

need be very few. Lastly, inspectors might fairly be appointed to see that not only in the actual experiments, but in the feeding, housing, and general treatment of the laboratory animals there was neither parsimony nor carelessness. The licence would be given on suitable recommendation by the Home Secretary, with power of revoking it for abuse, subject to appeal, as suggested in the Royal Commissioners' Report.

Under such an Act physiologists might fairly be expected to make it a point of honour that its provisions were fully carried out in spirit as well as in letter. The framers of the present Bill, by their disregard of physiology as an independent science, to be taught like any other, do their best to render its progress impossible; while, by their absurdly minute limitations, they would make original research almost as impossible as efficient teaching, and deprive the art of medicine of its only safe foundation.

The efforts of all who care for the advance of human knowledge or the alleviation of human misery should be directed to bring the scope of the Government Bill back to that indicated by the Report of the Royal Commission.

THE SCIENCE OF LANGUAGE

Language and its Study. By Prof. Whitney; edited by Dr. R. Morris. (London: Trübner and Co., 1876.)

Leaves from a Word-hunter's Note-book. By the Rev. A. S. Palmer. (London: Trübner and Co., 1876.)

The Aryan Origin of the Gaelic Race and Language. By the Very Rev. U. J. Bourke (London: Longmans, Green, and Co., 1875.)

THESE three books are very fairly characteristic of the present position of comparative philology. The first is a reprint of the first seven chapters of Prof. Whitney's well-known work on the science of language, and has been admirably edited by Dr. Morris with notes and introduction, with special reference to a scientific study of English. The second is just what it professes to be, extracts from a commonplace book on the etymology of various words, and it illustrates very well the influence exercised by a comparative treatment of language upon what used to be the pastime of literary *dilettanti*. Mr. Palmer's derivations have been traced with full regard to the scientific method, and besides being accompanied by a wealth of quotations, rest for the most part on a secure foundation. "The Aryan Origin of the Gaelic Race," again, is one of those books which a few years back would have teemed with the wildest vagaries; the author, it is plain, has little critical judgment, but a diligent study of works like those of Zeuss or Max Müller has kept him in the right path, and though he startles us now and then with such assertions as that the Aryan is "the primeval language of man," or that "there had been only seventeen letters in Greek at the earliest period," his views are in general just and sound. We may doubt whether his theory of the Pagan origin of the Round Towers will be widely accepted, and complain of his prolixity, but the book is a striking example of the extent to which a knowledge of Comparative Philology has spread, and the wholesome influence its principles have exerted.

When we consider that the science of language is a

science of not more than fifty years' growth, as well as the vast amount of details that had to be collected and classified before its creation became possible, its present advanced condition must be a matter of surprise. No doubt there is still very much to be done; some of the main questions connected with the study of language still remain unsettled, and new questions are starting up that will have to be answered hereafter. It is even possible that fresh knowledge and investigation will modify some of the hypotheses which have been accepted as fundamental truths.

Thus it might have been thought that the first question to be settled would be whether the science is to be included among the physical or the historical sciences, and yet this is even now a matter of dispute. There is much to be said in favour of both views. If we look merely to the fact that it lays down the laws in accordance with which thought endeavours to express itself in speech, it must be regarded as a historical science; if on the other hand, we consider that thought can only be expressed in speech by the help of physiological machinery, we are bound to class it among the physical sciences. If we make phonology not only the beginning, but also the end of linguistic science, linguistic science will differ but little from physiology in aim as well as in method; but if we remember that the various sounds which it is the province of phonology to determine and classify do not become language until they embody a meaning, the science of language will have to be grouped among those other sciences which deal with the history of human development. The same difficulty meets us again in the case of geology, which traces the history of the earth, and if with Prof. Whitney we prefer to regard the science of language as a historical science, while we call geology a physical science, it is because the element of mind enters more largely into the one, and the element of matter into the other. The laws which govern matter remain always the same; those which govern thought and life are modified by a process of internal development.

The science of language, otherwise called glotology or linguistic science, should, strictly speaking, be distinguished from comparative philology. The latter, by comparing words and grammatical forms within separate groups of languages, and thereby ascertaining the nature of these several groups and the laws which govern their growth and formation, provides the materials for the science of language. This takes the results obtained by comparative philology in the various species and genera or families of speech, and with the help of the comparative method determines from them the laws of speech generally. Inasmuch as we have to compare phenomena belonging not only to the same period, but also to different periods in the history of language, that part of linguistic research which is not purely phonological has to assume a historical character, so that to discover the causes of the phenomena is to explain their origin and process of growth. Now the phenomena of language are words and sentences, phonetic utterances, that is, which are or have been significant.

Perhaps the most important result of the science of language has been the demonstration that even language, even those "winged words" over which men once fancied they had the most complete control, are as much subject

to the action of undeviating laws as the forces and atoms of material nature. We now know that what might seem at first sight the most arbitrary of all things, the phonetic change undergone by words in their passage from one dialect to another, is yet under the control of laws which have been discovered and formulated, and which act, unless interfered with by other laws, with unbroken regularity. The old haphazard guesses which once passed for etymologies are now impossible; given a certain word in Greek or Latin and its phonetic analogue in the other branches of the Aryan family can be determined with certainty. The most plausible derivations, such as that which would connect the Greek *καλέω* and the English *call*, have had to be given up, and the rule has been laid down that if two words in two allied languages exactly resemble one another, we may safely conclude that there is no connection between them.

The reason why the laws of language can be determined with such precision is that language is a social product, at once the creator and the creation of human society. Language exists for the sake of intercommunication; it is not what the individual man wishes to be significant that is so, but what the whole community, by a sort of unconscious agreement, determines to be so. Consequently, the arbitrary caprices of the individual have no influence upon the general character of speech. At the most, the individual can do no more than bring some word or phrase into fashion; all his efforts would not avail to change the phonology, structure, or grammar of a single tongue. Hence it is that the records of speech reflect the ideas and knowledge of society at each successive epoch of its growth, just as surely as the fossil records of the rocks preserve the past history of our globe. In tracing the growth and history of language we are really tracing the growth and history of society and of human development. The science of language thus becomes of the highest value in testing the various theories that have been formed respecting the early condition and education of mankind. It is the only key which will unlock the secrets of the prehistoric past of society with scientific certainty. Thus it bears unequivocal testimony to the belief that the history of humanity has been on the whole a progress and not a retrogression. The further back we penetrate into the records of speech the more childlike and barbarous is the society that left them seen to be. The words that came to represent moral and religious ideas originally had a purely sensuous meaning; there was a time when abstracts of any sort did not exist; and we even have faint glimpses of a period when men were painfully striving to create a language by the help of onomatopœia, and of a still earlier period when language as such was not yet formed. Equally unequivocal is the testimony borne by the science of language to the antiquity of man. The three causes of change in language—phonetic decay, the desire of emphasis, and the influence of analogy—are very slow in their action wherever society is sufficiently compact and settled to allow us to speak of its several forms of speech as dialects of the same family; and yet the oldest monuments of language to which we can appeal, whether in Egypt, in Babylonia, in Assyria, or even in that parent-Aryan which it is one of the triumphs of comparative

philology to have restored by a comparison of its derived languages, are all, linguistically speaking, late, and imply untold ages of previous development. Ethnologists, however, must remember that the science of language does not pretend to occupy their own special province. Language is a social product; it can tell us therefore nothing of races, only of communities. Members of the same race may speak unallied languages and members of unallied races may speak the same language; identity of speech is a test of social contact, not of race. Comparative philology can throw no light on the physical, as opposed to the mental and moral, history of man; that task must be left to other sciences.

One of the chief elements in the mental and moral history of man is the history of his religious ideas, and under the guidance of a scientific study of language this has been to a considerable extent cleared up by comparative mythology. The original meaning of the terms and phrases which embodied the earliest attempts to explain the phenomena of nature came to be forgotten with the increase of knowledge; a new signification was put into them and an imaginary fairy-world built upon the misunderstood word. The term whereby the primitive savage had endeavoured at once to explain the movements of the sun by endowing it with human attributes, and to express his own intuitions of the supernatural, became an Apollo or a Phaethon to whom the shrine was made or the legend recited. The words in which men have, as it were, photographed their religious convictions in different ages and in different parts of the world are an enduring record of the convictions themselves. But the words must be interpreted before the record can be read, and the key to the interpretation is in the hands of the science of language.

The science of language, however, has a practical as well as a purely theoretical interest. The practical object at which it aims is the creation of a universal language, one, that is, which may serve as the medium of communication between civilised communities throughout the whole world. Another object is the reform of English spelling, at present the despair of teachers and pupils. The spelling of a language ought to represent its pronunciation; our English spelling is a disgrace to a civilised community, a bar to a scientific appreciation of language, a hindrance to acquiring a conversational knowledge of foreign tongues, a cause of wasted time and brains in education, and a fruitful source of pseudo-etymologies. If comparative philology effect this reform and nothing else it will have sufficiently vindicated its practical utility. Equally important is the reform which it urges in the matter of classical education. The method of nature and of science is to proceed from the known to the unknown; this is reversed in our ordinary system of education which begins with the dead languages and ends with one or two living ones. By breaking down the monopoly of the two classical tongues and demonstrating that for purely linguistic purposes the modern languages of Europe are of greater importance, the science of language is doing a good work. In the study of the classical languages themselves it has effected a revolution. By explaining the nature and reason of their grammatical forms and rules it has lightened the burden of the learner, since to understand is to remember.

But we must not forget that the science of language is still a young science. Its followers are still engaged in laying its foundations and testing their strength. The problems that await solution are numerous and important. So far as our evidence goes at present, it tends to show that the languages of the world have sprung from an infinite number of separate sources, but it remains to be seen whether future discoveries will not reverse this conclusion. Then, again, there is the question of roots. All comparative philologists admit that roots are the ultimate elements into which language can be decomposed, but it is still a question whether the roots discovered by the grammarian once formed a spoken language, or whether they are but grammatical figments which are the best representatives we can obtain of the early condition of speech. Equally disputed is the question whether the different classes of language—inflectional, agglutinative, polysynthetic, and isolating—are to be regarded as constituting separate streams of linguistic development from the first, or a single stream which has branched out into separate ones. It is unquestionable that a large part of flection can be shown to have had an agglutinative origin, it is also unquestionable that the phenomena of isolation are to be met with in the inflectional languages, and the phenomena of flection in the isolating languages; but it is asked whether this would have been possible if each class had not had a definite tendency to flection or isolation from its starting—a standard, that is, to which all foreign elements introduced into the language were made to conform. Such are some of the questions which still remain to be answered; and if we are to judge from the rapid progress already made by the science of language, the answers will not be long in coming.

A. H. SAYCE

OUR BOOK SHELF

Rudiments of Geology. By Samuel Sharp, F.S.A., F.G.S. Second Edition. (London: Edward Stanford, 1876.)

THE author of this little manual, which is designed for the use of schools and junior students, has evidently taken considerable pains to make his work fairly represent the existing state of geological knowledge. He has, moreover, succeeded in conveying in simple language an idea, not only of the conclusions attained, but of the processes of investigation and reasoning, followed by the geologist in his researches, and we regard the book as well adapted to introduce a beginner to the study of the science, and to prepare him for the profitable perusal of more extended treatises. As compared with some of the similar introductory text-books of the science, which have recently been published, Mr. Sharp's manual labours under the disadvantage of being somewhat inadequately illustrated, for we find in it only a few diagrams and no figures of fossils. This second edition, however, is certainly a considerable improvement upon the first, and the division of Physical Geology has received much more full and careful treatment; the extent of the additional matter being sufficient to increase the number of pages of the book from 126 to 204.

South Australia: its History, Resources, and Productions. Edited by William Hareus. Illustrated with photographs taken in the Colony. Published by authority of the Government of South Australia. (London: Sampson Low and Co., 1876.)

THE nature of this handsome volume may be learned from the fact that it has been prepared to accompany the speci-

mens of South Australian products and industries sent to the Philadelphia Exhibition. It contains a vast amount of the most useful information on nearly all matters connected with the colony, gives an excellent idea of its present condition, and is likely to be of great use to intending settlers. Mr. Hareus, who edits the volume, writes also one half of it, treating of the social, political, and industrial aspects of the colony. In a series of valuable appendices, Dr. Schomburgk treats of the flora of South Australia, Mr. Waterhouse of its fauna, Mr. J. B. Austen of mines and minerals, while Mr. Josiah Boothby contributes a statistical sketch of the colony, and Mr. Charles Todd treats of its observatory and meteorology. There are two very useful maps, while the illustrations are nearly all good and interesting.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

The Spelling of the Name "Papúa"

I QUITE agree with Mr. Whitmee's objections to English orthography of foreign words (see *NATURE*, vol. xiv. p. 48), but in this case I intended to show at a glance to non-linguistic readers that the accent in the word Papúa must be on the second syllable, and not on the first. The Germans write "Papua," and pronounce "Pápua" (as they pronounce "Mántua," "Pádúa," &c.). This being wrong, and fancying that in England the same mistake is often made, I wrote "Papooa," which leaves no uncertainty in respect to pronunciation. I confess that it would have been more convenient to retain "Papua," and remark in a note that the accent must be on the "u." In a linguistic work I should never have proposed "Papooa," but it cannot be supposed that every reader of *NATURE* knows what Marsden pointed out in 1812. In German I write "Papúa," and perhaps the same mode would be the most convenient in English. It is known that the French use "Papoua," the Dutch "Papoea," the Malay "Papuwa." In these cases the pronunciation may not be questionable, as it is in German and English, if written "Papua."

The most interesting point in Mr. Whitmee's letter is, no doubt, the announcement of a comparative grammar and dictionary of all the principal Malayo-Polynesian dialects; and those interested in these studies will certainly be anxious to receive such a valuable increase to their knowledge.

Dresden, May 23

A. B. MEYER

New Zealand Prehistoric Skeleton

AMONG the "Notes" in *NATURE*, vol. xiii. p. 196, just come to hand, you give an extract from the Order Paper of the Legislative Council of New Zealand concerning the remains of a supposed "prehistoric man," regarding which a motion for an inquest was tabled by Mr. Walter Mantell. As you correctly report, this skeleton was excavated under my direction in the so-called Moa-bone Point Cave, but it was not found in the lower beds containing Moa-bones, but in a much more recent formation, and to which I assigned a comparatively modern date.

You state that "I hold strongly to the palaeolithic age of the deposits," but I am at a loss to conceive what ground you have for such an assertion, and as I can only conclude that you received your information direct from New Zealand, I beg to forward you herewith for your perusal a copy of my paper reporting the excavations and my views thereupon.

With regard to the motion itself, which was treated throughout the colony as a joke, it is sufficient to state that Mr. Walter Mantell is the recognised jester of the Legislative Council, and that even science does not escape his attempted witticisms. I may add that the Hon. Dr. Pollen, the Premier of the Colony, also treated the motion as a joke, and offered Mr. Mantell the office of coroner for the proposed investigation.

Although Mr. W. Mantell, F.G.S., stated, when speaking on his motion (see Hansard, 1875, p. 548), that "he gloried in the fact that he was not a scientific man, and he did hope he would be able to go to his grave without incurring that disgrace," never-