may be made of an aluminium-manganese alloy.

37. **Exceptional metals—**

(Materials Protection, **4**, No. 1, 7, 1965). Staff feature about some of the new processes and applications of metals with exceptional corrosion resistance: cobalt, gold and silver, boron fibres and epoxy, columbium alloy products, zirconium diboride, magnesium-lithium alloy, molybdenum, titanium. References, special articles and books.

38. **Influence of cavitation on metal surfaces —**

A Grossmann and H. V. Loewis (Z. Physik. Chem., **225**, No. 3/4, 133, 1964). A study was made of the cavitation occurring on the surface of zinc, aluminium and its alloys, and copper. The cavitation was produced by passing steam into water in which specimens of the metals were arranged.

39. **Industrial applications of high frequency induction heating—**

M. Banerjee (Indian and Eastern Engineer, **106**, 669, 1964). Article discusses the advantages of induction heating, and other aspects including heat generators, power requirements and methods of induction hardening.

40. **Coppers —**

(Materials in Design Engg., **60**, No. 7, 115, 1964). This manual gives complete details on copper — types and forms, important properties, and processing and fabrication characteristics.

41. **Electrical engineering in process plant —**

G. W. Spall (Chem. & Process Engg., **45**, 457, 1964). The present-day approach to electrical engineering in process plants is discussed under: plant supply and distribution, transformers, motors, variable speed drives, motor starters, semi-conductors, cables, earthing and a survey of electrical safety standards for hazardous installations.

42. **Radioisotope — fueled thermoelectric generators—**

W. E. Kortier and M. Pobereskin (Battelle Tech. Review, **13**, No. 12, 3, 1964). The need for dependable, unattended sources of power is being filled increasingly by radioisotope — fueled thermoelectric generators. Here is a discussion of problems involved in their design and some steps being taken for improving such devices.

43. **The place of radiation in production of chemicals—**

J. F. Kircher and D. A. Jeffrey (Battelle Tech. Review, **14**, No. 1, 3, 1965). Review of current uses of radiation in chemical production; description of ongoing research in the field; discussion of factors important in the use of such methods.

—T.L.R.

(B) Electrodeposition and Metal Finishing

1. **Material costs in electroplating—**

O. Mudroch (Electroplating and Metal Finishing, **17**, 374, 1964). The formulae for calculating the costs of anodes and chemicals consumed in electroplating have been derived and the factors influencing these costs discussed. Two figures, 4 tables and 3 references.

2. **Black nickel plating—**

B. A. Shenoi and (Miss) K. S. Indira (Electroplating and Metal Finishing, **17**, 381, 1964). The conditions for satisfactory plating of black nickel on aluminium and its alloys, brass, cadmium, chromium, copper, nickel, stainless steel, mild steel and titanium have been described in detail. One table and 11 references.

3. **The case for fast, continuous filtration —**

J. H. Berg (Products Finishing, **29**, No. 2, 52, 1964). A filter that rapidly removes solid particles from plating solutions isn't a 'necessary evil'; it is a profit-maker. This is shown with a 36-cartridge filter which continuously processes 1000-gallon barrel zinc solution. Filtration prevents roughness and helps to maintain uniform temperature in the plating tank.

4. **Plating for the electronics industry—**

(Products Finishing, 29, No. 2, 65, 1964). This is the second part of a panel discussion report.

5. **Proposed recommened practice for the processing of mandrels for eletroforming —**

(Plating, **51**, 1075, 1964). ASTM recommendations: scope, classification of mandrels, design considerations, aluminium and its alloys, stainless steel and chromium-plated mandrels, nickel and nickel alloy mandrels, low melting alloys.

6. **Electroplates broaden use of plastics—**

P. West (Materials in Design Engg., 60, No. 6, 96, 1964). Electroplates on ABS, polystyrene, polyacetal and ploycarbonate plastic parts not only decorate the surface, but improve mechanical properties and durability as well.

7. **Metalizing non-conductors. Plating of A.B.S. Plastics—**

E. B. Saubestre, L. J. Durney and E. B. Washburn (Metal Finishing, **62,** No. 11, 52, 1964). Standard method of plating A.B.S. plastics. commercial problems, new method of plating, characteristics of plated plastics.

8. **The conservation of cadmium in cadmium plating—**

H. Geduld (Metal Finishing, **62,** No. 11, 60; No. 12, 56, 1964). Introduction, reduction of dragout, improving deposit distribution: careful attention to rejects, prevention of contamination and treatment of solutions, elimination of post-plate bright dipping, over-plating of cadmium work.

9. **Black coatings on aluminium—**

B. A. Shenoi and (Miss) K. S. Indira (Metal Finishing, **62,** No. 11, 64, 1964). Electrodeposition of molybdenum compounds: results, discussion. Four tables, 5 figures and 19 references.

10. **Science for electroplaters. 92, 93. Chromium analysis—**

L. Serota (Metal Finishing, **62,** No. 11, 72; No. 12, 75, 1964). Chromic acid, hexavalent chromium, trivalent chromoum, iron ; sulphate determination.

11. **The structure of electrodeposited iron-zinc alloys as revealed by x-ray diffraction—**

H. M. Dalal and D. S. Gill (J. Inst. Metals, **93,** 130, 1964-65). The results show that the alloys are deposited in a metastable state, the phase-boundary regions being alpha up to 25.5, alpha plus tau in the range 25.5-70 and tau beyond 70 per cent zinc by weight.

12. **Cathodic polarization and precipitate structure during coprecipitation of zinc and nickel—**

N. T. Kudryavtsev, S. M. Firger and K. M. Tyutina (J. Appl. Chem., USSR, **36,** No. 9, 1915, 1963). Codeposition of zinc and nickel from ammoniacal solutions takes place at less negative potentials than deposition of zinc alone. There is a marked displacement of the cathode potentials in the negative direction due to changes in the structure as confirmed by x-ray diffraction.

13. **Electrolytic deposition of the iron-chromium-nickel alloy of the 1 KH 18 NG type—**

R. Kvachkov and R. Stoicheva (Mashtinostroene, Sofia, **13,** No. 4, 27, 1964); Chem. Abs., **61,** 11613, 1964. A good, decorative, protective coating, resistant to corrosion and with a composition similar to stainless steel, was obtained from sulphate type baths with additions.

14. **Electrodeposited zinc-cadmium alloy. Structure and properties—**

L. Domnikov (Metal Finishing, **62,** No. 12, **62,** 1964). Deposition from a cyanide bath: cathode polarization, x-ray analysis, equilibrium potential, electrical resistance and microhardness. One table, 7 figures and 15 references.

15. **Black chromium plating—**

B. A. Shenoi and (Miss) S. Gowri (Metal Finishing, **62,** No. 12, 66, 1964). An experimental study from the chromic acid—fluosilicic acid bath: operating conditions, deposit characteristics. Two tables, 1 figure and 15 references.

16. **Automatic fluidised bed coating machines—**

(Industrial Finishing, **16,** No. 198, 36, 1964). The latest automatic units can apply a range of thermosetting and thermoplastic materials to electric motor components and other complex shapes.

17. **High-speed anodizing and dyeing of coil stock—**

J. M. Welch (Products Finishing, **29,** No. 3, 36, 1964). New coil anodizing line features automatic control of aluminium strip and processing solutions: processor certifies quality of anodized product. The article describes the new process including the significant features of the installation.

18. **Waste disposal for the small plater—**

H. Geduld (Products Finishing, **29,** No. 3, 54, 1964). Basic considerations, equipment, batch treatment procedure, analytical methods, auxiliary equipment, automated systems, recovery type plants, specilized treatment procedures; bibliography.

19. **Dry electrostatic coatings— a new technique—**

E. F. Miller (Materials Protection, 3, No, 12, 66, 1964). Discusses the elctrostatic method of coating materials with dry powders of plastics, enamels, silicones and ceramics. Describes theory of electrostatic spraying and lists several advantages of the process. Uses of electrostatic coatings are also included, and substrate surface preparation is described.

20. **Electrodeposition of lead from alkaline lead gluconate bath—**

A. Ueno and K. Okubo (Metal Finishing Soc. of Japan, J, **15**, No. 6, 14, 1964), in Japanese; Abs. in Rev. Met. Lit., **21**, No. 11, 21, 1964. Steel or cast iron containers are coated with lead by electrodeposition. Efficiency of the process is influenced by the bath composition and temperature, and current density.

21. **Bright anodized coatings for temperature control of space vehicles—**

J. H. Weaver (Plating, **51**, 1165, 1964). An attempt to relate the factors associated with the preparation of bright anodized aluminium coatings to their thermal control properties for aerospace use is presented. Seven tables, 15 figures and 8 references.

22. **Coating of refractory metal alloys by the fluidized bed—**

M. Kushner (Plating, **51**, 1161, 1964). This paper describes the birth of a new industry resulting from the 'Space age' missile. space vehicle and nuclear projects, dedicated toward the development of coatings which would protect high temperature resistant refractory alloys from oxidizing at temperatures above 2000 F. The atmospheric or vacuum pack cementation processes and the recently developed fluidized bed processes are in full production today.

23. **Bibliography of metal finishing wastes for 1964—**

D. G. Foulke (Plating, **51**, 1184, 1964). Contains 58 references.

24. **A review of the principles of electroplating gold alloys—**

M. A. Danemark (Metal Finishing J, **10**, 483, 1964). Introduction, principal features of electrodeposited gold alloys, establishment of a basic solution formulation and its evaluation, principal gold alloys—with copper, silver, nickel, cobalt, indium and antimony.

25. **Development of aqueous non-sludge forming zinc phosphate bath—**

K. P. Mukherjee and A. K. Lahiri (NML Tech. J., **6**, No. 4, 23, 1964).

Addition of non-sludge forming compounds gave a good phosphate coating comparable to that obtained from the conventional zinc phosphate bath. Six tables and 3 figures covering data on X-ray diffraction and corrosion tests; 9 references.

26. **Aspects of addition agent behaviour—**

J. Edwards (Trans. Inst. Metal Finishing, **41**, pt 5, 169, 1964). Discussion on behaviour of addition agents with special reference to nickel plating solutions: mechanism of incorporation, interaction of additives, effects on solution and deposit properties, theoretical implications. Twenty figures and 3 references.

27. **Recent research in anodizing and its practical implications—**

F. Sacchi (Trans. Inst. Metal Finishing, **41**, pt 5, 182, 1964). The original sulphuric acid process, new anodizing processes, dyeing, sealing, corrosion resistance, test methods, conclusions. One table, 4 figures and 26 references.

28. **Electrolytic zinc plating from molten salts—**

M. I. Bykov and A. V. Garodyskiy (Sb. Tr. Tsentr. Mauchn. Issled.. Inst. Chernoi Met, USSR, No. 34, 5A, 1963); abstract in Zinc Abstracts, **22**, 422, 1964. Investigations were carried out on the electrodeposition of zinc from a melt containing 31.5 mole per cent zinc chloride and 68.5 mole per cent potassium chloride. Bright deposits with reduced internal stress were produced on addition of 1-2 per cent aluminium chloride to the melt. A plating rate of 2-3 microns per second was obtained at 430-460C using 400-600 amp/sq. dm.

29. **Economic considerations on the installation of automatic plating plant for bulk goods—**

W. Peters (Draht, Germany, **15**, 568, 1964); abrsract in Zinc Abstracts, **22**, 422, 1964. The development of automatic barrel-plating processes in Europe is reviewed. The economic aspects of the change over from hard fininshing plant to fully automatic processes are discussed, and it is concluded that this would be advantageous with respect to extruded wire products and springs. Several examples of zinc plating plant are considered.

30. **Some developments in alloy gold plating—**

D. Williams (Metal Finishing J, **11**, 17, 1965). Introduction, description of processes, applications of deposits.

31. **A comparison of the fundamentals involved in polishing metals—**

J. P. Dewar (Metal Finishing J, **11**, 21, 1965). Introduction, mechanical polishing, chemical and electrolytic polishing, applications, deburring, cost of polishing, summary.

32. **Gold plating: which gold to use—**

W. T. Lee (Electroplating and Metal Finishing, **18**, 40 1965). Strongly alkaline, alkaline, neutral and acid gold baths, throwing power, properties of deposits. Three tables and 11 figures.

33. **Electrodeposition of ternary alloys—**

(Miss) M. Sarojamma and T. L. Rama Char (Electroplating and Metal Finishing. **18**, 51, 1965). The electrodeposition of ternary alloys has been reviewed with special reference to types of alloys, plating baths and applications; 78 references.

—T. L. R.

(*Continued from Page* 31)

Co. Ltd. under the trade name Trigard. Processes using these products are effective for the protection of copper and high copper alloy materials at all stages of their life cycle, throughout storage and in service, except in the presence of certain chemicals, like cyanide or ammonia. The method is applicable to copper or brass sheet or castings, domestic boilers and tubing, architectural copper alloys, electrical components, costume jewellery etc. — Industrial Finishing, Vol. 17, 28, 1965.

Nickel enters South Africa's Coinage

The first pure nickel coins minted by South Africa were issued into circulation from January 1965. The new series will replace all the existing silver coins. Nickel is being increasingly used for coinage in many countries in view of the attractive properties and the relative cheapness.— Corrosion Prevention and Control, Vol. 12, 14, 1965.

— T. L. R.