NEWS SECTION

SOCIETY REPORT

Meetings

A Special General Body Meeting of the Society was held on October 5, 1967 at the Indian Institute of Science, Bangalore. It was decided to introduce a new Category of Membership: Affiliate Members, to enable those who do not possess the requisite qualification to be associated with the Society. Some amendments to the Subscription were also adopted, reducing the amount for certain categories. The details will be announced as soon as the formal approval has been received.

GENERAL NOTES

Conference on Thermionic Electrical Power Generation

The Second Conference on the above subject will take place at Stresa, Italy during May 1968 under the Sponsorship of the European Nuclear Energy Agency and Euratom Research Establishment. The purpose will be to examine current research on thermionic processes for direct conversion of energy into electricity and to assist the diffusion of information on this new technique.

World's Largest Furnace

The largest medium-frequency induction furnace in the world, with an installed capacity of 10,000 kw, was supplied by Siemens to a French firm. Steel tubes which have first been seam-welded with the aid of high-frequency generators are heated by this furnace to temperatures from 950 to 1100°C. before being passed on to the stretch reducing mill. Silicon P thyristors for converting the frequency from 50 to 500 and 1000 c/s are employed for the first time in such a plant with a rating exceeding 2000 kw. The throughout is 30 tons an hour of steel tubes, 170 mm. diameter and 3-7 mm. wall thickness. The power consumption of the final tube temperature of 1100°C is about 290 kwh per ton. Another advantage of the plant is that the static frequency convertor is hardly subjected to any wear and requires almost no maintenance.—Indian and Eastern Engineer, Vol. 109, 375, 1967.

Copper in Coinage

The effect of the Japanese mint's decision to substitute coins for notes and a copper alloy for a gold-copper-zinc composition will be to increase copper consumption. The old 100-yen coins contained gold 60, copper 30 and zinc 10 per cent, while in future they will be 75/25 curpro-nickel. In 1967 the mint will require 2040 tons of copper and 680 tons of nickel.—Copper, Vol. 1, No. 3, 39, 1967.

Die Casting and Plating

Abstracts of 29 papers of interest in the above field have been published in Zinc Abstracts, June 1967. They form part of the Proceedings of the 1966 National Die Casting Congress, Cleveland, Ohio, U.S.A.

Zinc Smelter in India

The zinc smelter project at Udaipur of Hindustan Zinc Ltd., was scheduled to go into production in October 1967 when the roaster and acid plant are commissioned. It will produce 18,000 tonnes of zinc metal and 80 tonnes of cadmium per year from the Zawar mine ores. Production started in April 1967 at the Cominco Binani Zinc Ltd., Alwaye. Based on imported concentrates this smelter is licenced to produce 20,000 tonnes of zinc annually together with proportionate quantities of cadmium and sulphuric acid as by-products.

Mineral Dressing Conference

The Eighth International Mineral Processing Congress will be held in Leningrad during June 1968. It will discuss technical progress in the dressing of non-ferrous and ferrous ores and other materials for the mining and chemical industries. Topics include processing techniques, separation, flotation, chemical processing hydro-metallurgy, dewatering of beneficiation products, purification of concentrator waste water equipment and automation.

N.S.W. Branch of the Australasian Corrosion Association. The following papers presented therein have been published in Australasian Corrosion Engineering, June 1967: (1) Corrosion and the consulting engineer, (2) An architect's views on corrosion and (3) Prevention of corrosion of materials in the building industry.

Building Research Congress

The Melbourne Suburb of Clayton was the venue of the Third Australian Building Research Congress held in August 1967 by the Division of Building Research, CSIRO, Highett, Victoria. More than 50 papers were presented covering recent developments in the science, technology and practice of building. The topics included new materials, operational research, industrialized building and surface coatings. The proceedings will be published.

ECS Meeting

Chicago was the venue for the Meeting of the Electrochemical Society in October 1967. Technical sessions covered: battery, corrosion, dielectrics and insulation, electronics—semiconductors, electrothermics and metallurgy, leectrodeposition. Abstracts of the 212 papers presented have been published in JECS, August 1967.

Corrosion and Heat Transfer

A Symposium on 'Corrosion under Heat Transfer in Liquid Media' was held at the University of Aston, Birmingham during January 1967. The British Corrosion Journal, July 1967 has published the 6 papers presented therein.

Chemistry and Public Affairs

The American Chemical Society has set up a Committee on Chemistry and Public Affairs to see how it can serve best in the swirl of public affairs and serve chemistry at the same time. It consists of ranking chemists in education and industry. The hope is to raise chemistry's priority among the policymakers. It is thought that this would be a helpful input in settling priorities for the allocation of research funds.—Scientific Research, Vol. 2, No. 8, 28, 1967.

Desalination

Six papers on desalination presented at the National Metal Congress, Chicago during November 1966 have been published in Metals Engineering, Quarterly, August 1967, pages 1-48: (1) The US Govt. desalination program, (2) Dual-purpose nuclear power-desalting plant in Southern California, (3) Why copper-nickel alloys for desalination, (4) The application of titanium for desalination plants, (5) Applicability of aluminium for desalination plants and (6) Application of steels for desalination plants. Many of the contributions touch upon corrosion problems.

Silver-Zinc Batteries

The Astropower Laboratory of Douglas Aircraft Co., Newport Beach, California are producing silver-zinc batteries able to withstand up to 100°C. A unique separator, made of an inorganic material, functions much like a filter.—American Reporter, Vol. 17, No. 22, 9, 1967.

ACHEMA 67

The 15th Achema Exhibition—Congress was held for 9 days in June 1967 at Frankfurt/Main, West Germany. The congress discussed 225 scheduled lectures on several topics including rapid methods and automation in analysis, scaling problems in chemical technology, measurement techniques, process control, material and corrosion problems with new chemical or modified processes, and plastics as structural material for chemical plants. The October 1967 issue of Chemical Age of India has published a selected review of the exhibition and new processes reported. The ACHEMA Year book 1965/67 is available in 3 volumes: (1) European research in chemical engineering, (2) Technical developments in chemical engineering and (3) Guide to chemical engineering in Europe.

Alkali-Chlorine Plant in Maharashtra

The latest addition to electrolytic caustic soda-chlorine units in India is the most modern installation at the Standards Mills Co., Ltd., Thana-Belapur. The plant was installed primarily to meet the chlorine requirements of the giant NOCIL petrochemical complex for the manufacture of PVC. The cells were supplied by Oronzio de Nora, Milan. The improved techniques of cell design result in improved power consumption and less hold-up of mercury in the cells. They are capable of being operated at 120,000 amperes. The installed capacity of the plant is 100 tons of alkali per day. The lye obtained from the cells conforms to the requirements of rayon-grade caustic and is obtained at a concentration of

50 per cent. The unit is assured of sound economic running, especially since there will be a maximum utilization of chlorine. — Chemical Age of India, Vol. 18, 745, 1967.

Electrochemistry Seminar

The Eighth Seminar on Electrochemistry was held by the Central Electrochemical Research Institute, Karaikudi during December 1967. Technical sessions covered electrode kinetics—electrochemical equilibria and electroanalyses, solid state electrochemistry, corrosion, electro-deposition and metal finisihing, batteries, electro-organic and inorganic products, electrothermics and electrometallurgy, and techno-economic aspects of electrochemical processes. Abstracts of the 100 papers presented have been printed in booklet form.

Conference on The Solidification of Metals

A Conference on 'The Solidification of Metals' was held in Brighton during December 1967 under the auspices of the Iron and Steel Institute, Institute of Metals, Institute of Physics and the Physical Society, and the Institution of Metallurgists, London. Fifty papers were contributed in 3 sessions: factors controlling as—cast macro—and micro-structures, solidification of eutectics and application of solidification theory to ingot casting. The Proceedings will be published by the Iron and Steel Institute during 1968.

Hot Dip Galvanizing

Abstracts of preprints of 22 papers presented at the 8th International Hot Dip Galvanizing Conference, London—June 1967 have been published in Zinc Abstracts, August 1967.

Electroplating—Key to Joining Hollow Spheres

Electroplating is the key to joining two hemispheres in a technique developed by NASA to form a hollow sphere without cracking or destroying precise dimensions of the hemispheres. An equatorial band having a T-shaped cross section is machined to provide a locating fit for the two precision machined spheres. A shallow groove, 15-20 per cent of the width of the sphere diameter, is cut on the surface of the sphere, following the equatorial joint. The surface of the sphere, other than the groove, is marked by a stop-off lacquer. The assembly is clamped together and the groove, including the joint, is electroplated. The plate thickness is such that the surface of the groove is above, that of the sphere. It is then machined to conform to the sphere surface. This method has many advantages. Several non-magnetic materials may be used to form the joint, such as aluminium, copper, iron, gold, platinum and zinc.—Products Finishing, Vol. 31, No. 12, 64, 1967.

Zinc versus Plastics: The Case for Plated Die Castings

Platability is one of the points being emphasized in a campaign recently launched by the American Zinc Institute to prevent plastic injection moldings from capturing markets traditionally held by zinc die castings. Data sheets issued by AZI claim that cost is greater for finishing plastics than for zinc die castings. Research efforts are being conducted to improve the finishes on zinc die castings, to counter the plastics producers' efforts to replace die castings. It is concluded that certain applications will always be served by zinc, while others will go to plastics.—Products Finishing, Vol. 31, No. 12, 162, 1967.

Plastics in Motor Cars

In the U.S.A. and U.K., 35 lbs. of plastics were used in the average motor car in 1965. This figure is expected to be doubled by 1970. Bettelle at Geneva is proposing a technical and economic study of future uses of plastics in motor cars as an aid to managements of companies concerned with the problem. The final report will include consumption forecasts to 1975, classified by type of plastics, applications and class of vehicle. The study will concentrate on U.K., France, Belgium, Germany and Italy, and will also include Spain and Sweden. — Battelle Technical Review, Vol. 16, No. 9, 25, 1967.

Diffusion Bonding below 1000°F

The Battelle researchers at Columbus have developed a method of joining high-strength tubing by diffusion bonding, with cold-drawn stainless steel tubing. One of the objectives was the use of a temperature low enough to avoid significant impairment of metal properties and oxidation of base materials. To expedite bonding intermediate materials were used, the most promising bonds being those employing a gold-copper-gold intermediate with 0.0005 inch gold electroplate and 0.008 inch copper foil. Two bonding systems gave satisfactory results, the conditions being: 500°F 30000 psi and one hour; 700°F, 25000 psi and 15 minutes bonding time. No promising systems were found for use at these temperatures

that did not ultilize intermediate materials. Since the joint is made in air with pressure applied by tightening connector bolts, the systems should be readily usable in field applications.—Battelle Technical Review, Vol. 16, No. 9, 21, 1967.

Quantum Chemistry and Biomedical Materials Research Journals

Wiley-Interscience, Inc., New York, have started a new bimonthly publication "International Journal of Quantum Chemistry" effective 1967. It will be devoted to quantum mechanics and its application to the theory of atoms, molecules and crystals, together with developments in molecular biology, and to the application of computational methods to quantum chemistry. Another new quarterly is "Journal of Biomedical Materials Research". Topics include the chemistry and metallurgy underlying the preparation and behavour of biometals, stability and corrosion of materials in physiological environments, effects of materials on mechanism of blood coagulation, materials problems in pharmaceutical packing, and fundamental investigations on the biophysical and biochemical aspects of materials.

Soviet Science

In an article entitled "Soviet Science—Its Achievements and Perspectives" in Soviet Land, November 1967, M. Keldysh, President of the Academy of Sciences of the USSR has briefly reviewed the outstanding contributions of the USSR. He has stated that today four principal directions are coming to the fore, directions which characterize the entire scientific progress of the 20th century: physics of elementary particles and of the atomic nucleus, solid-state physics and the structure of solids and crystal lattice. The construction of powerful accelerators of charged particles and the development of varied highly elaborate experimental equipment over the past few years have enabled the accumulation of a wealth of material on elementary particles and to penetrate even deeper into the structure of matter. Soviet space rocketry has opened large opportunities in this respect. The evolution of new chemical elements is another problem

Modern science has received splendid facilities for research in space exploration. The launching of the sputniks has opened promising practical possibilities in improving radio communication and TV. The third principal direction of contemporary science is cybernetics, followed by biology. New methods in genetics have begun to play an increasing role. Contemporary technical progress is largely determined by the ability to create effective materials with a whole complex of useful properties. Effective methods have been devised for increasing the strength of metals, alloys and metal products.

Another achievement of Soviet science is the creation of many invaluable crystals, including synthetic diamonds. A super hard material-borazon, cubic boron nitride, has been developed in the USSR. It is equal to diamond in hardness, but is also capable of working at higher temperatures up to 1800°C. In the field of radio electronics, solid circuits make it possible to develop complex, highly reliable electronic computing systems, means of communication and automation. Researches in semiconductor physics have led to the development of semiconductor power equipment. The development of quantum generators is another important contribution. They have an output of 10,000 million watts, compared with the figure of 100,000 million watts for the power of all the electric power stations of the Soviet Union. Lasers help in making super-precise instruments. These generators are being put into practice.

It is concluded that the present era is characterized not only by closer co-operation between the various natural sciences, but also between them and the social sciences. Idealogical questions connected with the development of science, particularly questions of philosophy, materialistic explanation of new facts and theories of natural science—these are of tremendous importance.

Nickel in the News

Two steam generators designed to handle water at a pressure of 2100 lb./sq. in. and temperatures around 300°C have been built in West Germany using Alloy 600, nickel-chromium-iron containing about 76 per cent nickel, for the tubes and a similar alloy for cladding part of the tube plates. This material was chosen because of its excellent resistance to corrosion and its relatively high yield strength at elevated temperatures. The generators are destined for the 300 MW nuclear power station being built at Obrigheim.

A lighthouse recently installed in the U.K. employs austenitic stainless steel of the 18/10/3 chromium-nickel-molybdenum type for the battery chamber and lamphouse. Situated on submerged rocks about 3 miles offshore it is

in an extremely exposed position and maintenance must be reduced to a minimum. The use of stainless steel made pro ection from corrosion unnecessary and enabled weight to be reduced, thus simplying handling during erection. The battery chamber weights 3 tons with 12 ft. diameter and 8 ft. height.

A heat-treatable alloy containing nickel 66, copper 29 and aluminium 3 per cent has been chosen for the bolting system to support the roof of the Sydney Opera House under construction. The choice of the material was based on resistance to fatigue and corrosion together with high tensile strength. The environment is semi-industrial marine, and seepage may occur when the ceramic tiles covering the roofs are periodically washed in dilute hydrochloric acid.

Nickel-containing materials are used for some of the most highly stressed components and also for parts subjected to high temperatures in the small piston engines which power the majority of the world's aeroplanes.—Inco Nickel. No. 19, 1967.

Two major expansion projects, involving capital expenditures totalling 50 million dollars, have been announced by the International Nickel Co., of Canada Ltd. They are related to the company's worldwide expansion programme to increase the production of nickel to meet the rapid growth in demand for the metal. International Nickel has also opened in September 1967 a new 4 million dollar research laboratory specializing in extractive metallurgy near Toronto.—Press Information, September 1967, International Nickel (India) P. Ltd., Bombay.

Sealed nickel-cadmium batteries for aircraft have been discussed in 2 reports issued by the U.S. Air Force in 1966. The first one summarizes the results of recent research and development programmes aimed at improving the high-rate capabilities together with charge control and conditioning. It is considered feasible to apply sealed spacecraft battery technology to aircraft batteries. The second report relates to attempts to use sealed batteries as sources of aircraft battery power. The main problem here is the development of a suitable charge conditioner to operate with the battery and electrical system.—The Nickel Bulletin, Vol. 40, 147, 1967.

A Conference on 'Metal-Gas Reactions in CO_2 containing Gases' was held at the Institute of Metals Meeting in London during March 1967, in connection with the development of the advanced carbon dioxide cooled nuclear reactor. Titles of 10 papers presented therein together with 3 more papers, relating to the oxidation and corrosion behaviour of nickel-containing alloys and low-alloy and stainless steels, have been published in The Nickel Bulletin, Vol. 40, No. 6, 1967.

A new stainless steel alloy, IN-744-X, containing chromium 26 and nickel 6.5 per cent, has been announced by International Nickel during October 1967. Research work has shown that superplastic behaviour at elevated temperatures can be developed in certain two-phase iron-nickel-chromium alloys. The new alloys has an annealed yield strength in excess of 49 kg. per sq. mm., approximately twice the strength of the widely used ferritic and austenitic stainless steels, together with excellent corrosion resistance.—Press Information, October 1967, International Nickel (India) P. Ltd., Bombay.

International Nickel have launched a new quarterly "International Nickel" published in English, French, German and Italian. It focuses on major trends and developments in materials technology, business, science, education etc. The plans are to publish 4 issues annually beginning in 1968.

Metal Progress, August 1967 is a number exclusively devoted to Modern Stainless Steels in Product Design and Fabrication. There are a large number of articles dealing with prospects, critical point, technical forum, designing, data sheet, forming, welding, heat treating, finishing, joining, machining, building and roll forming.

Protection against Hydrofluoric Acid

Hydrofluoric acid poses major corrosion problems to plant builders. Monel alloy 400 is an outstanding metallic material of construction for this service. In common with some other high-nickel alloys, however, Monel is subject to stress-corrosion cracking in moist, aerated hydrofluoric or hydrofluosilicic acid vapour. Cracking is unlikely if the metal is completely immersed in the acid. Avoiding aeration is also beneficial. Further, cracking can be prevented by eliminating tensile stresses on the metal. A full anneal is given for most metals, but for Monel heating for one hour between 540 and 650°C followed by slow cooling is usually sufficient.—Anti-Corrosion Methods and Materials, Vol. 14, No. 10, 18, 1967.

Abrasion-resistant Nickel

A process has been developed in Czechoslovakia for producing hard and highly abrasion-resistant heavy nickel coatings for engineering

components. It is important that the surface should be absolutely clean. The pre-treatment steps are: soak cleaning, acid dipping, electro cleaning and acid dip. The parts are then plated from a Watts type solution containing silicon carbide, 280 mesh size. The operating conditions are: vigorous agitation—to avoid settling out of the carbide, 50°C and 30 asf with electrolytic nickel anodes. The properties of the coating can be varied by a variation in the amount as well as grain size of silicon carbide.—Electroplating and Metal Finishing, Vol. 20, 290, 1967.

Workshop Session on Corrosion

The Institution of Corrosion Technology, London has arranged a one-day workshop session in April 1968 to discuss corrosion topics under 4 groups: Corrosion in domestic water and industrial cooling water systems and in industrial electrical control gear, recent developments in paint coatings.

Automatic Hard Chromium Plating Plant

The September 1967 issue of Electroplating and Metal Finishing contains a description with illustrations of the plant installed by Leyland Motors, Leyland, England with the programme controller.

Stainless Steel

The No. 4, 1967 issue of Stainless Steel is mainly devoted to catering equipment. It briefly traces the history of cooking and the utensils employed from Roman times to the stainless steel equipment of the present day. The issue also deals with stainless in nuclear power stations, use as a roofing material and for accessories, and the appearance on British roads of vehicles clad in this material. Other articles include electropolishing, and the stainless steel plate-manufacture, recent developments and future applications.

Corrosion Conference in Australia

The Eighth Annual Conference of the Australasian Corrosion Association was held in Brisbane during November 1967. This year's theme was "Corrosion, Tropical and Urban", and the topics included protective coatings, catholic protection, corrosion resistant materials, atmospheric corrosion and miscellaneous.

Anti-Corrosion in Early Days

The famous French chemist Lavoisier is reported to have submitted to the Paris Assembly 2 products which were claimed to prevent the rusting and corrosion of firearms. The first, involved a plating process with 'white bronze', but the second was documented in 1791 and found to be 'very satisfying for its details and its result.' It was explained by the scientist that the corrosion of iron was caused by the action of air and water, and that effects to prevent corrosion depended on the exclusion of these agents by suitable coatings. Fatty substances, resins, varnishes and bronzes were suggested and the best results were obtained by applying a form of plating to the iron of the guns with the acid of moderate heat. This is an early report of a 'scientific' investigation of a corrosion problem. — Anti-Corrosion Methods and Materials, Vol. 14, No. 9, 7, 1967.

New High-Strength Copper-Nickel Alloy

The International Nickel Co., has developed a new alloy IN 732X containing nickel 30 and chromium nominally 2.8 per cent. It has unique hardening characteristics, and is equal or superior in corrosion resistance to conventional 70/30 copper-nickel in sea water at velocities of 20 ft./sec. or higher, and equal to the standard copper-nickels at 5-15 ft./sec. normally encountered in piping and heat-exchanger applications. — Press Information, International Nickel (India) P. Ltd., Bombay, December 1967.

Chemical Engineering Conference

A Tripartite Chemical Engineering Conference has been scheduled to be held in Montreal during September 1968 under the sponsorship of the Institution of Chemical Engineers, London, Canadian Society for Chemical Engineering and American Institute of Chemical Engineers. The sessions include two on corrosion: (1) Phenomena and principles, special problems, methods of control, (2) Advances in materials—metallic and nonmetallic.

Corrosion Education

The News Letter of the Institution of Corrosion Technology, Issue 12, 4, 1967 contains information on facilities available for corrosion training in Japan and India.

Technical Programme of Metals and Metallurgy Trust

The Metals and Metallurgy Trust, London has issued a leaflet with the September 1967 issue of Metals and Materials covering the programme of courses and meetings, October 1967—December 1968. The topics include aqueous corrosion, why metals fail, gases and

metals, metallurgy in industry, developments in steelmaking, fracture in metals, developments in steels and their uses and the application of modern physical techniques in metallurgy.

Cost of Corrosion Control

The cost of corrosion control has been estimated to be £ 195 million for the U.K. and more than £ 3,000 million for the U.S.A., and the world cost £ 15 billion yearly. The report "The Many Faces of Corrosion" by the National Bureau of Standards, U.S.A. gives the figures relating to some industries in the country: (1) extra pumping costs due to rust clogging the interior of water pipes $ 40 million a year, (2) replacing 2.5 million corroded water heaters $ 300 million each year, (3) 40 per cent of U.S. steel production, *i.e.*, 40 million tons a year, goes to replace corroded parts and products, (4) corrosion costs in industries—oil tankers $ 75 million, petroleum refinieries $ 50 million, automobile silencers and exhausts $ 500 million, miscellaneous $ 8,670 million, (5) total cost of corrosion $ 10 billion a year. It has been estimated that there are now 250,000 miles of oil pipelines and 600,000 miles of natural gas pipelines throughout the world-highlighting one of the biggest possible sources of corrosion. These figures emphasize the vital role of the corrosion engineer in the industry. Although the cost of corrosion prevention may seem high, it is more than outweighed by the savings.—Corrosion Prevention & Control, Vol. 14, No. 8, 7, 1967.

Seminar on Electronic Industry in India

A three-day Technical Seminar on Electronic Industry in India was held at Bangalore during December 1967 under the joint auspices of the Institution of Engineers (India) — Mysore Centre, the Institution of Telecommunication Engineers—Bangalore Centre, the Institution of Electronic and Radio Engineers—Bangalore Branch and the Institution of Electrical Engineers—Bangalore Overseas Branch. The following topics were discussed in 8 groups: design and development of equipment, import substitution, materials, production problems evaluation and testing, man-power, research and development, and intrumentation.

— T.L.R.