# NEWS SECTION

## SOCIETY REPORT

**Meetings:**

A lecture on "Oxidation of Metals" was delivered by Dr. K. I. Vasu, Assistant Professor, Department of Metallurgy, Indian Institute of Science, Bangalore at the Institute on March 26, 1969. The Speaker started at first that oxidation studies are of interest to electrochemists, corrosion scientists, engineers and metallurgists. Oxidation is serious with some of the base metals, especially at elevated temperatures. The oxidation meehanism was discussed in detail, and a reference was made to studies on composite alloys of copper-manganese, copper-magnesium oxide, nickel-zirconium oxide and other systems.

Dr. S. S. Misra, Scientist, Central Fuel Research Institute, Dhanbad gave a talk on "Electrochimical pH-Stat Study of the Hydrolysis of Ferrous Ions" at the Indian Institute of Science on May, 22, 1969.

A Special Meeting of the Governing Council of the Society was held on March 28, 1969 at the Madras Woodlands Hotel, Bangalore.

The Sixth Annual General Body Meeting of the Society was held on June 26, 1969 at the I.I.Sc., Bangalore. The Annual Report for 1968, and the Audited Statement of Accounts and Balance Sheet as at December 31, 1968 were adopted. The following were elected to the Governing Council for 1969-70: (1) Dr. A. N. Kappanna (President) (2) Dr. N. R. Kuloor (Vice-President); (3) Dr. S. Krishnamurthy (Secretary-Treasurer), (4) Dr. T. L. Rama Char (Editor-Journal), (5) Sri B. K. Balu, (6) Dr. S. Soundararajan, (7) Sri A. K. Bose, (8) Sri R. A. Shah and (9) Sri. K. Panchapakesan.

**Personals:**

S. Krishnamurthy has been nominated as Chairman, Metallic Finishes Committee SMDC 23, Indian Standards Institution, New Delhi.

T. L. Rama Char visited the US.S.R. during April 1969 under the India-U.S..S.R. Cultural Exchange Programme. He made a study of electrochemical research in various laboratories in Moscow, Leningrad and Kiev. He has been admitted as a Member of the Mendeleev Society of Chemists, All Union-U.S.S.R., Moscow.

## GENERAL NOTES

**Metal-Cutting By Magnetic Field:**

For decades the cutter has been the basic metalworking tool. Cutting speeds, and consequently labour productivity in removing shavings with a cutter tool, are apparently approaching the limit. A new method which substitutes a magnetic field for the cutter tool was suggested in the U.S.S.R. In magneto-thermal metalworking, electric current is passed through the workpiece, which is made to rotate or vibrate. The section to be machined is heated by a gas torch, an electric arc or high-frequency current until the metal softens and then is placed in magnetic field. The latter's interaction with the electric field intensively stirs and removes the molten particles of metal. In one hour such a magnetic "cutter" can remove a ton of metal, as compared with kilograms by conventional cutters. Instead of shavings it produces a solid briquette of caked metal, thus obviating the need to collect and briquette the scrap.—Soviet Union, No. 3 (228), 30, 1969.

**Rhenium Alloys:**

Soviet technologists have used rhenium alloys combining unique mechanical strength and plasticity to make metal wires only thousandths of a centimetre in thickness and better in quality than the best world standards. They are used in aircraft and navigation control instruments.—Soviet Union, No. 3 (228), 30, 1969.

**Platinium Catalysts in Fuel Cells:**

From an analysis of costs and performances of the fuel cell systems, it is reported that, although the least expensive system at the 5 kw level is that using a methanol reforming system giving pure hydrogen and non-platinum catalysts in an

alkaline electrolyte, the additional cost of using platinum catalysts is minimal and bestows significant advantages in increased performance/weight parameters. The system using impure hydrogen is about 2½ times as expensive; most expensive is that using methanol directly in an acid medium.—Platinum Metals Review, Vol. 13 No. 1, 8, 1969.

**Australian Process Industries:**

A Symposium on "The Future Development of the Australian Process Industries" was held in Syndey during October 1968. The December 1968 issue of Australian Chemical Engineering contains three of the papers presented therein. (1) Decentralisation and the Process Industries, (2) Financing Industrial Development and (3) New Technologies and their Economic Effects on the Australian Chemical industry.

**Nickel Alloys:**

A special nickel-containing cast steel has been used for the Pelton turbine wheel of a Norwegian hydroelectric plant, and for a highly-stressed impeller in a pumped-storage scheme in Germany. About 4 per cent nickel was added to the steel to improve its mechanical properties and its resistance to abrasion and to cavitation erosion and corrosion fatigue.

A high-tensile nickel-aluminium bronze containing 2-5 per cent nickel was chosen for the 55-ton propeller of a merchant vessel. In addition to its high strength. this alloy has excellent resistance to corrosion and erosion by fast-flowing sea water and is very resistant to cavitation erosion. The maintenance costs are low, and mechanical damage can be repaired by hot-straightening or welding.—Inco Nickel, No. 23, 1, 10, 1969.

**British Books Exhibition:**

The British Council, Madras displayed an Exhibition of books and periodicals on Science and Technology at the Indian Institute of Science, Bangalore during March 1969. They covered 1968 publications covering physics, chemistry, engineering, metallurgy and other subjects.

**The Challenge of the Materials Explosion:**

The above is the title of a Special Report in Materials Engineering, November 1968, pages 33-61. The subject is discussed under 7 headings.: (1) Prespective: the making of the 'Materials Age', (2) Concepts: modern concepts make structure key to properties, (3) Engineering: materials engineering groups gain, (4) Producers: competition gives rise to multi-materials producers, (5) Research: key to materials of tomorrow, (6) Societies: Groups gain membership, deepen education aids and (7) Education: more schools offer courses: science leads technology.

**Reversed Fuel Cell for Cheaper Hydrogen:**

A cell ecently developed by GE scientists is claimed to split steam more cheaply than by previous device. It has evolved from work on fuel cells. A solid electrolyte of yttria—stabilized zirconium oxide is sandwiched between solid electrodes. All the electrode materials are designed to resist operating temperatures of 1000°C—the cathode is of porous nickel filled with 10 mole per cent zirconium oxide. Two types of anodes are under examination, depending on whether oxygen gas is to be produced or whether the oxygen ions are used to oxidize a gas such as carbon dioxide or methane. A module of about 25 cell stacks, each a foot long, would contain 20 sq. ft. of active cell area, and produce between 10 to 60 thousand standard cubic feet of hydrogen per day.—Chem. and Engg. News, Vol. 46, No. 47, 48.

**High Temperatures—High Pressures:**

An International Journal of Research by the above title has been started by Pion Ltd., London effective 1969. It is devoted primarily to the experimental and theoretical study of matter under extreme thermal and mechanical conditions.

**Symposium on Plating Plastics:**

The Second Conference dealing with plating plastics was arranged by Roto-Finish at Oxford during October 1968. A digest of the following papers is given in Industrial Finishing, December 1968: (1) Moulding techniques for efficient plating on plastics, (2) New developments in plating on plastics and (3) Ultrasonic cleaning and its relation to plating on plastics.

**Balls Stop Boiler Corrosion:**

Tests recently conducted at a Scottish power station proved that a blanket of plastic balls, floating on the water surface in a machine hot well, provides a cheap, effective and simple means of reducing corrosion in boilers and condensate systems by limiting the oxygen

absorbed by the water during shut-down periods. The capital cost of introducing the Allplas blanket system is low and there are no installation or maintenance costs. The technique is already widely used by industry to reduce heat losses from heated open processes tanks and for supressing surface fumes, retarding the onset of freezing and preventing the splashing of corrosive liquids. Values obtained for the temperature and dissolved oxygen before and after the application of the blanket are shown in 2 tables.—Australian Chemical Engineering, Vol. 10, No. 1, 21, 1969.

**Pre-anodized Aluminium:**

The newest member in the fast-growing field of pre-finished materials is pre-anodized aluminium. It offers many advantages, not the least being that small companies can eliminate their anodizing shop or their outside contractor and fabricate items directly from the pre-anodized material—sheet or tube. It is being used for interior trim in the 1968 models of American cars, and for dials and nameplates because of its ready acceptance of paints and inks. Pre-anodized aluminium coil stock is manufactured in a similar way to coil-coated aluminium. — Industrial Finishing, Vol. 21, No. 248, 21, 1969.

**Roto-Finish Symposium:**

The second instalment of abstracts of papers and discussion held at the 1968 symposium has been published in Industrial Finishing. February 1969: (1) Automatic units for plating on plastics, (2) Metal plates deposited on ABS graft polymers, (3) Electroless copper plating, (4) Adhesion, stress and peel strength, (5) Experiences in plating ABS, (6) Printed circuits.

**Heatex 69 International:**

The 4th Industrial Process Heating Conference was held in Manchester during June 1969. The theme was "The Economics of Industrial Process Heating", and 30 papers were presented under: metal melting, heating in the non-metallic industries, drying and R.F. techniques, foundry developments, safety and heat treatment.

**Chromium-plated Food Cans:**

In the Central Institute for Ferrous Metallurgy in Moscow a new process has been developed for the production of chromium-plated and varnished steel strips for food cans, especially for meat and fish, as a possible cheap alternative to electrolytic tin coats. Chromium plating 0.03-0.07 microns thick does not alter the fabrication properties of steel plate, but does provide good corrosion resistance and temperature resistance, thus allowing short lacquer baking times at high temperatures. Production sequence is: derusting, pickling, brush cleaning, liquid cleaning, chromium plating, rinsing, drying and application of epoxide/phenol can varnish EP 527 in an electrostatic field, followed by induction heat drying. Pilot plant tests were good and a production plant of 75,000 tons of chromium plated and varnished steel strip capacity is in the design stage.—Industrial Finishing, Vol. 20, No. 246, 33, 1968.

**Continuous Corrosion-measuring Probes:**

Probes that will measure galvanic and crevice non-uniform corrosion on a continuous basis have been developed by Battelle-Northwest, Richland, Washington, U.S.A. They use either resistance or polarization techniques.—Metals and Materials, Vol. 3, No. 2, 40, 1969.

**Aluminium Pipes for Pressure Fluids:**

The Montecatini Edison (S.P.A.) Minerals and Metals Department has recently produced metal piping in MTA aluminium alloy, containing magnesium and silicon, whose main application is in the field of fluids transport even under pressure, i.e., air, various gases, oil, diesel oil, petroleum, water, and anything else compatible with aluminium. The principal advantages of using aluminium alloys are: remarkable lightness, saving in maintenance and easy recovery.—Australasian Corrosion Engineering, Vol. 13, No. 2, 25, 1969.

**Cavitation Research Centre:**

A new water-tunnel laboratory and research centre, designed to help India develop safe, economic and efficient turbines and other equipment and structures for hydroelectric plants nad irrigation facilities needed for economic growth, has begun operation near Poona. An account of the project has been given in the Bulletin of the Institution of Engineers (India), Volume 18, No. 9, 1969 under: introduction, the deadly bubbles, practical importance, 600-acre station set at base of reservoir, two serious mishaps, cavitation—where and why, saving of foreign exchange, importance of training, building and equipment.

**Harbor Island Corrosion Laboratory Renamed:**

The Harbor Island Corrosion Laboratory, Wrightsville Beach, N.C., U.S.A., has been renamed "The Francis L. LaQue Corrosion Laboratory" in honour of its founder Mr. Francis L. LaQue ,Vice-President of the International Nickel Co. Inc. The 34-year old research facility is one of the largest seawater test facilities in the world and a major centre of information on the behaviour of materials in a marine environment. The remaining ceremony was held during the 31st Annual Meeting of the Sea Horse Institute—an informal Society of specialists in the field of marine corrosion—of which Mr. LaQue is one of the founding members.—International Nickel, Bombay, Press Information E.28, May 1969.

**Codeposition of Alloy Films:**

Two scientists from the Weizmann Institute of Science, Israel and the University of Wisconsin, U.S.A., have succeeded in depositing, by electron-beam techniques, alloys of metals immiscible in the liquid phase, such as copper-tungsten and copper-molybdenum. The method seems to be the only one so far devised for achieving codeposition of such refractory materials. It is also succeessful for copper-nickel films, but fails with very volatile metals such as zinc. Metastable phases can be prepared. Codeposition of non-metallic materials is possible. The apparatus is relatively inexpensive and versatile, and could be used in simplified form in industrial process development.—J. Sci. Instruments, Ser. 2, Vol. 2, 183, 1969.

**New Aluminium Alloys:**

Eight-Year exposure tests of welded aluminium-copper-cadmium alloys produced commercially have been completed and show that they are free from foliation, intercrystalline corrosion and stress corrosion in severe atmospheric conditions. A newer development concerns the effects of germanium additions to aluminium-copper-magnesium-silicon alloys.—Newsletter, Fulmer Research Institute, Stoke Poges, Bucks, England. No. 5. 1969.

**Corrosion Conference in Australia:**

"Corrosion Prevention and Control in the Mineral Industry" is the theme for the 10th Annual Conference of the Australasian Corrosion Association to be held at Perth during November 1969.

**Desalination:**

A continued remarkable increase in the world's desalination capacity in 1967-68, with a total land-based capacity of more than 200 million gallons per day of desalted water installed for civil use, has been reported in a study by the United Nations. Apart from desalination for exclusively industrial purposes, the capacity of plants for potable water has reached 133 million gallons per day, an increase of 34 per cent. Some 25 desalination plants were completed during the period.—UN Weekly Newsletter, Vol. 17. No. 20, 3. 1969.

**U.S.S.R. Journals:**

The Consultants Bureau—Plenum Press is publishing cover-to-cover translations in English of the following Journals from the U.S.S.R. (1) Industrial Laboratory, (2) Siberian Chemistry Journal and (3) Journal of Analytical Chemistry of the U.S.S.R.

**High-Strength Steels:**

Metals Engineering Quarterly, February 1969, pp 1-101, contains 11 papers, to serve as a practical guide to joining high-strength steels. These were presented at a Symposium held at the 1968 Materials Engineering Congress, Detroit, U.S.A.

**Hindustan Organic Chemicals:**

Chemical Age of India, June 1969, pp 457-488 has presented a Feature on Hindustan Organic Chemicals Ltd., Rasayani ,Maharashtra.

**Fracture Mechanics and Corrosion:**

Digest of the following papers presented at the Spring Meeting 1969 of the Institute of Metals, London has been given in Metals and Materials: (1) The application of fracture mechanics to stress corrosion testing, (2) Fracture mechanics and stress corrosion, (3) Stress corrosion testing of high strength steels using pre-cracked specimens, (4) The application of fracture machanics to the stress-corrosion cracking of Al: Zn.: Mg Alloys, (5) Stress corrosion of welded joints: a realistic method of evaluation and (6) The use of pre-cracked specimens in engineering design.

**Electrochemical Technology Course:**

The City University, London has organized an M.Sc. Course in Electrochemical Technology for 1969-70 to meet the needs for graduates

trained in modern theory and experimental methods. Lectures will include the thermodynamics of cells, electrode kinetics, electroanalysis theory, electroanalysis, corrosion, batteries and fuel cells, deposition, machining, processing and synthesising.

**Meeting on Iron and Steel:**

An International Meeting on Iron and Steel Making will be held at Luxemburg and Dusseldorf during April 1970. The first section will be devoted to automation in sintering, blast furnace practice and steel plants, and the second will be concerned with automation of rolling mills and their ancillary plant.

**Council of Science and Technology Institutes:**

It has been agreed by the Councils/Governing Board of the Institute of Biology, Royal Institute of Chemistry, Institute of Mathematics and Its Applications, Institution of Metallurgists, and Institute of Physics and the Physical Society that a Council by the above title be established for collaboration on all matters of common concern.

**Surface Treatment Exhibition:**

The Second International Salon of Surface Treatments and Industrial Finishing was held in Paris during May 1969. A preview of some of the exhibits has been covered in Industrial Finishing, Vol. 21 No. 250. pp 18-31, 1969.

**IMF Conference:**

The Annual Technical Conference of the Institute of Metal Finishing, London was held at Scarborough, U.K. during April-May 1969. The sessions covered nickel and chromium plating, gold plating, finishing of aluminium, pretreatments, special processes plating for electronics, plating on plastics, organic finishing, education and training, and miscellaneous. A list of the papers can be found in Industrial Finishing, April, 1969.

**Metals Science:**

The May 1969 issue of "Chemistry in Britain" is a special issue devoted to metals and contains the following articles: (1) Metals: technical and economic, (2) Extraction metallurgy, (3) Mineral technology, (4) Developments in copper smelting, (5) Zinc extraction metallurgy in the U.K., (6) Chemistry of alloy development, (7) Carbon determination in modern steelmaking, (8) High-temperature Chemistry of simple metallic oxides, (9) Production and use of high-purity metals, (10) High-purity metals for the electronics industry and (11) Metallic corrosion.

**AES Annual Convention:**

The 57th Annual Convention of the American Electroplaters Society was held in Detroit during June 1969. Papers were presented covering aluminium processing, precious metals plating of common metals, alloy deposition, electroforming; racking and miscellaneous. The April 1969 issue of Products Finishing gives a list of the contributions.

—T.L.R.