supposed to be capable of easy transportation by aquatic birds, should not have made its way into the other river-systems.

The fishes contributed by the Rhone fall into two categories—one comprising those of the part of the River Doubs which is within the political boundaries of Switzerland; the other including the species of the Rhone proper above the "Perte." The latter are computed to be 20 in number, and do not call for special remarks.

The fishes of the Po show a marked difference from those of the Rhine and Rhone. This system is represented in Switzerland by the tributary Ticino, into which 23 species enter, out of a total number of 44 Po species. Although there is no mechanical obstacle to their ascent, the fishes of the Po, used to a warmer climate, avoid ascending into the cold waters from the Alps; and M. Fatio observes, also, that generally these southern fish do not ascend to the same high altitudes as those of the Rhine. Eight of the Ticino species are strangers to the rest of Switzerland, viz. a goby (*Gobius*), which has ascended from the sea; five Cyprinoids, which may be regarded as southern representatives of northern forms; *Cobitis taenia* and *Alosa finta*.

Of the 68 species belonging to the fauna of the Danube, only four find their way into Switzerland through the River Inn, viz. the miller's thumb, minnow, grayling, and trout. This is owing to the great elevation of this river at its entrance into the country (1000 metres).

Ichthyologists will turn with particular interest to that part of the volume which contains Dr. Fatio's views on, and his treatment of, the Salmonids; for my own part, I could not help feeling some surprise at what appears to me a somewhat inconsistent mode of dealing with this subject. Whilst the author distinguishes not less than eight Swiss forms worthy of binominal designation in the genus *Coregonus*, he admits, besides one species of char (*Salmo umbla*), two equivalent forms only in the genus *Salmo*, viz. the salmon and the trout, for which latter the collective term *Salmo lacustris* is chosen. If a student of the European fauna, or any part of it, arrives at the conclusion that the various forms of river, lake, and sea trout cannot, and should not, be held to be deserving of specific distinction, no one will deny that there are very strong arguments in favour of this view. In my own experience it does not seem to be desirable to adopt that course—first, because there are certain well characterized and well localized forms which the practical fisherman will always distinguish, and of which the naturalist has, somehow, to take notice; and, secondly, because the ichthyologist who goes beyond the narrow limits of a fauna, and has to deal with the trout of the whole northern hemisphere, is compelled by technical considerations to admit those distinctions. I myself go a step further, and consider it a mistake not to separate, specifically, from the extremely variable *Salmo fario*, such strongly differentiated forms as *Salmo lemanus*, *S. marsitii*, *S. venernensis*, or the Loch Leven trout of the older authors. But if, as is Dr. Fatio's opinion, no taxonomic value is to be assigned to the characters by which those forms of trout are differentiated, then I cannot see why in *Coregonus*, a closely related genus of the same geological age and distribution, similar organic modifications should be considered to have a different bearing.

As is well known, there are some very obscure facts in the life-history of Salmonoids which greatly contribute to the difficulties of their study. Dr. Fatio discusses them very fully, but we must pass over the deductions he draws from them, with the exception of the phenomenon of sterility as a cause of change in the outward appearance of a fish. Sterility among Salmonoids is apparently much more common in Switzerland than in British waters; but ever since Siebold has drawn attention to it, its effects seem to me to have been exaggerated. At any rate, I have received specimens as, and, indeed, with all the outward characters of, the so-called sterile trout of Lake Constance, which had fully matured ova.

Like errata, appendices of works are only too often overlooked; I would therefore mention that the present volume concludes with important supplements to those which contain the Mammalia and Reptilia.

The volume is illustrated with four plates—one representing the *Bondelle* of the Lake of Neuchâtel, the others various details of structure, chiefly of Salmonoids.

I trust that before many years Dr. Fatio will be able to complete his work, for which, not only his countrymen, but every student of the European fauna, owe him a debt of gratitude.

ALBERT GÜNTHER.

THE HISTORY OF MARRIAGE.

The History of Human Marriage. By Edward Westermarck. (London: Macmillan and Co., 1891.)

BY "history" our author means "natural history" (p. 19), and his reason for using the odd term "human marriage" is that "marriage, in the natural history sense of the term, does not belong exclusively to our species" (p. 6). According to him, "marriage is nothing else than a more or less durable connection between male and female, lasting beyond the mere act of propagation till after the birth of the offspring." In this sense marriage is "an almost universal institution among birds," and "occurs as a rule among the monkeys, especially the anthropomorphous apes, as well as in the races of men" (p. 20). Among mankind it is universal, and in all probability is "an inheritance from some ape-like progenitor" (p. 538). In this book, therefore, marriage is taken to mean what ordinary people call "pairing," and the professed subject of the volume is the natural history of the habit of pairing in the human race. But surely, on any proper use of terms, marriage is not simple pairing, but such pairing as is protected and regulated by law, or by the public opinion which in rude societies stands for law. And the history of an institution which is controlled by public opinion and regulated by law is not natural history. The true history of marriage begins where the natural history of pairing ends.

Mr. Westermarck's definition leads him to go at length into various topics that really belong to natural history, but have little or nothing to do with the history of marriage in the ordinary sense of the word; such as sexual selection, and the means used by one sex to attract the other. But he also deals with polyandry, kinship through females only, infanticide, exogamy—all of which belong to the sphere of law and custom, within which his definition of marriage is totally inapplicable. To treat these topics as essentially a part of the natural history of

pairing involves a tacit assumption that the laws of society are at bottom mere formulated instincts; and this assumption really underlies all our author's theories. His fundamental position compels him, if he will be consistent with himself, to hold that every institution connected with marriage that has universal validity, or forms an integral part of the main line of development, is rooted in instinct, and that institutions which are not based on instinct are necessarily exceptional, and unimportant for scientific history. One does not expect a tacit assumption to be carried out with perfect consistency; but, on the whole, Mr. Westermarck's results correspond with his assumption, and have no evidence to satisfy anyone that is not prepared to share the assumption with him.

To show this at length would exceed the limits of a short review; let us, however, take, as a crucial test, Mr. Westermarck's explanation of the origin of exogamy. He believes that exogamy and all laws of incest originate in an instinctive aversion to sexual intercourse between persons living closely together from early youth (p. 320), and the origin of this instinct he explains as follows. He thinks it can be proved that consanguineous marriages are detrimental to the species. Now,

"among the ancestors of man, as among other animals, there was, no doubt, a time when blood-relationship was no bar to sexual intercourse. But variations, here as elsewhere, would naturally present themselves; and those of our ancestors who avoided in-and-in breeding would survive, while the others would gradually decay and ultimately perish. Thus an instinct would be developed which would be powerful enough, as a rule, to prevent injurious unions. Of course, it would display itself simply as an aversion on the part of individuals to union with others with whom they lived; but these, as a matter of fact, would be blood relations, so that the result would be survival of the fittest" (p. 352).

The obvious and fatal objection to this theory is that it postulates the existence of groups which through many generations (for the survival of the fittest implies this) avoided wiving within the group. And this is, in fact, a well-established custom of exogamy, so that the theory begins by postulating the very custom that it professes to explain. Moreover, it is questionable whether Mr. Westermarck's theory even helps to explain the wide diffusion of exogamy. For where wiving outside the local group is the rule, all neighbouring groups mingle their bloods, and consanguineous marriages are not escaped.

It is not surprising that Mr. Westermarck, with his habit of looking at the whole subject from a biological point of view, should have little sympathy with the speculations of a man like McLennan, to whom marriage is not a mere fact of natural history, but a relationship resting on contract and approved by custom or law; and who in all his investigations gives weight to the action of human intelligence as the decisive factor in social progress. But it is a pity that this lack of sympathy has sometimes prevented our author from appreciating the full scope of McLennan's methods and arguments. What is said about the Levirate at pp. 510-14 could not have been written if Mr. Westermarck had carefully read the discussion of the subject in "The Patriarchal Theory"; nor, to mention a trivial matter, would he in that case

have made the error of confounding the Hindu Levirate with the Nyoga (p. 514, *note*). And here I may also note that the criticism of McLennan's views of exogamy does not take account of the posthumous and very important paper published in the *English Historical Review* for January 1888.

These are details: what is more to be regretted is that Mr. Westermarck has not learned, as he might have done from McLennan, a sounder method of handling the evidence drawn from the usages of rude societies. The very possibility of reconstructing the history of human progress rests on the fact that all over the world mankind has been moving in the same general direction, but at very various rates, and that careful reasoning, aided especially by the observation of cases which exhibit a state of transition (*e.g.* from one type of kinship to another), enables us to bring out the order in which the various observed types of social structure succeed one another. Of all this, Mr. Westermarck does not seem to have the least idea. He collects facts about the prevalence of kinship through males or through females, about forbidden degrees, and so forth, without ever rising to the conception that the evidence is good for anything more than an *inductio per enumerationem simplicem*. This is not the way in which real progress can be made.

W. ROBERTSON SMITH.

OUR BOOK SHELF.

Geological Map of Monte Somma and Vesuvius. Constructed by H. J. Johnston-Lavis, M.D., M.R.C.S., B.-ès-Sc., F.G.S., &c., during the Years 1880-88. Scale, 1 : 10,000 (6'33 inches = 1 mile). In Six Sheets, with a Pamphlet entitled "A Short and Concise Account of the Eruptive Phenomena and Geology of Monte Somma and Vesuvius." (London: George Philip and Son, 1891.)

DURING the latter half of last century, the changes taking place in Vesuvius were carefully studied and faithfully chronicled by an English diplomatist—Sir William Hamilton; in the closing years of the present century, the famous volcano has found an equally indefatigable investigator and historian in the person of an English medical man resident in Naples—Dr. Johnston-Lavis. In 1884, Dr. Johnston-Lavis laid before the Geological Society an elaborate memoir, in which he detailed the theoretical conclusions at which he had arrived after long and patient study of the various sections exposed on the flanks of Somma and Vesuvius. He has now published a very valuable addition to this work, in the form of a map constructed on the basis of the topographical surveys of the Italian Government, and coloured in accordance with the views to which he has been led by his long and painstaking geological labours.

In his general memoir on the geology of Somma and Vesuvius, the author has divided the time covered by the history of the volcano into four "eras," and these again into eight "phases," while some of the latter are subdivided into "periods." In colouring the map, it has, of course, not been found possible to give expression to anything like such a minute classification of the rocks composing the mountain as is implied in such a scheme. The legend on the map recognizes as the great landmarks in the past history of the volcano the paroxysm of 79 A.D. and the great eruption of 1631. The pamphlet accompanying the map, however, gives a very useful and readable abstract of the earlier memoir; and the map and descriptive pamphlet together cannot fail to prove of the greatest service to all students of vulcanology. By their