83657, 1969. Studies are reported on the reprocessing of lead dust containing lead 50.2, zinc 7.21, cadmium 1.45, sulphur 10.3, sulphate sulphur 7.5 per cent and smaller quantities of other constituents. This involved the treatment of the dust with sodium hydroxide and simultaneous electrolytic deposition of zinc and lead. The optimum processing conditions are listed; the lead recovery amounts to 87 per cent.

54 Regeneration of the solutions used in the production of zinc and manganese dioxide by the coupled electrolysis process—

W. Tomassi (Przemysl Chem., 48, 668, 1969): Zinc Abs., 28, 122, 1970. Determinations were made of the maximum permissible concentrations of zinc and manganese respectively in manganese and zinc sulphate solutions used in the production of zinc and manganese dioxide by the coupled electrolysis process. An electrochemical procedure has been developed for the removal of these ions permitting the regeneration and reuse of the treated solutions.

55 Method for producing electroluminescent zinc/cadmium sulphide/oxide phosphors—

U. S. Patent 3,462,372 (1966). The phosphors activated by copper and halides can be most effectively produced by firing a batch of zinc sulphide containing the activators and mixed with copper sulphide and cadmium oxide, and then removing the excess reactants. This method is designed to produce efficient phosphors which exhibit emission peaks between 520 and 590 nm, with good brightness characteristics.

56 Method for producing polycrystalline photovoltaic cell—

U. S. Patent 3,480,473 (1966). An improved polycrystalline photovoltaic cell, preferably made of cadmium sulphide, is produced by etching the surface of the semiconductive material with hydrochloric or preferably sulphuric acid before the formation of the barrier layer. The cells have output efficiencies 30–50 per cent higher than similar ones manufactured without the etching step.

—T. L. R.

(B) ANALYSIS

1 Cathodic stripping voltammetry of lead—

E. Hrabankova, J. Dolezal and P. Beran (J. Electroanal. Chem. Interfacial Electrochem., 22, 203, 1969). Utilizing a rotating platinum electrode and a derivative circuit, lead can be determined at concentrations of at least 5×10^{-9}M with an error not exceeding 10 per cent. Separation from elements such as copper, cadmium and zinc is easier than in the case of amalgam polarography, but the technique is less sensitive. One table and 5 figures.

2 The spectrophotometric determination of cobalt in steel—

F. M. Tulyupa, Yu. I Usatenko and V. A. Pavlichenko (Zavodskaya Laboratoriya, 34, No. 1, 14, 1968); Cobalt, No. 45, 224, 1969. Potassium dicarboxymethyldithiocarbonate, a new reagent, is proposed for cobalt determination, and its synthesis described. It forms a coloured water-soluble complex with cobalt, with a maximum absorption at 315 mu and a molar absorptivity of 20000. Manganese, chromium, titanium, tungsten, niobium, tantalum, aluminium, and small quantities of molybdenum do not interfere. Ferric iron and nickel present in the steel should be removed; the method is sensitive to 0.2 ug cobalt in 1 cub. cm. solution.

3 Automations gerechte analyse- mund messmethoden—

F. Oehme (Galvanotechnik, 61. 113, 1970). Investigation into possibilities of automatic analysing and testing methods suitable for application with automatic plating plants. Five tables, 8 figures and 16 references.

4 Die komplexometrische titration und ihre indikation—

G. Kraft (Galvanotechnik, 61, 123, 1970). Complexometric titration and its application possibilities for chemical analysis are discussed; 14 figures and 14 references.

5 Analytische untersuchungen mit ionen sensitiven elektroden—

F. Oehme (Galvanotechnik, 61 133, 1970). Modern analysing methods are outlined. It is shown how the use of respective electrodes makes the application of direct potentiometric analyses possible for determining solution concentrations. They are applicable in laboratories, and also practicable in plating shops. Four tables 10 figures and 11 references.

6 Improved method of coulostatic titrations—

R. F. Sympson (Anal. Chim. Acta. 46, No. 1, 71, 1969). The complexities of performing coulostatic titrations are reported to have been greatly reduced by using a special external sweep circuit which produces a horizontal sweep rate for the oscilloscope that varies with squate root of time. Since the potential decay at a large hanging drop mercury electrode also varies with square root of time and was applied to the vertical plates, linear decay curves were obtained. The slopes of the latter curves were plotted against volume of titrant. Lead and cadmium have been titrated successfully in the concentration range 4.4×10^{-6} to 4.7×10^{-5} M. Apparatus and titrating conditions are described; 2 tables and 1 figure.

7 Electrochemical determination of zinc content in molten brass–

T. C. Wildor and W. E. Galin (Trans. Met. Soc. A. I. M. E. 245, 1287, 1969). Measurements of the EMF of the cell Pt/Ni; NiO ZrO_2+CaO Zn (in molten brass), ZnO Ta at 995°C have shown that the cell may be used to determine the zinc content of molten copper–zinc alloys to the nearest 0.05 per cent. The cell is used for brass melts to which no zinc oxide is added intentionally since essentially all oxygen in the copper-zinc-oxygen system present in the form of zinc oxide. The cell may also be used to determine the thermodynamic activity of zinc for alloys of the brass composition range. Two tables and 3 figures.

8 Application of atomic absorption spectrophotometry to analysis of metallurgical materials. Part 9. Aluminium alloys—

J. L. J. Seeo and A. C. Seco. (Rev. Met. Spain, 5, No. 3, 290, 1969); Zinc Abstracts, 27, 338, 1969. A method is described for the determination of zinc and other elements in aluminium alloys. The sample containing zinc is dissolved in hydrochloric acid, oxidized with hydrogen peroxide, suitably diluted and the atomic absorption measured spectrophotometrically at 213 mu. It is reported that zinc content as low as 0.001 per cent can be determined with an error of 1 per cent. The effect of aluminium on the atomic absorption of zinc is discussed. Twentythree tables and figures.

9 High temperature methods in the chemical analysis of inorganic materials—

D. Zemmanova and J. Novak (Chem. Listy, Czechoslovakia, 63, 889, 1969); Zinc Abstracts, 27, 338, 1969. High temperature methods used for analytical purposes are surveyed and their various applications are discussed. Procedures used for zinc, cadmium and lead are considered. An extensive bibliography is included; 1 table and 2 figures.

10 Amperometric determination of zinc in zinc/lead ores—

Z. Ziemba (Rudy Metale Niezelazne, Poland, 14, No. 3, 154, 1969); Zinc Abstracts, 27, 339, 1969. Procedures have been developed for determination of zinc in the ore samples by amperometric titration with ferrocyanide in a solution of sodium acetate at +0.6V or versenate in an ammonium acetate solution at – 1.3V. The techniques necessitate the preliminary separation of interfering elements from the samples. Results are in good agreement with those obtained by polarography; 5 tables and 6 figures.

11 Trace metal analysis in water by atomic absorption spectrophotometry—

J. P. Grillo (U. S. Atomic Energy Commission SC–TM–68 587, 30 pages, 1968); Chem. Abs., 70, 90592, 1969. The use of atomic absorption methods for the determination of zinc, lead, cadmium and several other metals is discussed with special reference to the analysis of water containing these metals in the ppb concentration range.

12 Polarographic determination of lead by reference to the current corresponding to the reduction of lead dioxide—

L. G. Rutberg and N. G. Chovnyk (Zavodsk. Lab., 34, 781, 1968); Metals Abs., 2, 857, 1969. The creation of an analytical method using polarography for the determination of lead in ores and alloys is discussed. Oxidation of divalent lead and reduction of the deposit of lead dioxide obtained on rotating graphite electrodes in solutions of various pH values are considered. Both methods may be used for quantitative determination of lead, and a sensitivity of 5×10^{-5} per cent for lead in nickel compounds is reported.

13 Study of an amalgam electrode for polarographic determinations—

P. N. Palei, I. S. Sklyarenko and T. M. Chubukova (Zavodsk, Lab. 34, 1186, 1968); Metals Abs.,

2, 859, 1969. The construction of an amalgamated platinum electrode with a continuously renewable surface for use in polarographic analysis is described. The range of lead concentrations in lead acetate solutions tested was 10^{-6} to 10^{-4} mole/l., and the electrode operates for 20 days with an error not exceeding 2 per cent.

14 Chemical and instrumental aspects of metallurgical applications of the flame atomic absorption method—

J. Ramirez-Munoz (Rev. Met., Spain, 5, 451, 1969); Lead Abstracts, 9, 223, 1969. Details are given of the behaviour of metals including zinc, cadmium and lead which are frequently determined by the flame atomic absorption method. The method is suitable for many determinations of major and minor constituents of its high sensitivity and accuracy, selectivity and versatility. Four tables, 15 figures and bibliography.

15 Photometric determination of lead in free cutting steel—

K. H. Koch, K. Ohls and G. Riemer (Z. Anal. Chem., 237, 167, 1968.) Anal. Abs., **17**, 865, 1969. A sample of about 5 gm. is dissolved and solutions of tartaric acid, sodium hydroxide and potassium cyanide are added to mask interfering elements. Sodium sulphide in aqueous glycerol is added, and the turbidity due to the colloidal lead sulphide formed is measured at 546 mm. In the range 0.15-0.30 per cent lead the standard deviation was ± 0.003 per cent.

16 Analysenmethoden in der mess – underegeltechnik—

K. Laude (Galvanotechnik, **61**, 197, 1970.) Automatic analysing equipment (titration automates) are discussed, as used for control purpose in electrop'ating. It is shown that an automatic titration can be applied for acids, alkalis, chlorate, chromate, chlorite, hypochlorite, sulphide nickel, copper, zinc, ammonia solution and others ; 8 figures.

17 Ausgewahite beispiele zum messen und regein vonbadern—

F. Oehme (Galvanotechnik, **61**, 204, 1970). Practical examples of electroplating solution controls carried out automatically are given : rinshing baths, degreaing baths, pickles, phosphating solutions, and various electroplating solutions. Six figures and 17 references.

18 Amperometric titration of alkali metal thiomolybdate with lead (II)—

R. S. Saxena and M. C. Jain (Indian J. Chem. 6, 224, 1968). A method is described for the determination of the thiomolybdate ion by titration with lead nitrate solution at -0.8V vs SCE and at 25° in the presence of potassium permanganate and gelatin. The changes in diffusion current during the course of both direct and reverse titrations are plotted and the curves suggest the formation of lead thiomolybdate at pH 3.0 to 4.8. The titrations are reproducible to ± 1.1 per cent.

19 Rapid determination of copper, lead, cadmium and chlorine in zinc sulphate by A. C. Polarography—

L. N. Vasileva and coworkers (Sb. Nauchn.-Issled. Inst. Tsvet. Metal. U.S.S.R.,No. 28, 16. 1968); Anal. Abs., **17**, 754, 1969. A method is described for the measurement of the elements, at concentrations of 1 ppm or more, in zinc sulphate solutions. The electrolyte consist of 1 M phosphoric and 0.5. M perchloric acids containing 4% zinc sulphate. The peak potentials against the mercury pool are -0.32 V for copper, -0 42V for lead and -0.76V for cadmium. There is no interference from arsene, antimony or manganese but thallium interferes in the determination of lead if its concentration exceeds that of the lead.

20 Standards for the analysis of tin-lead alloys by X-ray spectrometary—

P. G. Lumb (Metallurgia, 80, 127, 1969.) A method is described which employs synthetic standards in order to avoid the necessity for periodic recasting of normal standards because of their progressive ageing. Metal powders having a particle size of less than 37 microns are suspended in an epoxy resin and hardened. Standard discs of less than the critical thickness are prepared from this material. Examples of typical formulations are given, and suitable procedures using a fully automatic spectrometer are suggested. Two tables and 35 references.

21 Determination of lead and bismuth by controlled potential coulometric oxidation—

Y. Su and D. E. Compbell (Anal. Chim. Acta, **47**, 261, 1969).

An accurate method is described for determining lead and bismuth as a major constituent of glasses and thin films. After simultaneous reduction of both metals in a mercury pool, they are determined by stepwise anodic stripping against a silver–silver chloride electrode in a supporting electrolyte of 0.4M tartaric and 0.30–0.72M perchloric acids. Solutions containing 0.02–0.2 m eq. of lead were analyzed with an error of +0.2 per cent. Two tables and 2 figures.

22 Atomic absorption micro-sampling with the 'sampling boat' technique--

H. L. Kahn, G. E. Peterson, and J. E. Schallis (At. Absorption Newsletter, U. S. A., 7, No. 2, 35, 1968): Anal. Abs., **17**, 1274, 1969. An improved sampling method is described which leads to better detection limits for some easily atomized elements including zinc, cadmium and lead. The sample is dried in a tantalum boat which is placed in the flame. The residue is quickly atomized without loss and the electronic systems produces a peak in 1.5 seconds. Traces of lead in bismuth and amounts of lead in urine as low as 0.03 microgram per milliliter have been determined.

23 Application of anodic stripping voltammetry to the determination of trace elements in sea water—

G. C. Whitmack aed R. Sasselli (Anal. Chim. Acta, **47**, 267, 1969). Several trace elements in sea water have been determined using anodic stripping voltammetry with a hanging mercury drop electrode and fast sweep polarograph. This technique is compared with the single sweep polarograph method for the trace elements zinc, lead and cadmium. Precise measurements of concentrations of 10^{-8} to 10^{-9} M can be made with carefully controlled conditions. Two tables and 2 figures.

24 Electrochemical masking of indium in A. C. polarographic determination of cadmium—

E. Jacobsen and G. Tandberg (Anal. Chim. Acta, **47**, 285, 1969). The anionic surfactant Benax serves as a masking agent for negativity charged metal citrate complex but does not affect A. C. polarograms of uncomplexed cadmium ions. In citrate buffer at pH 3.5–4.0 with 3 per cent Benax, cadmium can be determined in the presence of quantities of indium 10,000 times greater than itself. No other metal which is normally associated with cadmium interferes with the determination. Two tables and 3 figures.

25 Nondispersive atomic fluorescence analysis--

T. G. Vickers and R. M. Vaught (Anal. Chem., **41**, 1476, 1969). A method is described for atomic fluorescence determination of elements whose resonance spectra consist almost entirely of single lines so that there is virtually complete spectral isolation and neither filters nor monochromaters are necessary. Detection limits of 0.001 microgram per millilitre for cadmium and 0.0005 microgram per millilitre for zinc are reported.

26 Electron microprobe of the active materials in the lead-acid storage battery—

T. Chiku and K. Nakajima (J. Electrochem. Soc. **116**, 1407, 1969). The dependence of the concentration of lead sulphate and its distribution on charge and discharge in the electrode plate have been examined in commercial lead-acid storage batteries by using an electron probe X-ray microanalyzer. One table, 4 figures and illustration.

27 Determination of copper in cadmium sulphide—

F. Cabane – Broutsy (Anal. Chim. Acta, **47**, 511, 1969). Copper concentrations of the order of 10^{-6} gram per gram of cadmium sulphide can be determined colorimetrically by means of the copper–cuprizone complex. Atomic absorption spectrophotometry has been used for concentrations of 10^{-5} gram, and both give an error of about 5 per cent. The latter method has to be used for samples of 40 milligrams or less. Two tables and 2 figures.

28 Oscillographic determination of germanium, selenium and zinc in semiconductor materials—

A. M. Gabovich (Tr. Komis Analit. Khim. Akad. Nauk S. S. S. R. Inst. Geokhim. i. Analit. Khim., U. S. S. R., **16**, 155, 1968). Anal. Abs., **16**, 2865, 1969. Polarographic procedures are described for the determination of the above in the presence of each other. Basal electrolyte solutions are recommended. A 0.02 to 0.03 gram sample of the material is fused with potassium bisulphate, the melt dissolved in water, diluted to a known volume, and the elements determined by the method of additions.

29 Determination of the main components of semiconductors of the zinc-indium-sulphur type—

L. V. Mirovich (Tr. Inst. Geokhim. i Analit. Khim., U.S.S.R., Komis. Analit. Khim. Akad. Nauk S.S.S.R., **16**, 141, 1968); Anal. Abs., **16**, 2865, 1969. Procedures are presented for the determination of zinc, indium and sulphur. Zinc can be determined by a method utilizing dithiozone or by a polarographic technique using an acetate buffer solution, pH 4.75, as the basal electrolyte. The half wave potential for the zinc is – 1.15V.

30 Potable water for domestic and industrial purposes. Determination of zinc—

(Polish Standard, PN-67/C-04596, 1968, 4 pages): Zinc Abstracts, 28, 5, 1970. A colorimetric method using dithizone is presented for the determination of zinc. The water samples should contain 0.001 to 0.005 milligram of zinc. Sampling and storage of samples are considered, and the analytical procedure and equipment are described in detail.

31 Complexometric analysis of a mixture of cations. Part 6. Determination of copper, zinc and cadmium—

C. Liteanu and coworkers (Studia Univ. Babes – Bolyai, Ser. Chem., Rumania, **13**, No. 1, 45, 1968); Anal. Abs., **17**, 698, 1969. A method is described for the determination of mixture of zinc, cadmium and copper ions by titration with EDTA. Cadmium is separated from the mixture by selective precipitation of cadmium carbonate at pH 8. Aqueous cyanide is added to the filtrate until the solution is decolourized, then formaldehyde solution is added dropwise until the solution becomes opaque. Zinc is then titrated at pH 10, with EDTA using Eriochrome Black T as indicator. The errors are less than 0.4 and 1.2 per cent for cadmium and zinc respectively.

32 Methods for zinc determination—

G. Teodorescu and A. M. Lupu (Bul. Inst. Politch. Bucuresti, Rumania, **30**, No. 5–6, 59, 1969. The volumetric method involves an argentometric titration using Reinaak salt for precipitation, and the colourimetric procedure involves the formation of a complex which is highly soluble in acetone.

33 Chemical analysis of electrodeposited nickel – cadmium-tin alloys—

S. Djordjevic and G. Gunkic (Technika, Yugoslavia, 23, No.10, H 1264, 1968); Metals Abs., 2, 1034, 1968. A volumetric method utilizing EDTA is presented for the determination of nickel and cadmium in the alloys: tin as stannous by titration with potassium bromate.

34 Complexometric determination of zinc in the presence of other metal ions—

V. I. Derko and V. P. Savchenkova (Lakokrasochnye Matenaly i ikh Primenènie, U.S.S.R., No.2, 48, 1968); Anal. Abs., **17**, 752, 1969. A method is described for the analysis of zinc in zinc slag containing iron, aluminium and copper. The dissolved slag is titrated with EDTA at pH 9.5–11 in the presence of ammonia using sulpharsazene in borax solution as indicator. Tartaric acid is added to mask iron and aluminium, and thiourea to mask copper. The error is + 0.5 per cent.

35 Einige polarographische analysen von galvanischen badern—

P. W. Wild (Galvanotechnik, **60**, 757, 1969). Description of new methods using polarographic techniques for analysis of electroplating baths: cadmium and vanillin in alkaline zinc, lead in cadmium, and zinc in chromium. They are quick and accurate, and designed for easy application in the plating shop.

36 Complexometric analysis of mixtures of copper (II) and zinc (II)—

I. A. Crisan and P. Tanase (Revta Chim. Rumania, **19**, 228, 1968); Anal. Abs., **17**, 728, 1969. Divalent zinc is determined in the presence of copper by EDTA titration. The two metals are titrated together in an acetate buffer at pH 5. The copper-EDTA complex is destroyed by sodium hydroxide and hydroxyl-ammonium chloride, and the liberated EDTA titrated with copper sulphate. From mixtures containing copper and zinc in the ratios 3 to 1 and 1 to 3, recoveries of 98 per cent were obtained for both metals.

37 Complexometric determination of metals by high frequency titration in non – aqueous media—

T. Fernandez, E. Casassas and

F. G. Montelongo (Analas Real Soc. Espan. Fis. Quim., B, Spain, **64**, 315, 1968); Anal. Abs., **17**, 707, 1969. A high – frequency oscillator was used to determine the end points in direct or indirect titrations of bivalent metal ions with EDTA or its sodium salt in alcoholic media. Cadmium, zinc and lead may be determined in concentrations from 0.33 mM to 25 uM. If equimolar mixtures of EDTA and the metal ions are titrated with sodium hydroxide a point of inflection is obtained for 4 equivalent moles of base.

38 Chelometric zinc titration—

U. S. Patent 3,479, 152 (1969). A method is described for the determination of small amounts of zinc in water supplies which contain a high concentration of hardness salts. The chelating acid diethylene triaminopentaacetic acid is used for the titration with dithizone as indicator.

39 Magneson Khs, reagent for zinc—

N. N. Vysokova, A. M. Lukin and K. A. Smirnovo (Zavodsk. Lab,, U.S.S.R., **34**, 930, 1968); Anal. Abs., **17**, 3339, 1969. Magneson Khs is a colorimetric reagent producing a violet colour with zinc. at pH values of 9–10.5. A procedure utilizing this is described for the determination of zinc in silicate ores. It gives accurate results for ore samples of 1 gram in presence of other elements including cadmium. The reagent can also be used as an indicator in the complexometric titration of zinc, but only in the absence of cadmium, lead or other interfering metals listed.

40 Determination of traces of indium in cadmium by pulse polarography—

E. Temmerman and F. Verbeek (Z. Anal. Chem., **244**, No. 1, 25, 1969): The pulse polarographic behaviour has been studied of indium, cadmium and lead in several supporting electrolytes. A method is presented for the determination of indium as low as 0.004 ppm in 10 gram of cadmium.

41 Application of anion exchanger for quantitative separation of cations of analytical group three separation of manganese from zinc—

J. Gera (Chem. Anal., Poland, 13, No. 4, 763. 1968), Anal. Abs., 17, 3439, 1969, A procedure utilizing the oxalate form of the Lewatit MN exchanger is described for the separation of manganese and zinc ions in 15 per cent ethanol solution. In the case of samples containing 1-20 milligram of the metal ions, the recoveries of manganese and zinc were 98–99.6 and 97–99.5 per cent respectively for mixtures containing the two elements in ratios ranging from 1 to 1 or 20, and 20 to 1.

42 Successive amperometric titration of mixtures of cations containing mercury and other metals—

A. K. Zhdanov and N. V. Kapitsa (Uzbek. Khim. Zh., U.S.S.R., No. 4, 20, 1968); Anal. Abs., **17**, 3299, 1969. Amperometric titration procedures utilizing EDTA are described for the quantitative analysis of binary mixtures containing mercury and zinc or copper, and ternary mixtures of mercury and bismuth and either zinc, lead or copper. In the case of the ternary mixtures, EDTA titration of the sum of bismuth and mercury is performed in a basal electrolyte of 0.25N nitric acid at 1.2 volts. The pH of the solution is then adjusted to 5.5 by the addition of sodium acetate, and zinc or copper is titrated at 1 volt, lead being determined by titration at 0.9 volt. The error for the determination of 0.36–26.5 milligram of zinc ranged from 8.7 to 0.5 per cent.

43 Rapid determination of cadmium and copper in plating wastes and river water by atomic absorption spectroscopy—

J. L. Robinson, R.G. Barnekow and P. F. Lott (At. Absorption Newsletter, U.S.A., **8**, No. 3, 60, 1969); Chem. Abs., **71**, 53309, 1969. The extraction and concentration of the two metals with 2–mercaptobenzothiazole into n–butyl acetate are described. The metals are determined in the extract by atomic absorption spectrophotometry using the standard method of additions. It is reported that Tamm's reagent for the dissolution of free silica only dissolves amorphous silica.

44 Separating microgram quantities of the components of semiconducting alloys by thin layer chromatography—

M. P. Volynets, L. S. Chulkina and T. V. Fomina (Zavobsk. Lab., U.S.S.R., **35**, 554, 1969); Metals Abs., 2, 1516, 1969. Small quantities of the sample solution are deposited on a silica gel film

300 u thick, and the elements are then separated by the action of of capillary forces and determined by standard techniques. The conditions necessary for the application of this procedure to alloys of lead with gallium, antimony, tin and arsenic, tin-zinc and 4 other alloys are tabulated.

45 Use of a graphite electrode for analyzing alloys by a substoichiometric coulometric method—

P. K. Agasyan and T. K. Khamrakulov (Zavodsk. Lab., U.S.S.R., 35, 644, 1969); Metals Abs., 2, 1516, 1969. The electrochemical behaviour of platinum and graphite electrodes with different types of impregnation in acid and ammonia buffer solutions was investigated with reference to the analysis of alloys by substoichiometric coulometric method. The best reproducibility of electrical measurements was obtained using a graphite electrode impregnated with paraffin in vacuum at a high temperature. A procedure for the analysis of copper-cadmium and other metal alloys is described. The sensitivity, reproducibility and accuracy of analysis attainable with the graphite electrodes is reported to be comparable with those achieved using platinum electrodes.

46 Analysis of toxic metals in trade effluents by atomic absorption spectrophotometry–

P. J. Belling (Effluent Water Treat. J., 9, 914, 1988); Chem. Abs., 71, 84368, 1969. The atomic absorption methods were applied to the determination of zinc, chromium, copper and nickel in effluents from the electroplating industry. Interference effects were investigated and procedures developed which permit succesful analysis of trade effluent samples.

—T. L. R.

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