

density; and "to neglect this is to render nugatory all attempts to explain the phenomena presented by the moon."

In treating of the physical condition of the lunar surfaces, it is pointed out that Beer and Mädler's frequent quotation, "The moon is indeed no copy of the earth, much less a colony of the same," is not so well founded as it would appear to be; for although the first impression gained from the general appearance of the surface is that it contains neither oceans, seas, nor river systems, with the accompanying formation, but a desert containing innumerable craters and surface irregularities, still on a closer investigation with adequate means, more points of resemblance become manifest. The more level regions of the moon, especially the shores, though known to have been long destitute of water, are pointed out as appearing to show many traces of its action, as the formation of diluvial deposits recognised by Sir John Herschel; whilst Prof. Phillips traced many analogies between the apparent volcanic formations of the earth and moon, and found many indications of the action of a disintegrating atmosphere.

The greater craters apparently existing on the moon when examined with powerful telescopes, the author tells us, appear less and less like volcanic orifices or craters; their inclosing walls lose their regularity of outline and form, and appear as confused masses of mountains broken by valleys, ravines, and depressions, crossed by passes, and surrounded by low plateaus and an irregularly broken surface; whilst the seemingly smooth floors generally appear as diversely interrupted as the environmenting surface. These formations are thus seen in their true character, not as craters, but as low-lying spaces surrounded by mountain regions or disturbed highlands.

The author appears to think that the *ring plains* and *wall-plains* are not volcanoes, in the ordinary sense of the term, but depressions surrounded by mountain ranges, and that the great number of apparently small craters are mere shallow hollows, such as are not uncommon on the earth.

The fact that gentle slopes and valleys, like many of our river valleys, would not, except under most favourable circumstances, be shown in relief, is a matter which may easily escape notice, and is here referred to; and further, any small abrupt feature may cast a shadow completely masking much more extensive formations. Attention is called to the fact that Mädler pointed out that formations possessing a north or south direction are much more easily seen upon the moon than those extending east and west, a peculiarity tending to give an imperfect idea of the true nature of the surface, and accounting in some measure for the general meridional direction of numbers of the smaller formations of the moon, such as the ridges, land-swells, and rills, as matter very noticeable on a glance at a lunar map.

The variation of the appearance of lunar formations during the course of a lunation is very forcibly described, as also is that due to libration. The effects of the changes in temperature are referred to as causing a physical variation of the surface, and the changes in the crater Linné, and the ring-plains of Messier are referred to as probable instances of physical change.

The various formations on the lunar surface are

enumerated and described with considerable minuteness. With regard to the rills or clefts, Mr. Neison seems to incline to the belief that the majority of them are ancient river-beds, though at present their nature is purely conjectural.

Some thirty pages are devoted to an abstract of the work done upon the moon by various astronomers from the earliest times; but we find no mention of Nasmyth's and Carpenter's excellent book in this list, a work which surely deserves some notice.

The book, of 576 pages, is illustrated by five drawings of craters, and possesses no less than twenty-two maps, containing together the whole of the moon's surface, each of which is accompanied by a full explanation, taking up at least three-fourths of the book, the scale of the maps being 24 inches to the moon's diameter. Three of the craters—Gassendi, Maginus, and Theophilus, are drawn upon an enlarged scale. This work will, no doubt, be of considerable service to those who make our satellite their chief study, since, besides the objects enumerated by Beer, Mädler, and Schmidt, it contains a large amount of new work.

HOVELACQUE ON THE SCIENCE OF LANGUAGE

La Linguistique. By A. Hovelacque. (Paris: Reinwald and Cie., 1876.)

IN speaking lately of the Science of Language we alluded to the question that is still being debated among its students as to whether it ought to be classed with the physical or with the historical sciences. Its method is that of the physical sciences, while phonology, which forms so integral and fundamental a part of comparative philology, is purely physiological in character. On the other hand, since phonetic sounds do not become language until they have been made significant, the science of language may be regarded as a historical one. M. Hovelacque is a warm supporter of the first opinion, and his book is an attempt to treat the science of language as a physical science pure and simple. In this respect he is a follower of Schleicher, as he is also in applying the Darwinian hypothesis to the history of speech and in holding at the same time that the various languages of the world have branched off from a number of independent centres. His work is a valuable contribution to the literature of the subject.

M. Hovelacque starts with the assertion that man is man solely in virtue of language, or rather of the capability of language. Following M. Broca he holds that this capability is a function of the third frontal convolution of the left, more rarely of the right, hemisphere of the brain, and that it was first acquired by a primate which thereby became a man. A certain number of the same primates, "less favoured by circumstances, were checked in their development, and relapsed into a regressive change of character; their remains are to be recognised in the anthropoid apes, gorillas, chimpanzees, orangs, and gibbons." Those primates which by a process of natural selection acquired the capability of speech and with that the characteristics of man, gradually improved upon their new possession, wherever external circumstances were favourable, and with the development

of speech came also the development of conceptual thought and a corresponding progress in culture and civilisation.

A morphologic investigation of language enables us to trace the several stages of its development, and by supplying intermediate forms furnishes an important verification of the Darwinian theory. Thus we begin with isolating languages and monosyllabic roots, and then pass on through the agglutinative to the inflectional family of speech, each family, together with the members of each family, gradually increasing in complexity of organism. The roots themselves can be shown to be of onomatopœic or interjectional origin, and the interval between them and the six distinct sounds emitted by the *cebus azara* of Paraguay is far less than that between the several stages of linguistic development. Linguistic development itself depends upon the changes brought about in the pronunciation of words by natural causes, and since the laws which regulate these changes fall ultimately under the province of physiology, the "historical life" of language is as much a subject of natural science as the more special phenomena of the physiologist.

The main objection which offers itself to this theory is the necessity it involves of explaining the development of speech by the accidents of phonetic decay. No doubt the meaning of words is largely influenced by the forms they may assume in pronunciation under the action of phonetic laws which ultimately go back to such controlling conditions as climate, food, and the like; but just as often it is the meaning which determines the form. After all, it is not the particular phonetic sound which constitutes language, but the signification put into it by the joint but unconscious action of a community. Without language, it is true, there can be no thought; but it is equally true that language without thought would be only the gibberish of a parrot.

Another objection which holds against the view of M. Hovelacque is the undue limitation which it imposes upon the science of language. M. Hovelacque's work is little more than a catalogue of the various languages of the world, classified morphologically and genealogically, with a description of the chief phonetic and grammatical peculiarities of each. No place is left for that inner life of language which stands nearer to psychology than to physiology, and the science of language is accordingly made almost synonymous with phonology alone. One misses an account of the nature of language and the causes of its change and growth; one misses equally any reference to comparative grammar and syntax, to the changes of signification undergone by words, and the light they throw upon the history of the human mind. In short, in M. Hovelacque's hands the science of language appears as a classified collection of existing phenomena, while the causes and complex history of these phenomena are left untouched. In assuming, too, that the inflectional languages have once been isolating, M. Hovelacque assumes much more than can be proved. The Indo-European tongues *may* once have resembled Chinese; but there is no proof of the fact, if fact it be, and the "Parent-Aryan," as restored by Schleicher and Fick, is as thoroughly inflectional as Sanskrit itself.

On the other hand, M. Hovelacque does good service

in showing how fully all the evidence now at our disposal tells against the theory which would refer the manifold languages of the globe to only two or three original sources. On the contrary it would seem that the beginnings of speech were as numerous as the independent communities of primitive man. It is strange, however, that an author who hesitates about admitting the relationship of the Mongolian to the Finnic-Tatar group should yet accept without questioning the Indo-European affinities of Lycian and Etruscan.

To sum up, M. Hovelacque is a good scholar, and his book is a useful summary of the relationship and characteristics of the various languages of the world. It is also a valuable contribution on the side of those who hold that the science of language must be included among the physical sciences. But it exhibits the defects as well as the advantages of this view; and thus while it proves the difficulty of distinguishing between a physical and a historical science at least so far as the science of language is concerned, it yet shows that to regard the science of language as a merely physical one leads to an unsatisfactory inadequacy of treatment and an unjustifiable narrowness of view.

A. H. SAYCE

THE GERMAN NORTH SEA COMMISSION
Jahresbericht der Commission zur wissenschaftlichen
Untersuchung der deutschen Meere in Kiel für die
Jahre 1872, 1873. Im Auftrage des Königlich Preussischen Ministeriums für die landwirthschaftlichen Angelegenheiten, herausgegeben von Dr. H. A. Meyer, Dr. K. Möbius, Dr. G. Karsten, Dr. V. Hensen, Dr. C. Kupffer. (Berlin, 1875.)

THE second portion of the Report of the North Sea Expedition, just published, contains Article VI., Bryozoa, edited by Dr. Kirchenpauer. Like most of his countrymen, the author accepts Ehrenberg's name for this group, although there is no doubt that, as urged by Allman and Busk, Vaughan Thomson's name (Polyzoa) has the priority. The number of species met with is but small; we make it 55, the author 54, but perhaps he excludes *Pedicellina echinata*. A most interesting account is given of the Flustra of the Northern Sea, and we welcome the account of the geographical distribution which is appended to each species as a valuable addition to our knowledge. From the richness of Dr. Kirchenpauer's collections, he was peculiarly well able to give a long list of habitats. Among the very complete list of authors quoted, we miss a paper on New Zealand Polyzoa by Sir C. Wyville Thomson, published in the *Natural History Review* for 1858.

The Tunicata are described by Dr. C. Kupffer. Twenty-four species (not twenty-three) of Simple Ascidiæ are enumerated, belonging to the following genera:—Ciona, 3 sp.; Phallusia, 6 sp.; Corella, 1 sp.; Cynthia, 8 sp. (1 new); Molgula, 5 sp. (3 new); Pelonæa, 1 sp. The author describes as occurring in some species of Cynthia and Pelonæa certain nipple-shaped bodies met with in the water chamber. These are regarded as standing in close relationship with the circulatory system, and are called Endocarps. All of the species, except those for the first time described, are to be met with in Great Britain; some of them are among those recently described by Alder and Hancock from the West of Ireland, and five of them are