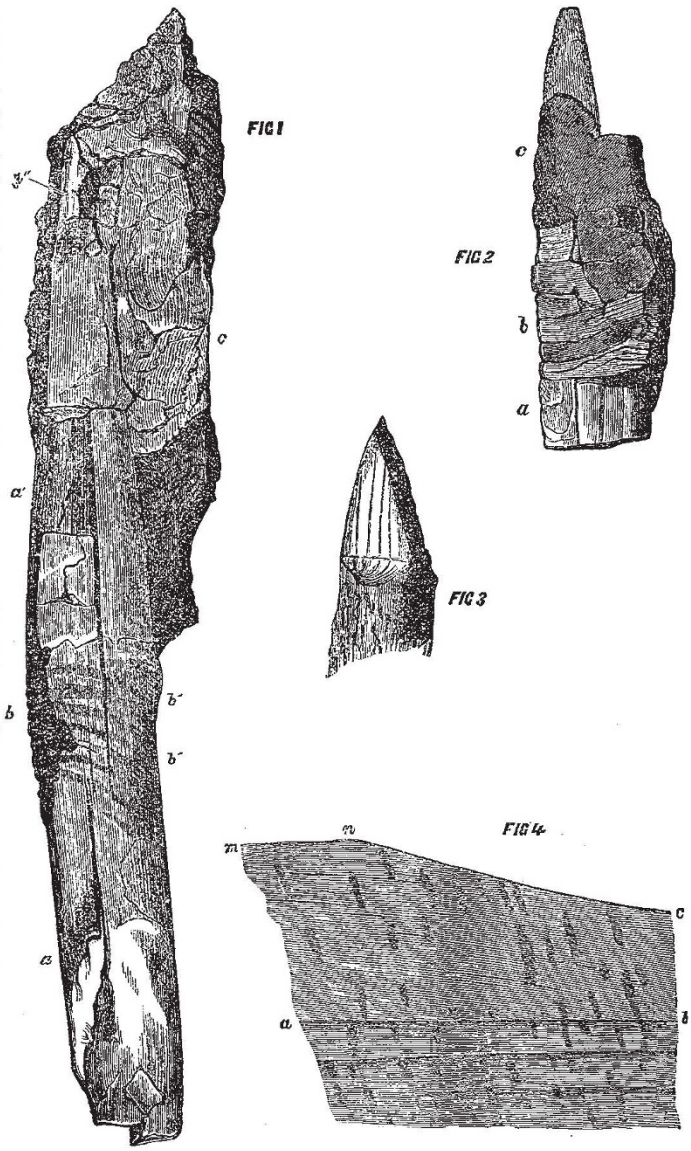
PRIMÆVAL SWITZERLAND[1]

THE veteran Swiss professor, Dr. Oswald Heer, is not more distinguished for his ability and indefatigable industry in original research than he is for his brilliant powers of popular exposition. His admirable work, "The Primæval World of Switzerland," of which both German and French editions have already appeared, has been so favourably received, alike by the scientific and the general public, that we are happy to be able to announce the publication of it in the form of an English translation, adorned with the whole of those numerous and excellent illustrations which contributed so greatly to the value of the book as it was originally issued. A work like the present, in which accuracy of scientific detail is in no degree sacrificed to its main design—that, namely, of producing a succession of lively descriptions leading up to clearly-enunciated generalisations—must be largely dependent not only on the literary skill of its translator, but on his competence for dealing in an intelligent manner with the various branches of natural history treated of; and when we state that the interpreter of Prof. Heer's views to English students is so erudite a naturalist as Mr. W. S. Dallas, the Assistant Secretary of the Geological Society, we have said enough to predispose our readers in favour of the present translation. Nor does a careful perusal of the work serve to disappoint the high expectations we have been naturally led to entertain with regard to it, for both editor and translator have evidently performed their respective tasks in a most skilful and conscientious manner. Neither in respect of accuracy or of elegance do we notice any very serious failures; under the former category, indeed, we only feel called upon to draw attention to a little confusion which exists in some parts of the work with respect to the English and German measures; and, under the latter, to what appears to us to be the rather awkward adoption of the third person, which, however suitable for abstracts or reviews of the writings of an author, seems somewhat out of place when employed in a full translation of one of his works.

To that numerous section of our countrymen who regard "the playground of Europe" as a place only for fashionable lounging or purposeless climbing, Prof. Heer's work may well be commended as opening up new, and to many perhaps, unsuspected sources of enjoyment during their holiday tours. Those who will take the trouble to master the contents of these two pleasantly written volumes—a task demanding no great preparation of preliminary studies—will be in a position to appreciate and follow with ever increasing interest the discussion of those numerous important geological problems, to the solution of which no country in the world affords more important materials than Switzerland. Aided by the carefully arranged collections of rocks and fossils which exist in the museums of all the larger Swiss towns, the tourist would find the means of enabling himself to vividly realise and almost live among the wonders of long past geological periods; and by personal contact with the actual evidences of geological change, his scientific knowledge and convictions would acquire a reality and solidity, which no amount of work in the library could ever communicate to them. Those who will adopt this plan will soon find aroused within their minds an interest and enthusiasm, which will prevent them from ever finding their holiday tour dull; and will be amply rewarded thereby for the necessary preliminary labour. Phlegmatic, indeed, must be the individual who does not find his pulses stirred as he follows in the work before us the life-like delineation by word-painting of the characteristics of ancient worlds, or who does not find the desire awakened in his mind to witness for himself some of the phenomena here described; for even the most indifferent reader cannot fail to catch a portion of the enthusiasm which everywhere glows in Prof. Heer's eloquent pages. But such feelings are only a very feeble echo indeed of the pleasures experienced by the student who has the courage to enter himself within the veil, and to look upon nature and her mysteries face to face.



Rods of fir-wood exhibiting marks of cutting and binding, rom the lignites of Wetzikon.

We should, however, be doing Prof. Heer an injustice if we referred to his book as being only a popular guide to the geology of Switzerland. To the man of science

[1] "The Primæval World of Switzerland." With 560 Illustrations. By Prof. Heer, of the University of Zurich. Edited by James Heywood, M.A., F.R.S., President of the Statistical Society. Two vols. 8vo. (London: Longmans, Green, and Co., 1876.)

the work will be no less valuable than to the tourist and general reader, for in it he will find an authoritative *résumé* of the results of multifarious studies by one of the most eminent of living palæophytologists; results which otherwise he would be compelled to search for in numerous scattered papers and bulky monographs. Just such a sketch of the general geology of Switzerland as is contained in the work before us, is indeed especially welcome at the present time, from the fact that Studer's admirable "Geologie der Schweiz," is so far behind date. The main features of the Carboniferous, Saliferous, Lias, Jurassic, and Cretaceous formations as displayed in Switzerland, are all very clearly described in Prof. Heer's book; but it is of course in respect to the Miocene—to the elucidation of the characters of the fauna and flora of which his own admirable researches have been more especially devoted—that our author's detailed observations and inferences are possessed of the greatest value and interest. Prof. Heer's general conclusions on such subjects as the physical evolution of our globe, the changes of climate during former geological periods, and the doctrine of descent and Darwinism, are also worthy of the most serious attention.

We shall not here stop to discuss how far the identification of species of plants, by their leaves alone, is safe or defensible on the part of the palæophytologist. Some botanists, especially in this country, have adopted very extreme views with regard to the work of Heer and others;

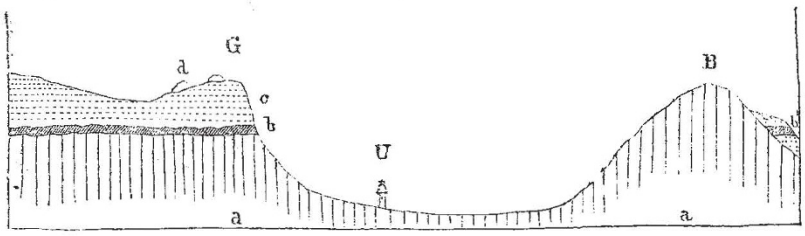


FIG. 5.—Ideal Section of the valley of Utznach (the vertical scale is to the horizontal as 8 : 1). G, Gubel; U, Utznach; B, Lower Buchberg.

demanding that fossil plants, like recent ones, should only be named after an opportunity has been found for studying their organs of fructification. But the geologist may with justice object to such a limitation, that it would practically be almost as fatal to the pursuit of his inquiries, as a demand from malacologists that no conclusions should be based on the shelly coverings of molluscs, or from comparative anatomists, that we should reject all identifications based on portions of the skeleton of the vertebrates. It is surely better to make the best of the imperfect materials which we possess—guarding ourselves meanwhile at every point with cautious reservations—rather than to reject it altogether because of its lack of completeness.

Opinions, too, may differ as to the propriety and value of those rather fanciful delineations of scenery in the ancient geological periods, which are so frequently introduced in French scientific treatises. But in the case of "The Primæval World of Switzerland" all such criticism is disarmed by the fact that, while a means of arresting the interest of the general reader has been supplied by these rather questionable "landscapes," the real wants of the student have by no means been lost sight of, but are very liberally provided for in numerous other plates and woodcuts of truly scientific character and accuracy.

No time, perhaps, could possibly be chosen as more opportune for the appearance of this work than the pre-

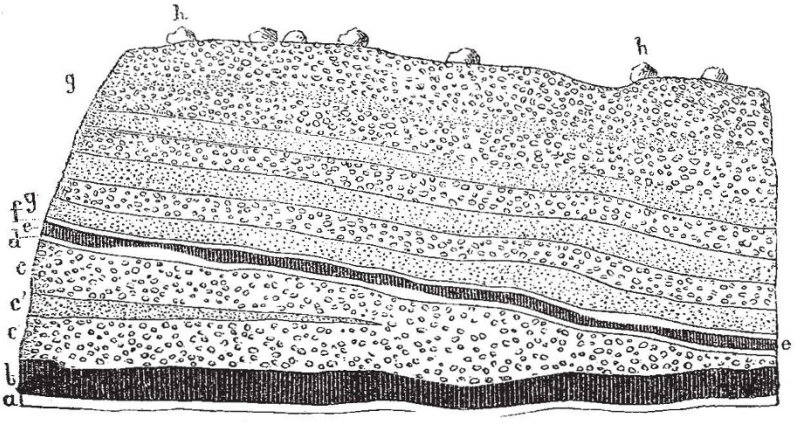


FIG. 6.—Section of the paper-coal or lignite deposit and pebble-beds, at Dürnten.

sent, for attention has recently been very generally drawn to the discovery of certain articles of human workmanship in Switzerland which seem to throw far back the date of the appearance of man upon the globe, and to make him contemporaneous with a portion at least of the Glacial period of that country. The editor of this work has, we think, acted most judiciously in appending to Dr. Heer's book, which contains ample details concerning the characters and relations of the beds which have yielded these interesting relics, a translation of Prof. Rütimeyer's memoir in the *Archiv für Anthropologie* for 1875, which describes the objects themselves, and we cannot more appropriately close this article than by a brief reference to the facts of the case, as detailed in the work before us, illustrating them by several woodcuts borrowed from the same source.

That the relics in question are of artificial origin, there can be scarcely the smallest room for doubt. They consist of a number of rods lying side by side in a block of lignite from Wetzikon, in the Canton of Zurich; these rods are of fir-wood, they are converted into true lignite perfectly similar to the surrounding matrix, and are flattened and crushed like the remains of plants, constituting the mass. Careful examination of them shows that the point of one of these rods has been artificially cut (Fig. 1, *a''* and Fig. 3), and that it has been bound round with

some flexible material (Fig 1, *b*, *b'*). A second rod exhibits its longitudinally fibrous woody body bound round transversely with a different bark (Fig. 2, *b*). Prof. Schwendauer, who has made a microscopical examination of these interesting rods, confirms the fact of their having been subjected to artificial treatment. He supplies in Fig. 4 an enlarged view, showing how the artificially-produced section cuts across the structure of the wood. We can hardly doubt that we have here portions of a piece of the rude basket-work, the construction of which is among the earliest practised of the arts of savage peoples.

With regard to the mode of occurrence of the Wetzikon lignite deposit, in which these singular remains were found, two woodcuts, which we transfer from Dr. Heer's book, will suffice to make the matter perfectly clear. The first is an ideal section across the Valley of Utznach, which shows the lignites in question (*b*) resting on upturned Miocene strata (*a*) and covered by beds of pebbles (*c*) and erratic blocks (*d*). From this section it appears that a vast amount of denudation has taken place since the formation of the beds of lignite and their being covered up by deposits showing signs of glacial origin, for the outcrop of the lignites occurs at a height of 100 yards above the bottom of the valley. The second section shows the nature of the stratified materials, sand, loam, and pebble-beds (*c*, *d*, *f*, *g*) with which the lignites (*b*, *e*) are interstratified and covered—a number of erratic blocks (*h*), evidently derived from the Alps, surmounting the whole mass.

That these lignites of Wetzikon with their relics of human workmanship are of great antiquity there is the plainest proof; that they are, however, of more recent date than the principal mass of the glacially-derived materials occurring in the great Swiss valley is rendered clear by their undoubted superposition to these deposits, which is seen at a number of different points; but that moraine matter and erratic blocks have been deposited *above* them, either by glaciers or icebergs, there seems to be no room for doubting. We would venture to suggest, in conclusion, however, that the greatest possible caution ought to be exercised in attempting to correlate these Alpine deposits with the glacial beds of our own country.

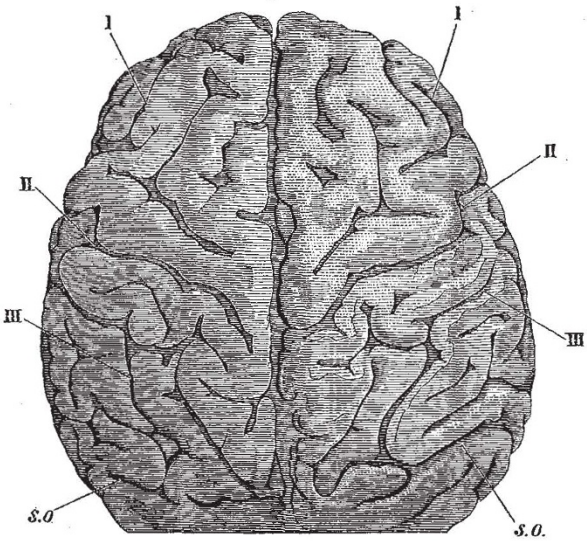
J. W. J.

THE BRAIN OF THE GORILLA

THE anatomy of the brain of the gorilla has been hitherto absolutely unknown. From the valuable photographs published by Dr. Bolau in his recent memoir on the anatomy of the gorilla, which was referred to in last week's issue of this journal (p. 127), I am enabled to give a brief account of its external anatomy, to reproduce the illustrations of its form, and to compare it with the brain of man and the other anthropomorpha. There are three views of the brain, the upper, the outer, and the inner surfaces, figures of which are here given, and a careful description of the sulci, by Dr. Ad. Pansch, is appended.

When seen from above the brain presents a broad ovoid figure, the greatest transverse diameter opposite the supramarginal convolutions, and very nearly two-thirds of its length from the anterior extremity; the frontal lobes are broad, and show a remarkable approximation to the square form of the human brain. In the lateral view it has moderate depth, the arching of the upper surface is but slight, and the highest point would seem to be about midway between the centre of its length and the broadest part. The dimensions are given, length = 100 mm., breadth = 87 mm., and the depth = 70 mm.; but the last certainly includes the cerebellum, for which an allowance of one-fifth may very properly be made, which will reduce the depth to 56. In the orang the three proportions are respectively 100, 78, and 50; in the chimpanzee 100, 84, and 66; in the bushwoman 100, 77, and 62. The breadth of the gorilla's brain here is notable, but in connection with this it may be pointed out that the bushwoman has as great a relative breadth of brain as the European, in whom the numbers are 100, 77, and 69, and

Fig. 1.

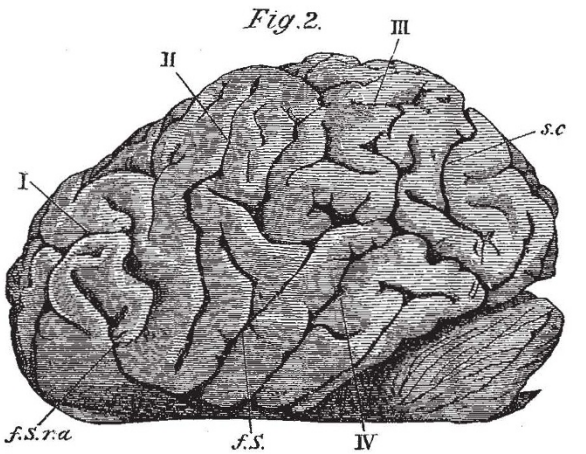


Upper view of the brain of the Gorilla. I. Sulcus, præ-central; II. Fissure of Rolando; III. Intra-parietal sulcus; *s.o.* External perpendicular fissure.

that the great and more valuable contrast is to be found in the depth; in the case of the orang (from Dr. Rolleston's paper) it would seem that it must be too low, probably from the flattening that follows removal of the brain from its natural cavity.

Hence conclusions drawn from the shape of the brain

Fig. 2.



Outer surface of the brain of the Gorilla. I. II. III. *s.o.* as before; IV. Parallel fissure; *f.s.* Sylvian fissure, posterior branch; *f.s.r.a.* Ant. branch of the same.

itself are from this very circumstance liable to error, and for this purpose casts of the interior of the cranium are the only reliable guides. Referring to those in the Hunterian Museum, that of the gorilla as compared with man is seen to be characterised by want of height, flatness of the vertex, and narrowed frontal obes; compared with