ABSTRACTS

DEPARTMENT OF PHYSICS

1. CHARTS FOR OBTAINING GEOMETRICAL CORRECTIONS DIRECTLY FROM ANTI-EQUI-INCLINATION PHOTOGRAPHS. Gopinath Kartha, *Rev. Sc. Inst.*, 1953, **24,** 871.

A convenient chart for obtaining Lorentz and polarisation corrections suitable for direct application to anti-equi-inclination photographs taken with a Weissenberg camera of 57·3 cm. diameter is given. The exact steps needed for applying the corrections using the chart are also given.

2. A NEW METHOD OF CALCULATING THE SCALE FACTOR IN STRUCTURE ANALYSIS. Gopinath Kartha, *Acta Crystallographica*, 1953, **6,** 817.

A new method is suggested for obtaining the absolute structure factors from a set of relative intensities. It differs from the method of Wilson in that, it does not depend on any statistical result. Formulæ are obtained relating the sum of the intensities of all the reflections with certain integrals involving the electron density distribution in the atoms. The method is applicable both to two- and three-dimensional data, but in practice it is more useful in the former case. The method makes use of the available structure factor tables, and has been verified to be valid in a number of cases where the scale factor is known. For the purpose of applying the method to unknown cases, tables of the required integrals are given for some of the commoner atoms which occur in organic crystals.

3. INFLUENCE OF MOSAICITY ON THE BRAGG REFLECTIONS OF POLARISED X-RAYS. S. Ramaseshan and G. N. Ramachandran, *Acta Crystallographica*, 1953, **6,** 364.

The variation of intensity of a Bragg reflection when the azimuth of the plane of polarisation of the incident X-ray beam is altered was studied for crystals of sodium nitrate. It was found that, using natural and ground faces, perfect and mosaic crystals differ in their behaviour with respect to polarised X-rays. This fact has been used to assess the degree of perfection of crystals. An important advantage of this method of finding the degree of perfection is that the difficulty of determining the absolute integrated reflection is not present.

4. THERMAL SCATTERING OF LIGHT IN BIREFRINGENT CRYSTALS—INTENSITIES OF BRILLOUIN COMPONENTS. V. Chandrasekharan, *Proc. Nat. Inst. Sci.*, 1953, **19,** 547.

The theory of thermal scattering of light in birefringent solids (Chandrasekharan, 1951) shows that there are 12 pairs of Doppler components. Their intensities have been individually evaluated following a reasoning similar to that of Mueller (1938) for amorphous solid. For specific crystal orientations the intensities have been calculated in the case of calcite (5) and of quartz (17) using the known elastic and photoelastic constants.

5. STRUCTURE OF HALOGENATES OF THE TYPE $A(BO_3)_2H_2O$. PART II. BARIUM BROMATE MONOHYDRATE $Ba(BrO_3)_2H_2O$. Gopinath Kartha, *Proc. Ind. Acad. Sci.* 1953, **38 A,** 1.

The crystal structure of barium bromate monohydrate has been determined and the atomic co-ordinates refined by differential synthesis and minimization methods as well as by Fourier methods. It is found that the atomic arrangement is closely similar to that in barium chlorate monohydrate.

6. APPLICATION OF THE Rb-Sr METHOD TO THE AGE DETERMINATION OF PHLOGOPITES. V. S. Venkatasubramanian, *Proc. Ind. Acad. Sci.*, 1953, **38,** 376.

The geological ages of two Phlogopite Specimens have been determined by the Rubidium-Strontium method. The "addition-plot" is utilized with proper choice of internal standards.

7. DETERMINATION OF THE THORIUM CONTENTS OF ROCK SPECIMENS FROM KOLAR MINES. V. S. Venkatasubramanian, *J. Sci. and Ind. Res.*, 1953, **12 B,** 551.

The thorium contents of rock specimens from Kolar mines have been determined by the streaming method. An improvement in the method is the use of the Flow Proportional Counter with moderate gas amplification. The results of the present experiments, taken in conjunction with the radium determinations by the fusion method, enable the (Th/U) ratios to be obtained.

DEPARTMENT OF GENERAL CHEMISTRY

1. ELECTRODEPOSITION OF COPPER FROM THE MONOETHANOLAMINE BATH. T. L. Rama Char and N. B. Shivaraman, *J. Electrochem. Soc.*, 1953, **100,** 227.

Copper has been electrodeposited on steel by using a complex copper-monoethanolamine solution. This has a low metal ion concentration of the order of 10^{-11} to 10^{-13} N and does not deposit copper on steel by immersion. Deposits which are bright and of good quality have been obtained over a wide range of experimental conditions and at high cathode efficiencies (90–100%). The inclusion of rochelle salt considerably improves the bath performance. The optimum conditions are: copper oxalate 60 g./l., monoethanolamine 60 ml./l., rochelle salt 60 g./l., c.d. 2·4–4·8 amp./dm.^{2}, pH 9·5 and temperature 24° C. Nitrates as addition agents increase the brightness of the deposits and the limiting c.d. (upto 6·0 amp./dm.^{2}) but considerably decrease the cathode efficiency. The amine bath is comparable to the cyanide bath for copper plating.

2. PYROPHOSPHATE COMPLEXES OF TIN AND ZINC. J. Vaid and T. L. Rama Char, *Curr. Sci.*, 1953, **22,** 170.

Complex formation between tin (stannous) or zinc with pyrophosphate has been studied by potentiometric and conductometric titration. The ratio of pyrophosphate to metal in the complex is 1 : 1 for tin and 2 : 1 for zinc. The metal ion concentration of tin and zinc in the complex pyrophosphate solutions is of the order of 10^{-14} N for stannous and 10^{-7} N for zinc. The calculated value for the instability constant of these complexes is of the same order.

3. ELECTRODEPOSITION OF COPPER-TIN ALLOYS FROM THE PYROPHOSPHATE BATH. J. Vaid and T. L. Rama Char, *Curr. Sci.*, 1953, **22,** 170.

Copper and tin have been co-deposited from the pyrophosphate bath containing copper pyrophosphate, stannous pyrophosphate, sodium pyrophosphate and disodium hydrogen phosphate. Alloy deposits analysing 12–95% copper have been obtained by varying the operating conditions.

4. DIRECT CHLORINATION OF RUBBER LATEX. N. H. Sivaramakrishnan, G. S. Rama Iyer and M. R. A. Rao, *J. Sci. and Ind. Res.*, 1952, **11 B,** 327.

In this process, for the direct chlorination of rubber latex, the latex is emulsified with carbon tetrachloride and chlorine bubbled through it at

room temperature in presence of aluminium chloride (catalyst) and turkey red oil (stabilizer). The chlorinated rubber obtained contains 68 per cent. chlorine. About 6 per cent. of rubber is also hypochlorinated. The chlorinated rubber obtained has properties very similar to those of normal varieties.

5. CHLORINATION OF RUBBER LATEX—CARBON TETRACHLORIDE EMULSIONS IN PACKED COLUMNS. G. S. Rama Iyer, N. H. Sivaramakrishnan and M. R. A. Rao, *J. Sci. and Ind. Res.*, 1952, **11 B,** 333.

Latex emulsions can be chlorinated directly in a packed column in the absence of sunlight. An emulsion containing 4 per cent. rubber gave a satisfactory product, the duration of chlorination being 2½ hours. The yield was nearly quantitative. The process ensures economy of chlorine and can be made continuous.

6. VISCOSITY OF RUBBER LATEX—CARBON TETRACHLORIDE EMULSIONS. G. S. Rama Iyer and M. R. A. Rao, *J. Sci. and Ind. Res.*, 1952, **11 B,** 335.

In the course of studies on the chlorination of rubber latex-carbon tetrachloride emulsions, it was observed that the viscosity of the latex emulsions decreases with ageing. The viscosity of the latex emulsions influences the extent and rate of chlorination. The high initial viscosity of the emulsion can be reduced either by ageing the emulsion or by repeated passage through a colloid mill. The fall in the viscosity of the emulsion is due to the disaggregation of the rubber molecules, which is accelerated by passing the emulsion through a colloid mill.

7. CHLORINATED RUBBER AND ITS APPLICATIONS. M. R. A. Rao and G. S. Rama Iyer, *Rubber India*, April 1952.

The historical survey in literature of the methods of preparation of chlorinated rubber, chemistry of chlorination of rubber, and the improvements in the production of chlorinated rubber developed at the Institute are given. The properties of chlorinated rubber such as viscosity in solutions, solubility, stability and its chemical resistance have been discussed. The formulation of paint prepared for the chemical resistance is described. The uses of chlorinated rubber are briefly detailed.

DEPARTMENT OF ORGANIC CHEMISTRY

1. STUDIES IN SESQUITERPENES, PART VIII. SESQUITERPENES OF THE ESSENTIAL OIL FROM *Dipterocarpus indicus*, Bedd. G. S. Krishna Rao, Sukh Dev and P. C. Guha, *J. Indian Chem. Soc.*, 1952, **29,** 589.

The essential oil from *Dipterocarpus indicus*, Bedd. has been shown to consist of humulene, β-caryophyllene, a bicyclic sesquiterpene and a sesquiterpene alcohol, the latter two giving cadalene on dehydrogenation.

2. STUDIES IN SESQUITERPENES, PART IX. THE MALEIC ANHYDRIDE ADDUCT OF M.P. 180–82° OBTAINED FROM THE ESSENTIAL OIL OF *Dipterocarpus indicus*, Bedd. G. S. Krishna Rao, Sukh Dev and P. C. Guha, *J. Indian Chem. Soc.*, 1952, **29,** 598.

The caryophyllene fraction of the essential oil of *Dipterocarpus indicus* gave an adduct of m.p. 180–82° C. with maleic anhydride, besides the product with m.p. 98°. A preliminary study of the 180° compound has been made.

3. STUDIES IN SESQUITERPENES, PART X. SESQUITERPENES OF THE ESSENTIAL OIL OF *Lansium annamalayanum*, Bedd. A. Somasekar Rao, K. B. Dutt, Sukh Dev and P. C. Guha, *J. Indian Chem. Soc.*, 1952, **29,** 604.

The essential oil from the wood of *Lansium annamalayanum* Bedd., has been shown to consist essentially of bisabolene and two new sesquiterpenes of azulene family.

4. STUDIES IN SESQUITERPENES, PART XI. SESQUITERPENES OF THE ESSENTIAL OIL OF *Lansium annamalayanum*, Bedd.—STRUCTURE OF α-CHIGADMARENE. A. Somasekar Rao, K. B. Dutt, Sukh Dev and P. C. Guha. *J. Indian Chem. Soc.*, 1952, **29,** 620.

α-Chigadmarene, a new sesquiterpene isolated from the essential oil of *Lansium annamalayanum*, Bedd., has been investigated in some detail. It belongs to the S-guaiazulene family. Its structure has been elucidated.

5. STUDIES IN SESQUITERPENES, PART XII. SESQUITERPENES OF THE ESSENTIAL OIL FROM THE WOOD OF HIMALAYAN DEODAR, PART I. G. S. Krishna Rao, Sukh Dev and P. C. Guha, *J. Indian Chem. Soc.*, 1952, **29,** 721.

The essential oil from the Himalayan Deodar has been examined in detail; *p*-methyl acetophenone, *p*-methyl tetrahydroacetophenone and atlantone have been identified. Two new sesquiterpenes designated as α- and

β-Himachalene constitute the major portion of the oil. Himachalol, a new sesquiterpene alcohol related to Himachalenes, has also been isolated.

6. STUDIES IN SYNTHETIC ANTIMALARIALS. PART XV. S. S. Guha and P. C. Guha, *J. Sci. and Ind. Res.*, 1952, **11 B,** 313.

In this paper is described a new method of synthesis of substituted biguanides starting from dithiobiurets. The two sulphur atoms of aryl dithiobiurets are successively replaced by amino- or alkylamino-groups.

7. STUDIES IN SYNTHETIC ANTIMALARIALS, PART XVI. S. S. Guha and P. C. Guha, *J. Sci. and Ind. Res.*, 1952, **11 B,** 317.

A new method of synthesis of N^1-*p*-chlorophenyl-N^5-isopropyl biguanide starting from *p*-chlorophenyl isothiocyanate and pseudo-S-ethylthioureas is described.

8. STUDIES IN SYNTHETIC ANTIMALARIALS, PART XVII. S. S. Guha and P. C. Guha, *J. Sci. and Ind. Res.*, 1952, **11 B,** 319.

Some biguanido-thioureas [RNH.C (=NH).NH.C (=NH).NH.CS .NHR'] have been prepared by the action of mono-substituted biguanides on substituted isothiocyanates and these thioureas have been converted into the corresponding triguanides [RNH.C (=NH).NH.C (=NH).NH.C (=NH).NHR'] by the action of mercuric oxide and ammonia.

9. STUDIES IN SYNTHETIC ANTIMALARIALS, PART XVIII. S. S. Guha and P. C. Guha, *J. Sci. and Ind. Res.*, 1952, **11 B,** 374.

In this paper is described the preparation of some cyclohexyl, 2-, 3- and 4-methyl cyclohexyl and phenyl-isopropyl-substituted N'-arylbiguanides.

10. STUDIES IN ANTIMALARIALS. N. S. Johary, S. S. Guha and P. C. Guha, *Curr. Sci.*, 1952, **21,** 184.

A series of new guanidine derivatives having 3:4-dichlorophenyl group at N^1-position and alkyl-, aryl- or sulpha-substituted residues at N^3-position have been prepared and described.

11. SULPHONAMIDE DERIVATIVES AS POSSIBLE ANTIMALARIALS. S. S. Guha, A. C. Roy and P. C. Guha, *J. Sci. and Ind. Res.*, 1953, **12 B,** 177.

With a view to searching a true causal prophylactic antimalarial a new series of compounds have been prepared and described, by linking two different or same sulphonamide residue to either end of a guanidine chain.

12. SOME GUANIDO ARSENICALS AS POSSIBLE ANTIMALARIALS. J. R. Guha S. S. Guha, A. C. Roy and P. C. Guha, *Curr. Sci.*, 1952, **21**, 247.

A new series of aryl, alkyl or sulphonamido-guanidine derivatives which also contained the arsonic acid residue have been described.

13. SOME ARYL- AND ALKYL-SULPHURYL-BIS-GUANIDINES AS POSSIBLE ANTIMALARIALS. S. N. Sur, S. S. Guha and P. C. Guha, *Curr. Sci.*, 1952, **21**, 278.

A number of alkyl- and aryl-sulphuryl-bis-guanidines have been prepared and described. The guanidine residues are linked by the active SO_2 group of sulphonamides.

14. SOME 2-BENZOTHIAZOLYL BIGUANIDES AS POSSIBLE ANTIMALARIALS. J. R. Guha and P. C. Guha, *Curr. Sci.*, 1952, **21**, 340.

A series of N^5-2-benzothiazolyl substituted N^1-alkyl and aryl biguanides have been described as possible antimalarials.

15. SYNTHESIS OF CRYPTONE. A. Bhati, *Curr. Sci.*, 1952, **21**, 314.

Starting from *p*-isopropenyl anisole and subjecting it to sodium-liquid ammonia reduction, cryptone has been synthesised. A dimeric by-product ($C_{20}H_{24}O_2$) has also been isolated. The results of the preliminary investigation of this by-product are also reported in this note.

PHARMACOLOGY LABORATORY

1. FREE AMINO ACID PATTERN OF BLOOD OF NORMAL AND MALARIAL CHICK INFECTED WITH *P. gallinaceum*. R. Rama Rao and K. V. Giri, *Ind. J. Malariology*, 1952, **6,** 411.

Changes in the free amino acids present both in normal and parasitised whole blood, plasma and erythrocytes have been studied by circular paper chromatographic technique. Glutamic acid was found to increase nearly five times in the infected conditions uniformly in whole blood and cells. The presence of increased amount of free glutamic acid in parasitised condition may probably be due to the transaminase reactions in the rapid process of protein synthesis in the parasitised erythrocytes.

2. DERMATOLOGICAL AND IMMUNOLOGICAL PHENOMENON IN FUNGAL INFECTIONS. M. Sirsi, *The Antiseptic*, 1953, **50,** 476.

Fungal infections are of very common occurrence and the mycotic diseases should be considered in the differential diagnosis of practically every obscure infection. The varied types and the widespread nature of the fungal infections are mentioned. Attention is drawn to the close analogy of fungal infection to diseases like tuberculosis and leprosy.

3. THE TOXIC EFFECTS OF SOME CHEMICALS ON FEMALE GENITAL ORGANS. M. Sirsi, *J. Mys. Med. Assn.*, 1953, **18,** 9.

The hazards to which a woman worker is exposed to in the factory life have not been sufficiently appreciated. Besides the general systemic toxicity, the influence of the chemicals on the genital system and on the future progeny has to be considered. Toxic nature of some of the chemicals has been briefly mentioned; the necessity for a scientific appraisal of the harmful effects of nicotine, in case of the female employee of the tobacco factories, is indicated.