(d) Some other Papers.

The papers delivered before the Section dealt with a diversity of subjects. Mr. Matthews contributed a paper on "The Distribution of Certain Elements of the British Flora." These show peculiarities of geographical distribution in Great Britain which, when studied cartographically and compared with their occurrence on the Continent, seem to furnish additional evidence in favour of the views of some of the earlier students of the problems of plant repopulation after the Glacial period. The Palæarctic flora of post-Glacial times is now confined to the highest Scotch mountains, and has been replaced elsewhere in Great Britain by a temperate flora from the Continent.

Mr. Hamshaw Thomas gave an account of his investigations into the structure of some angiospermous fruits discovered in the Middle Jurassic rocks of Yorkshire. Each fruit, which shows traces of what may be a stigma, contains about eight small seeds clothed with a double fibrous integument. While the specimens are obviously Angiosperms in that the seeds are developed inside a fruit-wall, the seeds themselves show resemblances to some of the primitive Gymnosperms or Pteridosperms, and may yet throw light on the origin of the flowering plants, that difficult problem referred to by Charles Darwin as an "abominable mystery."

Prof. McLean Thompson, in his account of the floral development of the cannon-ball tree and its bearing on the floral morphology of the Myrtales, put forward the view that the gigantism of cells and sterility of pollen found associated with the floral lopsidedness had arisen as a mutation.

Dr. Batten gave an account of the organs of attachment in Polysiphonia; Miss Saunders put forward a theory of the morphological nature of the Dicotyledon shoot, viz. that each internode consists of an axial core clothed with a skin of the extended bases of the leaves immediately above.

Major Hurst's paper on "The Origin of the Moss Rose" raised many interesting problems, particularly in view of the recent cytological work on this genus. Täckholm and Blackburn and Harrison ascribe hybridity as the cause of the irregular distribution of unpaired chromosomes found to be associated with abortive pollen. Darwin's view that the moss rose is a bud variation of the familiar cabbage rose (*Rosa centifolia*) seems to be confirmed. The moss rose would appear to have arisen as a mutation, and to have been in cultivation only since the end of the seventeenth century, while the cabbage rose has been cultivated for more than two thousand years. In conclusion, Major Hurst expressed his views thus:—"In terms of the recent development of the chromosome theory of heredity it may be said that the *moss* mutation arose through the presence of an additional factor in a single locus of a single chromosome of a somatic cell."

"The Behaviour of the Somatic Nucleus in Development" formed the subject of a paper by Prof. McLean, who described briefly the discovery of the binucleate phase, and discussed its significance in relation to senescence, normal histogenesis, and somatic segregation of characters.

The eminent Dutch botanist, Dr. J. P. Lotsy, furnished a paper on "Factors of Evolution." He deprecated the custom of tracing the course of evolution through the genealogy of species which exist only as a conception. Nature produces individuals, some of which interbreed freely and may be termed "syngameons," and these have been mistaken for species. The course of evolution should rather be traced by the genealogy of the gametes, and the questions of fundamental importance are: Can a gamete vary by itself without loss of chromosomes? And are such variants transmissible? The only transmissible changes proved to occur are the results of crossing, and they transgress the limits of the Linnean species. Not enough attention has yet been given to the crosses between gametes differing in the number of chromosomes and the consequent irregular distribution which causes changes that may even simulate Mendelian segregation.

E. N. M. T.

Mont Blanc Meteorological Observations.

THE seventh volume of Annales de l'Observatoire Météorologique Physique et Glaciaire du Mont Blanc (altitude 4350 metres) has now been published, under the direction of M. J. Vallot, founder and director of the observatory, following the sixth volume which was published in 1905 (tome 7, Paris, G. Steinheil, éditeur, 1917). It records the death of Janssen in 1908 and the transformation of the provisional society of his observatory at the summit (4808 metres) into a *société définitive* which placed that observatory also under the direction of M. Vallot. Both were utilised in 1908, but that on the summit became not merely uninhabitable, but dangerous, and it was therefore demolished in 1909. Since that date work has been carried on only at M. Valot's observatory, which he had placed at the disposal of the society. The volume referred to deals only with the work accomplished before the union of the observatories. The researches made at the cost of the society have been published *en résumé* in the *Comptes rendus*; those which cannot find a place there, as well as reports *in extenso*, will appear in later volumes of the Annales.

The publication of the seventh volume has been delayed by M. Vallot's ill-health and by the war. It contains two papers by M. Henri Vallot, one on some modern maps of the massif of Mont Blanc, the other on the progress made with the map on the scale of 1 : 20,000 by the brothers Vallot; also some "Notes expérimentales sur le mode d'action des cures d'altitude," by M. G. Kuss, of the Sanatorium d'Angicourt. The greater part of the volume is occupied by an elaborate discussion by M. J. Vallot of the barometric calculation of altitudes, particularly on the correction for the diurnal variation of the temperature of the air, which with the ordinary formula may cause differences of as much as a hundred metres in the estimation of a difference of level of 2800 metres. The discussion leads up to the suggestion for correcting the value of the difference of height obtained by the "classical" tables by a correction based on the mean temperature of the day for the base station, on a temperature for the upper station obtained from the base temperature by subtracting one degree for every 154·5 metres, and on a special correction for diurnal variation of temperature based on a month's observations in 1887 of Mont Blanc with reference to Geneva. Suitable winter values have still be to be ascertained. Examples of the application of the method are given and a defence of the procedure in view of recent work on the subject, which is of practical importance for meteorological maps as well as for Alpinists It is, however, full

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 protorhabd 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.