expedition, there is much which requires further study. The occurrence of the very faint phenomena is a case in point. The anomalous behaviour of the aurora at the Queen Mary Land station furnishes another example, the fairly even distribution of the aurora in different azimuths at this station being difficult to explain in view of the relative infrequency of its occurrence in the zenith.

The enhancement of the diurnal variation in the magnetic elements in high latitudes on disturbed days during the winter indicates an associated ionisation comparable with that due to sunlight, and there seems no doubt that this ionisation is responsible for the interesting correlations between auroral and magnetic activity. Whether any effective correlation exists also between auroral activity and radio transmission in and across the polar regions is not known, but the promised Part 3 of the present volume should throw some light on this question.

Quite apart from these interesting correlations and the laboratory work in progress to determine the properties of the radiations responsible for the aurora and the constitution and form of matter which emits the auroral light in the upper atmosphere, an immense amount of research is still required to clear up the position. More determinations of height and more spectroscopic observations, particularly at great heights, are required at widely separated places and especially in the Antarctic. More work is necessary to determine the cause of the occurrence of unusual colours during unusually active displays and to determine the wave-lengths of the weaker lines of the spectrum and their relative intensities. The relation between the light of the night sky and the occurrence of the auroral green line seems to demand further investigation, as also the fact that the polar aurora appears nearer the magnetic axis of the earth in storm periods, while the occurrence of an aurora in low latitudes is on occasions of world-wide magnetic disturbance.

This list of problems is only a small selection from a very large number which require investigation before the accepted outline theory of the origin of aurora can usefully be elaborated.

Our Bookshelf.

Fourfold Geometry: being the Elementary Geometry of the Four-Dimensional World. By David Beveridge Mair. Pp. viii+183. (London: Methuen and Co., Ltd., 1926.) 8*s*. 6*d*. net.

MR. MAIR states clearly in his preface the scope of his book, which deals essentially with the elementary geometry of a four-dimensional continuum of space and time, the existence of straight lines being assumed. His aim is to prepare the ground for an understanding of relativity geometry rather than to treat his subject as a special case of general manifold geometry. The terminology is evidently chosen from this point of view, and the distinction between 'time-like' and 'space-like' vectors is made early in the book and used throughout.

The author begins with an account of the line vector from which he builds the area, volume and super-volume vectors. He explains geometrically his frames of reference or lattices in two, three, and four dimensions in turn, deals with combination of vectors, defines the tensor operator and establishes the invariants for transformation of lattices. As examples he discusses the velocity vector, derives the Lorentz transformation and gives a brief account of the motion of a particle. One feels, however, that these results are not so much illustrations as part of the scheme of the book.

From the first the notation is carefully explained and chosen to foreshadow and fit the tensor operations which thus emerge naturally and easily. The style is lucid and precise. Such terms as 'perpendicularity' and 'parallelism,' for which new definitions are needed, are treated with admirable clearness. The dependence of results upon the straight line hypothesis is emphasised, and it is shown how the removal of this restriction leads to the wider problems of the curved fourfold, which, as Mr. Mair points out, are beyond the scope of the book, although he indicates the use of the geodesic. The idea of invariance for different lattices is well stressed so that the reader cannot fail to realise its importance. A knowledge of Cartesian geometry is assumed, but very little more. The careful diagrams and well-thought-out exercises interspersed in the text, together with solutions at the end, add to the value of this stimulating little book.

Essentials of Systematic Pomology. By Prof. Brooks D. Drain. (The Wiley Agricultural Series.) Pp. v+284. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1925.) 13*s*. 6*d*. net.

THE increasing number of varieties of fruit and the uncertainties of commercial nomenclature render the study of pomology full of pitfalls, and the student and grower alike will welcome Prof. Drain's attempt to set forth the essentials of the subject in a lucid style, shorn of unnecessary detail. Though dealing with American conditions, the text-book should prove of value to workers in other countries also. In studying the principal varieties of hard and soft fruits the various points are tabulated into good and bad characters, with notes on distribution and extent of cultivation. Various keys for the classification of apples are considered, that of Carpenter and Stafford being regarded as the best, Shaw's key for leaves and Keil's group classification of the fruit also finding a place. Of special interest are the sections on fruit exhibition and judging, details of American rules being given with the appropriate methods of scoring points. Exercises for class work are suggested, with practical hints on the cold storage of soft fruits for examination at later dates. A glossary of pomological terms and a certain number of references are included.

The development of fruit varieties in North America has been closely connected with the settlement and