NEWS SECTION

SECTION REPORT

Meetings

A Business Meeting of the Section was held on March 15, 1962 at the Indian Institute of Science, Bangalore with Dr. T. L. Rama Char in the Chair due to the unavoidable absence of Dr. M. S. Thacker. The minutes of the previous meeting were confirmed. The Statement of Accounts for 1961 was approved. Dr. S. Krishnamurthy informed the members that steps will be taken for the formation of 'The Electrochemical Society of India' as early as possible.

Personals

S. Venkatachalam has been appointed as Junior Research Assistant in the Dept of Inorganic and Physical Chemistry, Indian Institute of Science, Bangalore.

M. S. Thacker has been invited to preside over the UN Conference on 'Application of Science and Technology for the Benefit of the less developed areas of the World' to be held at Geneva in 1963.

J. Sundararajan has been elected an Associate of the Royal Institute of Chemistry, London.

K. S. G. Doss was out of India on deputation for 5 weeks during March—April 1962. The observation-cum-study tour covered France, U.K., Germany, Switzerland and Italy.

New Associates: India Section

S. Sathyanarayana, Electrochemistry Division Indian Institute of Technology, Bombay-76.

GENERAL NOTES

Aluminium Developments

Aluminium is being used in most motor car producing countries for decorative trim because its cost is significantly lower than either chromium plated steel with nickel undercoat, or chromium plated brass. The application of aluminium in building construction is increasing and certain problems associated with this are the subject of current research. Even anodized surfaces are liable to attack from atmospheric pollutions and contact with mortar and other materials containing free acids or alkalies. Organic finishes like BUT/100 or VIN are being suggested as a remedy. They are lacquer films having the characteristic vinyl resistance to hydrocarbon and alcohol solvents. Applications are for conditions without extremes of wear, humidity and heat. The problems of galvanic action especially between structural steel and aluminium curtain wall is a continued concern in building construction. A U.S. firm has produced a tape which easily sticks to unpainted or painted steel surfaces and prevents galvanic corrosion. — Australian Corrosion Engg, Vol. 6, No. 1, 41, 1962.

Automatic Anodizing Plant in the U.K.

New finishing facilities anticipate an increased demand for bright aluminium trim for motor vehicles. An entirely automatic chemical polishing and anodizing plant has been installed by the London Aluminium Co. at a cost of £150,000. Details concerning the plant and the special features have been given in Industrial Finishing, Vol. 14, 25, January 1962.

Architectural Anodizing

The two most important types of aluminium architectural components, namely anodized curtain walls and window frames, share pride of place with bright anodized motor trim as extremely promising outlets for finished aluminium. Architectural anodizing, however, presents a number of difficult problems to the anodizer, the most important being durability. The thickness of anodic coating which must be applied, normally 1.0 — 1.4 mil, requires the techniques of hard anodizing. Efficient equipment for cooling and circulating the solution is needed, as also strict control of the operating conditions for uniform thickness and dyeing properties which are essential for matching the colour of dyed aluminium panels which are to be assembled in a building. Further the choice of dyestuff itself is a much more restricted one; in general, black, gold and blue have so far proved the most satisfactory. The aluminium has to be cleaned regularly and frequently during its service life, and protection against wet concrete or plaster is necessary.

Progress has been made in the U.S.A. with a number of mixed electrolytes containing organic acids, such as sulphosalicylic or mellitic, for anodizing. The use of anodized aluminium in architecture has grown so fast that research both on choice of process and on the properties of the coating has yet to catch up. — Electroplating and Metal Finishing, Vol. 15, 1, Jan. 1962.

Aluminium vs Electroplate

One of the most urgently required research projects in metal finishing today is a comprehensive and realistic comparison of the durability of nickel-chromium plated steel and zinc base die castings with anodized aluminium in outdoor exposure. This is not simple, and a number of different exposure sites would have to be chosen, possibly supplemented by mobile tests on motor cars. Further, exposure tests on aluminium and on electroplated coatings are generally carried out by industries interested in aluminium and electroplating respectively. Hence the work has to be undertaken by a single organization which can spend sufficient money on research for a proper comparison of the two types of finishes.– Electroplating and Metal Finishing, Vol. 15, 25, Jan. 1962.

Standards in Precious Metal Plating

The exacting standards demanded by the present day electronics industry has led to new specialization in precious metals. One of the differences between the deposition of precious metals and plating with metals such as nickel lies in the cost of the metal coating in relation to that of the part plated. Although a part to be plated with a precious metal may be inexpensive to fabricate, it may nevertheless play a key part in the correct functioning of an expensive piece of radar equipment or a guided missile. Moreover, men's lives may well depend on the efficient operation of such equipment. Because of high standards required by a rapidly expanding electronics industry, new standards for precious metal deposition are being evolved.

One of the difficulties involved in organizing a specialized plating service for the electronics industry is the great variety of metals that have to be plated and the equally wide range of plating processes specified by customers. The metals include rhodium, palladium, gold, silver and tin-nickel alloy. Plating of semi-conductors requires considerable care, the function of the coating being generally to provide protection against corrosion or against chemical action during subsequent manufacturing processes. Techniques have been developed for the gold plating of difficult metals like tungsten and molybdenum. Silver plating is used for transistor components and on many diodes operating at high frequencies. Plating on printed circuits is on the increase, and electroless gold can also be employed. There will be growing demand for precious metal coatings suitable for high temperature applications. Hard silver plating of aircraft engine bearings has already proved highly successful, and the requirement for silver and lead/indium coatings for this type of application is expected to rise.—Industrial Finishing, Vol. 14, No. 163, 30, 1962.

International Chemical Engineering

A new quarterly periodical under this title has started publication since October 1961 by the American Institute of Chemical Engineers with the cooperation of the National Science Foundation. It will contain English translations of selected articles in the field of chemical technology originating from the U. S. S. R., East Europe and Asia. It will also publish reviews on progress in selected fields by specialists. The areas to be covered in the journal include high temperature and high pressure processes, fuel cells, corrosion, electrochemical reactions, kinetics and thermodynamics.

Electroforming for the Space Age

Making metal parts by electrodeposition techniques plays a part in the manufacture of the B-58 bomber and other airborne vehicles. A report on Convair's electroforming processes has been presented in Products Finishing, U. S. A., January 1962. It contains information on preparation of mandrel or matrix, application of conductive film, electroforming, removal of electroform shell, plating solutions for depositing copper and nickel, and electroforming costs. Tables give operating conditions for copper sulphate and nickel sulphamate solutions, and physical properties of electroformed nickel. The chief reasons for the popularity of electroforming in the aerospace industry are: demands for close tolerances, high strength-weight ratios, lower costs, and for fabrication of parts that cannot be made by other methods.

Electroless Chromium

A method recently developed by the Westinghouse Electric Corporation, U.S.A., produces electroless chromium coatings that are more uniform than obtained electrolytically. The process is economical for plating many tools such as taps, drills and cutters. The solution

consists of acetates of chromium, sodium and nickel, and sodium citrate. glycolate and hypophosphite, and is operated at a pH of 4-6 and 212°F. Small amounts of nickel and phosphorus are generally present in the deposit. Barrel plating produces good results, and the deposition speed is 0.001 inch per hour, Steel is the easiest basis metal, and others include stainless steel, titanium, aluminium, copper, brass and bronze.—Products Finishing, Vol. 26, No. 4, 58, 1962.

Corrosion Protection of Nickel/Chromium Coatings

A series of 8 papers on improved corrosion protection by composite metal coatings have been published in Galvanotechnik, Vol. 52, 340-389, July 15, 1961. The topics cover: decorative nickel/chromium plating in the U.S.A., corrosion behaviour and levelling performance of bright nickel and double-layer nickel deposits, crack-free and microcracked chromium overcoatings, significance of thick chromium coatings, corrosion protection of various electrodeposited coating systems, intermediate copper layer in composite coatings, and improvements in nickel plating of zinc-base die castings. Detailed abstracts of the papers have been given in the Nickel Bulletin, Vol. 34, No. 10-11, 1961.

Developments in Plating — 1962

An interesting prediction has been recently made on some of the developments that are worth watching during the current year. It is stated that multiple-layer nickel-chromium finishes will continue to make inroads upon other coatings in the decorative field. One new development which will assist in producing more durable parts is an increasing use of auxiliary anodes in decorative plating in both the nickel and chromium cycles. An increased use of titanium baskets to contain anode materials in cast or sheared form is predicted. Commercial production of nickel-chromium-coated aluminium parts on a really large scale is unlikely.

The year 1962 will witness important growth of new developments in plating on plastics, for instance, nickel plating in the new electric typewriters. In other industrial applications of plating and electroforming design engineers will get deposits with the special properties required — like alloys of nickel with iron, cobalt or boron. Life of switch contacts will be lengthened by palladium applied directly on copper printed circuit tabs by electro—as well as electro—less plating. All-nickel stampers will provide the necessary properties for stereo records. It is safe to predict an increase in automation of finishing operations. The principle of combining central control of cleaning and plating sequences with new flexibility of cycle adjustment will be extended to units suitable in size for job shops and to barrel plating machines. The result will be greater uniformity in quality and lower costs.—Plating, Vol. 49, No. 1, 79, 1962.

Research Estimates in the U.S.A.

The cost of research work in the U S.A. for 1962 has been predicted to be about $ 16 billion: government $ 10 billion, reflecting stepped-up space and defense programme; industry $ 5·5 billion; universities and foundations $350 million. If research were considered an industry its total 'sales' would rank it about midway among the 20 major manufacturing industries. About 350,000 professional people are employed in research today, the number being approximately half of the total production workers of the automative industries. — Battelle Technical Review, Vol. 11, No. 1, 15, 1962.

Symposium on Ferro-Alloy Industry in India

A Symposium on 'Ferro-Alloy Industry in India' was organized by the National Metallurgical Laboratory, Jamshedpur during February 1962. Twentynine papers were presented and discussed in the following sessions: (1) survey of raw materials, sampling and role of research, (2) extraction and production technology, (3) scope of ferro-alloy industry, by-products, standardization etc., (4) physico-chemical reactions, and (5) general aspects of ferro-alloy technology. Abstracts of the papers have been published in the NML Technical Journal, Vol. 4, No. 1, 1962.

18th NACE Conference

The National Association of Corrosion Engineers, U.S.A., held its 18th annual conference at Kansas City, Mo from March 19 to 23, 1962. Technical sessions covered: theoretical corrosion, refining industry, missile industry, chemical industry, protective coatings, corrosion principles, high purity water, cathodic protection, elevated temperature, corrosion inhibitors, aluminium pipe line, plastics, marine corrosion, utilities, oil and gas production, general corrosion and general pipe line. The programme included round-table discussions and a corrosion show. The January and February 1962 issues of 'Materials Protection' give the titles of the 106 papers presented.

At the Symposium on Corrosion Inhibitors, K. G. Sheth and T. L. Rama Char (India Section) presented a paper on ' Inhibition of the Corrosion of Aluminium-Zinc Alloy in Hydrochloric Acid Solutions '.

Second International Congress on Metallic Corrosion

The Second International Congress on Metallic Corrosion will be held at New York during March 1963. The programme is scheduled concurrently with the 19th Annual Conference of the National Association of Corrosion Engineers and the 1963 International Corrosion Show.

Rise of Aluminium

Statistics on the production and consumption in the western world of aluminium, lead, copper, zinc and tin between 1959 and 1961 demonstrate that aluminium has shown by far the greatest increase of the non-ferrous metals. Aluminium production has risen steeply from 1.3 to 3.6 million metric tons, the consumption being slightly behind, 3.4 million tons. The volume of the metal used today is about 2.5 times that of copper. This minor revolution in metal trends has had, of course, a strong influence on the metal finishing industry. The finishing of aluminium-mainly in terms of anodizing, conversion coating, painting and enamelling, has today become very important business in practically every branch of the industry.—Electroplating and Metal Finishing, Vol. 15, 59, 1962.

Cathodic Protection

The February 1962 issue of 'Materials Protection' contains 7 papers on various aspects of cathodic protection: (1) magnesium anodes for protection of fresh water condenser and cooling parts, (2) economics of cathodic protection for U.S. navy ships, (3) three applications of cathodic protection for chemical equipment, (4) engineering and economic problems involved in cathodic protection of Laclede gas system, (5) advantages of high density polyolefin for cathodic protection cable insulation, (6) solving refinery corrosion problems with cathodic protection and (7) some successful applications of cathodic protection in breweries.

Corrosion at the ASME Meeting

At the winter annual meeting of the American Society of Mechanical Engineers held in New York during November 1961, eighteen papers of particular interest to corrosion engineers were presented at the sessions on: boiler feedwater, corrosion and deposits, effects of radiation, fuels and heat transfer. A list of the papers can be found in Materials Protection, Vol. 1, February 1962.

Corrosion by High Purity Water

Four papers presented at the High Purity Water Symposium, 1961 NACE Conference, have been published in the Jan. 1962 issue of ' Corrosion '. The titles are: (1) Test facility for evaluating heat exchanger materials, (2) shot peening of metals for protection against stress corrosion cracking, (3) Corrosion of Inconel nickel-chromium alloy in primary coolants of pressurized water reactors, and (4) Testing steam generator materials for pressurized water reactor plants.

1962 Corrosion and Metal Finishing Exhibition

The Corrosion and Metal Finishing Exhibition sponsored by ' Corrosion Technology ' will be held in the National Hall of Olympia during November 1962. The first exhibition was arranged in 1957. Technical meetings and film shows will be extra attractions.

Electrolytic Cells — A Symposium

The Proceedings of the Symposium on Electrolytic Cells held by the CECRI at Karaikudi during December 1958—January 1959 have been published. The publication consists of 356 pages covering 39 papers and the discussions.

Metal Finishing Congress in Holland

An International Congress on Metal Finishing was held for 4 days from May 16, 1962 at Amsterdam. It was organized by the Dutch Metal Finishers Association and included an exhibition and a Conference. Twelve papers on the following topics were presented: nickel-chromium deposits, paints, protective coatings for zinc and aluminium, phosphating, iron platings, metal spraying, plating thickness, tin coatings, and chemical and pretreatment.

Fresh Water from the Sea

A Symposium on 'Producing Fresh Water from Sea Water' was held in Athens, Greece, during May 30–June 4, 1962. Thiritysix papers were presented by authors from Holland, India, Israel, Japan, U.K. and U.S.A. under the following sections: (1) Evaporation Processes, (2) Electrodialytical and related Processes, and (3) Crystallization Processes. The programme included introductory lectures. Titles of the papers

can be found in Corrosion Engineer, Vol. 4, March 1962.

ECS Meeting in Los Angeles

The Electrochemical Society held its 121st meeting in Los Angeles from May 6 to 10, 1962. Technical sessions covered electric insulation, electronics-luminescence and semiconductors, electrothermics and metallurgy, industrial electrolytic and theoretical electrochemistry. The March 1962 issue of JECS gives the abstracts of the 248 papers. At the theoretical electrochemistry session, K. N. Roy, R. L. Narayanan and B. N. Ghosh, Bombay, India, presented a paper on 'A Study in the Electrolytic Separation of Silver from Copper in presence of nitrite ions'.

AES Annual Convention

The forty-ninth annual convention of the American Electroplaters' Society was held at Milwaukee, Wis., U.S.A. from June 24 to 28, 1962. The programme included educational sessions and plant visits. There were twenty-seven papers covering a wide variety of topics: plating of metals and alloys, plating on uncommon bases, electroforming, testing of deposits, anodizing, organic coatings, miscellaneous finishes.

1962 IMF Conference

The Institute of Metal Finishing, London held its annual Conference at Brighton during May 8—12, 1962. The programme covered 4 technical sessions, practical plating forum, a colloquium on paints and painting, and works visits. The subjects for the 14 papers presented in the technical sessions were: nickel and chromium coatings, properties of deposits, processes.

Australasian Corrosion Convention

The Australasian Corrosion Association has arranged the Third Australasian Corrosion Convention at Auckland and Rotorua, New Zealand during November 1962. This year's theme is 'Corrosion—Its Cost and Reduction'. Methods of reducing the huge cost of corrosion, by suitable design, correction selection of materials, effective maintenance etc., will be discussed. Papers on other corrosion topics will also be accepted.

Aluminium Coating of Steel by Electrophoresis

A new electrophoretic method which has been developed by the British Iron and Steel Research Association provides a material that retains the corrosion resistant properties of conventional aluminium coatings without incurring their inherent disadvantages. 'Elphal' is produced by the electrophoretic deposition of aluminium powder and is claimed to have much wider range of useful properties than is possessed by any similar material. Basically the process consists of applying a layer of aluminium powder to the strip by electrophoresis, consolidating this powder into a solid layer by rolling and then sintering and bonding the compacted layer to the steel by heat treatment. The experimental plant is capable of coating 5 in. x 0.01 in. to 0.025 in. strip at speeds of up to 30 ft/min. The coating thickness can be varied from 0.00025 to 0.0015 in.—Electroplating and Metal Finishing, Vol. 15, 133, 1962.

Aluminium Industry in India

The 30,000 tons aluminium smelter, the largest so far in India, to be set up in Mysore State is a private public sector combine with the collaboration of Reynold International, U.S.A. The construction of the second stage of the Indian Aluminium Company's Hirakud Smelter for doubling the capacity to 20,000 tons per year was completed in November 1961 ahead of schedule. The Third Plan traget for aluminium is likely to be revised to 165,000 tons with a provision of 30,000 tons for export. This follows the decision of the Government to gradually replace copper by aluminium, particularly for electrical and other fabricating industries. On this basis the demand for the metal in India is likely to grow at the rate of 20,000 tons per year by 1965-1966, reaching a level of 265,000 tons by 1970-1971.

Corrosion Abstracts from Sweden

The Journal 'Corrosion Abstracts' is being published by the Corrosion Committee of the Royal Swedish Academy of Engineering Sciences, Stockholm. Starting from Vol. 3, No. 1, 1962 the abstracts are printed in English, German and French. About 700 periodicals from different parts of the world are covered, and the classification is according to the NACE filing index system. Comprehensive cross references further facilitate the practical use of the abstracts.

Direct Plating of Nickel on Die-Castings

Direct nickel plating on zinc base die-castings is now new. Many people would rather elimi-

(*Continued on Page 71*)

chloride content permissible to get good deposits of manganese dioxide with over 75% current efficiency.

It is proposed to conduct large scale trials using porous porcelain plate diaphragms fixed to ebonite lined vessels to assess the commercial feasibility of the process.

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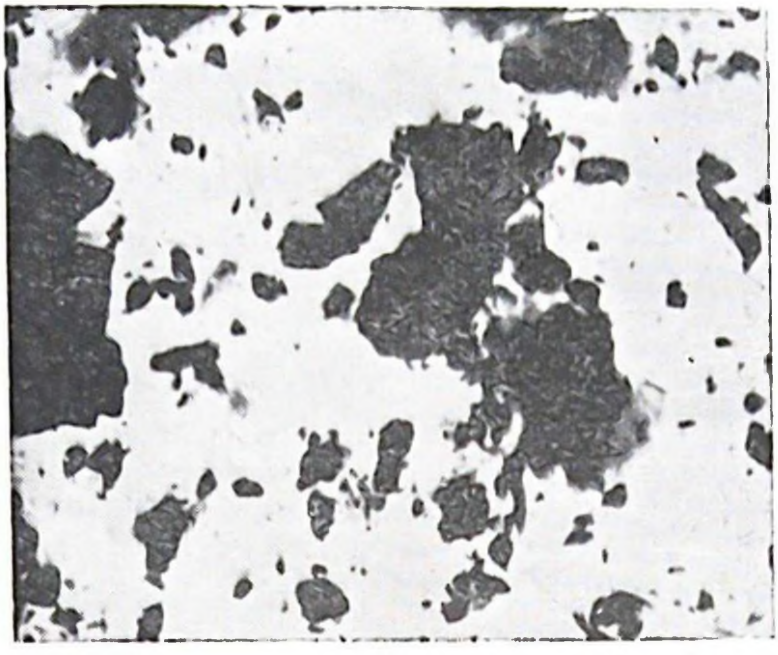


Fig. 1

ELECTRON MICROGRAPH OF
ELECTROLYTIC MANGANESE DIOXIDE

Magnification : X8000/3
Photographic Enlargement : X3

(*Continued from Page 63*)

nate the copper undercoating. Partly this is a matter of cost, and further, there is no doubt that a copper-nickel coating is less corrosion resistant than the same thickness of nickel. Of course, it is not a question of whether copper is desirable, but of whether there is any alternative. One of the attempts in this direction is the sequence embodying a special nickel strike followed by a nickel sulphamate deposit before bright nickel developed at the Battelle Memorial Institute, U.S.A. In practice, however, it has proved difficult to avoid a pitted coating and the process is no less expensive.

An alternative which appears to be rather more promising is the deposition of a first nickel coating from an alkaline pyrophosphate solution. It would not only eliminate the risk of immersion deposition, but also avoid the danger of the dissolution of the zinc from low current density areas. Although tests with such a bath are still in the development stage, there are signs that it may be possible to gain an increased corrosion resistance from the two different nickel coatings which is similar to that obtained by the conventional type of duplex nickel plating process. As there are only two plating stages involved, the process will be less expensive than the copper-duplex nickel sequence.—Electroplating and Metal Finishing, Vol. 14, 355, 1961.

—T.L.R.