

of difficulty in consequence of the changing thermal character of the air column between stations at different levels. Perhaps the diurnal variation of pressure affords the best line of approach. A proper formula regularly applied to observations at the top ought to give a diurnal variation of pressure at the base comparable with that obtained from direct observations at the bottom. What M. Vallot calls the "classical" method would certainly not do so. There is an interesting paper by Buchan on experiences at Ben Nevis which bears upon the subject.

NAPIER SHAW.

Sponge-spicules.

PROF. DENDY'S memoir (in *Acta Zoologica*, 1921, pp. 95-152, 50 figures) on the evolution of the tetraxonid sponge-spicule will appeal equally to those interested in problems of evolution or in sponge-spicules from the point of view of form and of their great taxonomic value. It is not only possible to arrange these spicules in an apparently phylogenetic series with a degree of completeness which is perhaps unparalleled in any other group of the animal kingdom, but the structure of the spicule itself, and the different forms which it assumes, are relatively so simple and definite that the problem of accounting for them in terms of physiological or physico-chemical processes seems far more capable of solution than similar problems among the higher animals. Prof. Dendy describes the forms of spicules of the primitive Plakinidæ, showing that they can all be derived from the tetract, and discusses concisely the evolution of megascleres (tetract, diact, and monact) and microscleres (polyact and diact) and the development of spines leading to the pseudopolyact forms. He also puts forward provisional conclusions as to the development of a spicule. Two kinds of cells—initial cells and silicoblasts—are concerned in spicule formation; the former cells secrete the organic material (spiculin) which forms the axial thread or proto-rhabd around which the silicoblasts collect and deposit silica. A growing spicule may come to be completely enveloped by a silicoblast, which has accordingly been regarded by nearly all observers as the mother-cell in which the spicule originates. In many cases the number of initial cells increases by cell-division as the spicule grows, and the development of spines and other outgrowths on the primary spicule is effected by the establishment of secondary growing points at the places where spiculin is deposited by initial cells. The causes which determine the form of the spicule are briefly considered, and though some of the characters of spicules are adaptive the vast majority are non-adaptive; for adaptation in spicule-form, where such exists, no satisfactory explanation seems to be forthcoming. To say that some "instinct" directs an amœboid silicoblast containing a spicule towards the gemmule or towards the surface of a sponge is, as the author remarks, not an explanation.

Iron Production in India.

THE *Journal of Indian Industries and Labour* for November last (vol. 1, part 4) contains, amongst other interesting matter, a summary of the present position of iron production in India which deserves the serious attention of all engaged in iron and steel industries. The large and rapidly developing coalfields, the enormous deposits of high-grade hæmatite iron

ore, ample supplies of limestone and of refractory materials, abundant and low-priced labour, all combine to place India in the position of a very serious potential competitor in the world's markets. Two firms are producing iron to-day—the Bengal Iron Co., with works at Kulti, on the Barakar River, comprising five blast furnaces, each with an output of 450 tons of pig-iron per twenty-four hours, and the Tata Iron and Steel Works at Jamshedpur, in Singbhum, with three blast furnaces having a capacity of 900 tons of pig-iron per diem; the latter firm also possesses a steel works with seven furnaces capable of producing 17,500 tons of ingots per month, whilst extensions to both the blast-furnace plant and the steel works are in course of erection and a plate-mill has just been completed. A number of new works are being projected; the Indian Iron and Steel Co. is building blast furnaces for an output of 600 tons of pig-iron per diem at Hirapur, the Eastern Iron Co. is building blast furnaces close to the Jharia coalfield, whilst the United Steel Corporation of Asia is to establish works producing both iron and steel at Manoharpur; this last works intends to use coal from the new Karanpura coalfield. The Kirtyanand Iron and Steel Works, near Sitarampur, does not at present propose to make pig-iron, but is confining itself to the production of iron and steel castings. In connection with the Tata works a group of subsidiary concerns have been, and are being, formed at Jamshedpur to work up the iron and steel produced by these works; they comprise the Calcutta Monifieth Works (for producing machinery for jute manufacture), Enamelled Ironware, Ltd., the Tinplate Co. of India (which will supply the Burma Oil Co. and other Indian oil companies), the Agricultural Implements Co., the Indian Steel Wire Products, Ltd., the Enfield Co., and the Hume Pipe and Construction Co.

University and Educational Intelligence.

CAMBRIDGE.—The governing body of Emmanuel College offers to a research student commencing residence at the college in October next a studentship of the annual value of 150*l.*, which shall be tenable for two years and renewable, but only in exceptional circumstances, for a third year. The studentship will be awarded at the beginning of October, and applications should be sent so as to reach the Master of Emmanuel (the Master's Lodge, Emmanuel College, Cambridge) not later than September 18.

The following grants from the Gordon-Wigan Fund are reported:—For plant-breeding experiments, 50*l.*; for museum cases, 35*l.*; for apparatus for studying marine organisms, 35*l.*; for the preparation of rock slices, 20*l.*; and for the preparation of sections of fossil plants, 10*l.*

The annual report of the General Board of Studies for the academic year 1920-21 refers to a distinct relief in the congestion in the scientific departments on account of the completion of new buildings. Fresh accommodation for chemistry and engineering has improved the position of affairs in those departments, and is easing it also in other departments. Several laboratories are faced with serious deficits on the year's working, and complaints are made of the effect of the 100 per cent. tax charged on certain things only procurable abroad. Valuable loans are announced of sound-ranging apparatus from the War Office and of radium from the Medical Research Council.