

It is true that a very considerable space is devoted to the history of the production of hybrid forms, and that an account is given of the methods of securing successful germination of spores; but those who expect to find a treatise on the cultivation of ferns *per se*, will not find their hopes realised.

The author again takes up cudgels in defence of his views as to the existence of *multiple parentage*, a term used to express his conviction that a single oosphere can be fertilised by several antherozoids, or at the least, that a number of fertilised oospheres on one prothallium can influence the one which actually develops into a seedling plant. It is true that some of the experiments adduced by the author in support of his contention offer startling results. Thus, if a pan be sown with the spores of, say, four varieties, in a large percentage of the seedlings each will exhibit resemblances to all the four forms, instead of to only two, at most, of them. And this latitude of variation exercised in the case of a single seedling is stated to depend on the number of varieties which are sown together, and not to accidental sports.

But the inferences thus drawn by the author are so entirely at variance with the results of experimental investigations on the higher organisms, that they will meet with a cautious reception, at any rate, until the factors which make up his results have been analysed and are better understood.

Whatever the ultimate verdict which will be passed on the theoretical conclusions may be, the details of the experimental basis on which they rest, provide interesting matter enough, and suggest fresh lines of investigation which may well prove fruitful in results.

*Vorlesungen aus der analytischen Geometrie der Kegelschnitte.* By Sigmund Gundelfinger. Edited by Friedrich Dingeldey. 8vo. viii. + 434 pp. (Leipzig: Teubner, 1895.)

THE first part of this book (pp. 1-240) is an edition of lectures on Conics delivered by Gundelfinger within the last twenty years in the University of Tübingen and the Technical School at Darmstadt. It contains a systematic exposition of the analytical theory of Conics based on the use of general homogeneous coordinates which are so arranged that corresponding results in particular homogeneous coordinates and in ordinary Cartesian coordinates can be written down from the results obtained. It also contains an exposition of the theory of sets of Conics, including four-point and four-tangent Conics, and nets and webs of Conics. The theory is not written out with the idea of enumerating all the independent concomitant forms, but with the idea of expressing the geometrical significance of the most important ones. The appendix (pp. 240-426) contains solutions of problems on the subjects treated in the first part. Many of the problems are taken from the works of Steiner, some are original, and not a few are difficult. A very complete index is given at the end of the book.

*Light.* By H. P. Highton, M.A. Pp. 243. (London: Rivington, Percival, and Co., 1895.)

BOOKS upon light are many and of various qualities, but we think there is room for this little one. The subject is treated in a very elementary manner, and is made easy of comprehension by numerous diagrams. A further good point possessed by the book is that the lessons comprised in it are fully illustrated by experiments, all of which are capable of being carried out by teachers whose apparatus cupboards only contain a small stock of materials for the demonstration of optical facts and principles. The boy who goes through a course such as that described by Mr. Highton, and who sees all the experiments performed, will obtain a fair notion of the laws of light; and if he does the experiments himself, he will benefit considerably by the manual and mental training which his work will give him.

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## LETTERS TO THE EDITOR.

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### Curious Aerial or Subterranean Sounds.

If the mysterious sounds referred to by Prof. G. H. Darwin should turn out to be of subterranean origin, as is not unlikely the case, it may be that they are the reports arising from the process of "faulting" going on on a small scale at a great depth, and not of sufficient intensity to produce a perceptible vibration at the earth's surface. In this connection I may recall an observation which bears upon the subject. When collecting materials for the report on the East Anglian earthquake of 1884, I was given a most circumstantial description of a loud report which was heard by the chief officer of the coastguard station at West Mersea during his watch between 1.10 and 1.20 a.m. on February 18 of that year. The sky was cloudless at the time, there was no flash such as might have been expected if the sound had been due to thunder or the explosion of a meteorite, and there was no artillery sufficiently within hearing to account for the sound. This report heard by the coastguard officer was afterwards found to have been *felt* as a slight shock at a house which was very much damaged by the earthquake which occurred a few weeks later (April 22), and we came to the conclusion that the officer and the inhabitant of the house in question had independently recorded a premonitory shock ("Report," p. 40, by the writer, and W. White, "Essex Field Club Special Memoirs," vol. i.). When Prof. Darwin's request for information shall have led to further knowledge as to the localities where the phenomenon has been observed, it would be of great interest to have in such places instruments for recording earth tremors.

R. MELDOLA.

November 3.

Is it not possible that the "Berisál Guns" and "mist pouffers," referred to by Prof. Darwin (p. 650), are merely earthquake sounds, the attendant shock being too slight to be otherwise perceptible? Nearly all earthquakes are accompanied by a rumbling sound, due, I believe, to the small and rapid vibrations proceeding chiefly from the margins of the area over which the fault-slip producing the earthquake takes place (*Geol. Mag.*, vol. ix., 1892, pp. 208-218). In some districts (Comrie in Perthshire, East Haddan, in Connecticut, Pignerol in Piedmont, Meleda in the Adriatic, &c.), sounds without shocks are common during intervals which may last for several years, but slight shocks with sound occasionally intervene, as if the sounds and shocks were manifestations, differing only in degree and the method in which we perceive them, of one and the same phenomenon. In great earthquakes, the sound-area is confined to the neighbourhood of the epicentre; in moderate and slight shocks the sound-area and disturbed area approximately coincide, or the sound-area may even overlap the disturbed area. In the limiting case, the disturbed area vanishes, and the vibrations are perceptible only as sound.

C. DAVISON.

Birmingham, November 1.

### Thermal Conductivity of Rocks.

IN view of recent discussions in NATURE anent the variation of the thermal conductivity of different kinds of rock with the temperature, the following results of an investigation, which has been in progress for the last year in the Jefferson Physical Laboratory, may be of interest.

We have made observations upon piles of comparatively large flat slabs of marble and slate by a form of "wall" method, and we hope that we have determined, with some accuracy, the internal temperature gradient.

We can detect no change in the conductivity of the block of white Carrara marble which we have used between 0° C. and 330° C.

In the case of our slate, the conductivity in a plane perpendicular to the cleavage increases about 25 or 30 per cent. between 70° C. and 300° C., the rate of increase being less rapid at the higher temperatures.

B. O. PIERCE.

Cambridge, Mass., October 20.

R. W. WILLSON.