in evolution. These are the seven divisions of the book, which aims at providing a foundation suitable for the further study of one or more of the many branches.

Prof. Calkins has selected his material judiciously, and by exercising unusual restraint he has kept his introduction within appropriately small dimensions. His treatment is beautifully clear throughout and he drives his nails home. Only in a few cases, *e.g.* in the last chapter, is the treatment too short to be of great use to the ordinary student, who must always have a certain amount of solid concrete stuff to chew at. We have two or three other suggestions to make—though it is a little like trying to adorn the rose. We have a strong impression that general biology deals with the fundamental principles not of living matter, as the author insists, but of organisms. We do not admire the striking first figure in which Prof. Calkins makes general biology the centre of twelve sub-sciences, duplicated for plants and animals, for the arrangement of these does not appeal to us and we have grave doubts regarding the neurology of plants. There are a few typographical errors, which should be seen to: the function of the “sdnalg” is immaterial, but Dalton instead of Galton (both in the text and the index) is awkward. These are pin-point blemishes on a work of great excellence, which is sure to be found very useful. Many of the new figures deserve great praise, *e.g.* the stereogram of the earthworm for its utility and the picture of Hydra for its beauty. J. A. T.

Farm Accounts. By C. S. Orwin. Pp. 209. (Cambridge University Press, 1914.) Price 3s. net.

As might be expected, Mr. Orwin has made this a very valuable book. Many works on book-keeping are arid and unconvincing because the transactions described are obviously artificial, but here we come into contact with the actual thing, and feel that the author is writing from large practical experience of farm accounts. The introduction demonstrates that the farmer is a manufacturer, not a merchant, so that his book-keeping should be conducted on the principle of tracing the cost of production right through to the time of sale. Farm valuations are then lucidly explained, and illustrated—as are all the other topics—“from actual accounts kept by tenant-farmers in various parts of Britain.” The following chapter on farm records deals with manual and horse labour, foods and manures. Next comes a clear and detailed description of the way books ought to be kept, accounts closed, and the figures used for construction of a profit and loss account and balance sheet. The final chapter sets forth some of the conclusions and deductions that may be arrived at by study of the year’s accounts. An index is appended.

The work is primarily intended for use in farm institutes, and should be well within the comprehension of full-time county council students in agriculture, though probably too difficult for short coursers, whose school education has often largely

evaporated. The value of the book would be enhanced by the addition of exercises for class work. J. R. A.-D.

Who's Who, 1915. An Annual Biographical Dictionary, with which is incorporated “Men and Women of the Time.” Pp. xxx+2376. (London: A. and C. Black, Ltd.) Price 15s. net.

WE have again to note an increase in the size of this invaluable work of reference. The many excellent characteristics of this annual are familiar to all who take part in the world’s activities; and it will be enough to remind readers of NATURE that it contains biographies of distinguished men of science, including, for instance, the fellows of the Royal Society, and those occupying important professorial and professional positions in this and other countries.

Magnetism and Electricity, including the Principles of Electrical Measurements. By S. S. Richardson. Pp. ix+598. New and revised edition. (London: Blackie and Son, Ltd., 1914.) Price 4s. 6d.

THE first edition of Mr. Richardson’s book was reviewed in the issue of NATURE for December 31, 1908 (vol. lxxix., p. 246), and a description of its chief characteristics was then given. The whole of the text of the new edition has been revised, several portions have been re-written, and a chapter on the principles underlying the action of dynamos and motors has been added.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

The Appley Bridge Meteorite.

IN NATURE of November 5, 1914, Mr. W. F. Denning gave an account of the meteorite of October 13, 1914, in which he mentions that the object had been found, and was then at the Godlee Observatory, Manchester.

The object which fell at Appley Bridge belongs to the aerolites or stony meteorites, and not to the siderites or irons. In appearance there is the striking meteoric features of deep thumb marks—piezoglyphs—and the general coating a dark brown to black. This was in distinct contrast to the interior, which was of a light grey colour. In general the figure gave one the impression of its being a segment of a spherical shell, the dimensions being:—

Length	...	...	...	9.65 in.
Depth	...	...	...	9.13 „
Width or thickness	...	...	...	6.62 „

The longest diagonal measurement gave 10.76 in. When the aerolite reached the Godlee Observatory, it was in two pieces, weighing 28 lb. 13 oz., and showed evident signs that some considerable portions had been broken away since its discovery.

The very friable nature of the mass was such that portions could be readily broken off by the thumb and fingers, and it is to this softness of texture that its losses are due, as the weight at the time of discovery was given as more than 30 lb.

It is certainly a remarkable object, as on a comparison with the list of meteorites recorded in Great Britain, published in the British Museum Guide to Meteorites, there is only one given of greater weight, that fell at Wold Cottage in Yorkshire in 1795.

The outer coating, which varies from a very thin film to nearly 2 mm. in thickness, presents a very finely-pitted surface, with evidence of a tendency to show lines of movement, as though the heated skin was being pushed backwards from the direction of motion. The portions which had become fused showed a dark glazed or shiny surface, this evidently being the forward end, and the portion to which the heat from the compressed air in front of it was most effective. The appearance of the pittings suggest that the heating of the surface was the means of liberating some portions of the structure of the mass, and that these would provide what is seen as the trail of the meteor after it has passed in its flight through the air, being the continued glow of the heated emissions by combination with the oxygen in the air.

There is evidence that some portions of the surface

Appley Bridge Aerolite, October 13, 1914.

had only come into contact with the air during the later portion of its traverse. These regions have all the appearance of flakes of the outer skin having been broken away, a slight tarnishing of the pyrites, if at a distance from the edge of the fracture or slight fusing when close to the general outer coating, indicating a removal of portions of outer layers of the mass.

This is quite in keeping with the assumption that the fragments were split off at the time of the apparent burst in the air, at about twenty miles' altitude, as from that position the speed of the meteor would be so much reduced by the compressional friction, that it would be losing more heat than gaining.

The fractured surface on an inspection appeared to be made up of a glittering mass of white and yellow points in a grey setting. These proved to be chiefly pyrites, and their presence accounted for the apparent great weight according to the size. The specific gravity of the mass determined from a fragment was 3.33, and is in accord with what would be

NO. 2358, VOL. 94]

expected from the mineralogical contents. A magnetic examination of the mass as a whole gave no appreciable effect, although a search amongst the dust which accumulated from the rubbing of the two pieces, indicated portions of magnetic nature though small in amount which proved to be metallic iron.

The pyritic material contains nickel as well as iron, portions being crystalline, the olivine being of a pale yellowish-green colour, whilst the enstatite is whitish or grey.

The proportions of the minerals worked out on the basis of the composition and solubility are approximately:—

Pyritic and metallic matter	...	...	5.07
Enstatite	...	...	31.5
Olivine	...	...	63.43

The analysis which has been made by Mr. E. L. Rhead indicate the presence of the following in order of amount:—

Silica	...	SiC ₂	Phosphorus	...	P
Magnesia	...	MgO	Soda potash		
Iron...	...	Fe	Chlorine		
Alumina	...	Al ₂ O ₃	Lime, etc.		
Sulphur	...	S	With oxygen in combina-		
Nickel	...	Ni	tion		

The accompanying illustration shows the front view of the aerolite with the thumb marks.

WILLIAM C. JENKINS.

11 Upper Lloyd Street, Moss Side, Manchester,
December 27, 1914.

A Suggested Definition of Magnetic "Permanence."

FROM time to time accounts appear of experiments on new kinds of steel which have been undertaken with the object of determining the most suitable material from which to construct a permanent magnet. Experiments of my own on this subject, made a good many years ago, led me to think that it would be an advantage if precision could be given to the term "permanence" in magnetism, and inasmuch as a high coercive force is the principal factor in the preservation of the magnetism in a magnet the measure of *permanence*, I think, might be taken as the *coercive force per unit of residual magnetic intensity*. Thus the inclination of the intensity-field curve as it falls from residual to zero intensity indicates what the permanence of the magnet may be expected to be.

According to this definition the permanence of soft iron is about 0.0024. Recent experiments by Miss Margaret Moir (*Phil. Mag.*, November, 1914) on chrome steel give the high permanence of 0.165, or, if the calculation is made from final residual magnetism after shocks and changes of temperature, of 0.201. These examples show a range of permanence from 0.0024 to 0.201, in the ratio of 1 to 84, but it is not unlikely that these limits may be exceeded.

J. R. ASHWORTH.

55 King Street South, Rochdale.

EUROPEAN AERODYNAMICAL LABORATORIES.¹

IN the summer of 1913 Prof. Zahm and Lieutenant Hunsaker, of the United States, visited the European aerodynamical laboratories in order to study apparatus and methods in use, before finally deciding on the details of the material to be

¹ Report on European Aeronautical Laboratories. By Dr. A. F. Zahm. Smithsonian Miscellaneous Collections, vol. lxii., No. 3. (Washington: Smithsonian Institution, 1914.)