M. J. C. Hutton-Wilson (Chemistry & Industry, No. 34, 1137, 1968). A detailed discussion with special reference to the U.K.; 7 tables, 5 figures and 11 references.

59. Report on the electrolytic industries for the year 1967—

J. H. Sullivan and R. R. Dukes (Electrochem. Tech., **6**, 365, 1968). Electrochemical Society, New York report: electrical energy, chlorine-caustic soda, other alkalies and electrolytic processes, developemnts of interest; tables and 46 references.

60. Electrical and photoelectric properties of organic polymeric semiconductors—

V. S. Myl'nikov (Russian Chem. Reviews, No. 1. 25, 1968). Review with 300 references.

61. Trends in process development—

F. R. Bradbury, L. M. Rose and C. W. Suckling (Chemistry in Britain, **4**, 489, 1968). Discussion of the underlying considerations and current state of the art: introduction, systems, economic dimension, market evaluation, process understanding—discovery—definition, design, construction and start-up, cost of uncertainty. Six figures and 16 references.

62. Various systems associated with production of carbon disulphide—

S. C. Naik (Chem. Age of India, **19**, 1183, 1968). Review of commercial methods; methane process has been recommended and an early possibility for higher hydrocarbon process has been indicated. Four tables and 20 references.

63. Evaluating plastics and resins—

O. H. Fenner (Chem. Engg., **75**, No. 24, 182, 1968). Modern techniques for evaluating plastics and resins permit reliable correlations between laboratory and field tests. Here is a detailed account of the methods.

64. Who owns the earth?—

B. M. Byrne (Australasian Corrosion Engineering, **12**, No. 10, 3, 1968). An examination of the serious corrosion side effects of the application of cathodic protection. Introduction, nature, identification and methods of suppressing interference, who owns the earth?—to which the best answer in the corrosion sense is "nobody in particular, but we all need to use it". Four figures.

65. The development of GDR chemical industry (Chem. Age of India, 20, No. 2, i-xxvi, 1969). Review of 20 years of progress.

—T.L.R.

(B) ELECTRODEPOSITION AND METAL FINISHING:

1. An analysis of job shop statistics—

D. Orenbuch (Metal Finishing, **66**, No. 10, 58, 1968). Examination of some of the available data concerning the metal finishing industry: contract finishing, plant size and output, supplier statistics; 2 tables.

2. Printed circuit board etch characteristics—

E. Duffek and E. Armstrong (Metal Finishing, **66**, No. 10, 63, 1968). Etching solutions, etch characteristics, conclusion; 23 figures and 7 references.

3. Studies on chromium plating from tetrachromate electrolyte—

N. V. Parthasaradhy and T. R. Subramanian (Metal Finishing, **66**, No. 10, 70, 1968). Introduction, current efficiency, corrosion, deposit distribution, advantages of this bath; 4 tables, 6 figures, 6 photos and 26 references.

4. The coating of alunimum with plastics by the fluidized—bed and electrostatic powder techniques—

A. H. Lamdrock (Metal Finishing, **66**, No. 10, 81; No. 11, 69, 1968). Conventional fluidized-bed coating, electrostatic spray coating, electrostatic fluidized-bed coating, process parameters in fluidized-bed coating; 1 table, 3 figures and 13 references. Coating powders, attributes of aluminium substrates, applications of fluidized-bed coating and its limitations, weathering studies. Three tables, 4 figures and references 24 plus 3 additional.

5. Effect of pH on structure and mechanical properties of electrodeposited iron—

E. M. Levy and R. D. MacInnis (J. Appl. Chem., **18**, 281, 1968). Results from a chloride-fluoborate plating bath. Both ultimate tensile strength and percentage elongation at fracture passed through a maximum over a narrow pH range, and this is supported by optical and electron microscopy; 5 figures and 7 references.

6. Bright zinc as a decorative and industrial finish—Part 3—

M. E. Roper (Metal Finishing J., **14**, 320, 1968). Mechanism of film formation and corrosion protection: methods of testing passivated zinc surfaces, uses of passivated zinc, future developments, bibliography; concluded.

7. Commercial applications of the aluminium electrodeposition process—

A. G. Buschow and C. H. Esola (Plating, **55**, 931, 1968). Recent experiences of operating the 200 gallon ethereal plating bath, and modifications made to the original cell design. Comparisons with other conventional processes, and specific examples of commercial applications of the plating process. Two tables, 14 figures and 2 references.

8. A low-volatility noninflammable bath for electrodepositng aluminium—

J. G. Beach, L. D. McGraw and C. L. Faust (Plating, **55**, 936, 1968). The chloride-ether type of bath with a quarternary ammonium salt such as 2-ethoxyethyl trimethylammonium chloride produces continuous mat deposits in thcikness of 0.003-5 mil at 5-144 asf. The costs appear to be of the same order as from high-volatility baths. One table, 4 figures and 10 references.

9. Some production plating problems and how they were solved. Part 19—

F. M. Dixon (Plating, **55**, 962, 1968). Bipolar nickel "peelers", meter readings, "chicken tracks" in chromium deposit, auxiliary anode for chromium plating, job plating test, consumption of addition agents.

10. Addition agents, anions, and inclusions in bright nickel plating—

H. Brown (Plating, **55**, 1047, 1968). Ninth William Blum Lecture: introduction, brief review of the past, the organic sulfon- and sulfin-compounds, leveling agents, efforts toward maximum corrosion protection, conclusion; appendix, 8 figures and 40 references.

11. Properties of some gold electrodeposits,

R. Duva and D. G. Foulke (Plating, **55** 1056, 1968). Introduction, purity, density stress, crystalline structure, wear-contact—ohemical-oxidation resistance, hardness, electrical resistivity; 6 tables, 16 figures and 10 references

12. Metal finishing waste treatment: comparative economics—

D. Yuronis (Plating, **55**, 1071, 1968). Treatment methods, comparative economics and examples; 5 tables, 4 figures and 9 references.

13. Engineering aspects of internal stress in electrodeposits—

R. Walker (Metallurgia, **78**, 131, 1968). Introduction, measurement of internal stress, properties affected, methods of reducing the deterimental effects of stress; 5 figures and 24 references.

14. Crack-free chromium plating with silicofluoride and sulphate catalysts mixture—

A. N. Chatterjee and A. N. Ray (Chem. Age of India, **19**, 1179, 1968). Conditions for crack-free chromium platings have been ascertained by controlling the catalysts mixture concentrations in chromic acid in the region of unsaturated state and the temperature of plating operations. One table, 5 figures and 4 references.

15. Uber die streuung galvanischer Bader—

R. Rolff (Galvanotechnik, **59**, 796, 1968). A new method for measuring the throwing power is discussed, with the prerequisites of constant current density on the cathode and a constant velocity of the cathode surface in the solution. Two tables, 10 figures and 3 references; in German.

16. Plastic coated tinplate—

(Tin and Its Uses, No. 79, 8, 1968). A superior constructional material: introduction, a two-ply material, durability, welding the plastic coatings, protecting the cut edges.

17. Ultrasonic aqueous cleaning in metal finishing—

R. D. Stafford (Metal Finishing, J., **14**, 352, 1968). Advantages of ultrasonic aqueous cleaning, characteristics of cavitation, practical examples, equipment, cleaning chemicals; 5 figures and 6 references.

18. Metal finishing at Flight Refuelling Ltd., including the precious metal plating of reed switches—

(Metal Finishing J., **14**, 355, 1968). Introduction; vacuum impregnation of castings; plat-

ing shop-phosphating, pretreatment and cleaning, anodizing, plating; effluent treatment; paintshop; reed switch manufacture; plating of reeds; 7 figures.

19. Electroless deposition of copper—

W. Goldie (Metal Finishing J., **14**, 364, 1968). Chapter from a book by the author on metallic coating of plastics. Nine figures, 23 references and bibliography.

20. Applications of tin-nickel alloy electroplate—

(Tin and Its Uses, No. 78, 5, 1968). Electrodeposited alloy, tarnish resistance, whisker-free tin-nickel; good future in the electronics and other fields.

21. A new colour anodised finish—

(Aluminium Courier, No. 83, 9, 1968). Anodizing, sulphuric acid anodizing and dyeing, integral colour anodizing, the Anolok finish; illustrations.

22. Plating die castings: cutting the cost of preplate—

(Products Finishing, 33, No. 1, 8, 1968). Vibratory finishing lowers the cost of smoothing die cast license plate frames. A plating cycle including bright acid copper follows to produce an attractive product. Here is a detailed account of the process, with illustrations.

23. Plating waste treatment: which system?

R. W. Martin (Products Finishing, **33**, No. 1 61, 1968). Evaluation of the three methods: chemical destruction, evaporative recovery and ion exchange; comparison, costs and choice; 1 table, illustrations and flowsheet.

24. The preparation and structure of electrodeposited sponge cadmium electrodes—

I. H. S. Henderson and S. G. Ladan (Canadian J. Chem. Engg., **46**, 355, 1968). A method is described for preparing coherent sponge cadmium electrodes on cadmium-plated substrates by electrodeposition from cadmium chloride solutions without and with potassium chloride. Of the 5 main deposit types observed, only one, a sponge with very small crystallites, displayed high electrochemical activity when cycled in potassium hydroxide solution and had sufficient coherence and adherence to its substrate to be considered suitable as a battery electrode. One table, 7 figures and 13 references.

25. The electrolytic "sintering" of nickel powder—

I. H. S. Henderson and S. G. Ladan (Canadian J. Chem. Engg., **46**, 361, 1968). Adhered and coherent deposited of nickel sponge simila to sintered nickel may be made from sulphate' chloride, fluouborate or sulphamate nickel plating solutions containing the metal powder in suspension. One table, 1 figure and 8 references.

26. Fluoborate baths for the electrodeposition of metallic coatings in printed circuit production—

H. Benninghoff (Metall-Rein.u.Vorben, **17**, No. 8, 264, 266, 269, 271, 1968); Met. Finishing Abs., **10**, 221, 1968. A review of formulations for lead, lead-tin, iron, indium, cadmium, copper, nickel, zinc and tin baths with operating details.

27. Gold electroplates shine in tough jobs—

J. A. Mock (Materials Engg., **68**, No. 4, 64, 1968). Introduction, non-toxic plate popular, electronic and aerospace uses, gold goes to sea, good heat reflector, other new uses.

28. Silver spraying—

(Industrial Finishing, **20**, No. 245, 28, 1968) An account of the techniques which can be used on a variety of materials for a finish coat or to provide a surface pretreatment for electroplating: introduction, chemical spraying, racking for silver spraying, jigging for electroplating, shiny spray finishes, copper plating and polishing, storage and packing mass production processing

29. The anodic dissolution of copper (1) sulfide and the direct recovery of copper and elemental sulfur from white metal—

F. Habashi and N. Torres-Acuna (Trans. Met. Soc., AIME, **242**, 780, 1068). Metallic copper of purity equal to commercial electrolytic copper is deposited during the anodic dissolution of technically available white metal, Cu_2S in an acid solution of copper (II) sulphate and copper sheet cathodes The process may be applied on a commercial scale, and has the advantage of bypassing the converting and poling steps, decreasing pollution problems

due to sulphur dioxide and recovering the sulphur The working conditions that lead to 98 per cent cathode efficiency are: 30 g/l cupric and 100 g/l sulphuric acid; 1 amp/dm² and 40°C.

30. Electroless plating baths (for deposition of copper, chromium and nickel)—

G Bacquias (Galvano, **37,** No. 1, 47, 1968); Copper Abstracts No. 8162 in Copper, **2,** No. 6. 25. 1968. Solutions suitable for the electroless deposition of copper chromium and nickel are described, including high-and low-speed copper. The high-speed bath operates at a pH of 11.5, but has a very short life.

31. Anodizing of aluminium alloys—hard-coating—

L. F. Spencer (Metal Finshing, **66,** No 11, 58 1968). Introduction, anodic coating proeass, hardcoating equipment, characteristics of the coatings, colour-hardness-thickness; 6 tables. 3 figures and 11 references.

32. Bright brass plating—

S. Ramachandran and S. Sriveeraraghavan (Metal Finishing, **66,** No. 11, 64, 1968). Effect of various additions to the cyanide bath. Specular reflectivities of deposits from solutions containing ammonium hydroxide and fluoride indicate that the latter is to be preferred. Three tables, 4 figures and 46 references.

33. Metal pickling practice—

J. B. Mohler (Metal Finishing, **66,** No. 11, 77, 1968). Common pickling acids, other pickling agents. pickling practice and terms, electrolytic pickling, electropolishing. chemical polishing and milling; 1 table.

34. A new paint-plating line for National Cash Register—

G. T. Robinson (Products Finishing, 33, No. 2, 40, 1968). Details of operation of a new electropainting installation in the U S.A.; illustrations.

35. Ultrasonic cleaning. Part 1, 2—

D. F. Steiner (Products Finishing, **33,** No. 2, 52; No. 3, 58, 1968). Introduction, sonics — ultrasonics, cavitation, degassing; 7 illustrations. Vapour pressure surface tension, viscosity, density, temperature; equipment; 16 figures and illustrations.

36. Tinplate proves popular for electronics—

(Products Finishing, 33, No. 2, 59, 1968). Good solderability with a bright acid tin electroplate' process cycle, solution maintenance and control; illustrations.

37. Coil coating—

(Products Finishing, 33, No. 2, 68, 1968) Air and water pollution problems' chromate waste treatment, deep well disposal, measuring temperature in curing coated coils, an acrylic film, a small coil coater; 1 table and waste treatment flow sheet.

38. Fluidized bed coatings: contract coater finds ready market—

(Products Finishing, 33, No. 3, 49, 1968). These heavy plastic coatings are more expensive than paint, but whose long-term durability and heavy use are factors, they are worth it. The process is described in detail in the article.

39. Galvonotechnick in der elecktronischen industrie, Teil VII—

A. F. Bogenschutz (Galvanotechnick. **59,** 866, 1968). Surface treatment of semiconductors—silicon and germanium type, as well as problems occurring during lapping or polishing or etching; classification of usual etching solutions in a table.

40. Uber den korrosionsschutz von silberuberzugen—

F. Hasko R. Fath and E. Ban (Galvanotechnik **59,** 884, 1968). Methods of preventing the tarnishing of silver coated surfaces in air are outlined. In the case of microwave equipment for the electric industry. a beryllium protection layer proved effective; test results.

—T.L.R.