ABSTRACTS

1. **Device of a battery employing cation reversible metallic electrode —**

S. Furumi and H. Sakashita (J. Electrochem. Soc, Japan, **30**, E173, 1962). The following battery was designed and examined: copper—copper sulphate, sulphuric acid—lead sulphate, lead peroxide, lead. On charging it yields only small amount of gas from the anode; when it is left in a charged condition the self-discharge is very little, almost no gas bearing liberated. The battery appears to possess many advantages including the cheap cost.

2. **Corrosion resisting cements—properties and applications. —**

R. Srinivasan (Chem. Age of India, **14**, 445, 1963). Brief review of the major types of corrosion-resistant cements suitable for various chemical conditions.

3. **Corrosion inhibitors for industrial cleaning -**

G. A. Grizzell (Corrosion Technology, **10**, 226, 1963). Derusting and de-scaling, inhibition after cleaning, inhibition of paint removers, cold immersion-type paint removers, application-type paint removers, hot immersion strippers.

4. **Non-destructive test methods for corrosion detection —**

C. E. Lautzenheiser (Materials Protection, **2**, No. 8, 72, 1963). Visual inspection, radiographic examination, ultrasonic testing, new transducer devised, dynamic pressure vessel tests, hydrogen evolution, corrosion probes, detection of stress corrosion cracking, strain measuring devices, eddy current measurements, other non-destructive tests. Bibliography.

5. **Corrosion and electrochemical behaviour of copper-mild steel couple bielectrode system —**

N. Subramanyan and (Miss) N. Shyamala (Indian J. Tech, **1**, 338, 1963). Coplanar bielectrodes of copper and mild steel have been used to study the influence of area ratio on the potential and corrosion rate of the couple. The corrosion current increases with increase in the ratio of anodic to cathodic area.

6. **Metal corrosion in saline waters —**

F. W. Fink (Battelle Tech. Review **12**, No. 9, 5, 1963). Mechanisms of corrosion of metals in saline waters and steps for countering the attack.

7. **Pitting corrosion of metals —**

JA. M. Kolotyrkin (Corrosion, **19**, 261, 1963). Summary of the effects of the following possible factors in the pitting corrosion of metals: aggressive anions and their diffusion rates, unaggressive anions, solution concentration, metal structure and physical state, oxidising agents, oxygen affinity of the metal, extent and conditions of cathodic reaction, compositions changes in medium during reaction. Two tables, 5 figures and 121 references.

8. **Anodic protection of carbon steel in sulphuric acid —**

W. P. Banks and J. D. Sudbury (Corrosion, **19**, 300t, 1963). The effectiveness of anodic protection of mild steel in sulphuric acid and the current density requirements for maintaining protection were found to be dependent on acid concentration (45 to 105 per cent) and temperature (80 to 535 F). Field performance is in agreement with laboratory current requirements and corrosion data. Six tables, 16 figures and 10 references.

9. **Corrosion tests at elevated temperatures and pressures —**

C. R. Bishop (Corrosion, **19**, 308t, 1963). Corrosion tests in sealed glass tubes at elevated temperature and pressure show that tantalum, zirconium, molybdenum, tungsten, columbium and titanium are, in general, much more resistant than austenitic stainless steels or nickel-base alloys to sulphuric, hydrochloric, nitric and phosphoric acids. The selection of the most suitable material depends upon the environment and economies involved. One table, 14 figures and 10 references.

10. **Atmospheric corrosion resistance of aluminized M. S. wire exposed to saline atmosphere at Visakhapatnam A.P. —**

S. M. Arora et al (MML Tech. J., **5**, No. 3, 5, 1963). Aluminium coating offered sacrificial

protection to steel for over 18 months as compared to 6 months which is the maximum life of galvanised wire in such severely corrosive atmosphere. The corrosion products were fully adherent to the steel base.

11. **Anti - tarnish treatments for silver —**

W. Goldie (Electroplating and Metal Finishing **16**, 336. 1963). Tests employed, tests on existing formulations, comparison of four chromate passivating treatments.

12. **Corrosion of metals and alloys exposed to Jamshedpur —**

S. Rao et al (NML Tech. J., **5**, No. 3, 18, 1963). Atmospheric corrosion rate data of 2 ferrous and 5 non-ferrous metals have been discussed with respect to the climate and pollution, nature of attack, and nature of corrosion product formed.

13. **The development of zinc alloy anodes for cathodic protection of marine structures —**

P. J. Knuckey and N. S. Dempster (Australasian Corrosion Engineering, 7, No. 10, 15, 1963). Introduction, principle of cathodic protection, advantages of zinc anodes, development and field assessment of zinc alloy anodes, test conditions, results, discussion. Three tables, 5 figures and 6 references.

14. **Magnesium as a passive metal —**

P. F. King (J. Electrochem. Soc, **110**, 1113, 1963). When magnesium is in the trans-passive state, its corrosion rate can be decreased by lowering its potential into the passive region. When high-purity metal is polarized in the negative direction to the region of its reversible potential, a considerable weight loss is observed which might be due the incipient breakdown of passivity.

15. **Stress - corrosion cracking —**

T. P. Hoar (Corrosion, **19**, 331t, 1963). Stress - corrosion cracking facts and theories are reviewed, especially the phenomena found with stainless steels and with alpha - brass. Seven figures and 84 references.

16. **Corrosion in the chemical industries —**

F. O. Howard (Australasian Corrosion Engineering, **7**, No. 11, 15, 1963). Introduction, pitting, welding, intergranular corrosion, duplex steels and sigma phase, effects of hydrogen, vapour space damage, solid - liquid - air interface, stress corrosion, corrosion fatigue, corrosion - erosion, non - oxidative corrosion, intrinsic effects, general factors in chemical plant corrosion : 40 references.

17. **Principles and practice of anodic protection of metals —**

T. L. Rama Char and (Miss) Vasantasree (Chem. Age of India, **14**, 665, 1963). The prevention of the corrosion of metals by anodic protection has been reviewed with reference to principles, techniques, applications and economics.

18. **Anodic protection against corrosion —**

J. D. Sudbury and C. E. Locke (Chem. Engg, **70**, No. 23, 268, 1963). Introduction, oxide film gives protection. temperature and pH ranges, field installations, designing for inexpensive construction, anode units now portable, electrochemical processing.

19, **Preventing corrosion by liquid metals —**

C. Willhelm (Materials in Design Engg, **58**, No. 6, 97, 1963). Liquid metal corrosion is common in heat transfer and metal processing equipment. This article tells how attack occurs and how 15 liquid metals effect structural materials.

20. **Tri - n - butylamine as an inhibitor against the corrosion of pure aluminium in hydrochloric acid solutions —**

U. K. V. Unni and T. L. Rama Char (Corrosion Prevention and Control, **10**, No. 11, 23, 1963). Tri-n-buty lamine is a good inhibitor for the corrosion of pure aluminium in acid medium. It is possible to obtain cathodic protection by impressed current. Polarization measurements indicate that the corrosion process with this amine is under cathodic control. Two tables covering inhibitor efficiency, anode weight loss and cathode polarization; 10 references.

21. **Some new views on soil corrosion —**

E. Schaschl and G. A. Marsh (Materials Protection **2**, No. 11, 8, 1963). Introduction, review of corrosion in aqueous solutions, oxygen mechanism of soil corrosion, pitting in soil, long cell action involving drained soil, resistivity and draining characteristics of soil, effect of permeability and long cell action on local cell action, role of soil resistivity, variation of soil corrosion with time, conclusion. Ten figures and 12 references.

22. **Metal whiskers : their role in corrosion —**

A Riegert (Materials Protection 2, No. 11, 28, 1963). Introduction, corrosive action,

experimental growth of metal whiskers; references and bibliography.

23. **Corrosion in civil engineering —**

M. S. Haque (Corrosion Prevention and Control, **10**, No, 12, 23, 1963). The causes of the corrosion of steel are studied with particular reference to certain aspects of civil engineering: recognition of environmental effects, corrosion in the air, bacteria, wood, submerged and embedded metals, distribution anode system, buried pipe lines.

24. **Nickel-chrome on plastics —**

(Products Finishing, **27**, No. 11, 44, 1963). The combination of very strong, durable plastics and plating processes that give the surfaces of these materials the sparkle of metal will result in increasing use of these products in the automotive and appliance businesses. The article describes a proprietary process developed by Enthone, Inc for the application of standard nickel-chrome plates on plastics.

25. **Electrodeposition of the platinum-group metals —**

F.H. Reid (Metallurgical Reviews, **8**, 167-211 1963). Review with 95 references: introduction, rhodium, palladium, platinum, ruthenium and iridium, immersion and chemical reduction processes, alloy deposition, applications, conclusion.

26. **Measurement of coating thickness by magnetic methods 1, 2 —**

F. Forster (Industrial Finishing, **15**, No. 183, 36; No. 184, 36, 1963). Measurement of thickness of non-magnetizable layers on iron or steel; thickness of nickel coatings on non-ferromagnetic base, general survey of coating-thickness problems.

27. **Some experiences with modern chromium plating solutions —**

D. R. Gabe (Metal Finishing J. **9**, 345, 1963) A survey is made of baths used in chromium electrodeposition. A list of addition agents and an indication of their usefulness is given. Six tables and 56 references.

28. **Engineering applications of electrochemistry-5. The production of printed circuits 6. Platinum metal plating —**

W. G. F. Roberts (Metal Finishing J. **9**, 351, 431, 1963). Printed circuits; plating of rhodium palladium, platinum, ruthenium and iridium; electroless plating; conclusion; 36 references.

29. **Choice of finish and process —**

C. D. Leonard (Electroplating and Metal Finishing, **16**, 300, 1963). Protective finishes, maintenance, decorative finishes, aesthetic functions, shape and size, basis metal, choice of method and process, changes within a finishing sequence, bright plating, material supply, proprietary processes; 7 references.

30. **Chemical and electrochemical metal-removal methods—**

W. P. Innes (Products Finishing, **27**, No. 12, 34, 1963). Processes for polishing, deburring, stripping metals from metals, salvaging electroplated rejects, making printed circuits, reclaiming precious metals. Four figures and 2 tables.

31. **Black finishes for metals—**

D. Fishlock (Metal Finishing, **61**, No. 9, 56, 1963). Types of black finishes; finishes for ferrous metals, stainless steels, copper alloys, aluminium, tin, nickel, magnesium, zinc and cadmium; 19 references.

32. **Nickel plating with titanium anode baskets**

B. G. Harrison (Metal Finishing, J, **9**, 408, 1963). Functions of an anode, development of basket anodes, advantages of the titanium-basket nickel-anode system, primary nickel forms, economic assessment, technical considerations, the future.

33. **Plating components for semi-conductor devices—**

J. E. Weaver (Products Finishing, 28, No. 1, 54, 1963). The new techniques a plater must learn to meet the high standards for plating semi-conductor parts.

34. **Black nickel plating on aluminium—**

B. A. Shenoi and (Miss) K. S. Indira (Metal Finishing, **61**, No. 10, 65, 1963). Introduction, preparation of the basis metal, operating conditions, lacquering, black deposits from other baths, composition of the deposit. Eleven tables and 15 references.

35. **Electroplating education and research in the Soviet Union—**

S. Heiman (Plating, **50**, 916, 1963). Education and research for the electroplating industry in the Soviet Union have reached a fairly high state of development and further advances may be expected in the future.

36. **The composition of thin electrodeposited alloy films with special reference to nickel-iron—**

M. E. Henstock and E. S. Spencer — Timms (Trans. Inst. Metal Finishing, **40**, 179, 1963).

The existence of a composition gradient in thin electrodeposited films, below 3,000. A thick, of a nickel-iron alloy has been confirmed. The initial deposit appears to be nickel but within seconds it becomes greatly enriched in iron, 40 per cent average and 80 per cent instantaneous composition, after which are iron content decreases finally approaching a steady value above 3,000 A. The behaviour is similar in a brass deposit, the initial layer being copper.

37. **Electropolishing of aluminium—**

B. A. Shenoi and (Miss) K. S. Indira (Metal Finishing, **61**, No. 11, 52, 1963). Some theoretical and practical aspects: current-voltage relationship, photomicrographs, effect of chloride ion, concentration of aluminium salts, stirring effect, addition agents, alkaline and acid baths. Eight figures and 13 references.

38. **Self regulating chromium baths—**

L. Domnikov (Metal Finishing, **61**, No. 11, 65, 1962). Report of work with Russian tetrachromate electrolyte: experimental, optimum operating conditions, properties and structure of deposits. Seven figures and 11 references.

39. **Nickel-tungsten electroless deposition —**

F. Pearlstein, R. Weightman and R. Wick (Metal Finishing, **61**, No. 11, 77, 1963). A preliminary report of studies with a bath containing nickel sulphate, sodium tungstate, sodium citrate and sodium hypophosphite.

40. **Understanding plating and corrosion —**

S. E. Beacon and J. D. Thomas (Products Finishing, **28**, No. 2, 36, 1963). A survey of some recent research into the mysteries of nickel-chromium plating, brightening, activating and corrosion testing.

41. **Science for electroplaters 82. Chromium-periodic cracking. 83. Chromium inclusions. 84. Chromium hardness —**

L. Serota (Metal Finishing, **61**, No. 9, 80; No. 10, 90; No. 11, 83; No. 12, 71, 1963). Hydrides, striations, stress, threshold level; grain structures, hydride decomposition; film; grain size; optical microscope, electron microscope, hardness, recrystallization.

42. **Progress in metal finishing —**

(Industrial Finishing, **15**, No. 186, 32, 1963). Review of recent developments: quality finishes, chromium plating, bright plating, decorative and protective finishes on aluminium, organic finishes.

43. **Electropolishing aluminium —**

B. A. Shenoi, (Mrs.) K. Vijayalakshmi and (Miss) K. S. Indira (Metal Finishing, **61**, No. 12, 50, 1963). Optimum conditions for alkaline baths: details of treatment, results—diffused reflectivity, effect of addition agents, plating cell studies, six figures and 15 references.

44. **Engineering applications for precious metal plating —**

D. G. Foulke (Metal Progress, **84**, No. 6, 107, 1963). Unusual engineering requirements, for plated parts—such as good electrical conductivity and solderability, oxidation resistance even at high temperatures and ductile coatings—can be met at minimum cost by precious metal plating. Sound engineering, good housekeeping and tight control of the process must be observed to achieve these goals. Discussion covers properties, baths, control, future applications etc.

45. **Addition agents for gold plating baths —**

D. G. Foulke (Metal Finishing J, **9**, 487, 1963). Cyanide, neutral and acid baths, addition agents, structure and physical properties of deposits. Two tables, 9 figures and 13 references.

46. **Electroforming—the next step forward —**

(Inco-Mond Magazine, No. 23, 28, 1963). Introduction, mandrel materials, nickel plating solutions, industrial applications, market development, electroformed automotive parts, research efforts.

47. **Nickel-cobalt-iron ternary alloy deposition from the pyrophosphate bath —**

D. V. Subrahmanyam and T. L. Rama Char (Chemistry and Industry, 2010, 1963). Ternary alloys of nickel-cobalt-iron have been electrodeposited from the pyrophosphate bath. Good quality deposits, dull streaky to semi-mirror bright grey and in the composition range 4–70 per cent nickel, 9–72 per cent cobalt and 6–57 per cent iron, can be obtained by a variation in the operating conditions. Table shows the effect of variables on deposit composition, cathode efficiency and potential. Addition of tungstate to the plating solution gives a quarternary alloy.

48. **Chromium-plated steel strip for can making —**

H. Uchida et al (Trans. Inst. Metal Finishing, **40**, 212, 1963). In laboratory researches and food packing tests it has been shown that

cold rolled steel strip, plated with about 0.002 mil of chromium and coated with lacquer is a satisfactory material for cans.

49. **Functional electronics and its significance to technology —**

R. B. Sorkin and L. H. Stember (Battelle Tech. Review, **12**, No. 10, 1963). A new technology-termed functional electronics-is emerging, and the authors discuss a few of its most significant developments and future possibilities.

50. **Application of lead dioxide anodes during electro-synthesis of isobutyric acid—**

N. G. Bakhchisaraitsbyan et al. (Zh. prikl. Khim, **35**, 1643 1962 ; Lead Abstracts, **3**, 144, 1963), The lead dioxide anodes were very stable during electrolysis of isobutyl alcohol-sulphuric acid mixtures, and showed a weight loss of only 0.15 per cent after 2500 amp. hr. Acid yields from 52 to 54 per cent were obtained.

51. **Electrothermal smelting of ferroalloys —**

L. R. Vaidyanath (Indian Chem. Engr, **5**, 110, 1963). The advantages of electrosmelting of ferroalloys, with manganese, silicon and chromium, have been outlined and the latest developments discussed. Production problems have been reviewed, and the actual production and metal recoveries appraised.

52. **Arc welding electrodes—their manufacture and industrial development in India —**

O. P. Narula (Indian Chem. **5**, 146, 1963). Introduction, types of electrodes, new materials, electrode coatings, process of manufacture, development programme.

53. **An electrochemical pH-stat and its application to corrosion studies—**

F. A. Posey, T. Morozumi and E. J. Kelly (J. Electrochem. Soc., **110**, 1183, 1963). An apparatus has been developed which controls automatically the acidity of unbuffered solutions in the pH region 4 to 10, with the use of a potentiostat. The electrochemical pH-stat may be used to measure corrosion rates. The limitations of the device are discussed.

54. **Analytical chemistry of cobalt —**

C. Tombu (Cobalt, No. 20, 103, 1963). Detection and determination of cobalt traces, quantitative determination of cobalt in ores and alloys ; bibliography.

55. **Nuclear power costs —**

(International Atomic Energy Agency Bull, **5**, No. 4, 3, 1963). Current cost trends and use of cost data for economic comparisons.

56. **For seven industrial chemicals—a guide to materials selection —**

(Wiggin Nickel Alloys, No. 73, 15, 1963). Corrosion characteristics of Wiggin nickel alloys in hydrochloric, hydrofluoric, sulphuric, phosphoric, acetic and nitric acids, and sodium hydroxide.

57. **The administration of science as technology in the USSR —**

J. P. Taylor (Battelle Tech. Review, **12**, No. 11, 3, 1963). Summary of the present administrative complex : 36 references.

58. **CAI-Mid-plan appraisal of the chemical Industry —**

(Chem. Age of India, 14, 635, 1963). Introduction, profitability, progress of the inorganic chemical, industries, alkalies, other inorganic chemicals, inorganic acids, fertilisers ; tables covering statistical data.

—T. L. R.