

of the Salève. This mountain, which rises about 3000 ft. above Geneva, consists of limestones and shales (Upper Jurassic and Neocomian), with Middle Tertiary sandstones, chiefly molasse, and glacial deposits. Apart from the effects of altitude, the flora is much affected by the nature of the rock on which it grows, and besides this, a small colony of special plants generally accompanies any local physical peculiarity. Of this association the large erratics of Alpine granite and schists afford a remarkable instance. *Asplenium septentrionale* is the only phanerogamous plant found on them to which rocks, in the High Alps, it is practically restricted.

BLOOD-PARASITES AND FLEAS.

FOR the past five years Prof. E. A. Minchin and J. D. Thomson have been engaged upon the investigation of the rat trypanosome, *Trypanosoma lewisi*, with special reference to its relation to the rat flea, *Ceratophyllus fasciatus*. The results of this laborious and painstaking research are now published in the *Quarterly Journal of Microscopical Science*. They form a comprehensive monograph which occupies the whole of the last part of this journal (vol. lx., part 4) and will undoubtedly be a standard work of reference for students of these very important blood-parasites. The fact that the authors have dissected and examined more than 1600 fleas in the course of their investigations shows the thoroughness with which the work has been carried out, while the artistic treatment and accuracy of detail contributed by the illustrations, for which due acknowledgment is made to Miss Rhodes, leave nothing to be desired. *T. lewisi* is fortunately a non-pathogenic parasite, at any rate so far as the rat is concerned, and it cannot live at all in human blood. It therefore forms a much more suitable type for general study than such deadly species as those which are conveyed by the tsetse-fly in Africa, and are responsible for fly-disease amongst horses and cattle, and for sleeping sickness in human beings. The authors give a very useful account of the technique employed in their investigations, and, incidentally, throw a good deal of light upon details of the anatomy and histology of the flea.

The flea, of course, receives the parasite with the blood which it extracts from the rat, but apparently it cannot infect the rat by inoculating trypanosomes into it through the proboscis. The rat is supposed to become infected through the mouth; in the process of licking its fur it takes in trypanosomes with faecal matter deposited by the flea; or it may become infected by eating infected fleas.

While in the flea the trypanosome is confined throughout its whole development to the digestive tract, where it undergoes extensive asexual multiplication and passes through a number of more or less distinct phases, some of which are intracellular in the epithelium of the stomach. No sexual phenomena have been detected, and the authors agree with Miss Robertson that such phenomena have not as yet been satisfactorily demonstrated in the case of any trypanosome.

CHANGES OF RELATIVE LEVELS OF LAND AND SEA.

AMONG the different kinds of evidence showing that changes in the relative levels of sea and land are going on all over the globe, the forms assumed by coast-lines are now recognised by geologists as being the most convincing and satisfactory. Sea-erosion, acting only along shore-lines, and sub-aerial denudation, operating over the whole land-

surfaces, result in features of such clearly differentiated character that no unbiassed observer can fail to recognise their great significance and value. When we find long, narrow, deep, and winding inlets from the sea into the land ("fiords," etc.), it is obvious that such features could not result from the cutting back of the coast-line by the sea, but that they are old river-channels that have been drowned by the sinking of the land. On the other hand, sea-beaches, with caves, fan-talus, and other signs of shore work, occurring at various heights above the present sea-level, speak, quite as unmistakably, of elevation having taken place.

The illustrious American geologist, James Dwight Dana, when accompanying the United States Exploring Expedition under Wilkes, had the opportunity of visiting many coral-reef islands, and we are indebted to him for first showing, in 1849, the value of the evidence afforded by coast-lines, where bounded by "encircling" or "barrier" reefs, of subsidence having taken place. These valuable observations of Dana seem to have been almost completely overlooked until quite recent years, and it is only fitting that to a fellow-countryman of his should fall the task of recalling and developing this pioneer work.

Where a coral-reef encircles a land-mass it is evident that the presence of "fiords" or their equivalents in the central island supplies clear evidence of submergence having taken place, though possibly this may not be the latest of the movements that have occurred. On the other hand, the existence of islands composed of upraised coral-rock, with sea-caves and shore deposits at different stages, up to more than 1000 ft. above the present sea-level, supplies equally clear evidence of movements in an opposite direction having taken place. The late Prof. Alexander Agassiz published a very valuable series of reports, abundantly illustrated, concerning these upraised Pacific reefs, and we now have the promise of equally important descriptions by Prof. W. M. Davis, also of Harvard, of the cases in which the proofs of subsidences can be no less satisfactorily made out.

The general result to which these various observations appear to point is that, over the whole area of the Pacific, areas of elevation and others of subsidence can be clearly traced, though the movements were often interrupted and sometimes reversed; nevertheless, it must be admitted that in some cases the evidence seems puzzling and contradictory—islands with clear evidence of elevation lying in close proximity to others which have clearly subsided. Geologists will not, however, be unprepared for the occurrence of such seeming anomalies; they will only recognise that, eventually, actual fault-lines may be traced by such means in the oceanic areas. At the same time it may be well to bear in mind the caution suggested by Darwin in his correspondence with Semper that, however clear may be the evidence in favour of any special theory of coral-reef formation, we must be always prepared for the occurrence of special cases which can only be accounted for by the operation of exceptional causes. The full and complete account—which will no doubt be sufficiently illustrated—of Prof. W. M. Davis's important series of explorations will be looked forward to with special interest, and in the meantime the subjoined general summary of his results will be welcomed by all naturalists.

J. W. J.

Preliminary Report on a Shaler Memorial Study of Coral Reefs.

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