

domestic gas-fire. A committee appointed by the Institution of Gas Engineers, upon which scientific men are largely represented, is now considering the adoption of a standard method of testing the radiant efficiencies of gas-fires. Thus no one can say that the gas industry is not making every effort to put its affairs upon a thoroughly scientific basis.

Passing on to the metallurgical and allied industries (who, of course, are large consumers of fuel), there is much here to be done in improving the construction and operation of furnaces in order to check the waste of fuel. But of these details there is no time to treat; and one instance of the possibilities of very large economies as the result of scientific control must suffice.

It is perhaps common knowledge that the most economical arrangement of plant for the manufacture of iron and steel is one in which bye-product coke-ovens, blast-furnaces, steel furnaces, and rolling mills are brought together on one site and under one organising direction, so that the surplus gases from the coke-ovens and blast-furnaces may be utilised to the fullest extent. My relative, Mr. T. C. Hutchinson, of the Skinningrove Iron Company, who has devoted many years of anxious thought and practical study to this important problem, ventured some few years ago to predict that—with the most approved type and arrangement of plant, working under strict scientific control by competent chemists—it would soon be possible to make finished steel rails or girders from Cleveland ironstone with no further consumption of coal than is charged into the bye-product coke-ovens for the production of the coke required for the blast-furnace, and all subsequent experience at Skinningrove has fully demonstrated that his prophecy can be fulfilled in everyday practice. Of course, it means a constant watchful control by a well-paid and competent scientific staff under efficient leadership, and in Mr. E. Bury—an old Owens College student, trained in an atmosphere of "gas and combustion"—we have found the very man for the work.

It is perhaps unnecessary, even had time permitted, for me to multiply instances of possible economies in other important directions—such, for instance, as power production and the heating of domestic apartments. There is probably no direction in which equally good results would not accrue with proper scientific application and control as those already cited as having been reached in the direction of carbonisation, or in the iron and steel industry. To-morrow we are to discuss the important subject of smoke prevention, in which many Manchester public men are showing an active interest, so that there will be some further opportunity of referring to the matter.

But may I, in conclusion, appeal in all seriousness to chemists and scientific men generally to take up this important matter effectively as a public duty at this crisis in the country's affairs? I would suggest that the Government be memorialised with a view to the establishment of a central organisation for the supervision of fuel consumption and the utilisation of coal somewhat on the lines of the existing alkali works inspection, which has been so beneficial to chemical industry. And in connection with such an organisation there might be undertaken a much needed systematic chemical survey of British coal-fields, as well as experimental trial of new inventions for fuel economies. There would certainly be no lack of important work for such a properly organised department of the State, and there can be no doubt at all that the results of its activities would be, not only a very large direct saving in our colossal annual coal bill, but also a purer atmosphere and healthier conditions generally in all our large industrial areas.

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UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—In his valedictory address to the Senate, the retiring Vice-Chancellor, Dr. M. R. James, the provost of King's College, stated that the University has shrunk to less than one-third of its former numbers; no fewer than 10,000 Cambridge men have entered the military and naval services. The Rev. T. C. Fitzpatrick, president of Queens' College, was elected Vice-Chancellor for the ensuing year. The Quick professorship of biology is vacant, as the period of three years for which Dr. G. H. F. Nuttall was appointed has now ended.

ALTHOUGH much of the best glass used in England is of English manufacture, large quantities of glass, principally of the cheaper types, have been for some years imported. Cheaper labour, cheaper transport, and the scarcity of technically trained managers and chemists, together with the prevalence of "rule-of-thumb" methods, have been the determining factors. The manufacture of fine glass requires a peculiar combination of engineering, physical, and chemical knowledge and training, and the chemical knowledge is not usually obtainable in university or technical college courses, because of the specialised nature of the subjects and the difficulties which arise in translating laboratory experiments into practice on a manufacturing scale. To meet these difficulties, the University of Sheffield has established a department of glass manufacture and technology, and has instituted special technological courses. A syllabus of special lectures and laboratory work has been issued with details of a projected full-time three years' course. The announcement indicates the variety of scientific and technical work which is essential to a good training in glass manufacture, and includes, *e.g.*, the chemistry of the materials, the glasses and pots, the fuel used, the furnaces, the temperatures at which they work, variations in the methods of melting, chemical actions in the process of melting, methods of working the glass, such as rolling, pressing, and blowing, grinding and cutting, and the machinery and appliances incidental to all these operations. The success of these courses will necessarily depend on the co-ordination of the lectures and the laboratory practice with larger scale experimental work; but the University of Sheffield, with its experience of similar problems in the metallurgical department, should be well qualified to deal with these difficult problems. Their successful solution should be of material assistance to a very important and growing branch of British industry which it is particularly essential to encourage as much as possible at the present time.

THE third war programme in connection with the Chadwick Public Lectures dealing with the last quarter of the present year has now been published. Prof. D. Noel Paton is giving a course of three lectures on "Food in War Time" at the Hampstead Central Library, Finchley Road, London, N.W. The first lecture was given on Monday last, and the others will be given on the two succeeding Mondays, at 8.15 p.m. Dr. R. O. Moon, physician to the Serbian Isolation Hospital at Skoplje (Uskub), will lecture on "Typhus in Serbia," at the Royal Society of Medicine, 1 Wimpole Street, Cavendish Square, London, W., at 5.15 p.m. on October 20 and 29, and on November 3. On November 10, at 8.15 p.m., Mr. A. Saxon Snell will lecture on "Emergency Military Hospital Construction" at the Royal Institute of British Architects, Conduit Street, London, W. On November 17, at 8.15 p.m. Mr. W. E. Riley will lecture on "Some Con-

clusions on Housing our Workers," at the Royal Sanitary Institute, 90 Buckingham Palace Road, London, S.W. The admission to all lectures is free.

THE calendar for the current session of Armstrong College, Newcastle-upon-Tyne, one of the constituent colleges of the University of Durham, is now available. Since August, 1914, the buildings of the college have been in the occupation of the War Office, and the various departments of the college are housed temporarily in different buildings throughout the city. The arrangements for the session follow the general lines of previous years. Complete courses of study leading up to degrees in pure and applied science have been provided. Students who wish to graduate in applied science may take up one of the following branches: general mechanical, marine, civil, or electrical engineering, naval architecture, mining, and metallurgy. Such a degree is accepted by the Institution of Civil Engineers in lieu of their examination for associate membership, and by other corporations. Courses are also provided in preparation for degrees in commerce. A gratifying characteristic of the work done in the college is the active co-operation of employers of labour in the district, who have made it easy for students to obtain experience of workshop conditions during or after their college course.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, September 27.—M. Ed. Perrier in the chair.—Paul Appell: A second form of Θ functions of the fourth degree.—Henry Le Chatelier and Jules Lemoine: The heterogeneity of steels. An account of the application of an etching reagent proposed by Stead (methyl alcoholic solution of cupric and magnesium chlorides containing hydrochloric acid), with details of the proportions found to give the best results. Nine reproductions of microphotographs accompany the paper.—J. Haag: A system of differential formulæ concerning the elements of a projectile submitted to a quadratic resistance of air.—Charles Rabut: The calculation of the strength of a beam reinforced with metal bands.—P. Vaillant: The laws of flow of liquids in drops. The weight of a drop from a given orifice depends on the number of drops per second. It is proved that the weight of a drop is a parabolic function of the frequency of fall, and experimental data are given in support of this.—P. W. Stuart Menteath: The Permian of the western Pyrenees.—Jules Welsch: The Pliocene lignites of Bidart, Lower Pyrenees. South of Biarritz there are deposits of lignite the age of which is near to the Middle Pliocene.—R. Chudeau: Rain and vapour pressure in western and equatorial Africa.—J. Bergonié: A new method of physical treatment of the after results of wounds: pneumatic pulsatory massage. A detailed description of the mode of application of mechanical massage to the treatment of masses of cicatricial tissue. Particulars of the results obtained will be published later.—P. Portier: The resistance of certain races of *B. subtilis* arising from insects to chemical reagents. The organisms, isolated from the larva of *Tenebrio molitor* and the chrysalis of *Myelois cribrella*, prove to survive very drastic treatment, including 50 hours with 5 per cent. phenol, 25 hours with 20 per cent. formaldehyde, 95 per cent. alcohol more than fourteen months, boiling chloroform, and other reagents. This resistance to chemical reagents is greater than any hitherto observed, and has a direct bearing on the problem of sterilisation of instruments and bandages.—J. Wolff and Mlle. Nadia Rouchelmann: The properties of a chromogen univers-

ally distributed in plants.—A. de la Baume Pluvinel: The use of Hughes's induction balance for the detection of projectiles in the wounded.

BOOKS RECEIVED.

Department of Agriculture and Technical Instruction for Ireland. Suggestions for the Teaching of the First Year's Syllabus in Experimental Science for Day Secondary Schools. By E. P. Barrett. Pp. 19. (Dublin: Browne and Nolan, Ltd.)

Armstrong College, Newcastle-upon-Tyne. Calendar, Session 1915-16. Pp. 523. (Newcastle-upon-Tyne: Armstrong College.) 1s.

Five Figure Mathematical Tables. Compiled by E. Chappell. Pp. xvi+320. (London: W. and R. Chambers, Ltd.) 5s. net.

DIARY OF SOCIETIES.

THURSDAY, OCTOBER 7.

EUGENICS EDUCATION SOCIETY, at 5.15.—Eugenics and the Doctrine of the Super-man: Prof. J. A. Lindsay.

FRIDAY, OCTOBER 15.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—The Theory of Grinding, with reference to the Selection of Speeds in Plain and Internal Work: J. J. Guest.

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