

News and Views.

IN his speech at the opening of the exhibition of British chemical plant, held last week at the Central Hall, Westminster, in connexion with the Society of Chemical Industry's Congress of Chemists, Sir Max Muspratt referred to the ever-changing nature of the chemical industry and to the great part which chemical engineering plays in the changes. The life of the Le Blanc soda process, now extinct, was greatly prolonged by engineering, and it is that branch of the industry to which we must look to keep us abreast of the times, and more particularly in regard to the artificial fibre industry and to what is known as 'high-pressure' chemistry. As an illustration of the radical changes now taking place, Sir Max referred to a large sulphuric acid works, using the lead-chamber process, which is producing 1000-1200 tons of acid per week solely by electric power. We must learn to dispense with coal, he said. British chemical industry was built upon cheap coal and the German industry upon dear coal; now the positions are reversed, and all our old problems must be attacked from this new point of view.

THE exhibition, which was organised by the British Chemical Plant Manufacturers' Association, may be described as small but good. Owing to the restricted dimensions of the hall, it was impossible to show any large plant, but the exhibits of plant parts, constructional materials, and accessories, were so numerous and so well selected, that they presented a convincing picture of the resourcefulness and constructive ability of British plant manufacturers. From careful inquiries we have made, we can endorse the claim that at the present time practically all the requirements of British chemical manufacturers can be met at home; in a few respects, such as plant for high-pressure work, it may be necessary to go abroad, but we are gradually accumulating our own experiences in this direction and can look forward to complete independence of foreign makers within a comparatively short time.

AMONG the novelties exhibited was the Webb colloid mill, which consists of a spherical shell with three arms or beaters, circular in section and revolving at different speeds. The emulsified material is withdrawn in such a way that only the extremely finely divided material is removed. Another exhibit of a similar kind was a copper-lined machine for breaking down cotton linters in the manufacture of acetyl-cellulose silk. Excellent centrifugal machines, such as are used in the home beet-sugar industry, were shown, together with a clutch-pulley which enables the cage-motor to start against full-load torque. The Ruths steam-accumulator was too large to be shown *en bloc*, but illustrations and plant parts testified to the value of this type of plant for eliminating the peak-load on boiler-plants, especially in works where large quantities of low-pressure steam are required in process work; the boiler can be worked for the average demand, and the pressure, as well as the temperature, of the steam can be maintained at uniform levels. A 300-gallon aluminium still

formed an attractive exhibit, and other interesting exhibits included heat-exchangers, crushing machines, compressors of various types, mixers, electrolytic cells, filters, evaporators, film-dryers, scrubbers, and excellent enamelled cast-iron ware. Constructional materials were shown in abundance, non-corroding metals and alloys being particularly conspicuous. Acid-resisting, long-fibred asbestos from the Transvaal, silica-ware, and 'Prodorite,' the new pitch-cement, were among the more noticeable non-metallic resistant materials. No fewer than forty firms were represented at the exhibition, which left a most favourable impression of the quality and diversity of British chemical plant.

ALL interested in technology from whatever point of view will welcome the news that Italy has fallen into line with others of the leading countries of the world, and has commenced the printing *in extenso* and in separate numbers of the specifications of patented inventions. All patents granted after October 1 of last year are, we understand, to come under the new regulation, but it may be hoped that perhaps some day the earlier period will be similarly dealt with so that the record may be complete. The gap is not so large. The old Kingdom of Sardinia printed the specifications and drawings of patents granted under the basic law of 1855 in a publication entitled *Descrizione delle macchine*, which appeared in semi-annual volumes until 1864, when it was replaced by the *Bollettino Industriale del Regno d' Italia*, which continued except for a short period until 1896. Since the latter year, however, those concerned have had to be content with classified lists of inventions from which only the meagre information supplied by the bare titles is obtainable. The new regime is to be congratulated on the revival of the original practice in the more modern style adopted by so many patent offices. Belgium, Spain, and Portugal are the chief European countries that still have to take this step.

AN unofficial committee of twelve members of various points of view, and no doubt of divergent opinions, on economic problems, has drawn up a report which, under the title of "The Facts of Industry," has been published by Messrs. Macmillan and Co. Ltd., (price 1s.). The committee included among others Lord Astor, Prof. Bowley, Mr. W. L. Hichens, Mr. W. T. Layton, Mr. Kenneth Lee, Mr. B. Seebohm Rowntree, Mr. F. Hodges, Mr. A. Pugh, Mr. J. T. Brownlie, and Mr. J. J. Mallon. In other words, it represented employers, employees, professional economists, and trade union officials. The purpose of the committee was to investigate the possibilities of increased statistical publicity, and to ascertain what statistical information is required and how it can be obtained. The committee, agreeing that it is impossible to formulate a wise policy in industrial problems without knowing the facts of the case, has drawn up a series of recommendations, not with the aim of introducing changes in industrial relations, but in the hope of obtaining an adequate basis of facts

on which to discuss any problem that may arise. In problems of industrial relations, information additional to that which is already available should be collected on total production, cost of material and cost of labour. For the study of industrial fluctuations, figures should be provided by each industry as regards stocks, deliveries, and orders on hand. From the point of view of the investor a number of recommendations are also made. The pamphlet indicates reforms which are outside the scope of political controversy, many that have already been put into effect in the United States and none that could fail to throw light on the difficult problems of the day.

DURING the last twenty years the electric pressures used for testing the material and apparatus used by electricians have been steadily rising. Owing to the much wider areas over which power is transmitted, and the greatly increased demand for it, economical considerations make it necessary to increase the pressure. The pressure required in the test room has to be at least double the working pressure. This necessitates the use of very large transformers which need to be housed in special laboratories. A paper on high voltage laboratories by Mr. A. P. M. Fleming, which has appeared in *World Power* for July, is therefore a timely one. Mr. Fleming points out that in order to keep ahead of developments it is necessary that facilities for producing a million volts should be provided. Several million-volt transformers are in daily use in the United States and on the Continent. At the National Physical Laboratory the high-pressure laboratory has been built but the apparatus has not yet been constructed. The Soviet Government at Moscow has similar plant under consideration. With these high-pressure transformers, it is very difficult to avoid producing brush discharges and this renders the measurement of the applied pressure very difficult. Mr. Fleming points out that the sphere-gap method of measurement is the one that is almost universally used. In our opinion the radiations from brush discharges must seriously affect the pressure at which the disruptive discharge ensues and so must make the readings very uncertain. It is scarcely fair to say that the method is dependent on purely empirical data. One of the data is the value of the maximum potential gradient between the spherical electrodes and the other is purely experimental. The first is computed by advanced theory, the second is got from concordant experimental results obtained in almost every laboratory in the world. For many tests, high voltage direct current is necessary. This is readily obtained by rectifying high voltage alternating current by a thermionic valve rectifier.

THE First Report of the commission appointed to further the study of solar and terrestrial relationships (Étienne Chiron: Paris, 1926), has recently been circulated by the International Research Council, setting out the statements and recommendations made by the committee which met in Brussels last July. Statements are given (1) of the principal

terrestrial phenomena definitely known to be affected by intrinsic changes in the state of the sun or by the sun's rotation, such as (a) the magnetic state of the earth and earth currents; (b) auroræ; (c) meteorological and climatic changes; (2) terrestrial phenomena not improbably affected by solar changes but requiring further investigation to establish a definite relationship, such as (d) atmospheric electricity (potential gradient and general ionisation of the atmosphere); (e) radio-telegraphic transmission; and (3) terrestrial phenomena likely to be affected by solar changes and therefore requiring investigation from this point of view, such as (f) the amount of ozone in the upper air; (g) the extra-polar auroral light; (h) high-level atmospheric absorption; (i) penetrating radiation in the atmosphere; (j) the light of the night sky. The recommendations of the committee are then given, indicating clearly the particular matters requiring research and co-operation in observation. Memoranda contributed by members of the committee (C. G. Abbot, G. Abetti, S. Chapman, C. Chree, H. Deslandres, G. Ferrié, G. C. Simpson, C. E. St. John, and C. Störmer) and by a few other investigators make an admirable commentary on the foregoing recommendations. The report concludes with a comprehensive summary of literature up to 1924 dealing with the relations of solar and meteorological phenomena. A French version of the complete report is appended.

ABOUT eighteen years ago, Lippmann indicated the possibility of the preparation of a photographic plate that should contain in itself the image-forming elements, and by a single exposure, etc., give a result that would show a picture of the original in stereoscopic relief, adopting the principle of an insect's multiple eye, and Dr. E. Estanave shortly afterwards deposited a sealed communication with the Paris Academy. Dr. Estanave has only recently been able to demonstrate experimentally the possibility of the process, and he describes his method in *La Nature* of June 26, p. 409. The attempt to make it commercially practical by moulding the glass plate so that it shall have one side covered with small, regularly placed, spherically curved projections the principal focal points of which lie on the other surface, which is coated with a fine-grain gelatine emulsion, appears to have failed because the small lenses so obtained were not good enough. The demonstration that the principle is correct was done by making a block of closely packed Stanhope lenses of about 6 mm. focal length each with a square base of about 2 mm. x 2 mm. A photographic plate was placed with its film side in contact with the surface made by the bases of these small lenses, the exposure made and developed, etc., and the plate then attached to the block of lenses exactly in its original position. The composite plate is viewed by looking through it (as a transparency) with the lens surface towards the eyes. The picture of the original object is then seen in stereoscopic relief.

A REPORT issued by the Smithsonian Institution states that news has been received from Dr. Matthew

W. Sterling that the expedition to New Guinea of which he is the leader has started up the Memberamo River. This expedition, which is a joint undertaking of the United States and the Dutch East India Government, is very completely equipped, and has with it an aeroplane for scouting, exploration and cartography. Including carriers and Indonesian troops, the expedition numbers nearly four hundred individuals. Its purpose is the exploration and mapping of the country which lies between the coast line and the range of mountains which forms the backbone of Dutch New Guinea. The members of the expedition are Dr. Sterling, leader and anthropologist, R. H. Peck, photographer, Hans R. Hoyte, chief pilot, A. E. Hamer, assistant photographer and mechanic, S. A. Hadberg, historian of the expedition. Dr. Van Leeuwen, botanist, and M. Leroux, cartographer and surveyor. It is hoped to secure an extensive collection of bird skins in addition to the scientific data for which provision is made in the personnel of the expedition. A special effort will be made to obtain information concerning the pygmy people of the forests on the mountain slopes, of whom comparatively little is known. It is possible that unknown peoples may be discovered in the interior, of whom the existence is at present only suspected.

BEFORE the War the wood-distillation industry in what is now the eastern part of Czechoslovakia was in a very flourishing condition on account of the abundant supplies of beech-wood. But the industry has received a severe set-back on account of the rapid development of improved industrial processes for producing both acetic acid and methyl alcohol synthetically. Acetic acid is now manufactured from acetylene by oxidation with oxygen in the presence of vanadium pentoxide and mercuric sulphate as catalysts. More recently methyl alcohol has been made from water-gas, and it is stated in the *Chemiker Zeitung* that the new process may ultimately lead to the abandonment of the older process, although the synthetic product is much less suitable than wood-spirit for the denaturation of fermented spirit. The success of the method depends upon the careful control of external conditions, namely, temperature, pressure, nature of the catalyst, and the relative masses of the reacting gases, since methane, carbon dioxide, and water may be obtained as by-products if conditions are not well adjusted. The water-gas needs to be carefully freed from certain impurities, particularly from sulphur compounds.

UNDER the rather curious title of *The Cancer Review*, the British Empire Cancer Campaign has begun to issue a journal of abstracts of the voluminous literature of cancer in its various aspects. The mass of matter printed on the subject of malignant disease is so great and its quality so varied that some such critical collation is most desirable, and we do not doubt that the present journal will be useful. We hope, however, that it will be possible to arrange and group the material more effectively and to supplement the arid abstracts with the critical surveys which may

more properly be called 'reviews,' and in these connexions we would commend the admirable *Tropical Diseases Bulletin* to the consideration of Dr. Francis Cavers and his editorial committee. The form is not so good as the substance: it is printed on heavy art paper (illustrations may be contemplated, but there are none in this first issue), and the line is too long ($4\frac{5}{8}$ inches) for convenient rapid reading—a point on which publishers and physiologists might collaborate with advantage.

A MEETING of the Society for Experimental Biology was held at Edinburgh University on July 17-19. A variety of papers was presented, including one on the growth of fish by Mr. J. Gray, the anterior pituitary and metamorphosis by Mr. E. A. Spaul, the fertilisation membrane of Echinus by Mr. A. D. Hobson, the kinetics of hæmolytic and bacteriolytic reactions by Dr. Ponder, and a demonstration of new methods for studying early stages of cell injury by Dr. Rettie. At a session held in the Botanical Gardens, Dr. K. Blackburn discussed the relation of plant chromosomes to sex, Dr. Philip Smith the effect of acidity on regeneration in *Coleus*, while Prof. Priestley considered the conceptions of stimulus-transmission and hormones in plants. One session was devoted to a visit to Dr. Crew's laboratory, where breeding experiments with many domestic animals were demonstrated and discussed. This was followed by a dinner which was well attended. The next conference will be held in London in December.

THE Report of the Director-General of Public Health, New South Wales, for the year 1924, recently received, contains details of the public health administration of the State and of investigations carried out for the Board of Health. In industrial hygiene an investigation has been made of the sandstone dust hazard among miners, quarrymen, and stonemasons. It is recommended that a standard of not more than 200 dust particles per c.c. of air, as determined by the Owens' dust counter, should be adopted for the air of the workings, a figure which can easily be attained by proper methods and ventilation. No cases of plague occurred among human beings or rats. Of the latter, 16,351 were examined, and the species and number of fleas upon the rodents are recorded. Interesting details are given of cases of snake-bite and of paralysis following the bite of ticks.

A NUMBER of scientific expeditions to Arctic Russia and Siberia are announced in the *Weekly News Bulletin* of the U.S.S.R. Society of Cultural Relations, No. 22, vol. 3. The Hydrographical Board has begun the exploration of Maligena Strait which separates Byeli Island from the north of the Yamal peninsula, on the northern sea route to Siberia. Another expedition has left Perm to study the flora and fauna of the Kara Sea, the Ob estuary and the Gulf of Taz. A third expedition, based on Muzhinskoe on the River Ob, is to study the northern Urals, particularly the valleys of the Sosva and Lyapin. Lastly, a geological examination of the coal and oil deposits of northern Sakhalien is promised.

THE Library of the Chemical Society will be closed for stocktaking from Monday, August 2, until Saturday, August 14, inclusive, and will close each evening at 5 o'clock from August 16 until September 11.

THE following have been elected officers of the Institution of Electrical Engineers for the year 1926-1927: *President*, Dr. W. H. Eccles; *Vice-President*, Colonel T. F. Purves; *Hon. Treasurer*, Lieut.-Col. F. A. Cortez Leigh.

APPLICATIONS are invited by the Dorset Field Club for the Cecil medal and prize of 10*l.* for the best essay on "The Wireless Transmission of Power, its Position and Prospects." The competition is open to persons between the ages of seventeen and thirty-five on May 31, 1927, and either born in Dorset or resident in the county not less than one year between May 1, 1925, and May 1, 1927. Particulars may be obtained from Mr. F. H. Haines, Appleslade, Ringwood, Hants.

At a meeting of the Council of the Royal Society of Arts held last week at Clarence House, H.R.H. the Duke of Connaught, President of the Society, presented the Society's Albert Medal for 1926 to Prof. Paul Sabatier, "in recognition of his distinguished work in science and of the eminent services to industry rendered by his renowned researches in physics and chemistry, which laid the foundation of important industrial processes."

NOTICES have been issued of a class in marine biology to be held at the Millport Marine Biological Station during the fortnight August 17-31. Facilities will be provided for collecting and the examination of living specimens, and those attending will be encouraged to investigate some particular problem. Lectures will be given by the Station staff and others on special subjects. Improved facilities for research workers are now available at Millport Laboratory, following the recent installation of electric plant.

THE following are among the recipients of Civil List pensions recently announced: Mrs. Marian Dibdin (125*l.*), in recognition of the scientific work of her husband, the late Mr. W. J. Dibdin; Lady Dorothea Hosie (100*l.*), in recognition of the public, literary, and scientific services rendered by her husband, the late Sir Alexander Hosie; Mrs. Elizabeth Japp (100*l.*), in recognition of the services rendered by her husband, the late Prof. F. R. Japp, to the advancement of organic chemistry and chemical education.

In our issue of July 24, p. 126, we referred to the retirement of Prof. J. A. Fleming from the chair of electrical engineering in the University of London (University College), which he has occupied with distinction since 1885. In recognition of his services to electrical science it has been decided, by a committee presided over by Mr. A. A. Campbell Swinton, to invite subscriptions for a portrait to be placed in University College, and a replica for Prof. Fleming

himself, who wishes to offer it to the Institution of Electrical Engineers. Subscriptions should be sent to Prof. W. C. Clinton, University College, Gower Street, London, W.C.1.

WE have received a copy of Circular 279 of the U.S. Bureau of Standards on the relations between the temperatures, pressures, and densities of gases, prepared by S. F. Pickering of the Bureau. It is the purpose of the circular to explain simple methods of making calculations and solving problems involving the properties of gases. Detailed explanations of the gas laws and equations of state are presented together with a large number of charts, tables of data for various gases, and an extensive bibliography.

Natural History, the journal of the American Museum of Natural History, does much to popularise zoology and keep the public informed of discoveries in natural history as they are revealed by study and by exploration in various lands. Its issue for March-April 1926 (vol. 26, No. 2) is devoted to insects and contains a number of general articles admirably illustrated by coloured and half-tone figures. Among the contributors to this issue are Dr. L. O. Howard, who discusses the great economic waste occasioned by insects; Dr. J. Bequaert, who writes on insects and man in tropical America; and Dr. V. L. Kellogg, who describes the structure and functions of the wing-scales of butterflies.

THE British Museum (Natural History), South Kensington, London, S.W.7, has recently issued a fourth edition of the "Guide to the Exhibited Series of Insects" (price 1*s.*). It is a reprint of the previous edition except that a few slight alterations and corrections in the text have been made. Some idea of the magnitude of the main collection of insects that is contained in the Museum may be gathered from the fact that it is now estimated at 3,500,000 specimens comprised in about 250,000 named species. Only a very small representative series of these is exhibited in the public galleries, but the exhibit is sufficiently complete to give the public a general idea of the classification, forms, and habits of all the chief groups of these animals. The present guide serves as a useful brochure on the subject, and should be used by all who wish to make intelligent use of the specimens that are displayed for their benefit in the galleries. It is fully illustrated, and can be obtained either at the Museum or through booksellers.

THE latest catalogue (No. 484) of Mr. F. Edwards, 83A High Street, Marylebone, W.1, will be interesting to those on the look-out for books relating to the Far East, seeing that it gives particulars of many works on China, Formosa, the Indian Archipelago, Japan, Korea, and the Philippines.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—A small live-stock instructress and an assistant for general agricultural instruction and dairying under the Surrey Agricultural Committee—C. R. Harding, County

Agricultural Officer and Secretary to the Agricultural Committee, County Hall Annexe, Kingston-on-Thames (August 4). Inspectors under the Ministry of Agriculture and Fisheries for the purposes of the Diseases of Animals Acts 1894-1925—The Secretary, Ministry of Agriculture and Fisheries, 10 Whitehall Place, S.W.1 (August 9). A lecturer in agriculture at the Agricultural Institute, Plumpton—The Director of Agriculture, County Hall, Lewes (August 10). A lecturer in pathology at the Welsh National School of Medicine—The Secretary, University College, Cardiff (August 21). A senior metallurgist under the British

Cast Iron Research Association—The Director, 75 New Street, Birmingham (August 27). A reader in physics at King's College, Strand—The Academic Registrar, University of London, South Kensington, S.W.7 (September 17). A male junior assistant under the directorate of explosives research of the Research Department, Woolwich—The Chief Superintendent, Research Department, Woolwich, S.E.18. A taxidermist for Public Museum—Prof. Carr, University College, Nottingham. A physics mistress at the Cowley Girls' School, St. Helens—The Secretary to the Governors, 17 Cotham Street, St. Helens.

Our Astronomical Column.

JULY METEORS.—Mr. W. F. Denning writes: "A few observations were made at Bristol between July 12 and 22, but meteors seemed somewhat scarce. The coming Perseid shower gave evidence of its presence on July 13 and 16, and several rather bright meteors were seen, presumably from radiants near α and ζ in Cygnus. These are well-known showers at about $314^\circ + 48^\circ$ and $317^\circ + 31^\circ$ and appear to be pretty regular in their annual returns. On July 16 and 20, meteors were recorded from a shower directed from a point near α Capricorni ($304^\circ - 12^\circ$). A rather fine object, belonging probably to this stream, appeared on July 20, $2^h 25^m$ G.M.T., moving along a path of about 45° approximately between Jupiter and Mars and towards Mars. This meteor was seen by an assistant, who pointed out the position, but no other observations have as yet come to hand. This shower of Capricornids is one of considerable activity and seems possibly connected with comet 1881V. Its meteors were numerous in 1908 and 1916, but their chief abundance seems to occur a fortnight before the earth's nearest approach to the comet's orbit."

CHANGES IN THE EARTH'S RATE OF ROTATION.—Prof. Newcomb was the first to suggest that the unexplained oscillations in the moon's position might really be changes in the earth's rotation. Support was given to the suggestion by Glauert, Innes, and others, the test being that other rapidly moving bodies should show similar oscillations, agreeing in phase but differing in amplitude proportionally to their motion.

Prof. E. W. Brown contributes a paper to the *Proc. Nat. Acad. of Sciences*, U.S.A. (June 1926), on the subject. He strongly supports the hypothesis, finding, *inter alia*, confirmation from the observations of the sun: there has been a marked deviation from the tables since 1900, which now amounts to 1". He considers that an oscillation in the earth's radius appears to be the only way of producing such changes in the rotation. Such oscillations were already postulated by Joly ("The Surface of the Earth"), but these are of much longer period than those required for the present research. The chief unexplained lunar term has a period of some $2\frac{1}{2}$ centuries, found by Prof. Turner to be about the same as a period indicated by Chinese earthquakes. The amount of oscillation in the radius required by Brown lies between 5 inches and 12 feet according to the depth of the source, which he estimates to be at least 80 kilometres.

MUTUAL ECLIPSES OF JUPITER'S SATELLITES.—Once in six years the orbit planes of Jupiter's satellites are turned edgewise to the sun, and mutual eclipses

of one satellite by another occur. These phenomena have very seldom been observed, for they last so short a time that, unless notice is given beforehand, they are likely to escape detection. The Computing Section of the British Astronomical Association has now undertaken the computation of these phenomena, and gives lists of them for June, July, and August in the March and April issues of its journal. Unfortunately, after July 6, none is visible in England until Aug. 4, when III. is eclipsed by II. at $2^h 28^m$. Mr. B. M. Peek described at the June meeting of the Association his observations of three of these phenomena. On June 17, I. was partially eclipsed by II.; at mid eclipse their magnitude was equal, I. having been $\frac{1}{4}$ mag. brighter before eclipse. On June 23, III. was eclipsed by II., the loss of light being very appreciable, so that III. became equal to II. On June 28 there was an annular eclipse of II. by I., of very brief duration, since the motion of the satellites was in opposite directions. Fading began at $23^h 46^m 15^s$, centrality occurred $23^h 46^m 45^s$, and II. suddenly brightened at $23^h 47^m 10^s$.

THE REFLECTION EFFECT IN ECLIPSING VARIABLES.—In some cases of eclipsing binaries the light is not constant during the period between two eclipses, owing to reflection of the brighter star's light by the secondary. The hemispheres of the fainter stars facing and remote from the primary are of unequal luminosity and produce a well-recognised effect on the light curve of the system. The theory of this reflection effect is discussed by Eddington in the *Monthly Notices, Roy. Ast. Soc.*, vol. 86, p. 320 (March 1926). He considers primarily the case of the reflection of heat energy, which is greatly simplified by the fact that the 'heat albedo' = 1 (*i.e.* a star re-emits completely the radiation falling on it). The phenomenon considered in the theoretical case is not strictly one of reflection, but of absorption and re-emission of radiation, and the conclusions obtained are translated into terms of light reflection by means of simple assumptions. It is shown that the 'reflection' coefficient for heat will not be greater than that for light, and calculated theoretical values are compared with observed values of the reflection effect, in the case of systems of known orbits. Good agreement is shown between the calculated heat reflection and the observed light reflection in seven systems out of twelve, and (contrary to expectation) in only one case is the light reflection the greater of the two. The assumption that the incident radiation is re-emitted in amalgamation with the natural radiation of the fainter star as black body radiation would imply a large increase of the luminous efficiency of this star. The absence of this effect in observed systems suggests that the incident light retains its original quality after 'reflection.'