

the only instance, so far as we know, in which a number of contiguous societies have united into a connected group, though other societies occasionally have excursions in common.

We regret to say that since our list was published, we have ascertained that two of the Yorkshire Societies named therein, are now defunct, viz. the Halifax Naturalists' Society, once a member of the West Riding Union, and the Leeds Natural History Society. We have been told that the Wigan Field Naturalists' Scientific Society, given in Sir Walter Elliot's list, with 150 members, is also dead. We hope that in reality these are not dead, but only sleeping; and that means may soon be taken to rouse them again into activity.

Altogether, then, including the Lancashire Societies not in our list, and others of which we have heard since our list was published, one of which was founded at Ballymena, County Antrim, the result, we believe, of some lectures there last winter, there are at the present time in Great Britain and Ireland at least 169 associations established solely or partly for the pursuit of science in one form or another. Of these 104 are professedly field-clubs, while a considerable number of the remainder do field-club work in so far as the publication of lists of the natural productions of their surrounding districts are concerned. Only 22 of these 169 societies were founded previous to 1830, while all the field-clubs were formed after that year, and by far the greater number of them within the last twenty-three years. We do not reckon among these the scientific societies which have been formed in connection with our public schools, to which we shall refer afterwards.

Of these societies the English ones are mainly grouped in the North of England, along the Welsh border, and in the southern counties, the midland district being but sparsely represented, and Bedfordshire,* Derbyshire, Essex, Hertfordshire, Huntingdonshire, Lincolnshire, Rutlandshire, not at all, not to mention the Channel Islands and the Isle of Man, which would afford opportunities to field-clubs which cannot be attained in the main island at all. Glamorganshire is the only Welsh county represented by a society, while all but three of the Irish counties are unrepresented. Scotland, the birthplace of field-clubs, we have already referred to as being far behind England in this respect. Ireland, and even Wales, cannot perhaps at present be blamed for their backwardness in regard to associations of this kind, though each country, in its own way, offers a magnificent field of investigation to local naturalists. With regard to the unoccupied districts of England and Scotland, we can only hope that the scientific contagion may rapidly spread, as no doubt it will when all the conditions are present for its taking effect. Meanwhile, the rapid spread of scientific societies, and especially field-clubs, and the valuable results that have already followed from the labours of a number of them, must be exceedingly gratifying to all who desire to see the triumph of science, and, indeed, to all who are earnestly seeking after the elevation of their fellow-men. Is it not one more sign that "the old order changeth, yielding place to new?"

* By a misprint in our last article the Woolhope was said to be in Bedfordshire instead of Herefordshire.

MARSHALL'S TODAS OF SOUTH INDIA

A Phrenologist amongst the Todas; or, the Study of a Primitive Tribe in South India. By William E. Marshall, Lieut.-Col. of H.M. Bengal Staff Corps. (Longmans, 1873.)

THE Todas are a pastoral hill-tribe in the Nilagiri region of Southern India, whose singularly interesting social condition fairly entitled them to be described in a volume by themselves. Colonel Marshall succeeds in communicating to his readers the lively interest he felt in his work, and several points of ethnology will be perceptibly advanced by it, notwithstanding much of the theoretical part of the book which will hardly meet with acceptance.

Especially from the moralist's point of view, the condition of these secluded herdsmen deserved to be put on record while still little changed under influences from without. They show perfectly how the milder virtues naturally prevail among men in an intellectually childlike state, if only society is undisturbed from without, and finds its equilibrium within. "The general type of the Toda character is most unvarying; singularly frank, affable, and self-possessed, cheerful yet staid; theft and violence are almost absent among them; their quiet domestic life is "undisturbed by the wrongs of grasping, vindictive, overbearing natures;" their engagements to support their wives and children, though resting on mere promises, are kept through utter guilelessness and want of talent to plot. Toda society is simply held together by the strength of family affection. "It is a quiet, undemonstrative, but intensely domestic people; domestic in the wider sense of viewing the entire family, to the last cousin, much as one household, in which everyone is everywhere entirely at home; each one assisting, with the steadiness of a caterpillar, in the easy, progressive task of emptying his neighbour's larder; no one exerting himself by one fraction to raise the family. The great feature in Toda organisation, is the all-absorbing power of his domestic attachments, which, like Pharaoh's lean kine, swallow up all other qualities." The points where the moral code of these easy-going folk differs from that of modern intuitive moralists, are especially polyandry and infanticide. Their marriage-relations within the family have perhaps more nearly approached than those of any other known tribe that promiscuity which several modern ethnologists have supposed to belong to a primitive state of society; "it was formerly their almost universal custom—in the days when women were more scarce than they are now—for a family of near relations to live together in one mand, having wife, children, and cattle all in common." Here, indeed, is socialism of an extreme order, prevailing among a low race, in whose general condition its evil and good are alike visible. As need hardly be said, to the Toda mind polyandry seems part of the natural order of things. So it was with infanticide, till about fifty years ago an English officer, Mr. Sullivan, mounted the Nilagiri plateau and visited the homes of the Todas. Since then all the events of Toda history have been dated from the visit of "Sullivan Dore," as we date from the Christian era, and thenceforward the Government put down infanticide, and its former prevalence is now only to be traced in the census, and learnt from the memory of old people.

An aged Toda gave his account of the practice :—"I don't know whether it was wrong or not to kill them, but we were very poor, and could not support our children. Now every one has a mantle ('putkuli'), but formerly there was only one for the whole family, and he who had to go out took the mantle, the rest remaining naked at home, naked all but the loin-cloth ('kuvn'). We did not kill them to please any god, but because it was our custom. The mother never nursed the child—no, never! and the parents did not kill it. How could we do so? Do you think we could kill it ourselves? . . . Boys were never killed, only girls; not those who were sickly and deformed—that would be a sin ('papum'); but when we had one girl, or in some families two girls, those that followed were killed."

Perhaps the ablest part of Colonel Marshall's work is his tracing out of the social forces which brought about this condition of society, the enforced equilibrium between population and means of subsistence, leading a tender-hearted people to systematic female infanticide, and then causing a huddling together of the endogamous polyandrous clans to keep themselves alive. It is no doubt true that the entrance of new conditions, such as a state of war or an advance in the arts, would have altered not only the relation of the sexes but also the moral laws of the people. Colonel Marshall's researches were especially suggested and guided by Mr. M'Lennan's "Primitive Marriage," and if a new edition is brought out of that important treatise (now out of print and scarce), the Todas will supply some items of valuable evidence to it, bearing on ancient social conditions of mankind.

Care must be taken, however, to interpret with proper reservation the word "primitive," as used in these inquiries. Colonel Marshall calls the Todas a "primitive tribe," and argues from their customs to the condition of "primitive races," nor is this objectionable if the word be meant only to signify a comparatively early stage of society. But the Todas are by no means primitive as representing the earliest known grades of civilisation: they are not savages, but a pastoral tribe in a condition much above savagery, belonging to the great Dravidian race of South India. Among them, moreover, may be noticed certain curious customs, to be accounted for on the principle of "survival in culture," and being apparently relics of a former condition of the race different from the present. The Todas are not now hunters, nor do they use bows and arrows. But, at a certain time after marriage, the Toda husband and wife go into the village wood, and kneeling before a lamp at the foot of a tree, the wife receives from the husband a bow and arrow made by him, which she salutes by lowering her forehead to them. Taking up the weapons, she asks, "What is the name of your bow?" each clan apparently having a different name for its bow; he tells her the name, and afterwards she deposits the bow and arrow at the foot of the tree. Colonel Marshall can hardly be wrong in his supposition that this custom has come down from a former period when the Todas actually carried such weapons. This is also confirmed by their funeral rites, where among the articles burnt for the dead man are a flute (an instrument they never use), and a toy bow and arrows, which they get made for the purpose by their neighbours the Kotas. When the author got a man to buy him one, the Kota who made it asked

"Who is dead?" The inference is obvious, that the Todas were hunters before they took to their absolutely pastoral life. Nowadays, their cattle are all in all to them; not only their life but their religion turns on buffalo; the milkman is a divine personage too holy to be touched; the most sacred objects are certain ancient cow-bells, and the dignity of the sacred bell-cows is handed down from mother-cow to daughter-cow. The keeping up of this sacred heritage in the female line leads Col. Marshall to infer, at any rate ingeniously, that he has found here a relic of ancient days when the rule of kinship on the mother's side (which he considers with Mr. M'Lennan to characterise primitive society) still prevailed; it only now holds good of bulls and cows, while among men and women relationship is on the male side, thus following the rule which is considered to belong to a higher stage of society. It is not a new idea that the worship of the cow in Egypt and India had its origin not in myth but in practical expediency, being craftily devised to prevent the lives of such valuable creatures being wasted. But nowhere does this argument look so complete and rational as among those thoroughgoing devotees of the milk-can, the Todas.

It is to be feared that the title of Col. Marshall's volume may prevent its having all the popularity it deserves. Not that this title is misleading, for he accepts and uses confidently the now discredited phrenological system of bumps and organs, and tabulates his series of Toda skulls according to their Concentrativeness, Amativeness, Veneration, &c. On this classification by phrenological organs he founds a theory as to the relation between civilisation and the shape of the skull. It appears, from his description, that the Todas are a uniformly long-skulled race, though, among his dimensions, I fail to find anywhere the actual measurements of cranial length and breadth, and can only guess from the portraits (which, by the way, are beautiful autotypes), that the proportions of these two diameters may perhaps be something like 100:72 or 75. Now these dolichocephalic Todas being a kindly, harmless, indolent, unprogressive race, Col. Marshall proceeds to connect their narrowness of skull with their want of active energetic qualities, the phrenological organs of which are placed at the side of the head. Thus he comes to the conclusion that it is the brachycephalic tribes, with their skulls broadened by the fierce conquering and progressive organs, which come to the front in the march of civilisation. Well, no doubt there are various dolichocephalic tribes who have remained at low stages of culture, but how is it in the northern half of Asia, the abode of the broadest-headed tribes of man, whom nevertheless the comparatively long-headed Russians have for ages been beating with one hand and civilising with the other. Prof. Carl Vogt's treatment of the question is on a far broader basis, where in a few lines of one of his lectures he shows that both the extreme dolichocephalic and brachycephalic tribes are savages or barbarians, while the main work of civilisation has been done by people who are neither the one nor the other, the mesocephalic or intermediate-headed races, such as ourselves. This is one of the points which make the reader regret that Col. Marshall did not keep his book waiting till he could bring his opinions under discussion at the Anthropological Institute or the Asiatic Society, which might have

led him to modify his views in several ways. As it is, his preface is dated from Faizabad, and in it he describes himself as "a solitary Indian, far away from contact with men of science, but fresh from the actual and impressive presence of 'Nature's children.'" These words account for the freshness and vigour of his style, but they must not be taken to imply that his examination was made without want of knowledge of anthropology. So far from this, one of the great excellencies of the volume lies in showing how much more deeply an observer sees into the life of an uncivilised people, when he is engaged in examining evidence for and against current ethnological theories, than when he goes as a mere traveller, setting down at random anything that takes his attention.

EDWARD B. TYLOR

OUR BOOK SHELF

An Elementary Treatise on Geometrical Conic Sections.
By G. Richardson, M.A. (Rivington, 1873.)

THIS is one of the volumes of the publisher's Mathematical Series, is very well printed, and has, if we are not mistaken, only three trivial misprints. There is quite a run at the present time on this subject, if we may judge by the number of treatises which have recently made their appearance, and this we are not altogether surprised at, as it is one of great interest; its theorems have great intrinsic beauty and almost boundless applications. The ordinary propositions are discussed not altogether in the usual order of consecution from the locus-point of view (the last chapter of four pages being devoted to the cone); the demonstrations are neat, and two or three are exceedingly concise as well. The only or chief novelty is the simultaneous treatment of the ellipse and the hyperbola, the corresponding propositions facing one another on the even and odd pages respectively. The discussion of the asymptotic properties of the latter curve pairs off against a series of propositions on projections. The book is a good working one for beginners, and embraces sufficient for the preliminary examination for mathematical honours at Cambridge, without having too much for school use. There is an extensive selection of exercises.

R. T.

Waste Products and Undeveloped Substances. A Synopsis of progress made in their economic utilisation during the last quarter of a century, at home and abroad. By P. L. Simmonds. (London: Hardwicke, 1873.)

MR. SIMMONDS'S book is seasonable in these days, when so much has been done in the utilisation of waste, as showing how very much yet remains to do.

In nearly 500 pages of close print he has drawn attention to a mass of matter almost bewildering in its vastness, and extending to nearly every kind of material in use in civilised communities. We cannot help noticing that Mr. Simmonds has been affected by the mass of subjects he has attempted, for the book very frequently displays a considerable lack of arrangement.

The author should look to this in a future edition, in which also the book might be easily and advantageously condensed to a considerable extent.

We must, however, thank the author for the service he does in calling the attention of civilisation to the extravagant, and we might say, "riotous" living with which its substance is wasted.

La Botanique de la Bible. Étude scientifique, historique, littéraire et exégétique des plantes mentionnées dans la Sainte-Ecriture. Par Frédéric Hamilton. 8vo. pp. 220, 25 photographs. (Nice: Eugène Fleurdelys, 1871.)

THIS interesting volume will possibly be unknown to the

majority of our readers, and yet we venture to think that, from the beauty of its illustrations and the pleasantness of its style, it may to some of them prove a welcome addition to their knowledge of the subject on which it treats. Not stopping to discuss the nature of those mysterious trees said to have existed in the Garden of Eden, the author divides his subject into two parts. The first treating of the genera and species of which there can be little doubt, such as the pomegranate, almond, cedar, fig, &c.; and the second of those plants or portions of plants about which it is difficult to decide to what genus even they may belong, such as shittim-wood, hyssop, &c. In the first portion of the volume not only are the scientific characters of the plants given, but there is also added a series of references to them from the classics. The photographs are taken from living specimens growing chiefly in the neighbourhood of Nice and Mentone.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.]

Effects of Temperature on Reflex Action

I DO not know if I quite understand Mr. Lewes's objections to my little article in the *Journal of Anatomy and Physiology*. He attributes the absence of movements in the case in question to a loss of sensibility to temperature. At first his statement reads as if the loss of sensibility to temperature were due to the removal of the brain. But he cannot mean this, because the whole of my paper starts from the fact that when the toes alone are exposed to gradually heated water, the leg is withdrawn. If he means that the sensibility to temperature alone is destroyed or depressed by the exposure of the whole body to the gradually heated water, and the other "sensibilities" left intact, I do not see how my argument touching the difference between the entire and the brainless frog is affected at all by a limitation of the stimulus to one particular kind. Moreover, in the last observation recorded in my paper it is expressly stated that in the later stages of heating the absence or diminution of reaction towards chemical as well as thermal stimuli was observed. Gradually heated water acts as a very slight stimulus, sulphuric acid (even dilute) is a very strong stimulus; and that the latter suddenly applied, as in the experiment of Goltz referred to by Mr. Lewes, should call forth a reflex action at a time when the former is unable to do so, in no way contradicts my explanation of the absence of movements. A red-hot iron might have been substituted for the sulphuric acid with identical results.

The paper in question had for its object simply the solution of the difficulty why the brainless frog allowed himself to be boiled without moving. In it I carefully avoided entering upon any discussion concerning Sensation (or Consciousness) in the spinal cord. The words "movement of volition, that is, a movement carried out by the encephalon,"—"ordinary reflex action, that is, a movement carried out by the spinal cord alone," were purposely chosen. I went so far as to speak of an "intelligent frog" and an "unintelligent reflex action," because we have means of measuring intelligence, and we can speak of a body as being conscious and yet not intelligent. I imagine that if Mr. Lewes and myself were to talk over the matter quietly, he would find that I am not so much at variance with him as he imagines. I feel with him the difficulty of refusing to the protoplasm of a white blood corpuscle, a something which may be evolved into (not out of) consciousness. That and like difficulties are not a little increased if, as Mr. Darwin seems to suggest, we regard inherited voluntary acts as the chief instead of the occasional source of reflex actions. Without entering into any long discussion, perhaps I may be permitted to say that in such matters as the movements of a brainless frog, it seems to me there are two things which ought to be kept separate: the investigation into the laws according to which those movements take place, i.e., the study of the various nervous mechanisms of the spinal cord, and the question whether those movements, whether the working of those mechanisms, is or is not accompanied by consciousness. As a physiologist I am prepared to busy myself with the first, as I see prospects of success. With regard to the second, I am not prepared to say anything until we have ob-