

Brunoniaceæ, members of the sympetalous series Campanulatae. The former is a small but important Australian family with about 300 species; the latter is a monotypic group, restricted to a single species, *Brunonia australis*, a small perennial herb of somewhat daisy-like habit, widely distributed in Australia. It is interesting to note that the wealth of Australian material preserved in the great herbaria at the British Museum and Kew have supplied a large proportion of the material on which Dr. Krause's monographs are based.

A. B. R.

OUR BOOKSHELF.

Le Monde Polaire. By Otto Nordenskjöld. Traduit du Suédois par G. Parmentier and M. Zimmermann. Préface du Dr. J. Charcot. Pp. xi+324+xx plates. (Paris: Librairie Armand Colin, 1913.) Price, 5 francs.

HERE is a handbook to the Polar regions, dealing, not with the exploration (of such there are plenty), but with the physical conditions of the regions, for which there was a vacant place. It is well for readers outside Scandinavia that it has been translated from the original Swedish into French: it might well be so into English. In a sense it treats the two polar regions as one, for it is comparative throughout, and for that reason the chapters are not arranged in a topographical sequence. Thus we have successive chapters devoted to Greenland, Iceland, and Spitsbergen; the next chapter deals with the Antarctic lands. The writer ranges widely enough to include among "sub-antarctic" lands Patagonia and Tierra del Fuego, the Falkland and other islands, and New Zealand, so far as that Dominion can be considered to lie under such conditions; correspondingly we find chapters on Arctic America (including Labrador), on Siberia, and on north-western Europe. Numerous photographs and sketch-maps accompany the text, and the French translation, which is prefaced by an introduction by Dr. J. Charcot, appears to have been excellently carried out by MM. G. Parmentier and M. Zimmermann. Dr. Nordenskiöld's chapters deal with the relief of land, ice conditions and effects, plant and animal distribution, climatic conditions and human life, and, where appropriate, with economic products.

Coast Erosion and Protection. By E. R. Matthews. Pp. xiv+147+33 plates. (London: C. Griffin and Co., Ltd., 1913.) Price 10s. 6d. net.

THE author of this book writes with a practical knowledge of the subject with which he deals. He holds the position of Borough Engineer of Bridlington, and has constructed sea walls, promenades, and sea defence works of considerable magnitude, which are good examples of what such work should be.

The book follows much the same lines as that

on the Destruction, Littoral Drift, and Protection of the Sea Coast, published by Messrs. Longman and Co. in 1902, but it does not treat the question of Littoral Drift with the same detail. As that book is now out of print, and the author of the present book has had the advantage of the large body of evidence laid before the Royal Commission on Coast Erosion, this work will be a valuable aid to engineers called upon to take charge of sea defence works.

The text is very fully illustrated with numerous plates showing the effect of waves on sea walls and cliffs in course of erosion, and illustrations of sea walls, groynes, and other sea defence works. As these latter are clearly drawn, and have the dimensions of the several parts marked on, they cannot fail to be of great practical use.

The book is divided into twelve chapters, the subjects dealt with being: wave action; erosion and accretion of the shore; types and designs of sea walls; groynes; reinforced concrete; and the action of sea water on cement and concrete.

In his account of the erosion of the Yorkshire coast, the author repeats the old fallacy of the material eroded from those cliffs being carried southward by the tides and being deposited on the Lincolnshire shore, and also as being carried up the Humber. This subject was fully dealt with in a paper on the source of warp in the Humber, read before the Geological Section of the Glasgow meeting of the British Association in 1901, in which it was shown that it is practically impossible for this eroded material to be carried so far southward; and samples of water taken on several occasions of the water entering the Humber on the flood tide give no indication of alluvial matter being carried into that river.

I Fenomeni Magnetici Nelle Varie Teorie Elettromagnetiche. Note Storico-Critiche. By Silvio Magrini. Pp. 165. (Bologna: Nicola Zanichelli, 1912.)

THE scope of this interesting little volume, by an Italian author, is novel to English readers; at least, the present writer cannot recollect any other book devoted entirely to the history of the theory of magnetism. Oersted's fundamental discovery that an electric current gives rise to a magnetic field in surrounding space was important, not only as the starting point of electro-magnetism, but also because, in the hands of Ampère, it became the basis of a theory designed to explain the physical nature of magnetism. Beginning at this point, the author passes in review the work of Poisson; Faraday's conception of lines of force, with its necessary recognition of the part played by the medium; the successful development of this idea in mathematical form by Maxwell; the theories of Weber and Ewing; the experimental work of Curie on diamagnetic and feebly magnetic substances; and finally, the modern electronic theory of magnetism as extended by Langevin, Weiss, Gans, and others. The various stages in the historical development are

clearly displayed, and, although more elementary in its treatment, the book is a worthy companion of Whittaker's well-known "History of the Theories of Elasticity and the Ether." An English volume of similar scope would be a very desirable addition to current text-books.

R. S. W.

LETTERS TO THE EDITOR.

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The Theory of Radiation.

THE natural unit of angular momentum postulated by Dr. Niels Bohr, of Copenhagen, in his researches on the theory of spectral lines actually exists. It is the angular momentum of the magneton. Rejecting entirely the idea of magnetic or electric substance, the magneton may be regarded as an inner limiting surface of the æther, formed like an anchor-ring. The tubes of electric induction which terminate on its surface give it an electric charge, the magnetic tubes linked through its aperture make it a permanent magnet.

I find that the angular momentum of any such system, whatever its shape or dimensions, about its axis of symmetry is $(8\pi^2 V)^{-1} e\mu$. V is the velocity of light, e the electric induction over the surface, and μ the magnetic induction over the aperture. I shall consider elsewhere the applications to the theory of complete radiation, spectral series, and the asymmetrical emission of electrons in ultra-violet light. Only this need be mentioned. If an electron (charge e) be thrown off from a magneton like a speck of dust from a flying wheel, then the angular momentum of the magneton changes by the amount $-1(2\pi V)^{-1} \mu$. This is therefore the angular momentum of the ejected electron about the axis of the magneton. Taking the velocity of ejection to be proportional to the angular velocity in the magneton, we have Ladenburg's result that the energy of the emitted rays varies as the frequency.

Dr. Bohr, by first insisting on the fact that Planck's h is an angular momentum, has done something of the greatest importance, whatever the ultimate fate of his particular interpretation. Dr. Nicholson has, I think, used the same idea.

G. B. McLAREN.

University College, Reading, September 20.

Stability of Aëroplanes.

IN his experiments on the resistance of the air to spheres, M. Eiffel showed that for a certain critical velocity for a given sphere the resistance suddenly fails. The critical velocity appears to be very different for different spheres; e.g. in his paper (*Comptes rendus*, December 30, 1912) the sudden change is shown to begin at velocities of 12, 7, and 4 metres per second for spheres of diameter 16.2, 24.4 and 33.0 cm. respectively.

Suppose we make a triangular frame with one of these spheres at each corner and allow the frame to fall from a height. It would appear that if the weights of the spheres were so adjusted that the frame would

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maintain a horizontal position for a part of its flight, it must reach some velocity at which the equilibrium of the resisting forces would be destroyed, and rotation would ensue, tending to make the frame take up a vertical position.

If such a law holds for bodies of other shapes than spheres, it would appear that an aëroplane would have a much better chance of being stable in winds of great variety of velocities, if the resisting surfaces were all of the same size and shape.

I do not know whether this case has already been dealt with by others, and I make the suggestion for what it may be worth.

G. A. SHAKESPEAR.

The University, Birmingham.

The Pancreatic Treatment of Tuberculosis and Malaria.

THERE are two points in Dr. Saleeby's remarks upon p. 61 of NATURE (September 18, 1913) which I should like to notice briefly. In my letter to you on the same page I did not refer to Baetzner's brilliantly successful results in the treatment of tuberculosis by pancreatic enzymes (*The Practitioner*, January, 1913, pp. 203-219), because after his prolonged investigations the thing is an accomplished fact, which cannot be disputed by any interested in its operative treatment. I am neither a medical practitioner nor the apostle of a new faith, but merely a scientific investigator. I foresaw, and foretold, the complete success of this treatment of tuberculosis in 1907; and with the fulfilment of this scientific forecast at the hands of Dr. M. A. Cleaves in that year and of Dr. W. Baetzner more recently, my concern with the matter has ended. Moreover, I have taught medical students for more years than I care to think of, and I know how hopeless it is to try to teach something new of a scientific nature to the medical profession.

As to the sexual phases of the life-cycle in malaria, they are of no practical importance at all in the treatment of malaria by enzymes. A reference to Major Lamballe's original manuscript shows that the presence of such sexual phases had been verified in several of his cases. Like all the clinical symptoms, such as in grave cases, delirium and coma, these sexual phases vanished and did not return, when the Fairchild injections of trypsin and amylopsin were administered. These sexual phases, the so-called "crescents," have a scientific interest, but scarcely a clinical importance, as Major Lamballe also recognises. The disease is not continued by them any more than cancer is continued by the cells, to which Prof. Farmer gave the name of "gametoid tissue." Probably they are got rid of by the leucocytes, but, in any case, in ordinary circumstances the pancreatic ferments would be devoid of action upon such sexual phases, as my experiments upon various non-pathogenic micro-organisms demonstrated (*vide* Beard, J., on the occurrence of dextrorotatory albumins in organic nature, *Biol. Centralblatt*, vol. xxxiii., pp. 150-170, 1913).

J. BEARD.

8 Barnton Terrace, Edinburgh, October 1.

Relative Productivity of Farm Crops in Different Countries.

IN view of the repeated statements that British farming is declining and that the world is threatened with a shortage of wheat supplies, the following extract from the results of an investigation into the facts regarding both these questions may be of interest. Lack of space precludes reference to the