et chercher la Vérité dans les Sciences." We think that, without wounding the susceptibilities of our readers, we may assume that comparatively few of them have read this celebrated discourse. We would advise those to whom it is still "untrodden ground" to study it forthwith, taking Professor Huxley's address as an explanatory commentary.

Nicholson's Zoology.1—This little work, while laying no claim to originality, is likely to prove of far greater general utility than many more pretentious volumes. It contains in a remarkably convenient form the classification of the invertebrates with a description of each sub-kingdom, and of the manner in which it is divided, followed by an account of its divisions down to sub-orders.

In many cases where a received arrangement of the families of an order exists a synopsis of it is added.

The primary divisions of Professor Huxley have been adopted, except that the Molluscoida rank as a division of the Mollusca. A somewhat greater divergence from Professor Huxley's arrangement might have been better, as his sub-kingdoms Annulosa and Annuloida form groups neither homogeneous in themselves nor distinct from each other. In dividing the sub-kingdoms while retaining Professor Huxley's classification as a basis, the author has slightly modified it in those parts in which it does not agree with the arrangement most widely followed.

The introduction, which is the only really original part of the book, is a well condensed categorical statement of the general truths and definitions of zoology, with some mention of the principal theories which have been framed to explain them.

Woodcuts of many characteristic species, and rough but clear diagrams to illustrate the structure or mode of development of those groups that most require it, are inserted in the text.

When they are of sufficient importance or interest to warrant it, a short account of the habits of the animals described is added. This is especially done in the description of the Insecta. But in other respects the author's description of this class is the most meagre in the book. This is unfortunate, considering the surpassing interest and importance of the group, but no doubt it would have

1 A Manual of Zoology for the use of Students, with a General Introduction on the Principles of Zoology. By HENRY A. NICHOLSON, M.D. Hardwicke, 1870. Vol. I, "Invertebrate Animals," pp. xvi and 322.