

and offices at the disposal of the Flying School which is about to be formed in Reading. Munitions work has been instituted in the physical laboratory, and the making of splints for use in hospitals is being carried on in the building devoted to craft work. The lists of military distinctions and of officers killed in action, as well as the list of present members of the staff, past and present students, and present servants of the college serving with the Forces of the King or in the French Army, printed in the magazine, are a splendid tribute to the loyalty and patriotism of the institution.

FOUR points relating to the place of science in education are dealt with by Sir E. Ray Lankester in a letter to the *Times* of January 14. The first consideration is that instruction in the elements of physics, chemistry, and biology must not be limited to the few, but be a part of the education of all; for they are equally necessary for the conduct of public affairs in a progressive spirit as for the development of industries. The view that attention to scientific knowledge necessarily leads to the barbarisms committed by our German adversaries is as illogical as it is untrue. The men who are responsible for the present conflict are not men of science but historians and other official advocates of world-power by Germany; and the military authorities have made use of whatever forces scientific discovery can give them. The third point referred to is that science in the public schools and universities is regarded as specialisation, whereas Greek and Latin and allied subjects are considered to be parts of a general education. This view is a legacy of past centuries, and should be the reverse of the truth for modern times, though classical headmasters will not understand the different needs of to-day, and will not depart from the ways of traditional instruction. Sir Ray Lankester places the chief burden of responsibility for existing conditions upon the Civil Service Commissioners, who assign an overwhelming excess of marks for classical and literary learning in examinations for the chief posts in the national service. He would give one-half of the possible total to science, which should be compulsory for all candidates, one-quarter to mathematics, and one-quarter to the classical and literary group; and he believes that "the one and only way of saving the country from utter inefficiency and consequent ruin is for the Legislature entirely to remodel the competitions for the valuable posts of the Home and Indian Civil Services."

An interesting supplement on "War and Education" appeared in the *Times* of January 14. It is a commonplace that a great war is invariably followed by educational reform, and in the first article this is illustrated in English education from Alcuin to the South African war. It was the last-named which led to measures—medical inspection and provision of meals—for securing better physical care of school children. In most of the articles the importance of character training receives due recognition, the columns headed "A Lesson of Empire" and "Teaching Patriotism" being written with force and judgment. The editor directs attention to the great need of the immediate future, the training of boys and girls between the ages of fourteen and seventeen. At present two millions below the age of seventeen are receiving little or no education either in school or in skilled work. All who have given thought to the matter are in agreement as to the importance of educating our adolescents, both from the point of view of ethical training for citizenship and of increasing productive efficiency, but not all thinkers will agree as to the methods advocated by the editor of the "Educational Supplement." Dr. M. E. Sadler

discusses the comparative merits of German and English education, and gives as the defects of English education: (1) too low a standard of *mental* training, hence failure to realise the value of pure science; (2) uninstructed parental opinion; (3) failure to stimulate intellectually the average boy and girl; (4) inertness of mind towards science in industry, public administration, and domestic management; (5) neglect of personal hygiene in its widest sense. British schools must impart love of knowledge and care for conduct; love of adventure and readiness to endure routine; capacity for individual initiative, and patience in the work of scientific co-operation. All the articles are useful so far as they go; it is a matter for regret that Dr. Sadler is alone in recognising the necessity for greater attention to science. The unfortunate and serious omission to give proper consideration to this vital need is a defect in an otherwise able and helpful symposium.

With the approval of the War Office, Colonial Office, and Board of Education, and of the High Commissioners of the Dominions beyond the Seas, an organisation has been formed with the title of "The Fighting Forces Book Council." This organisation, of which Lord Bryce is president, and Sir Edward Ward the chairman of the executive committee, is intended to supplement, and not in any way to overlap, existing bodies, such as the Camps Library, which is the recognised collecting and distributing *dépôt* for the books sent through the medium of the General Post Office, the Red Cross, and St. John's Ambulance War Library, which supplies the hospitals, and the Young Men's Christian Association. Through the machinery of these various organisations large quantities of books—mainly light fiction—are being regularly distributed to the forces on active service, naval and military hospitals, and convalescent camps, both at home and abroad. It has been found, however, that books of a more solid kind are asked for by an immense number of educated men now in the military service of the Empire. The objects of "The Fighting Forces Book Council" are to try to meet this need, and at the same time to assist the existing organisations in every possible way. It proposes to: (1) raise funds for providing reading matter of the kind indicated above for his Majesty's Forces at home and abroad, including the wounded and convalescent and the British prisoners of war; (2) procure, by purchase or gift, books of this kind in sufficient quantities, and arrange for their distribution through the Camps Library to the various organisations and corps; (3) draw up lists of such books required by, or suitable for, various types of men. An appeal is made for funds to carry on this work, and we trust that it will meet with a ready and generous response. Contributions should be forwarded to Dr. I. Gollancz, treasurer of the Fighting Forces Book Council, Seymour House, Waterloo Place, London, S.W., or to the London County and Westminster Bank, Law Courts Branch, W.C.

#### SOCIETIES AND ACADEMIES.

LONDON.

**Aristotelian Society**, January 3.—Dr. H. Wildon Carr, president, in the chair.—Prof. A. N. Whitehead: Space, time, and relativity. Mathematicians have succeeded in defining diverse Euclidean measure-systems without any reference to distance. There are alternative groups of such congruent transformations of space all equally applicable, but, while the distance  $P_1P_2$  may equal the distance  $Q_1Q_2$  for one measure-system, it

will not equal it for another. The extraordinary thing is that each of us does, as a matter of fact, employ a determinate measure-system which remains the same, except probably for very small variations, and that the measure-systems of different human beings agree, within the limits of our observations. This, however, is different in regard to time. Owing to the fact that points of space are incapable of direct recognition, there is a difficulty in determining what is at rest and what is in motion, and a further difficulty of determining a definite uniform flow of time. If all physical influences require time for their propagation in space, the idea of an immediate presentation to us of an aspect of the world as it in fact is must be abandoned. What we perceive at any instant must, in that case, already be ancient history, with the dates of the various parts hopelessly mixed. Again, if all physical influence is electro-magnetic, all influences are propagated with the velocity of light *in vacuo*. But what dynamical axes are we taking as at rest? There are two possibilities. We may assume either (a) that one set of axes are at rest and that the others will show traces of motion in respect to the velocity of light, or (b) that the velocity of light is the same in all directions whichever be the dynamical axes assumed. The first supposition is negatived by experiment, and hence we are driven to the second, which immediately lands us in the whole theory of relativity.

**Geological Society**, January 5.—Dr. A. Smith Woodward, president, in the chair.—E. B. Bailey: The Islay anticline (Inner Hebrides). Other observations in regard to the "Schistose Islands" of Scotland are passed in review, and many of them confirmed. Certain new interpretations are offered. (1) An important fault, perhaps the Great Glen Fault, passes through the hollow separating Colonsay and the western peninsula of Islay from the rest of the archipelago. (2) The dolomitic "Furoid Beds" are not the highest geological subdivision of the district. They are earlier than, and structurally they underlie, the greater part of the Islay Quartzite, as well as the whole of the Port Ellen Phyllites and Easdale Slates. (3) Several correlations must now be abandoned. Thus the Scarba Conglomerate is not the equivalent of the Portaskaig Conglomerate, but is of considerably later date. (4) Small-scale isoclinal folding is of less significance in the greater part of the district than has sometimes been thought. The main feature of the tectonics of eastern Islay is a comparatively simple isoclinal anticline overthrown towards the north-west upon the Loch Skerrols Thrust. (5) Finally, grounds are given for believing that an accurate knowledge of the structure and rock-succession of Islay is of crucial importance in determining the tectonic plan of the West Highlands generally.

## PARIS.

**Academy of Sciences**, January 3.—M. C. Jordan in the chair.—G. Bigourdan: The manuscripts of the works of Jean de Lignières.—G. Humbert: Continued fractions and indefinite binary quadratic forms.—Paul Appell: The hidden relations and the apparent gyroscopic forces in non-holonomical systems.—Henry Le Chatelier: The laws of solution. A reply to M. Colson.—M. de Sparre: The projectory of projectiles shot with high initial velocity with an angle of projection in the neighbourhood of 45°.—Pierre Delbet: The action of antiseptics on pus. Experiments on the effects of antiseptics on pus *in vitro* gave unexpected results, as even after twenty-four hours' contact sterilisation was the exception. A 2 per cent. solution of carbolic acid was sterile in six cases out of fifteen;

ether, corrosive sublimate, hydrogen peroxide, Dakin's solution, Labarraque's solution, were all less effective.—J. Comas Solà: Some astronomical applications of stereoscopic photography. Description of a special apparatus, the "stereogoniometer."—Pierre Humbert: The simplification of a formula of Liapounoff.—L. Tschugaëff and W. Lebedinski: A new series of platinum compounds analogous with Cossa's salts. Acetonitrile resembles ammonia and the organic amines in its reaction with soluble chloroplatinites.—Domingo de Orueta and S. Piña de Rubies: The presence of platinum in Spain. Between Malaga and Gibraltar, in the Ronda massif, there is a series of rocks strongly resembling the platiniferous rocks of the Urals. Borings made near Taguil gave proportions of platinum varying from traces to 28 grams per cubic metre, the average of fifty borings giving about 3 grams per cubic metre. On account of its importance, the matter has been taken up by the Spanish Government, with a view to the thorough investigation and ultimate exploitation of the deposit.—Emile Saillard: The attack of beetroot by *Cercospora beticola*.—Jules Regnault: A case of lateral thoracic cords, probable embryonic vestiges of Wolf's band in a man.—Paul Godin: The individual formula of physical growth for children of both sexes.—Maurice Mendelssohn: Galvanotaxy of the leucocytes. A description of changes of form and motion observed in leucocytes when acted upon by galvanic currents.—C. Houlbert and C. Galaine: The formation of shell partitions (*chambrage*) in oysters and the possible infection of these spaces by a parasitic Annelid of the shell.

## BOOKS RECEIVED.

Board of Agriculture and Fisheries. Fishery Investigations. Series II.—Sea Fisheries. Vol. ii., No. 3. Pp. 31. Vol. iii., No. 1. Pp. 46. (London: H.M.S.O.; Wyman and Sons, Ltd.) 2s. and 3s. respectively.

An Inquiry into the Statistics of Deaths from Violence and Unnatural Causes in the United Kingdom. By Dr. W. A. Brend. Pp. v+80. (London: C. Griffin and Co., Ltd.) 3s. 6d. net.

A Student's Heat. By I. B. Hart. Pp. vii+376. (London: J. M. Dent and Sons, Ltd.) 4s. 6d.

Applied Mechanics, First Year. By H. Aughtie. Pp. 184. (London: G. Routledge and Sons, Ltd.) 2s. net.

Textile Mechanics. By W. Scott Taggart. Pp. vii+117. (London: G. Routledge and Sons, Ltd.) 2s. net.

Proceedings of the London Mathematical Society. Second Series. Vol. 14. Pp. xxxviii+480. (London: F. Hodgson.)

Elementary Applied Mechanics. By Profs. T. Alexander and A. W. Thomson. Third edition. Pp. xx+512. (London: Macmillan and Co., Ltd.) 15s. net.

An Outline of Industrial History, with special reference to Problems of the Present Day. By E. Cressy. Pp. xiv+364. (London: Macmillan and Co., Ltd.) 3s. 6d.

Macmillan's Geographical Exercise Books. Key to I.—The British Isles. With Questions by B. C. Wallis. Pp. 48. (London: Macmillan and Co., Ltd.) 2s. 6d. net.

Willing's Press Guide, and Advertiser's Directory and Handbook, 1916. Pp. 472. (London: J. Willing, Ltd.) 1s.