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PHARMACEUTICAL ABSTRACTS

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ABSTRACTORS

CONTENTS

BACTERIOLOGY (*Continued*)

Plaster of Paris Bandages—Sterile. While sterilization of plaster of Paris bandages is not important when they are applied to unbroken surfaces, it may be essential when applied to broken surfaces. There are three sources of contamination: the basis material, the exsiccated plaster of Paris and the substance added to retard or accelerate setting; if the bandages are prepared by hand, a further source of contamination arises. To prepare a sterile plaster of Paris bandage, it is essential that the bandage material should first be cut into requisite length and width, and sterilized by dry steam for one hour at 160° C. The plaster of Paris should be placed on glass or enamel trays, in thin layers, and placed in a cold electric oven, the contents being heated at 160° C. for $1^1/_2$ hours and then allowed to cool. The bandage material is impregnated with the sterile powder, the manipulator wearing sterile rubber gloves; the finished plaster is placed in a sterile tin, which is then sealed to keep the bandage airtight until used. If required, a compressed paper core, perforated, may be used, the bandage being wound loosely round this. The usual method of treatment before application is to immerse the bandage, until bubbling ceases, in a pail or deep bowl filled with water to a depth of a foot. In order to retain sterility of the bandage, tepid, sterile distilled water, in a sterile bowl, would be necessary.—G. PERRINS. *Chemist and Druggist*, 134 (1941), 336. (A. C. DeD.)

Schistosomiasis Japonica in the Philippines—Studies on the Geographical Distribution, Incidence and Control of. Survey reports show one or more areas of infection in Leyte, Samas, Mindanao, and Mindoro. Incidence varies from 17.1 to 45.5%, average 20%. Control measures recommended are education, specific treatment and extermination of the snail intermediate host.—MARCOS A. TUBANGUI and ANTONIO M. PASCO. *Philippine J. Sci.*, 74 (1941), 301. (P. A. F.)

Smoke—Effect of, on Bacteria in the Air. Under experimental conditions, exhaled tobacco smoke interfered with the effect of a phenolic germicidal aerosol in a concentration of 1 Gm. in 680 cc. of air on a suspension of *E. coli*. Smokes produced by smouldering six organic substances were lethal to four bacterial suspensions tested, the flora of a normal saliva being much more sensitive than broth emulsions of three laboratory cultures. Cardboard and incense were the most satisfactory materials used, there being evidence of some lethal effect of the incense smoke in a concentration of 1 Gm. in 3000 cc. of air after half an hour's contact with the atomized saliva. In calculating concentrations of smoke no account has been taken of unburnt carbon, ash or material passing into the air as vapor (presumed inactive as germicidal aerosols). Estimations, by aspiration, of the actual quantity of smoke present in the air under test resulted in the recovery of only about 25 mg. for every 100 mg. of crude incense burnt. Incense smoke, under our experimental conditions, persists in the particulate form, liquid or solid, for at least half an hour. Magnesium oxide and ammonium chloride smokes in a concentration of 1 Gm. in 10 cc. of air had no apparent lethal effect on an atomized broth emulsion of a laboratory culture. Infection of the respiratory apparatus of mice with a bacterial suspension of *S. enteritidis* ("Liverpool virus" strain) was mostly prevented by decontamination of the air with cardboard and incense smokes in a concentration lower than 1 Gm. in 30 cc. of air.—C. C. TWORT and A. H. BAKER. *Lancet*, 239 (1940), 587. (W. H. H.)

Sulfadiazine—Effect of, on E. Coli Infection in Mice. Sulfadiazine, (2-sulfanilylpyrimidine) is the most effective of the sulfonamide compounds in treating experimental colon bacillus infection in mice, and would seem to be the drug of choice in treating *E. coli* tissue infections in human beings.—HARRY F. KLINEFELTER. *Proc. Soc. Exptl. Biol. Med.*, 46 (1941), 591. (A. E. M.)

Sulfamido Compounds—Inhibitory Effect of, upon Development and Growth of Phage-Resistant Bacteria. Sulfanilamide, sulfapyridine and sulfathiazole either completely inhibit or definitely delay the development of phage-resistant bacteria in broth. The drug mentioned and also sulfanilyl-guanidine may delay the secondary growth of *S. dysenteria* (Shiga) and *E. coli* in broth containing bacteriophage. The phage-resistant bacilli were found to be susceptible to the bacteriostatic action of sulfamido compounds.—ERWIN NETER. *Proc. Soc. Exptl. Biol. Med.*, 47 (1941), 20. (A. E. M.)

Sulfanilamide—Inhibition of Bacteriostatic Action of, by Yeast Extracts. Two extracts prepared from baker's yeast by different methods inhibited the bacteriostatic action of sulfanilamide toward hemolytic streptococci and *E. coli*. Both preparations also promoted growth of *E. coli* under the conditions of the experiment. The effect seems to be due to the presence of two factors one of which resembles closely *p*-aminobenzoic acid while the other factor is probably not an individual being partly soluble in acetone.—T. A. LOOMIS, ROGER S. HUBBARD and ERWIN NETER. *Proc. Soc. Exptl. Biol. Med.*, 47 (1941), 159. (A. E. M.)

Sulfanilamide, Sulfapyridine and Sulfathiazole Therapy of Gonococcal Infection of the Chorio-Allantoic Membrane. Sulfanilamide-resistant and freshly isolated strains of gonococci were tested for their response to sulfanilamide, sodium sulfapyridine and sodium sulfathiazole on the chorio-allantoic membrane of embryo chicks. The resistant strains retained their resistance *in vitro*. Sulfanilamide and sulfapyridine were about equally efficient in curing the infection. Sulfathiazole was about three times more effective therapeutically than the other substances.—FREDERIK B. BANG and BETSY BANG. *Proc. Soc. Exptl. Biol. Med.*, 46 (1941), 527. (A. E. M.)

Sulfanilyl-Guanidine—Selective Action of, on Different Salmonella Types and Its Practical Importance. The drug acts markedly as a bacteriostatic on *E. coli* and *S. typhi*, strongly on Shigella but is practically without effect on other Salmonella types except *S. parathyphi A* and *S. cholerae suis*. The treatment with the compound in infections with other than the susceptible organisms may be harmful by suppressing the coli flora and leaving the offending bacteria intact.—S. BORNSTEIN and L. STRAUSS. *Proc. Soc. Exptl. Biol. Med.*, 47 (1941), 112. (A. E. M.)

Syphilis—Test Reagent for. Compound tincture of benzoin and a fat stain (Scarlet Red or Sudan III) are added to cholesterolized antigen (prepared from ox heart muscle by extraction with ether and ethyl alcohol and treatment with cholesterol) and diluting with an electrolyte (saline) to the desired degree.—G. F. LAUGHLEN. U. S. pat. 2,111,976; through *J. Soc. Chem. Ind.*, 59 (1940), 899. (E. G. V.)

Tannic Acid Jelly—Antiseptic Analgesic, for Burns. This tannic acid jelly appears to have several advantages. Apart from its antiseptic and analgesic qualities, the hygroscopic action of the glycerin in withdrawing the blister fluid is beneficial in making resorption of this fluid impossible. Bacterial growth is diminished by this action of the glycerin and by increased penetration and concentration of the antiseptic dye. The authors are trying to obtain a jelly which will make for equal ease

in dressing and produce a pliable softer incrustation rather than the rigid tannic acid eschar.—J. F. HEGGIE and R. M. HEGGIE. *Lancet*, 239 (1940), 391. (W. H. H.)

Tetanus Toxoid—Anaphylaxis after Injection of. A case of anaphylaxis following immunization with tetanus toxoid is recorded, but is a rare phenomenon, and in this patient was most probably due to sensitization to Witte peptone, a constituent of the medium in which *Cl. tetani* was grown.—A. A. CUNNINGHAM. *Brit. Med. J.*, 4163 (1940), 522. (W. H. H.)

Tetanus Toxoid and T.A.B.—Immunization with. The authors wished to immunize men simultaneously against tetanus and the enteric fevers, with the minimum number of inoculations, and found that the simplest effective method was to give two doses of the combined antigens (T.A.B.T.) at an interval of 4 weeks. The response to the antigens of the T.A.B. vaccine was as good as if these were administered at the usual short interval of 1 week. The amount of tetanus antitoxin in the serum of the immunized man was over five times as great as it was in those who had two doses of tetanus toxoid alone at intervals of 4 or 6 weeks. Every subject tested who had been immunized with two doses of T.A.B.T. at 4 weeks interval had an antitoxic titre of over 1 unit of antitoxin per cc. in his serum, which is much higher than that which is accepted as an immunizing level against tetanus. In 50 per cent the antitoxic titre rose to 5 units or more per cc., which is many times higher than would be reached by the usual prophylactic dose of tetanus antitoxin. The reaction to the combined antigens (T.A.B.T.) was no greater than to the T.A.B. vaccine alone.—I. H. MACLEAN and L. B. HOLT. *Lancet*, 239 (1940), 581. (W. H. H.)

Ultraviolet Rays—Bactericidal Effect of, on Microorganisms on Restaurant Glassware. Almost sterile surfaces are produced when clean drinking glasses are irradiated with the ultraviolet light produced by the Steriiamp.—J. W. APPLING and F. W. TANNER. *Proc. Soc. Exptl. Biol. Med.*, 47 (1941), 51. (A. E. M.)

Ultraviolet Rays—Bactericidal Effect of, on Non-Spore Forming Bacteria and Mold Spores. The initial number of cells influences the survival of microorganisms exposed to ultraviolet light. The order of decreasing resistance for the species used was: *Staphylococcus aureus, Escherichia coli, Serratia marcescens.* For the mold spores the order of resistance was: *Aspergillus glaucus, Aspergillus niger, Penicillium* and *Mucor.* Suspensions were more easily sterilized than cardboard inoculated with the microörganisms.—F. W. TANNER and J. W. APPLING. *Proc. Soc. Exptl. Biol. Med.*, 47 (1941), 47. (A. E. M.)

BOTANY

Botanical Drug Situation in the United States—Review of the. The author makes mention of some of the more important facts relating to our natural drug resources and touches on the possibility of future production of botanical drugs and some of the commercially important products derived from plants.—F. H. EBY. *Am. J. Pharm.*, 113 (1941), 45. (A. C. DeD.)

Hydroponics. The author summarizes the developments to date—W. O. HOWARTH. *Chemist and Druggist*, 134 (1941), 380. (A. C. DeD.)

Plant Histochemistry—Review of the Studies of, from 1933 to 1940. A brief review of all of the articles appearing on plant histochemistry during the period indicated, organized under the following headings: inorganic constituents, microsublimation and microincineration, organic constituents, microchemistry as applied to cytology. 180 articles are reviewed.—A. MIRIMANOFF. *Pharm. Acta Helv.*, 15 (1940), 171–210. (M. F. W. D.)

Yeast—Effect of Selective Poisons on Utilization of Glucose by. The synthesis of carbohydrate cell material from glucose by resting yeast is completely inhibited by $M/1000$ 2:4-dinitrophenol. Fermentation, however, is markedly stimulated, while respiration appears to be unaffected. Both synthesis and respiration are inhibited by $M/10{,}000$ sodium azide, but a portion of the alcohol formed by fermentation of the glucose is later oxidized. Higher concentrations of azide also inhibit the oxidation of alcohol, thus permitting the accumulation of alcohol as an end-product of the utilization of glucose.—MORRIS J. PICKETT and C. E. CLIFTON. *Proc. Soc. Exptl. Biol. Med.*, 46 (1941), 443. (A. E. M.)

Zornia—Botanical Study of. The plant, *Dicliptera unguiculata*, belongs to the acanthus family. Its popular medical use is in amebic dysentery caused by *Entamoeba hystolitica.* The plant is classified as an herb with white or violet flower and pubescent stalk which is tough in old plants. It is a tropical annual, with fragile flowers appearing after the rainy season. Its chemical analysis shows no alkaloids, but its tannins are probably responsible for its antidysenteric action. It is used as an infusion of stalk and leaves. Several case records are listed with a good percentage of cures. Further chemical and clinical studies are being made.—RAUL L. COTO FERNANDEZ. *Rev. Cien. Costa Rica*, 1 (1940), 66. (G. S. G.)

CHEMISTRY

GENERAL AND PHYSICAL

Anesthetics—Physicochemical Properties of Local. V. Influence of Chemical Constitution of Anesthetic Bases on Passage through Cellophane. The following conclusions are given: (1) Considering the following list, arranged in order of the decreasing rates of passage, starting with the hydrochlorides, after eight hours: percaine, cocaine, stovaine, novocaine; the rates of passage through a cellophane membrane do not follow the pharmacodynamic activities of the local anesthetics. (2) The molecular weights of the bases do not appear to determine the rates of passage. The constitution of the base seems to play a more important part. (3) Comparing the chemical structures of the compounds studied the following points can be made: (*a*) The cyclic double chains of cocaine and percaine seem rather to favor than hinder their passage. (*b*) The constitution of the acid esterifying the alcoholic group of the amino alcohols (novocaine and stovaine) seems to play an important part. The free amino group of the *p*-aminobenzoic acid entering into the preparation of novocaine may, at least in part, be responsible for the particularly slow passage of this local anesthetic.—J. REGNIER, A. QUEVAUVILLER and A. FIEYRE. *Bull. sci. pharmacol.*, 47 (1940), 72–75. (S. W. G.)

Charcoal—Adsorptive Capacity of. The adsorption of ions by activated charcoal is not a true measure of the adsorptive capacity. Charcoal which has been treated with sulfuric acid, or partially oxidized, contains acid groups which give it a base-exchanging capacity. Activated charcoal, after treating with hydrochloric acid and washing free from chlorides, will still give up chloride after treatment with sulfuric acid, showing that the adsorption is not truly reversible. The results of the usual methods of determining adsorption of ions are complicated by chemical reactions. Thus mercuric chloride is reduced to calomel, barium chloride gives barium carbonate and potassium permanga-

nate oxidizes charcoal to mellitic acid. These compounds have been used for tests for adsorptive capacity because of their apparently high adsorption on charcoal.—B. STEENBERG. *Svensk Farm. Tids.*, 30 (1940), 565; through *Quart. J. Pharm. Pharmacol.*, 14 (1941), 188. (S. W. G.)

Cryoscopic Determination of Molecular Weights—Fluorochloroethanes as Solvents for. Fluoropentachloroethane, *sym*-difluorotetrachloroethane and *unsym*-difluorotetrachloroethane were shown to be good cryoscopic solvents for non-associated substances. Their large molecular freezing point depressions, chemical inertness and convenient melting temperatures recommend their use.—J. BERNSTEIN and W. T. MILLER. *J. Am. Chem. Soc.*, 62 (1940), 948–949. (E. B. S.)

Emulsions—Stability of. II. Emulsions Stabilized by Hydrophilic Colloids. A large number of emulsions stabilized by hydrophilic colloids have been examined by the size frequency technique and the distribution of their globule size has been measured, both when freshly prepared and at various times thereafter. Most of these agents form emulsions coarser, but often more stable, than the corresponding soap-stabilized systems. Deterioration of the emulsions takes place by gradual growth of the dispersed oil droplets by coalescence, without the separation of free oil. Lecithin emulsions were found to be an exception to this and aged in the same way as soap-stabilized emulsions, the larger droplets being unstable and appearing as free oil. Gum tragacanth emulsions, although very coarse, were exceedingly stable. Addition of calcium chloride inverted emulsions stabilized by egg yolk and broke those with saponin; the other systems became coarser to a greater or smaller extent and, in some cases, less stable. Addition of hydrochloric acid had much the same effect as that of calcium chloride except that egg yolk emulsions were not reversed. Heating led to an immediate coarsening of most systems, and that stabilized by agar broke at temperatures above that at which agar dispersions do not gel. The importance of viscosity in the stability of emulsions is made clear from these results.—A. KING and L. N. MUKHERJEE. *J. Soc. Chem. Ind.*, 59 (1940), 185–191. (E. G. V.)

Emulsions—Stability of. III. A General Survey of Solid Emulsifying Agents with Special Reference to the Hydrous Oxides and Hydroxides. Solid emulsifiers have a certain limited use in the stabilization of bitumen emulsions and bentonite is of more general application. Many other solids have been proposed as stabilizers but few of them are effective The authors have examined many inorganic solids as emulsifying agents and conclude that, although coarse, temporary emulsions are formed by many of them, few solids are sufficiently useful for technical application. The hydrous oxides and hydroxides were found to be the most effective of the solid stabilizers, and hydroxides and oxides of 18 metals were therefore precipitated by a number of methods and their emulsifying properties examined. The emulsifying efficiency varied much with the method of precipitation, very gelatinous, highly dispersed systems being, in general, most effective. Gelatinous precipitates other than oxides and hydroxides were ineffective, as was silica gel. Many of the hydroxide precipitates improved or deteriorated on aging; aged aluminum hydroxide was especially useful as an emulsifying agent. Emulsions stabilized by gelatinous hydroxides are relatively coarse but are very stable and are insensitive to the presence of electrolytes. The addition of very small amounts of surface-active materials together with the solid stabilizers made possible the preparation of emulsions of a much higher degree of dispersion than did the solid agents alone.—H. L. BENNISTER, A. KING and R. K. THOMAS. *J. Soc. Chem. Ind.*, 59 (1940), 226. (E. G. V.)

Gelometer for Starch Pastes. A gelometer for measuring elasticity and breaking strength of starch gels embodies the following principles: Suction is used to deform the gel, the volume of deformation being measured by hydrostatic means. The deforming force changes uniformly and at a constant rate. Skin effects and the influence of containing walls are eliminated. This apparatus is suited to starch concentrations of 6.5 to 8.5 per cent.—R. M. HIXON and B. BRIMHALL. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 193–194. (E. G. V.)

Glycerin Solution—Vapor Pressure of, at 20°. The vapor pressures of glycerin solutions from 25% to 92% by weight are measured by determining the dew point of air maintained in equilibrium with the solutions. By means of Duhrings rule it is proved that the relative vapor pressure of glycerin solutions is substantially independent of temperature over the range 0° to 70° C., a fact which enables the figures of various workers to be compared. The relative vapor pressures obtained at 20° are in good agreement with the majority of the published data, but not with one table in the International Critical Tables, which must therefore be considered to be in error.—D. W. GROVER and J. M. NICOL. *J. Soc. Chem. Ind.*, 59 (1940), 175–177. (E. G. V.)

Intermolecular Compounds—Study of. It is difficult if not impossible to determine quantitatively residual affinity possessed by organic compounds. Application of melting point curves offers the greatest possibility. A study has been made of combinations of substances of pharmaceutical value. The "thaw-melting point" was the method used and details of procedure are given. Acetanilid was tried with antipyrine, mandelic acid, betanaphthol, phenacetin, pyramidon, sulfonal; trional, phenacetin; antipyrine and phenacetin; mandelic acid with betanaphthol, phenacetin, sulfonal; betanaphthol with phenacetin. Results are shown by tabulation.—HELMUT M. HAENDLER with L. WAIT RISING. *Jour. A. Ph. A.*, 30 (1941), 105. (Z. M. C.)

Microscopist—Portable Laboratory for. The arrangement of the apparatus in a carrying case is described. The "laboratory" is intended for home or field use.—G. WEINGARTEN. *J. Chem. Educ.*, 17 (1940), 293–295. (E. G. V.)

Molecular Weights of Dark-Colored Organic Materials—Microdetermination of. A device is described which permits the microdetermination of molecular weights of dark-colored organic materials by measuring the depression of the freezing point of a pure solvent. This procedure, which has been used in this laboratory for the past two years, ensures the same accuracy, about 5%, as that obtained by measuring the depression of the melting point of the solvent. The freezing point procedure requires less time and manipulation than does the melting point procedure.—V. A. ALUISE. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 365–367. (E. G. V.)

Particle Size Studies. II. The Grain Size distribution of Bismuth Subsalicylate U. S. P. Grain size distribution in six samples of Bismuth Subsalicylate U. S. P. XI has been determined. The method was described in an earlier paper. Calculation was from Stoke's law according to falling velocities. In five of the samples tested, 80 per cent of the particles had a grain size less than 20 microns. One sample showed 90 per cent of particles of size less than 3 microns. It is concluded that the U. S. P. might describe Bismuth Subsalicylate as "an amorphous or microcrystalline powder in which not less than 80 per cent of the particles have a grain size smaller than 20 microns."—JOHN

J. CORCORAN and SISTER MARY ETHELREDA. *Jour. A. Ph. A.*, 30 (1941), 220. (Z. M. C.)

pH Values, Molarities and Dissociation Constants—Graphical Correlation between. Data are plotted for the following acids: acetic, aluminic, boric, butyric, carbolic, carbonic, citric, formic, fumaric, gluconic, glucose, lactic and oxalic.—N. PORGES and T. F. CLARK. *J. Chem. Educ.*, 17 (1940), 571-573. (E. G. V.)

Secalin—Physical Chemistry of. Electrophoresis and Diffusion Constant Studies of the Prolamine of Rye. The prolamine of rye grain was prepared and purified by two different methods and certain of its physical constants were determined. The diffusion constant calculated to the water basis at 25° was found to be 4.78×10^{-7} cm.^{2} per sec. (At 20°, $D = 4.3 \times 10^{-7}$ cm.^{2}/sec.) A calculation by means of sedimentation methods, using this value of "*D*" and an estimated value for the sedimentation constant, gave a molecular weight for secalin of approximately 40,000. Thus the predominant constituent of secalin seems to belong to the egg albumin molecular weight class of molecules. The ordinary isoelectric point for secalin as determined by electrophoretic mobilities was found to be at pH 6.67.—A. C. ANDREWS. *J. Am. Chem. Soc.*, 62 (1940), 942-948. (E. B. S.)

Surface-Active Agents. About 270 agents, manufactured in America and commercially available, are listed. The type of compound, use, industry and manufacturer are given.—ANON. *Ind. Eng. Chem.*, 33 (1941), 16-22. (E. G. V.)

Surface Areas—Determination of. The method consists of adsorbing a monomolecular layer of some gas, as nitrogen, on the surface of a weighed amount of material. Knowing the amount of nitrogen and the area of one molecule, the absolute area of the adsorbent can be calculated. The method is applicable to industrially important finely divided materials.—P. H. EMMETT and T. DEWITT. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 28-33. (E. G. V.)

Viscosity of Chocolate. The theory and technique of the MacMichael viscometer applied to determine the viscosity of chocolate have been examined. A modified Couette equation holds dimensionally for the MacMichael instrument. It is advisable to express viscosities in degrees MacMichael because of practical, commercial and logical considerations. A standard technique is described to embrace the entire range of chocolate viscosities on the same basis. The factors influencing viscosity are discussed—cocoa butter, lecithin, moisture, air, fineness and temperature. It is shown that besides saving cocoa butter, counteracting moisture and stabilizing chocolate, lecithin protects colloidal dispersion, especially when the chocolate is in the melted, heated or overheated state. Rheograms of chocolate show the influence of various factors on plastometric properties—for example, how the "yield stress" represents a numerical measure of "gumminess," and how the "body" represents a numerical measure of the equally elusive "coverage" of chocolate.—J. STANLEY. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 398-405. (E. G. V.)

Wetting and Frothing Agents—Preparation of. The agents are prepared by condensing 1,2,4-methyl phenyl diamine with at least one molecule of formaldehyde (*a*) in presence of excess of acid, or (*b*) in alkaline or neutral solution; the dried product of (*a*), or of (*b*) after treating with acid, is heated to not less than 70°.—F. POLLAK. Brit. pat. 519,710; through *J. Soc. Chem. Ind.*, 59 (1940), 515. (E. G. V.)

INORGANIC

Arsenic—Notes on the How Method for the Microestimation of. How (*Ind. Eng. Chem., Anal. Ed.*, 10, p. 226) divised a modification of the Gutzeit method suitable for estimating arsenic in amounts as low as 0.1γ. The present authors have given some notes as an aid to those who wish to employ the How method which is described as delicate but intricate. The notes are concerned with the zinc alloy, construction details of the wringer and standardization of the technique. Tables are given of the reproducibility of the stain lengths for 1γ or arsenic.—T. WILKINSON and C. G. GREENHAM. *Australian J. Exp. Biol. Med. Sci.*, 18 (1940), 341-342. (W. T. S.)

Calcium Nitrate from Strontium Nitrate—Separation of. Calcium nitrate is completely and easily separated from strontium nitrate by the use of the monobutyl ether of ethylene glycol. The hydrated strontium and calcium nitrates and the reagent are rendered anhydrous by boiling the nitrates in the reagent (b. p. 170.6° C.). The solubility of anhydrous calcium nitrate in the reagent is 2.43×10^{-1} Gm. per cc. while the solubility of the anhydrous barium and strontium nitrates in the anhydrous reagent is not more than that of strontium carbonate and barium sulfate in water. An analysis of 25 unknowns of the alkaline and alkaline earth groups, using 1 drop of the unknown solution of 0.1 *M* concentration, gave results 100% correct, and without uncertainty as to the presence or absence of the alkaline earth metals.—H. H. BARBER. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 572-573. (E. G. V.)

Calcium Phosphate, National Formulary VI—Study of the Composition of Precipitated. Analyses of several specimens which conformed with purity tests indicate that the formula for precipitated calcium phosphate, $Ca_3(PO_4)_2$, given in National Formulary VI and in the French Codex are in error. Apparently $(Ca_3(PO_4)_2)_3.Ca(OH)_2$ more nearly agrees with the true composition.—J. W. MILLAR. *Jour. A. Ph. A.*, 30 (1941) 139. (Z. M. C.)

Ephedrine—Review of Tests for. This paper briefly discusses the discovery and synthesis of ephedrine, its structure and sources. Tests, physical, macrochemical and color are considered at greater length. Experimental details reported include materials used, technique, tests with gold chloride, platinic chloride, Krauts or Dragendorff's Reagent (Potassium Bismuth Iodide), potassium iodide, picric acid, potassium thiocyanate, potassium oxalate, sodium perchlorate, sodium vanadate and finally a salting out. The authors conclude that of the numerous acceptable tests devised, the color and microscopic methods seem to be the best means of identification. The U. S. P. XI biuret reaction and the osmic tetraoxide reagent seem to give the best color tests. Microcrystalline precipitates form slowly, but identification may be made through the micro tests with Dragendorff's Reagent, platinic chloride reagent and potassium oxalate. A combination of these tests may be used to distinguish *l*-ephedrine from ephetonin, the pseudo-ephedrine and adrenaline.—MARGARET AIRSTON and EDWARD S. BRADY, II. *Jour. A. Ph. A.*, 30 (1941), 135. (Z. M. C.)

Elements—Historical and Industrial Discovery of. The elements discussed include scandium, gallium, germanium, yttrium and the rare earths.—J. H. FRIEND. *Chemistry and Industry*, 60 (1941), 194-197. (E. G. V.)

Formic Acid—Method for Determining, in the Presence of Formaldehyde. The authors have developed a method for determining formic acid in the presence of excess formaldehyde in solutions con

taining inorganic acids or alkalis. The formaldehyde is removed by precipitation as trithioformaldehyde with H_2S in a strongly acid solution and then the formic acid determined by oxidation with alkaline permanganate. The conditions necessary for the analysis are defined.—A. HICKLING and F. RODWELL. *J. Chem. Soc.*, (1941), 51–52. (W. T. S.)

Liquid Ammonia Research. A review.—G. W. WATT and N. O. CAPPEL. *J. Chem. Educa.*, 17 (1940), 274–281. (E. G. V.)

Microchemical Kits. The outfitting of a machinist's chest is described.—R. C. COOL. *J. Chem. Educ.*, 17 (1940), 283–286. (E. G. V.)

Qualitative Chemical Analysis—Scheme for, Employing Spot Tests. The tests for metallic radicals follow the usual group separations. The tests are carried out by spotting on a strip of pure filter paper, with a spot plate, or in small test tubes.—W. C. DAVIES. *J. Chem. Educ.*, 17 (1940), 231–234. (E. G. V.)

Radioactivity and the Periodic Table. A discussion of the study of atomic structure and isotope in elementary chemistry.—J. F. KING and P. H. FALL. *J. Chem. Educ.*, 17 (1941), 481–482. (E. G. V.)

Sodium Pyrophosphate and Phosphomolybdic Acid—Revised Reagent Monographs for.—GLENN L. JENKINS and W. THOMAS SPAIN. *Bull. Natl. Formulary Committee*, 9 (1941), 184. (H. M. B.)

Sulfur—Plastic and Allotropic Forms of. The equilibrium relationships and properties of the various forms of sulfur are discussed.—H. F. SCHAEFER and G. D. PALMER. *J. Chem. Educ.*, 17 (1940), 473–475. (E. G. V.)

Water and the Water Molecule—Structure of. Evidence seems to indicate that the water molecule consists of a large negative oxygen ion in which two positive hydrogen ions are deeply imbedded. Each concentration of charge is capable of forming an electrostatic bond with another of an opposite sign in a neighboring molecule. Thus four molecules arrange themselves into a tetrahedron.—F. S. LLEWELLYN. *Chemistry and Industry*, 59 (1940), 619–622. (E. G. V.)

Zinc Sulfide—Precipitation of, from a Solution of Ammonium Citrate and Citric Acid. For the separation of zinc the formate-formic acid buffer is not necessary, since a mixture of ammonium citrate and citric acid serves not only to keep iron in solution but as an efficient buffer. Zinc cannot be determined by weighing as zinc sulfide.—S. A. COLEMAN and G. B. L. SMITH. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 377–380. (E. G. V.)

ORGANIC

Alkaloids

Absorption Spectrophotometry in Pharmaceutical Analysis. III. The following procedure is given for the determination of morphine in a pill containing 0.1 gr. of morphine: One pill was dissolved in 25 cc. of water and 2 Gm. of calcium hydroxide was added. The extract was filtered after thirty minutes, and 15 cc. of the extract shaken with 10 cc., 5 cc. and 5 cc. of chloroform. The bulked chloroform washings were washed with 2 cc. and 1 cc. of lime water, and the washings added to the lime water extract; 1.0 Gm. of ammonium sulfate was added and the liberated morphine extracted thoroughly with chloroform-isobutyl alcohol mixture. The extract was evaporated and dissolved in sufficient 1*N* sodium hydroxide so that the final concentration represented 1 pill in 500 cc. The absorption curve of this solution was determined by the procedure reported earlier (*Pharm. J.*, 143 (1939), 92). For the calculation the flat portion of the absorption curve of morphine in 1*N* sodium hydroxide between 245 and 252 mμ ($E^{1\%}_{1\,cm.}$ = 260) as given earlier (*Quart. J. Pharm. Pharmacol.*, 13 (1940), 219) was used. The result obtained was 0.34 corresponding to $\frac{0.34 \times 5}{0.26}$ = mg. of morphine per pill, equivalent to 0.102 gr. of morphine, which represents 1.02 gr. of powdered opium per pill. Other substances examined are ethinyl testosterone, 2-methyl-1,4-naphthoquinone and its diacetate, aneurine hydrochloride (vitamin B_1), with procedures for tablets and triturates of aneurine hydrochloride, and sulfanilamide and some of its derivatives. Detection of teaseed oil in olive oil by this method is not recommended.—W. F. ELVIDGE. *Quart. J. Pharm. Pharmacol.*, 14 (1941), 135–148. (S. W. G.)

2-Acetyl-1-Methylpyrrolidine Not Identical with Bellaradine. 2-Acetyl-1-methylpyrrolidine was synthesized by this series of reactions: proline → betaine stachydrine → methyl hygrate → ethyl-1-methylpyrrolidoyl-2-acetate. On comparison with bellaradine, an alkaloid of Bulgarian belladonna, it was found to be not identical.—HAROLD KING. *J. Chem. Soc.*, (1941), 337–339. (W. T. S.)

Alkaloidal Nicotinates. Therapeutical nicotinates are prepared of cinchona alkaloids such as quinine, cinchonidine and hydroquinone.—THOS. K. THOMAS, EDWIN DOWZARD and LEO FLEXSER, assignors to THE NEW YORK QUININE & CHEMICAL WORKS. U. S. pat. 2,230,631, Feb. 4, 1941. (A. P.-C.)

Alkaloidal Products—Obtaining from Species of Erythrina. A process for the production of a physiologically active alkaloid fraction from species of *Erythrina* involves removing any fats present in parts of the species, extracting the parts with a substance selected from the group consisting of lower aliphatic alcohols, water and aqueous lower aliphatic alcohols, concentrating the extract at about 40° to 50° C. and 10 to 20 mm. when lower aliphatic alcohols are used and at about 25° to 30° C. in vacuum when water or aqueous lower aliphatic alcohols are used, adding water to the concentrate when lower aliphatic alcohols are used, acidulating the aqueous mixture with hydrochloric acid at the ratio of about 2 cc. of concentrated hydrochloric acid to 100 Gm. of *Erythrina* parts, clarifying the acidulated aqueous extract with petroleum ether and then with chloroform, making the clarified extract weakly alkaline and exhaustively extracting with chloroform to obtain the physiologically active alkaloidal fraction.—KARL FOLKERS, assignor to MERCK and CO., INC. U. S. pat. 2,226,528, Dec. 24, 1940. (A. P.-C.)

Alkaloids with Bromocomplexes of Some Heavy Metals—Salts of. It is known that dilute brucine sulfate solution and potassium bromide with a trace of cadmium salt cause separation of a white double bromide while copper, aluminum, iron, chromium and chloride give no precipitate. Preliminary experiments suggested that an investigation of these precipitates might lead to microanalytical reactions of value. Reference is made to the analytical literature on the use of iodides of mercury, cadmium, bismuth, antimony, zinc and other metals for the determination of basic nitrogen compounds, especially alkaloids. The property of forming sparingly soluble complexes of the type $HgBCl_2$ is one of most nitrogen compounds. Properties of other chlorosalts are mentioned. Some mercuric bromide complexes and mercury, gold and platinum bromosalts of the same general properties as the chloroanalogs have been recorded. During the present work certain of the mercuric bromide complexes have been obtained insoluble in excess bromide. Bromosalts, their properties and formation by metals and alkaloids, are reported in detail as well as experimental details.

In the cadmium salts the following alkaloids were used: brucine, quinine, cinchonine, cinchonidine, sparteine, tropacocaine, narcotine, hydrastinine, cotarnine, veratrine. In the mercury salts the following alkaloids were used: brucine, quinine, cinchonine and sparteine. Lead salts were prepared with brucine and tropacocaine. Bismuth salts were prepared with brucine, quinine and veratrine. Brucine and quinine were used in antimony salts.—E. P. WHITE. *Jour. A. Ph. A.*, 40 (1941), 156. (Z. M. C.)

Arecoline Hydrobromide—Report on the Determination of. From a study of the physical and chemical properties of arecoline and its hydrobromide the three following possibilities of assay are worthy of investigation: (1) steam distillation; (2) extraction from alkaline solution with a volatile solvent and titration of the extracted alkaloid; (3) precipitation with silicotungstic acid in a manner similar to the official A. O. A. C. method for assay for nicotine.—HENRY R. BOND. *J. Assoc. Official Agr. Chem.*, 23 (1940), 764. (A. P.-C.)

Atropine, Ephedrine, Epinephrine and Procaine—Certain Salts of. Necessity for reduction of acidity of solutions of hydrochlorides, hydrobromides and sulfates of physiologically active bases could be avoided if salts of weak acids were available. To be useful, such salts must be stable either in the solid state or in an aqueous solution or both. So studies along this line were undertaken. Theoretical phases of the question are discussed and experimental work reported in detail. The authors summarize their findings as follows: "Solutions of salts of four physiologically active bases were prepared by exact neutralization with weak acids after it was shown that recrystallization from water solution failed to yield satisfactory salts. Potentiometric titration curves are shown for the formation of aspartates, glutamates and levulinates of atropine, ephedrine, epinephrine and procaine. Similar curves are shown for the neutralization of atropine, ephedrine and procaine with primary sodium phosphate and for the neutralization of ephedrine with nicotinic acid. The calculated pH values for the equivalent point of each titration are in good agreement with the values read from the curves. The products prepared by evaporating the salt solutions to dryness did not in all cases redissolve in distilled water to give solutions having the original pH. The possible significance of some of these changes is discussed. The approximate solubilities and certain general properties of these products are given. Atropine and procaine salts of the weak acids studied are deliquescent but those of ephedrine appear to possess desirable properties. Melting points of the ephedrine salts are recorded and pure ephedrine levulinate, prepared by sublimation, is described.—FRANK M. GOYAN and T. C. DANIELS. *Jour. A. Ph. A.*, 30 (1941), 98. (Z. M. C.)

Bulgarian Belladonna Root—Alkaloids of. A study of Bulgarian belladonna root was undertaken in view of its claimed superiority over other belladonnas in treating paralysis agitans (Parkinsonism). The alkaloids were isolated by percolation with ammoniacal alcohol. Fractionation was accomplished by titrating with a standard acid to neutrality and then adding aliquot portions of standard alkali in the presence of an immiscible solvent as ether or chloroform. The alkaloids were thus liberated to the solvents in the order of their increasing basicity. In this way *l*-hyoscyamine, *l*-hyoscine, tropine and bellaradine were found. Bellaradine, found for the first time, forms a sparingly soluble picrate, has formula $C_6H_{13}ON$, and is water soluble. The base, an oil with a tropine-like odor, is tertiary and gives the Runge's pine splinter test when heated with Zn, indicating a pyrrole nucleus. It was not claimed that samples of belladonna root of other origin do not contain tropine or bellaradine nor was it suggested that Bulgarian belladonna owes its beneficial action in Parkinsonism to these bases.—HAROLD KING and LANCELOT L. WARE. *J. Chem. Soc.*, (1941), 331–337. (W. T. S.)

Caffeine—Report on the Determination of. In the purification of contaminated caffeine recovered from mixtures, the caffeine can be recovered quantitatively by precipitation with Wagner's reagent provided the solution is sufficiently acid at the time of precipitation; if the acidity is too low, precipitation is incomplete even at refrigerator temperature. Certain plant extractives cannot be completely eliminated by precipitation of the caffeine with Wagner's reagent, and results are high when these extractives are present.—JOHN R. MATCHETT. *J. Assoc. Official Agr. Chem.*, 23 (1940), 768–773. (A. P.-C.)

Cinchona Alkaloids—Modified. VIII. Niquine. A report of the continuation of a study devoted to determining the structures of certain transformation products of cinchona alkaloids.—WILLIAM SOLOMON. *J. Chem. Soc.*, (1941), 77–83. (W. T. S.)

Ephedrine in Jellies—Report on the Determination of. There is no reason for adopting a method for the assay of ephedrine in jellies differing from the method used for other preparations of this alkaloid. In the A. O. A. C. method, the use of "moderate heat" in evaporating the ether means that the temperature of the ether must not rise appreciably above room temperature, nor fall enough below such temperature as to cause any appreciable condensation of water.—E. H. GRANT. *J. Assoc. Official Agr. Chem.*, 23 (1940), 767–768. (A. P.-C.)

Ephedrine—Solubility of, in Liquid Petrolatum. Water content has a marked effect on the degree of solubility of ephedrine. The U. S. P. permits use of hemihydrate or anhydrous. The present paper reports solubility at 25° C. and also at 20° C. Details of experiments are reported. Using hemihydrate the average solubility at 20° C. was found to be 0.84 Gm. of anhydrous ephedrine to 100 cc. of solution; using anhydrous ephedrine the solubility at 20° C. was found to average 2.235 Gm. to 100 cc. of solution. Light liquid petrolatum was used. When hemihydrate and light liquid petrolatum were used the average solubility at 25° C. was 1.242 Gm. of anhydrous ephedrine to 100 cc. of solution; using the anhydrous ephedrine, average solubility was 3.133 Gm. to 100 cc. of solution. Using heavy liquid petrolatum, the average solubilities were reduced to 1.11 Gm. with hemihydrate and 2.873 Gm. with anhydrous. The difference in degree of solubility between 20° and 25° is noteworthy. It was observed also that anhydrous ephedrine melts at about 34° C. but the hemihydrate melts at about 40° C.—JOSEPH ROSIN, G. K. EGER and HARRY MACK. *Jour. A. Ph. A.*, 30 (1941), 275. (Z. M. C.)

Ergot—Chemical Assay of. Notes on Extraction and Decomposition of Alkaloids. The following summary is given: Continuous extraction of ergot with methylene dichloride does not completely extract the alkaloids. Shaking ergot with a menstruum of ammoniacal acetone does not completely extract the alkaloids. The alkaloids of ergot are completely extracted by continuous extraction with anesthetic ether, the time occupied being usually four to five hours. During the continuous extraction of ergot with ether for five hours, about 2% of the alkaloids are decomposed.—C. H. HAMPSHIRE and M. W. PARTRIDGE. *Quart. J. Pharm. Pharmacol.*, 14 (1941), 116–122. (S. W. G.)

Ergometrine and Ergotoxine—Determination of, in Ergot and Its Liquid Extract. A rapid determination of ergometrine and ergotoxine is described, in which the total alkaloids are extracted by

maceration and suction percolation with ammoniacal acetone, followed by a similar treatment with a mixture of ether and an aqueous suspension of magnesium oxide. After transference of the total alkaloids to a aqueous solution of tartaric acid, the ergotoxine is separated by extraction with ether after adjusting the reaction of the aqueous solution to pH 5.5. The ergometrine which remains in the aqueous layer is transferred to a solution of smaller volume, and both alkaloids are finally determined colorimetrically. The method has also been applied to the assay of liquid extract of ergot. It gives higher results for the total alkaloidal content to the liquid extract than the pharmacopœial method, for in a sample tested this figure was found to be 0.060% as ergotoxine by the official assay and 0.070% when tested by the procedure described. This difference is to be expected, since in the method of the Pharmacopœia some ergometrine must be lost when the ether extract is washed with water.—N. L. ALLPORT and N. R. JONES. *Chemist and Druggist*, 134 (1941), 252. (A. C. DeD.)

Ergometrine—Quantitative Separation of, from Other Ergot Alkaloids. Since the discovery of ergometrine (ergonovine) and recognition of its therapeutic importance, the need of a quantitative method for its determination has been imperative. Alkaloids of ergot occur in isomeric pairs and five pairs have been isolated and identified. One isomer in each pair is physiologically active. Separation of water-soluble alkaloids has been accomplished by a number of workers but none of these methods will do for quantitative separation of ergometrine from its inactive isomer, ergometrinine. So, first experimental work was an attempt to separate them. Attempts to precipitate one of the alkaloids did not meet with success. The manner in which the two alkaloids distribute themselves between water and various immiscible solvents was studied. A considerable number of immiscible solvents were tried and details of this experimental work with tabulations of results are reported. The method adopted starts with a 1 per cent tartaric acid solution of the alkaloids, adds ammonia to make it alkaline, shakes with ether for three minutes by hand. The aqueous layer is separated and shaken with ether and the same procedure carried out a third time. This whole process is repeated with six successive portions of weak ammonia water. Aqueous extracts are combined, dissolved ether removed by slightly warming, volume reduced and alkaloids determined colorimetrically. All details must be strictly adhered to. About 98 to 99 per cent of ergometrine will be recovered and about 5 per cent of the erogmetrinine will come through. Efforts are being made to adapt the separation method to the assay of ergot. It is hoped this method will result in agreement between chemical and biological assays.—DONALD C. GROVE. *Jour. A. Ph. A.*, 30 (1941), 260. (Z. M. C.)

Ergonovine in Ergot and Its Fluidextract—Biologic and Colorimetric Assay of. Ergonovine is water-soluble and acts promptly when given by mouth. It is extensively used. The present paper deals with chemical separation and physiological assay of ergonovine in ergot itself and in the fluidextract. With pure ergonovine, the isolated rabbit's uterus method gives reliable figures but it is of little value if water-insoluble (ergotoxine-like) alkaloids are present. Because of the antagonism between ergonovine and ergotoxine, the Brown-Clark Method and the U. S. P. Cock's Comb method are useless in differentiating the mixed alkaloids. Other methods are also unreliable. A logical procedure would be chemical separation of the alkaloids and this has been attempted. Essentially the method involves dissolving the ergonovine out with acetone-tartaric acid-water solution and leaving behind the water-insoluble alkaloids (ergotoxine-like). Thirty-seven lots of crude ergot and thirty-six commercial fluidextracts of ergot were studied. Evaluation of ergonovine was more accurate than the ergotoxine-like group. The colorimetric method gave higher values than biological methods on the average, in the potency tests. The isolated rabbit's uterus was used for ergonovine and the Broom-Clark method for the ergotoxine-like alkaloids. In isolating ergonovine maleate commercially, this method has been of value in the selection of the crude ergot and in estimating yield to be expected.—C. E. POWELL, O. W. REAGAN, ASA STEVENS and EDWARD E. SWANSON. *Jour. A. Ph. A.*, 30 (1941), 255. (Z. M. C.)

Iodocinchonidine Sulfate. A solution of cinchonidine sulfate in ethanol is mixed with a solution of iodine in propyl alcohol and the temperature is lowered sufficiently to effect crystallization of the product.—ALVIN M. MARKS. U. S. pat. 2,226,568, Dec. 31, 1940. (A. P.-C.)

Lupine Studies. XVI. The Isolation of Nonalupine from Lupinus Andersonii Wats. Nonalupine has now been isolated from *L. andersonii*, a perennial Pacific States lupine, which has not previously been examined chemically. Spathulatine was not found in this species.—J. F. COUCH. *J. Am. Chem. Soc.*, 62 (1940), 986–987. (E. B. S.)

Lupinus Caudatus Kellogg—Phytochemical Study of. An alkaloid, monolupine, the monomethyl ether of inosital or pinite and an unidentified high molecular weight wax alcohol were isolated. Tests for tannins, phenols, a plant acid and a carbohydrate were obtained—TAITO O. SOINE and GLENN L. JENKINS. *Pharm. Arch.*, 12 (1941), 65–71. (H. M. B.)

Metals and Alkaloids—Bromo Complexes for the Identification of. Conditions are described for the use of bromometallic salts of alkaloids, sparingly soluble in bromide solution, as micro-analytical tests for the metals of the mercury, cadmium, bismuth, antimony, lead and tin groups, or as tests for alkaloids of certain tertiary types. Such salts are often beautifully crystalline and characteristic in appearance. Likely sources of interference are discussed, and concentration limits are given for alkaloids and for metals. Several reactions of special significance are indicated. Application of the tests to mixtures has not been studied.—E. P. WHITE. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 509 511. (E. G. V.)

Morphine Determination in Opium. The authors present a modification of their 1937 method of determining morphine. Very explicit and detailed directions are given for carrying out the procedures. Each new step is thoroughly controlled with blank determinations and the results are tabulated. This improvement of the method involves a filtration of the chloroform-isopropanol solution of the crude morphine through a layer of aluminum oxide. This step removes substances present in the extract which tend to reduce the complete precipitation of the purified morphine without retaining any morphine. The values for morphine content so obtained are more exact and higher than by the old method. The method is good but requires too much time. A new and shortened method is developed which involves the following improvements. In the preparation of the calcium hydroxide extract of the opium, manganese sulfate is added for the purpose of removing troublesome extractive material. The bulk of the accompanying non-phenolic alkaloids are removed by extraction of the lime extract with a benzene-carbon tetrachloride mixture. After the addition of ammonium sulfate to the lime extract, the morphine is extracted with chloroform-isopropanol. The extract is then filtered through aluminum oxide and the morphine purified by precipitation as before and then titrated. The new method gives the same

results as the 1939 method but is simpler and more rapid. It can be used as a standardization procedure. A method for homogenizing the crude opium prior to the removal of a sample for assay and of determining moisture is also given. Several corrections to previous publications by the authors on this determination are listed.—R. EDER and E. WÄCKERLIN. *Pharm. Acta Helv.*, 15 (1940), 227–256. (M. F. W. D.)

Nicotine and Its Compounds—Distribution of, between Water and Vegetable Oils. The distribution of nicotine and several of its compounds between water and a number of vegetable and other oils has been determined at two concentrations in order to estimate the suitability of these combinations for insecticidal sprays. Most of the vegetable oils, particularly those with free alcohol groups, hold more nicotine than the mineral oils. The nicotine compounds give a less favorable distribution than free nicotine but tend to shift less toward the water with increasing concentration. The vegetable oils and a few of the nicotine compounds offer some advantage over mineral oil in the distribution of nicotine between the components of the spray, but this advantage is too small to be a deciding factor unless these materials show additional desirable properties.—L. B. NATON. *Ind. Eng. Chem.*, 33 (1941), 812–813. (E. G. V.)

Physostigmine Salicylate—Report on the Determination of. A collaborative study of the determination of physostigmine salicylate in tablets by extraction with chloroform from sodium bicarbonate solution, evaporation of the solvent, addition of excess fiftieth-normal sulfuric acid and titration with fiftieth-normal sodium hydroxide in presence of methyl red indicator (technique described in detail), gave recoveries of only 93.9% to 98.8% (average 96.1%).—GEO. M. JOHNSON. *J. Assoc. Official Agr., Chem.*, 23 (1940), 762–764. (A. P.-C.)

Quinine—Alkaloidal Values of. The crystalline alkaloids of cinchona are quinine and cinchonine and their isomers quinidine and cinchonidine. The amorphous alkaloids are of secondary importance and are found in smaller quantity in the bark. A study was made of twenty-two samples of cinchona alkaloids from four different species of bark. Determinations of total alkaloids were made by a volumetric method using silicotungstic acid. Alkaloids were extracted with dilute hydrochloric acid neutralized with ammonia and then extracted with chloroform which was distilled. The weight of the alkaloids crystallized from this was subtracted from the weight of the total alkaloids giving the weight of the amorphous alkaloids. A representative proportion is: Total alkaloids 4.76, quinine 1.29, quinidine 0.08, cinchonine 1.25, cinchonidine 1.61, amorphous alkaloids 0.53.—ALOISIO FERNANDES COSTA. *Noticias Farm.*, 7 (1940–1941), 173. (G. S. G.)

Quinine and Some of Its Salts—Optical Activity of. Data are presented to show the variation in optical activity of quinine as a free base, dihydrochloride and sulfate in mixtures of water and ethyl alcohol, and the variation as the free base is progressively neutralized with hydrochloric and sulfuric acids, each in that water-alcohol solution which gives the maximum rotation for each salt.—J. C. ANDREWS and B. D. WEBB. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 232–233. (E. G. V.)

Sprekela Formosissima—Chemical Study of. It is an herb of the amaryllidaceae family and has no alkaloids. The sample studied was dried, powdered and precipitated with reagents for alkaloids, but this precipitate was insoluble in alcohol. It was found to contain 13.50% water, its fusion point was 65°, saponification was incomplete after five hours. The sulfuric ether extract, soluble in ether, chloroform, carbon sulfide and benzol, contains an acid resin and a small amount of coloring.—JUAN ROCA. *Quim. Farm.*, 6 (Sept. 1940), 2. (G. S. G.)

Essential Oils and Related Products

Essential oils—Testing, for Heavy Metals. The detection of 0.0004% zinc, 0.001% copper and 0.003% lead in essential oils, with application of only 0.25–0.5 cc. of sample, is effected by direct addition of a 6 mg. % dithizone solution in carbon tetrachloride to a dilution of the essential oil in carbon tetrachloride in the ratio of 1:1. The disturbing influence of old oxidized oil is excluded by the addition of a small amount of pyrogallol. The method compares favorably with the sodium sulfide of the DAB 6 and the usual microanalytical dithizone method with aqueous metal salt solutions.—L. FUCHS and E. SOOS. *Deut. Apoth. Ztg.*, 56 (1941), 317–319; through *Chem. Abst.*, 35 (1941), 5640. (H. M. B.)

Mexican Linaloe Oil. The botany, production and distillation of the plant are described. The constants of the wood oil and the seed oil are, respectively: sp. gr. at 15° C. 0.883–0.889, 0.885–0.888; optical rotation −7° 16′ to −12° 1′, +2° 4′ to +3° 10′; refractive index 1.4587–1.4610, 1.4641–1.4650; ester content calculated as linalyl acetate 13.7–27.1%, 13.9–18.6%; solubility (of wood oil) at 20°, clearly soluble in 4–5 volumes and more of 60% alcohol; seed oil soluble in 5 volumes or more of 60% alcohol; acid value of seed oil up to 3.1. Chemical constituents are reviewed.—ERNEST S. GUENTHER. *Drug and Cosmetic Ind.*, 49 (1941), 146–150, 161. (H. M. B.)

Oil of Sandalwood—East Indian. A review of constituents, physical and chemical constants, adulterants including cedarwood oil, guaiacwood oil, West Indian, West Australian and East African sandalwood oils, synthetic isolates, and aromatic chemicals as well as uses.—ERNEST GUENTHER. *Drug and Cosmetic Ind.*, 48 (1941), 468–469. (H. M. B.)

Oleum Terebinthinæ and the Testing of Essential Oils for Heavy Metals Via the DAB 6.—LEOPOLD FUCHS and ERICH SOOS. *Deut. Apoth. Ztg.*, 56 (1941), 80; through *Chem. Abstr.*, 35 (1941), 5640, 6388. (H. M. B.)

Peppermint Oil—Menthol Content of. The method of Swedish Phar. X for determination of menthol content of peppermint oil was studied. This is the classic method for determining alcohols in ethereal oils by acetylation with acetic anhydride and anhydrous sodium acetate, separation, washing and quantitative saponification with alcoholic potash. The variation of saponification rate (with temperature) of acetylated peppermint oil, menthyl acetate, terpenyl acetate and of two acetylated synthetic oil mixtures of menthol, terpineol and xylol, was studied. Comparing the Swed. Phar. method with that of the French Phar. 1937 (Delaby and Sabetay's method of acetylation in pyridine solution) it was found that the method of the Swed. Phar. did not determine only menthol, but determined terpineol quantitatively as so much menthol, while the pyridine acetylation method gave the true menthol content. It was found that peppermint oils bought on the Swedish market in 1939 contained terpineol and that their true menthol content was below pharmacopœial requirement. Hence the French Phar. method of analysis is recommended, together with a determination of the ester menthol content.—A. ÅGREN and E. BENGTSSON. *Farm. Revy*, 40 (1941), 157, 173. (C. S. L.)

Perfumes and Essential Oils—Fluorescence of, under Filtered Ultraviolet Light. The quartz lamp

is not suitable for the testing of perfumes, as most of them are not luminescent or exhibit only a slight blue or violet fluorescence, the evaluation of which is largely dependent on the subjective impression of the observer.—A. MÜLLER. *Deut. Parfüm.-Ztg.*, 26 (1940), No. 4, 37–40; through *Chimie & Industrie*, 44 (1940), 149. (A. P.-C.)

Tyrolean Oil Pinus Pumilio Haenke (Oil Pinus Montana Miller) Fam. Pinaceæ and Oil Abies Alba Miller (Oil Abies Pectinatia D. C.) Fam. Pinaceæ—A Critical Study of the Physico-Chemical Properties of Tyrolean. Because shipments of these oils of guaranteed purity differed considerably from the accepted standards a critical study was undertaken. Many samples were tested and results are tabulated and discussed. The authors conclude that the limits set forth in the literature should be revised. New standards are recommended.—CHARLES H. GRIMM, EDWARD E. LANGENAU and ERNEST S. GUENTHER. *Jour. A. Ph. A.*, 30 (1941), 209. (Z. M. C.)

Volatile Oil in Cassia Bark. Based upon the appearance of the bark, the characteristics of their volatile oil content and their geographic origin cinnamon can be grouped into 7 rather definite classes. Photographs of each of these classes are reproduced. The yields and characteristics of the volatile oil (determined by the A. O. A. C. methods) obtained from many shipments of these barks received at New York over the course of 6 years are as follows: *Saigon cassia:* yield 1.5 to 4.0% vol./wt., specific gravity at 25° C. 1.047 to 1.057, optical rotation at 25° C. 0.0° to −0.6°, refractive index at 20° C. 1.605 to 1.612, aldehyde 90 to 98, acid no. 2.2 to 10.1, ester no. 100 to 230. *Honan cassia:* yield 2.0 to 3.1%, specific gravity at 25° C. 1.043 to 1.051, optical rotation at 25° C. 0.0° to −0.6°, refractive index at 20° C. 1.605 to 1.614, aldehyde 96 to 98, acid no. 6.7 to 11.8, ester no. 28.5 to 47.3. *China cassia:* yield 0.75 to 1.5%, specific gravity at 25° C. 1.043 to 1.052, optical rotation at 25° C. 0.0° to −1.0°, refractive index at 20° C. 1.606 to 1.611, aldehyde 95 to 97, acid no. 3.9 to 14.9, ester no. 39 to 130. *Kwongsai cassia:* yield 0.8 to 1.49, specific gravity at 25° C. 0.983 to 1.051, optical rotation at 25° C. 0.0° to −3.5°, refractive index at 20° C. 1.553 to 1.614, aldehyde 60 to 98, acid no. 0.9 to 8.4, ester no. 12.8 to 56.1. *Korintji cassia:* yield 1.0 to 2.5%, specific gravity at 25° C. 1.025 to 1.038, optical rotation at 25° C. −2.7° to −4.8°, refractive index at 20° C. 1.587 to 1.600, aldehyde 88 to 92, acid no. 5.2 to 10.8, ester no. 49.8 to 99.7. *Batavia cassia:* yield 0.6 to 1.9%, specific gravity at 25° C. 1.023 to 1.034, optical rotation at 25° C. −1.4° to −4.8°, refractive index at 20° C. 1.582 to 1.596, aldehyde 78 to 90, acid no. 3.9 to 10.0, ester no. 63 to 131. *Ceylon cinnamon:* yield 1.2 to 1.3%, specific gravity at 25° C. 1.017 to 1.030, optical rotation at 25° C. 0.0° to −0.7°, refractive index at 20° C. 1.579 to 1.589, aldehyde 66 to 76, acid no. 3.98 to 10.0, ester no. 127 to 145. Oil cassia buds were also analyzed with the following results: yield 0.8 to 1.6%, specific gravity at 25° C. 1.032, to 1.047, optical rotation at 25° C. 0.0° to −1.0°, refractive index at 20° C. 1.595 to 1.610, aldehyde 87 to 97, acid no. 2.7 to 7.8, ester no. 27 to 82. The volatile oil obtained from these barks and buds must not be confused with the volatile oil official in the U. S. P. XI as oil of cinnamon which is obtained from the leaves and stems of *Cinnamomum cassia.*—J. F. Clevenger. *J. Assoc. Official Agr. Chem.*, 24 (1941), 461–464. (A. P.-C.)

Volatile Oils Lighter than Water—Steam Distillation of Small Quantities of. Insert a graduated tube, conveniently a part of a broken buret, open at both ends, in the neck of the separatory funnel by means of a cork which has a slit to permit air to escape. The tube should reach nearly to the bottom of the funnel and sufficient water be added to cover the bottom opening. The adapter attached to the condenser should lead into the top of the graduated tube. Distill in the usual manner. As volatile oils lighter than water float on the surface, the oil distilled over will always remain in the graduated tube and the water will rise in the funnel. As water is collected, remove it from the funnel by opening the stop-cock, taking care that the water level is never below the bottom of the graduated tube. Continue the distillation until the oil is all distilled over. This point is easily found, as the volume of oil can be read at any time during the distillation. Finally, read the volume of the oil in the tube, drain off the water completely and collect the oil, which is now in the separatory funnel, for further examination.—F. M. BIFFEN. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 422–423. (E. G. V.)

Glycosides, Ferments and Carbohydrates

Adonis Vernalis—Isolation of a Crystalline, Cardioactive Glycoside from, and Its Identification as Cymarin. A sample of "Adovern" a Hoffmann-La Roche product consisting of a glycoside mixture obtained from *Adonis vernalis* was separated into a water-soluble and a chloroform-soluble portion. The crude glycoside from the chloroform solution when passed through a column of aluminum oxide and eluted yielded a pure glycoside melting 132° (from methanol). The material was highly active and accounted for practically all of the activity of the crude chloroform soluble glycoside. The material was identified as cymarin. It held methanol and water of crystallization quite tenaciously and had to be dried very carefully before analysis. Hydrolysis of the glycoside with dilute sulfuric acid yielded a crystalline aglycone melting 136–138°, remelting 220–230° on a melting point block and a sugar melting 88° and which was identified as cymarose. The analysis of the aglycone indicated an empirical formula of $C_{23}H_{32}O_6$ which is the same as that for strophanthidin. The optical rotation also agreed with that reported for strophanthidin. However, the melting point reported for strophanthidin is 170° with frothing, and the anhydrous material was reported to melt 235°. When the melting point of the aglycone was determined in a tube in the usual method, it also gave a m. p. of 170° with frothing. It gave no depression of melting point when mixed with strophanthidin, and the acetate and iso-compounds likewise were identical. The glycoside and its acetate were identical with authentic samples of cymarin and its acetate.—T. REICHSTEIN and H. ROSENMUND. *Pharm. Acta Helv.*, 15 (1940), 150–159. (M. F. W. D.)

Almond Emulsin—Action of, on Phenyl Glycosides of Synthetic Sugars and on β-Thiophenyl *d*-Glucoside. The action of enzymes of almond emulsin on the phenyl glycosides of a number of sugars which are not naturally occurring has been investigated. The sugars used were synthetic heptoses (*d*-α-mannoheptose and *d*-α-glucoheptose) and *d*-talose. The results obtained indicate that almond emulsin does not hydrolyze all glycosides but instead only the glycosides of naturally occurring sugars or of sugars which may be considered to be derived from these sugars by a simple substitution outside of the pyranose ring. In the ordinary glucoside the two parts are connected through an oxygen atom. It has not been found that the substitution of this oxygen by sulfur atom reduces the hydrolytic action to such an extent that it cannot be readily measured. The resistance of the β-thiophenyl *d*-glucoside to emulsin hydrolysis seems to be related to its resistance to acid hydrolysis and may possibly be due to a bonding of the S atom of the glucoside to the enzyme in a way to prevent hy-

drolysis.—WILLIAM WARD PIGMAN. *J. Research Natl. Bur. Standards*, 26 (1941), 197–204. (W. T. S.)

Almond Emulsin on α-Phenyl-*d*-lyxoside—Action of. The preparation of α-phenyl-*d*-lyxoside is reported. This substance is hydrolyzed by almond emulsin. The rate is the slowest reported for a hydrolyzable phenyl glycoside. The enzyme responsible for the hydrolysis is shown to be α-mannosidase. A prediction is made of the specificity to be expected of the enzymes found in almond emulsin and of other similar enzymes.—W. W. PIGMAN. *J. Am. Chem. Soc.*, 62 (1940), 1371–1374. (E. B. S.)

Bromelin. The fate of bromelin, the proteolytic enzyme of pineapple juice has been followed throughout the factory operations of pineapple canning. The enzyme appears in the juice and is there remarkably resistant to heat. A method is suggested which laboratory experiments only have indicated might be used to recover bromelin from low-grade juice without decreasing the yield of alcohol. The curious behavior of bromelin toward heating and alkali has been studied, and it was found that the activity of a bromelin preparation at a fixed pH depended upon the pH at which the preparation was held. The facts appear to be best explained by the assumption that the enzyme protein easily undergoes reversible denaturation.—A. K. BALLS, R. R. THOMPSON and M. W. KIES. *Ind. Eng. Chem.*, 33 (1941), 950–953. (E. G. V.)

Digitalis Glucosides. A process for producing glucose-containing pure digitalis glucosides comprises the steps of extracting the leaves of *Digitalis lanata* by heating them with a solvent which is immiscible or only slightly miscible with water and adapted to separate inert impurities, freeing the leaves from solvent, mixing the solvent-free leaves with magnesia and ice water, the quantity of the latter being only enough for the production of a pulpy mass, extracting the mass with a neutral organic solvent for the glucosides, purifying the resultant extract and separating the glucose-containing glucosides.—EMIL WOLF, assignor to GEORG HENNING CHEMISCHE PHARMACEUTISCHE WERK G. M. B. H. U. S. pat. 2,224,804, Dec. 10, 1940. (A. P.-C.)

Estrogens—Oxidation of, by Phenolases. Two previous reports have indicated that native estrogens are acted on by enzymes but evidence is indirect. The present authors have used the Bancroft-Warburg respirometer to observe the oxygen uptake of estrogenic and androgenic compounds in the presence of certain enzymes. Due to insolubility of the estrogens the reactions were carried out in diluted alcohol with the use of controls. Enzymes used were mushroom laccase, potato tyrosinase and the cytochrome-cytochrome oxidase system. The latter is inactivated by 20% ethanol but was used by suspending the estriol in lecithin. Estrone, estriol and estradiol are oxidized by atmospheric oxygen in the presence of laccase but not in the presence of tyrosinase. Laccase did not cause the oxidation of dehydroandrosterone, testosterone, nor progesterone. Cytochrome oxidase will not cause the oxidation of estrogens.—MARK GRAUBARD and GREGORY PINCUS. *Proc. Nat. Acad. Sci. U. S.*, 27 (1941), 149–152. (W. T. S.)

Halogenosalicins—Enzymatic Hydrolysis of. It is shown that the introduction of a halogen in the para position of the salicin aglucon reduces the rate of hydrolysis to less than one-third of the salicin value. While the three halogenosalicins do not differ greatly in their rate of hydrolysis, their relative ease of enzymatic splitting is iodo-> bromo- > chloro-.—WILLIAM WARD PIGMAN. *J. Research Natl. Bur. Standards*, 27 (1941), 1–8. (W. T. S.)

Laccase from the Wild Mushroom, Russula Fœtens. A method is described for the preparation of the enzyme, laccase, from the wild mushroom, *Russula fœtens*. A typical preparation has a Q_{O_2} of 3000. A measurement of units using hydroquinone as the substrate is outlined. Common plant oxidases do not appear to interfere with this procedure. The unusual stability of the laccase preparation over a wide pH range is demonstrated. The optimum pH for measurement of laccase activity is shown to be in the vicinity of pH 6.0. The enzymatic oxidation of hydroquinone, *p*-phenylenediamine, catechol, dimethylcatechol and potassium ferrocyanide has been described. The behavior of the laccase preparations is contrasted with tyrosinase (campestris). The importance of substrate concentration in studying the behavior of the enzyme has been emphasized.—D. C. GREGG and W. H. MILLER. *J. Am. Chem. Soc.*, 62 (1940), 1374–1379. (E. B. S.)

Levulose—Determination of, in the Presence of Dextrose and Sucrose. A Ferricyanide Method. Exactly 10 cc. of the sugar solution, which contains not more than 90 mg. of levulose, or its equivalent levulose-dextrose mixture, are treated with 25 ± 0.1 cc. of ferricyanide reagent (containing 50 Gm. of potassium ferricyanide, 220 Gm. of disodium phosphate dodecahydrate and 150 Gm. of anhydrous sodium carbonate per liter) and heated at 50 ± 0.05 C. for 60 minutes ± 5 seconds. The flask is removed from the bath, immediately cooled in cold water and carefully acidified with 60 cc. of 3*N* sulfuric acid, 6 to 8 drops of 0.005*M* sodium diphenylamine sulfonate indicator solution are added and the ferrocyanide is titrated with 0.1*N* to 0.15*N* standard ceric sulfate solution.—H. C. BECKER and D. T. ENGLIS. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 15–18. (E. G. V.)

Mannitol—Manufacture of. In the catalytic hydrogenation of fructose to sorbitol and mannitol the proportion of the latter formed is increased in presence of another poly-hydroxy-compound, for example, a glycol or another carbohydrate. The use of inverted sucrose is claimed.—J. W. BLAGDEN and G. C. CLARK. Brit. pat. 522,729; through *J. Soc. Chem. Ind.*, 59 (1940), 756. (E. G. V.)

Pasteur Enzyme and the Respiratory Ferment in Yeast—Photochemical Absorption Spectra of the. The absorption spectra of the CO derivatives of the respiratory ferment and of the Pasteur enzyme have been charted in bakers' yeast by Warburg's photochemical method. Both enzymes exhibit a spectrum characteristic of pheohemin proteins. The steep γ-bands in the blue at 430 mμ coincide and the small β-bands in the blue-green at 510 mμ are also similarly located. However, the structure of the spectra in the green and yellow is significantly different: whereas both enzymes have a strong α-band at 589 mμ, the spectrum of the respiratory ferment shows an additional, secondary maximum at 560 mμ. There thus appear to exist within the same cell two hemin-containing enzymes capable of reacting with molecular oxygen. One, the respiratory ferment, is instrumental in the oxidation of metabolites; the other, the Pasteur enzyme, controls the inhibition of fermentation by oxygen.—JOSEPH L. MELNICK. *J. Biol. Chem.*, 141 (1941), 269. (F. J. S.)

Pectin and Certain Gums—Use of Thorium Nitrate to Distinguish between. To 10 cc. of the aqueous solution of the gum (1 in 100) add 1 cc. of 10 per cent thorium nitrate solution, stir and allow to stand 2 minutes. If a gel results, the gum is either pectin or quince seed gum. If no gel results it is not pectin. To differentiate between the two gums: To 10 cc. of the sol add 1 cc. of 5*N* acetic acid, then 1 cc. of 10 per cent thorium nitrate solution, stir and allow to stand 2 minutes. If no firm gel

results the gum is pectin; if a gel results it is quince seed gum. To check the reaction, a 10 per cent solution of neutral lead acetate is used and the same procedure carried out as for thorium nitrate. Table shows the gums tested and the results obtained.—E. F. BRYANT. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 103. (E. G. V.)

Primula Root Saponin. In view of the shortage of senega root in Denmark, the value of the root of *Primula veris* as a source of saponin was examined. Extracting the root directly with either 40% or 60% alcohol an hemolytic index of 5440 was obtained on the extract, indicating a content of 2.86% saponin in the drug (expressed as elatior saponin, since the saponin is believe identical to that from *Primula elatior*). If the primula root was pretreated by boiling 3 minutes with 10 volumes of 0.01*N* HCl, this filtered off, and the drug powder moistened with ammonia water and dried at 50° C., on extracting the saponin content with alcohol as before, an hemolytic index of 6220 was obtained, indicating a content of 3.27% saponin. The HCl extraction removed about 23% of the weight of the drug. Fluidextracts were made from the untreated drug, comparing the efficiency of 10%, 25%, 40%, 60%, and 86% alcohol. Best results were obtained with 60% alcohol; hemolytic index: 4310; 79.1% of the saponin content of the drug extracted. Using the HCl treated drug and 60% alcohol menstruum the fluidextract obtained had hemolytic index: 4660; 74.9% of the saponin content of the drug. Two syrups were made by diluting the fluidextracts (adjusted to hemolytic index of 4000) to a content of 2% fluidextract with black raspberry juice. The preparation made from the drug pretreated by extraction with HCl had the better taste.—V. WÜRTZEN. *Dansk Tids. Farm.*, 15 (1941), 25. (C. S. L.)

Reducing Sugars—Rapid Determination of. A rapid photocolorimetric method for determining reducing sugars in aliquots containing up to 1.2 mg. has been described. The method is an extension of the procedure developed by Forsee for plant materials and represents a three-fold increase in concentration range. The decrease in yellow color produced by heating reducing sugars with alkaline ferricyanide was measured with an Evelyn photoelectric colorimeter. Test-tube absorption cells were employed, permitting complete serial analyses without transfer. A reference curve for glucose and invert sugar has been prepared. The method was developed for rapidly analyzing large numbers of watermelons during a short harvesting period. Good recoveries were obtained when various sugars were added to watermelon juice.—S. A. MORELL. *Ind. Eng., Chem. Anal. Ed.*, 13 (1941), 249–251. (E. G. V.)

Santonin—Production of, from Irish-grown Artemisia. A hybrid variety of *A. cina*, found in Limerick, yielded very little santonin. Experimentally cultivated plants afforded 0.75% of the dried flower-heads as santonin, melting point 169–171°, which was chemically and pharmacologically identical with a sample of B. P. santonin.—P. J. DRUMM and W. F. O'CONNOR. *Sci. Proc. Roy. Dublin Soc.*, 22 (1940), 279; through *J. Soc. Chem. Ind.*, 59 (1940), 897. (E. G. V.)

Saponin from Luffa Cylindrica Roemer. A saponin was isolated from *L. Cylindrica* (Linn.) Roemer, with the following characteristics; crystallized from an alcoholic macerate, the crystals were white, bitter, soluble in water, dilute acids and alkalis and dilute alcohol. Insoluble in chloroform and other organic solvents. It produced a pinkish red color with concentrated sulfuric acid, a characteristic of saponins. The melting point was 268–270° C. levorotatory 25°, acid, no water of adhesion or crystallization. Chemical analysis gave: 50.8% C, 8.18% H and 9.32% residue. Fehling's test positive, the sugar forming a crystalline osazone with methyl phenylhydrazine. Hemolytic index with dogs blood was 1:27,000, foam index was 1:7000, minimal fatal dose for frogs (ventral lymph sac), 0.06 mg. per gram body weight.—AMPARO MENDOZA, PARALUMAN CRUZ and ALFREDO C. SANTOS. *Rev. Filipina Med. Farm.*, 32 (1941),49.(G. S. G.)

***l*-Sorbose—Reducing Properties of.** The reducing power was determined by the method of Hildebrand and McClellan. In each case the desired quantity of the sugar was contained in 5 cc. of solution which was allowed to react with 10 cc. of the alkaline ferricyanide solution. The values are corrected for the blank which was determined daily and never exceeded 0.7 cc. of a 0.01773*N* ceric sulfate solution. The results obtained in comparing the reducing properties of fructose and sorbose bear out the hypothesis that the configuration about the third and fourth carbon atoms of the hexose sugars is the important factor in determining the reducing properties, and that, if the configurations of the hydroxyl groups on the carbon atoms 3 and 4 of the two sugars are similar, these sugars will have approximately the same reducing properties. Fructose and sorbose have the same configurations on these carbon atoms and their reducing powers are of the same order of magnitude.—F. K. BROOME and W. M. SANDSTROM. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 234–235. (E. G. V.)

Sugar Alcohols. XXII. Metabolism and Toxicity Studies with Mannitol and Sorbitol in Man and Animals. The authors give the following summary: (1) In mice and rats the laxative action of mannitol and sorbitol limits nutritional studies when these compounds comprise a portion of the diet. (2) In the rhesus monkey, sorbitol is capable of storage as glycogen in the liver of the fasted animal. Under the same conditions mannitol is incapable of producing significant glycogen storage. (3) The feeding of 3 Gm. per day of mannitol and sorbitol to rhesus monkeys over a period of three months produced no histopathological findings or toxicological indications which were attributed to these compounds. (4) In man, the daily ingestion of 10 Gm. of mannitol and sorbitol, respectively, for one month produced no significant changes in the non-protein nitrogen, CO_2-combining power of the blood or the red blood cell count. The phenolsulfonephthalein test indicated no kidney damage. (5) The approximate threshold of laxative action in man was determined. (6) In normal human subjects, sorbitol increased the respiratory quotient above the basal level. The effect was similar within two hours to that of an equal quantity of dextrose. The blood sugar curve remained practically normal after sorbitol. Mannitol and sorbitol syrup did not significantly influence either the blood sugar or respiratory quotient. (7) The laxative effect of mannitol and sorbitol syrup is greater than that of crystalline sorbitol.—FRED W. ELLIS and JOHN C. KRANTZ, JR. *J. Biol. Chem.*, 141 (1941), 147. (F. J. S.)

Trypsin—Inhibiting Fraction of Ascaris on. The work of previous investigators has been confirmed to this extent. A crude extract of *Ascaris lumbricoides* strongly inhibits pepsin and trypsin but not papain. An active trypsin inhibitor was isolated by fractional precipitation. The inhibitor is not precipitated by trichloracetic acid, possesses the properties of a polypeptide and exerts its maximum effect on trypsin at neutral and acid reactions, with a minimum at pH 5. Contrary to findings of other workers, proteinase activity of the extract could not be found. Demonstration by others may have been due to bacterial contamination or to the use of nonspecific methods of estimation.—H. BRUCE COLLIER. *Can. J. Research, B*, 19 (1941), 91–98. (W.T. S.)

Zinnia Elegans—Apigenin Glucoside of. Apigenin glucoside was isolated from the flowers of the yellowish white double variety of zinnia by extraction with warm alcohol. After concentration, a large amount of water was added, and the waxy substance which separated was filtered off and the filtrate saturated with ether. On standing for about one month, yellow crystals separated in a yield of about 1%. Recrystallization from methanol-acetone gave yellow needles which decomposed at 218–220°; $[\alpha]_D^{17} = -65.7°$ (pyridine-water). It is easily soluble in hot water, hot alcohol and menthol; insoluble in ether, chloroform and benzene. It gives a reddish brown solution with ferric chloride but does not reduce Fehling's solution. Analysis showed a formula of $C_{21}H_{20}O_{10} + 2H_2O$. On heating at 110°, one molecule of water is lost, and the second molecule is lost when the temperature is raised to 140°. The anhydrous substance thus obtained decomposes at 227–230°. On hydrolysis the compound yields an aglucone, apigenin (a trihydroxyflavone), and a sugar, glucose. Experimental data indicated that the sugar is linked to apigenin through the hydroxy group in the 7 position; hence, a apigenin glucoside is 5,7,4′-trihydroxyflavone-7-glucoside. The glucoside was synthesized by treating apigenin with acetobromoglucose. The apigenin-glucose tetraacetate thus obtained was saponified to yield the desired apigenin glucoside.—TASITIRO NAKAOLI. *J. Pharm. Soc. Japan*, 60 (1940), 502–506 (in English, 190–191). (N. L.)

Other Plant Principles

Borneol and isoBorneol—Dehydrogenation of, Using Activated Nickel Catalyst. Camphor is obtained in 92–94% yield by heating isoborneol at 200° with 0.2% of a catalyst consisting of nickel containing 0.1% of sodium hydroxide, on wood charcoal. The spent catalyst is regenerated by heating in a stream of hydrogen.—V. E. TISCHTSCHENKO and M. A. GRECHNEV. *Prom. Org. Chim.*, 7 (1940), 238; through *J. Soc. Chem. Ind.*, 59 (1940), 778. (E. G. V.)

Cannabidiol—Structure of. II. Absorption Spectra Compared with Those of Various Dihydric Phenols. The ultraviolet and infrared absorption spectra of cannabidiol resemble closely that of olivetol, 1,3-dihydroxy-5-*n*-amylbenzene, and do not resemble that of 4-*n*-amylcatechol. It therefore was concluded that cannabidiol is a resorcinol derivative. A comparison of the absorption spectra of resorcinol with its 5-methyl and 5-*n*-amyl derivatives indicates that introduction of the alkyl groups causes a slight shift in the peaks toward lower wave lengths and the molecular extinction coefficients at these wave lengths are decreased. Just the opposite effect is noted with catechol and its alkyl derivatives.—ROGER ADAMS, C. K. CAIN and H. WOLFF. *J. Am. Chem. Soc.*, 62 (1940), 732–734. (E. B. S.)

Cannabis Indica. A New Synthesis of Cannabinol, and of a Product with Hashish Activity. To study the biogenesis of certain constituents of cannabis resins, compounds produced by the condensation of terpene derivatives with orcinol and olivetol have been studied. Condensation of orcinol with crude pulegol (from reduction of pulegone) gave the expected hexahydrodibenzopyran derivative. Orcinol with pulegone gave a mixture of isomerides which on dehydrogenation produced 6″-hydroxy-2:2:5′:4″-tetramethyldibenzopyran. Similarly, pulegone and olivetol condensed to give a product with the composition of a tetrahydrocannabinol. This condensation product possessed about 50% of the hashish activity (Gayer test) of tetrahydrocannabinol and is probably a mixture of isomerides. Dehydrogenation of the pulegone-olivetol product yielded cannabinol.—R. GHOSH, A. R. TODD and D. C. WRIGHT. *J. Chem. Soc.*, (1941), 137–140. (W. T. S.)

Cannabis Sativa Resin—New Color Reactions for. A volume of petroleum ether extract containing 2 mg. of the resin was either spotted onto a spotting porcelain plate with depressions, or added to a microtest tube and the solvent allowed to evaporate. A quantity of the aldehyde corresponding to 3 mg. contained in 0.5 cc. of the solvent was added to the resin and the material was dissolved by manipulation with a microspatula. Concentrated hydrochloric acid was then added drop by drop from a micropipette until maximum color intensity was developed. The test was carried out also by smearing a minute portion of the resin on filter paper, adding a small drop each of benzyl alcohol and benzaldehyde and developing the color with concentrated hydrochloric acid. The reaction under these conditions is very striking and is of value in the examination of stains and minute quantities of the resin. Cannabis indica resin reacts in a similar manner, while over a hundred dissimilar drugs failed to give a positive test.—W. J. BLACKIE. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 96–97. (E. G. V.)

Capsaicin in Capsicum—Report on the Vanadium Oxytrichloride Colorimetric Method for the Determination of. Following the publication in 1933 of a simplified method for the extraction of capsaicin from capsicum and a colorimetric method for its quantitative determination, indicated the possibility of its use instead of the organoleptic test of U. S. P. X. Four men collaborated in the investigative work and their reports are quoted at some length. In view of their findings the colorimetric assay was not recommended for adoption by the U. S. P. Revision Committee but it was thought to be deserving of further study. The study then undertaken aimed to determine the time of maceration required to completely extract capsaicin; the effect of the paprika solution; the effect of concentration and quantity of reagent on the color produced; to provide a permanent, non-fading color standard in order to eliminate preparation of capsaicin and errors due to instability of its solution; the effects of adulteration on the assay method. Work covering all of these objectives is carefully reported. The following conclusions were reached: (1) The maceration period of 30 to 60 minutes is sufficient to extract the capsaicin from capsicum using acetone as the solvent. (2) The duration of the reliable color in the standard is not long enough to insure satisfactory matchings with the unknowns. (3) A permanent, non-fading color for the standard may be achieved by using colorimetric solutions of cupric sulfate and ferric chloride. (4) More concordant results are obtained by using a weaker solution of the vanadium oxytrichloride (0.5 per cent prepared volumetrically), and measuring the reagent from a graduated pipette or a burette instead of using the dropper method. (5) A number of substances containing phenolic compounds gave color reactions with the reagent. In some instances, the colors produced approximated the standard so closely that a color test using vanadium oxytrichloride would not serve as a reliable qualitative or quantitative test for capsaicin. (6) Further investigation might prove vanadium oxytrichloride to be a sensitive generic test for phenolic compounds. —ALICE HAYDEN and C. B. JORDAN. *J. A. Ph. A.*, 30 (1941), 107. (Z. M. C.)

Carotene—Recent Developments in Methods for Determining. Improvements in methods for the extraction and quantitative determination of β-carotene in dry and fresh plant tissue are described. Solvent and adsorption methods for the separation of β-carotene from accompanying petroleum-soluble carotenoids are discussed in the light of new developments. The Petering-Wolman-Hibbard method has excellent potentialities in the development of methods for the quantitative determination of crypto-

xanthin and other carotenoid pigments, as well as carotene.—W. J. PETERSON. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 212–216. (E. G. V.)

Cassytha Filiformis—Presence of Dulcitol in. The authors report that an investigation of two samples of *Cassytha filiformis* revealed the presence of dulcitol. The entire plant was digested with methanol and after recovery of the solvent, the residue remaining behind was treated with warm water. Lead acetate solution was added to the filtrate and the precipitated material filtered out. The excess lead was then removed by treating the solution with hydrogen sulfide, the precipitate filtered off and the filtrate evaporated. The crystals thus obtained, melted at 185° after recrystallization from alcohol. A portion mixed with pure dulcitol showed no lowering.—FUKUZIRO FUZIKAWA, ICHIRO NAKAMURA and KENZI ASAMI. *J. Pharm. Soc. Japan*, 60 (1940), 534–535 (in German, 209). (N. L.)

Chlorophyll and Carotene—Simplification of Petering-Wolman-Hibbard Method for Determination of. Five Gm. of fresh plant tissue (or 1 Gm. of dried tissue) are ground and extracted with pure acetone and the extract is brought to a volume of 200 cc. A 100-cc. aliquot is taken and to it are added 15 cc. of saturated solution of barium hydroxide. This mixture is then refluxed for 30 minutes as in the original procedure, which results in the complete removal of chlorophyll from the extract.—H. G. PETERING, E. J. BENNE, and P. W. MORGAL. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 236. (E. G. V.)

Gossypol—Estimation of, in Crude Cottonseed Oil. A clear-cut method for the estimation of gossypol in crude cottonseed oil is presented, with modifications which permit sets of ten determinations to be made fairly expeditiously. Precipitation is expedited by increased temperature, by the addition of gossypol in an ether-extracted oil prepared from cottonseed meats, and by constant agitation which precipitates the gossypol in a good crystalline condition for rapid filtration and washing without appreciable loss due to dissolving. Solubility is prevented by the use of pyridine in the wash solution. The gossypol compound is prevented from adhering to the glass container by the elimination of practically all water. Recovery of added gossypol and the reproducibility of results are good.—J. O. HALVERSON and F. H. SMITH. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 46–48. (E. G. V.)

Neem Oil—Bitter Principles of. Neem oil obtained from the seeds of *Melia azadirachta* had previously been shown to be a mild antiseptic and reputed to be of value as an anthelmintic and in the treatment of certain skin diseases. The authors made a chemical investigation of neem oil with the aim of isolating and identifying those constituents to which the odor, taste and germicidal action of the oil can be attributed. From the methanolic extracts of the freshly pressed oil was isolated and amphorous solid, which formed on standing a light gray powder, a portion of which was soluble in benzene. The benzene-soluble fraction has the formula, $C_5H_7O_2$, decomposes slowly from 115° but more so at 155–157°; it possesses a disagreeable bitter taste and is difficultly soluble in dilute aqueous sodium hydroxide. The benzene-insoluble fraction, $C_4H_7O_2$, liquifies at 72° and decomposes at 110–115°; it has a bitter but less disagreeable taste and is easily soluble in dilute aqueous sodium hydroxide. Both substances reduce alkaline permanganate and Fehling's solution readily and give no color with alcoholic ferric chloride. The authors believe that both substances do not have carbonyl groups and are not glycosidal. Toxicity tests were carried out on fresh water fish (*Haplochilus panchax*) and earthworms. Results showed that the fish were not visibly affected by either substance in a dilution of 1 in 5000 even after three hours; the earthworms were equally resistant.—M. L. NARSIMHA MURTI, S. RANGASWAMI and T. R. SESHADRI. *Indian J. Pharmacy*, 2 (1940), 206–212. (N. L.)

Osage Orange Pigments. IV. Degree of Unsaturation and Flavone Nature. Osajin has been hydrogenated stepwise to produce a dihydro, tetrahydro and hexahydro derivative, each of which has been characterized as a monoacetate and diacetate. Pomiferin has been hydrogenated stepwise to produce a dihydro and a tetrahydro derivative, each of which has been characterized as a diacetate and triacetate. Perbenzoic acid titrations and nonreactivity with maleic anhydride indicate the presence of two non-conjugated, active double bonds in both osajin and pomiferin. By a combination of the Wilson boric acid color reaction and the Asahina reduction tests, it is shown that a flavanone structure for hexahydro-osajin and a flavone structure for osajin and pomiferin are probable.—M. L. WOLFRAM, P. W. MORGAN and F. L. BENTON. *J. Am. Chem. Soc.*, 62 (1940), 1484–1489. (E. B. S.)

Pyrethrin I—Extraction and Determination of, in Grown Pyrethrum Flowers. An improved apparatus is described which reduces the loss of ether and the volume required for extraction.—J. S. YIP. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 107–108. (E. G. V.)

Senna Leaves (Cassia Angustifolia)—New Crystalline Component of. An examination of fresh senna leaves (*Cassia Angustifolia*) resulted in the isolation of a new crystalline compound from the basic lead acetate fraction after removal of isorhamnetin, kaempferol and rhein. This new substance separated out mixed with resin and was subsequently purified by crystallation from boiling alcohol. The colorless needles thus obtained melted with decomposition at 258°. It was not identical with either kaempferol or iso-rhamnetin and contained no nitrogen, halogen, sulfur or methoxy group. Analysis showed an empirical formula of $C_{15}H_{18}O_9$. The new compound was insoluble in ether, sparingly soluble in cold water and alcohol but more soluble in boiling alcohol and water and readily soluble in cold aqueous sodium bicarbonate. It gave a deep yellow solution with cold dilute alkali and a brown color with alcoholic ferric chloride. In sulfuric acid, it gave a yellow solution which exhibited a blue fluorescence. No anthocyanin was formed on reduction with magnesium and hydrochloric acid; reduction by sodium amalgam in an alcoholic solution of the substance and subsequent acidification gave a bright violet color, which was unstable and rapidly disappeared. The authors concluded that this new substance is not a flavone and probably does not belong strictly even to the group of hydroxyflavones.—P. BHASKARARAMA MURTI and S. RANGASWAMI. *Indian J. Pharmacy*, 2 (1940), 203–205. (N. L.)

Tung Tree (Aleurites Fordii Hemsl.)—Phytosterol from the Buds and Fruit of. Experimental work in progress at the Field Laboratory for Tung Investigations at Gainesville, Florida, has to do with physiological functions and nutrition of the tung tree at various periods of the year when major changes are taking place in its tissues. A sterol identified as phytosterol has been isolated from the buds and mature fruit. Procedures for preparation of the extract from the buds, sterol acetate, free sterol and sterol benzonate are described.—HAROLD M. SELL and ALBERT H. BEST. *Jour. A. Ph. A.*, 30 (1941), 170. (Z. M. C.)

Fixed Oils, Fats and Waxes

Castor Oil—Acid Catalysis for Dehydration of. Elimination of water from the ricinoleic acid of cas-

tor oil is complete after heating for 5 hours at 250° with 0.5% of sulfuric acid, aluminum bisulfate, phosphoric acid or aluminum biphosphate.—V. VARLAMOV and N. TICHOMIROVA. *Maslob. Zhir. Prom.*, No. 1. (1940), 22–25; through *J. Soc. Chem. Ind.*, 59 (1940), 545. (E. G. V.)

Castor Oil—Continuous Dehydration of. Oil containing 0.2% of lead ricinoleate is passed through a series of reaction tubes at 270–275°.—A. A. IVANOVA and M. G. BUMAN. *Prom. Org. Chim.*, 7 (1940), 320; through *J. Soc. Chem. Ind.*, 59 (1940), 804. (E. G. V.)

Castor Oil—Effects of Certain Solvents on Properties of. Dehydrated castor oil losses its drying properties after keeping for a few days in cracking benzin or crude turpentine solution.—G. I. SCHURAEV. *Prom. Org. Chim.*, 7 (1940), 332; through *J. Soc. Chem. Ind.*, 59 (1940), 804. (E. G. V.)

Castor Oil of High Acidity—Parallel Esterification and Dehydration of. Glycerol (1 Gm.-mol) is added to castor oil fatty acids (3 Gm.-mol) at 60°, followed by sulfuric acid (0.5 Gm.-mol), and the mixture is heated. Foaming is observed at 160–220° (elimination of water), and again at 280° (cracking of ricinoleic acid). The oil obtained after 3–5 hours at 160–220° is suitable for use as drying oil.—G. I. SCHURAEV and A. F. VASILIEVA. *Prom. Org. Chim.*, 7 (1940), 34–36; through *J. Soc. Chem. Ind.*, 59 (1940), 463. (E. G. V.)

Coconut Oil—Further Data on a New Process for the Extraction of. Mixing water with coconut meat in the ratio by weight of 1 part of water to 2 parts of the fresh comminuted meat, or in the ratio of 1 part of water to 1 part of the pressed coconut meat gives mixtures with fluidities that seem to be best adapted for feeding in a roller press. The size of the particles of comminuted meat affects the degree of oil extraction; the greater the size the less the efficiency of extraction, for a given set of rollers. As high as 88 per cent oil extraction can be obtained with the rollers used in one pressing if the meat is comminuted to an average size of 5.9 by 1.8 by 0.9 mm. Four tables of data from pilot-plant studies are presented. —V. G. LAVA, P. E. TORRES and S. SANVICTORES. *Philippine J. Sci.*, 75 (1941), 143. (P. A. F.)

Coconut Oil—New Process for the Extraction of. Fifteen tables are given showing laboratory and pilot-plant data obtained in an effort to improve commercial extraction. In conjunction with the Lava process which extracts directly from fresh meat, the roller method of obtaining the oil emulsion from the coconut meat is better than the cage hydraulic press method. An average of 86% oil recovery can be made with crude rollers. Improvements in the system of feeding fresh meat and in roller design are necessary before the process can be considered commercially practicable.—V. G. LAVA, P. E. TORRES and S. SANVICTORES. *Philippine J. Sci.*, 74 (1941), 247. (P. A. F.)

Cocos Pulposa Palm-Kernel Oil. Nuts of *C. pulposa* (syn. *Butia capitata*, var. *pulposa*, Barb. Rodr.) from Uruguay (1939) yielded 37% of kernels containing 4.8% of water and 59.5% of oil. The expressed oil had melting point 17–18°, index of refraction at 25° 1.4554, acid value 1.7, saponification value 160.3, Reichert-Meissl value 7.1, Polenske value 24.8, unsaponifiable matter 0.44%, iodine value (Hanus) 24.6, thiocyanogen value 22.4, and contained (per cent on oil) hexoic 1.47, octoic 9.40, decoic 13.23, lauric 34.39, myristic 6.59, palmitic 1.78, and stearic acid 1.31 (determined by ester fractionation), and oleic 22.39 and linoleic acid 2.4 (from iodine and thiocyanogen values). The oil is suitable for the manufacture of soap or margarine.—G. S. JAMIESON and W. G. ROSE. *Oil & Soap*, 17 (1940), 144; through *J. Soc. Chem. Ind.*, 59 (1940), 873. (E. G. V.)

Cod-Liver Oil Emulsions—Studies in the Evaluation of. The production, storage, testing and spectrographic examination of such emulsions are described. Emulsions prepared in accordance with Reinhard's procedure were stored in different glass containers of varying quality and indifferently filled for a period of 14 months. Decomposition took place, irrespective of glass quality, only in slovenly filled containers. Acidity and iodine number of pure cod liver oil as also emulsions obtained therefrom underwent, depending on the filling height of the glass but irrespective of glass quality, strong changes with access to air; the changes were less when air was excluded (displaced with carbon dioxide and nitrogen). The step-wise photometric evaluation of the Carr-Price reaction for vitamin A in cod liver oil and emulsions teaches that; (*a*) aromatic substances as cassia oil and benzaldehyde added to the emulsion cause no derangement; (*b*) insufficient extraction of cod liver oil and emulsions as also too long standing of the extraction residue (unsaponifiable) is no cause for erroneous results; (*c*) greater importance should be given to the duration of saponification and this is governed by the quality of the oils; (*d*) the application of the oil itself or the emulsion without prior saponification yields no absolute, though within ±5%, constant reproducible vitamin A values; thus the method possesses the advantage of simplicity and avoids errors due to saponification. If it assumed that the Carr-Price reaction is specific for vitamin A, it can be established that: (*a*) improperly stored oil suffers loss of vitamin A after 1 year; (*b*) oil shaken several hours, under admission of air, followed by 6 months storage, showed no diminution in the original vitamin content; (*c*) cod liver oil exposed 1 hour in an open dish heated at 200° C contains 60% vitamin A (if heated 2 hours, however, the oil no longer contains vitamin A); (*d*) cod liver oil emulsions in completely filled flasks closed with glass or cork stoppers and in well-closed incompletely filled flasks under foreign gas atmosphere suffers at the most 8% loss and in partially filled flasks closed with cork under presence of air loses its entire vitamin A content over a period of 14 months; (*e*) homogenization of cod liver emulsion (particle size of oil glooules 90% above 20–30 mμ) causes no damage, the production of emulsions under foreign gases is superfluous and the storage of emulsions under nitrogen and carbon dioxide is beneficial only in partially filled shelf containers standing some time. Experiments for the direct quantitative absorptions spectral analytical estimations of vitamin A in cod liver oil emulsions after clarification show that the errors arising from the flattened course of absorption curves render the exact estimation of vitamin A impossible; this method, however, is suitable owing to its rapid operation. Comparative analyses yield satisfactory results.—W. PAUL and W. SPERBER. *Deut. Apoth. Ztg.*, 56 (1941), 1–2, 9–11, 34–35; through *Chem. Abstr.*, 35 (1941), 6388. (H. M. B.)

"Coqui" (Cyperus Rotundus L.)—Some Constituents of the Tuber of. I. Preliminary Examination of the Tuber and Composition of the Fatty Oil. The tubers of "Coqui" are found on the fruit markets of Puerto Rico. An aqueous preparation prepared by boiling the whole tuber has been used in Puerto Rico with the idea that it stimulates diuresis and dissolves kidney stones. It has been official in several pharmacopœias. The present paper covers history, distribution, botanical classification and folk uses. A proximate analysis is reported; also the yield of extractives when treated with slective solvents. The principal constants of the fatty oil were determined. It was found to contain a large amount of unsaponifiable matter, a neutral waxy substance, glycerol, linolenic, linolic, oleic, myristic and possibly stearic acid.—CONRADO ASENJO. *Jour. A. Ph. A.*, 30 (1941), 216. (Z. M. C.)

Euphoribia Lathyris—Oil of, as Source of Olein. The seeds yield up to 50% of oil containing 90% of oleic acid esters. Toxic substances present in the oil can be entirely eliminated by extraction with ethyl alcohol. The oil thus purified may be used instead of oleic acid.—S. V. RUSCHKOVSKI and N. F. DUBLJANSKAJA. *J. Applied Chem. Russ.*, 12 (1939), 1490–1494; through *J. Soc. Chem. Ind.*, 59 (1940), 545. (E. G. V.)

Extract of Malt with Cod Liver Oil—Note on Oil Content of. For the determination of the total fatty matter, acid extraction, as in the Werner-Schmidt method, was adopted and the modification found most satisfactory was the following: Disperse about 2.5 Gm. of extract of malt with cod liver oil in 15 cc. of warm water, add 15 cc. of concentrated hydrochloric acid, transfer to a 200-cc. separator, washing it with 10 cc. of water and 50 cc. of ether. Shake and separate; reëxtract the aqueous layer with 30 cc. of ether. Wash the combined ether extracts free from mineral acid, reëxtract the washings with ether, bulk the ether washings, evaporate, re-evaporate twice with a little acetone and dry in a desiccator for thirty minutes before weighing. The method is not suitable for routine analysis as persistent emulsions are liable to be formed and are eliminated with difficulty. The extracted oil was titrated for free acidity in the usual way, and in some cases the neutral oil was separated from the soaps by the Pharmacopœial method for determination of unsaponifiable matter and the acids were then liberated, extracted and weighed. Extract of malt with cod liver oil sold by retail sources was examined and found usually of approximateyl Pharmacopœial strength in cod liver oil. A surprisingly large proportion of the samples had developed excessive acidity. It is recommended that extract of malt with cod liver oil sold under this or a similar name without qualification should be that of the B.P., and the authors suggest a tentative limit of 5% acidity in the oil.—D. C. GARRATT and J. E. WOODHEAD. *Quart. J. Pharm. Pharmacol.*, 14 (1941), 172–175. (S. W. G).

Fish Liver Oils—Vitamin A Content of Argentine. The oils extracted from 9 species were examined. The yields obtained by extraction with acetone, benzene, and also by successive dehydration with sodium sulfate and extraction with benzene are recorded. The vitamin A contents (Carr-Price) are comparable with those previously recorded for the same species.—A. O. CASTELLANOS. *Anales asoc. quím., argentina*, 28 (1940), 91; through *J. Soc. Chem. Ind.*, 59 (1940), 874. (E. G. V.)

Glycerin in Fats and Oils—Determination of. Oxidizable soluble fatty acids (including octoic but not hexoic acid), which are the cause of overhigh results when glycerin (I) is determined by the dichromate method in the solution obtained by saponification of the fat, may be largely eliminated by treating the crude I solution with alkaline copper sulfate, and filtering before proceeding to the oxidation with potassium dichromate. Saponification of the fat with ethyl alcohol-alkali is preferred and shown to have no effect on the results. (A blank determination should be run.) The technique of the determination is described in detail, and methods of checking the I content of refined stocks and of acid oils by calculation from the results of other determinations are explained.—L. B. SMITH and H. MATTHEWS. *Oil and Soap*, 17 (1940), 58–61; through *J. Soc. Chem. Ind.*, 59 (1940), 462. (E. G. V.)

Mineral Oil Specifications. The Toilet Goods Association Inc. (of the United States) has issued Specification No. 1A covering mineral oil and recommends that future purchase of the oil be based upon this standard as a minimum. The specifications include a Saybolt color standard and A. S. T. M. cloud-point odor, taste, solubility and A. S. T. M. viscosities. U. S. P. specific gravity and saponification volume are adopted. T. G. A. methods are stipulated for the determination of absence of free acids and alkalies and of sulfur and sulfides.—*Perfumery Essent. Oil Record*, 32 (1941), 127. (A. C. DeD.)

Mineral Oils—Organic Halogen Compounds in. Procedures for the determination of halogens in mineral oils are given.—M. S. AGRUSS, G. W. AYERS, JR. and H. SCHINDLER. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 69–70. (E. G. V.)

Oil of Palta—Investigation of. Oil of palta is stable, resists rancidity and is not a drying oil. It is penetrating, is rich in stearin and contains vitamins A, D and E. It may be used internally or externally without harm to the organism and its intravenous use is also well tolerated. It is useful as a pharmaceutical vehicle for substances not soluble in water or which have caustic action. It also has both bacteriostatic and bactericidal action, and is useful in various dermatoses. Its physical constants resemble those of olive oil as well as its assimilability, and it is an excellent food oil.—C. NUNEZ VALDIVIA. *Bol. soc. quím., Peru*, 5 (1939), 207; through *Anales farm. bioquím.*, 11 (1940), 36. (G. S. G.)

Olive Oils—Presence of Extracted Oil in Purified and Virgin Pressed. The content, melting point and temperature of opalescence formation of the unsaponifiable fraction are used in the detection of solvent-extracted oils.—G. DORTA. *Atti X Congr. Internaz. Chim.*, IV (1938), 517–523; through *J. Soc. Chem. Ind.*, 59 (1940), 545. (E. G. V.)

Paraffin—Monograph for. A detailed monograph is offered.—V. B. BEYER. *Bull. Natl. Formulary Committee*, 9 (1941), 258–262. (H. M. B.)

Vegetable Oil—Measuring Oxidation of. The measurement of the spreading pressure of a drop of liquid placed on a monomolecular film on the hydrophilic balance is a far more accurate evaluation of oxidation in a vegetable oil such as soybean oil or the presence of hydrophilic groups in any liquid than the familiar peroxide number. The evaluation of lubricating addition agents is an especially valuable application.—G. L. CLARK and F. M. RUGG. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 243–244. (E. G. V.)

Vitamin A Content of the Germ Oil of Seed of Theobroma Cacao. Cacao germ oil contains 825–1400 I. U. of vitamin A per 100 Gm. (rat tests).—K. H. WAGNER and L. SEBER. *Biedermanns Zentr.*, 10B (1938), 261–264; through *J. Soc. Chem. Ind.*, 59 (1940), 464. (E. G. V.)

Vitamin A in Oils—Estimating Antioxidant Activity of Agents Used to Stabilize. The destruction of vitamin A in oils by oxidation is paralleled by an increase in the peroxide value of the oil. Both processes are speeded by metallic ions, ultraviolet light and by increased temperature. Antioxidants retard the processes. The authors have developed a method of estimating antioxidant potency of possible preservatives of vitamin A. The method is based on ultraviolet irradiation of a chloroform solution of halibut liver oil and the antioxidant followed by an estimation of the vitamin A using the $SbCl_3$ reaction and photoelectric colorimetry. The method and apparatus are described in detail and consistent results are claimed for it. Wheat germ oil reduced the rate of decomposition of vitamin A in oils under ultraviolet light irradiation.—W. F. PARKER, A. C. NEISH and W. D. MCFARLANE. *Can. J. Research B*, 19 (1941), 17–23. (W. T. S.)

Vitamin A Potency of Sawfish and Shark Liver Oils. The vitamin A content of shark and sawfish

liver oils was found not less than 2400 and 300 U. S. P. XI vitamin A units per gram, respectively. The sawfish liver yields two times more oil than the shark liver. Shark liver oil, like "Sanga" liver oil, may be employed as a substitute for cod liver oil.—M. GUTIERREZ. *Acta Med. Philippina*, 2 (1940), 199; through *Rev. Filipina Med. Farm.*, 31 (1940), 379. (G. S. G.)

Unclassified

Alkyl Nitrites. VII. The following organic compounds have been synthesized: 2-Ethyl-*n*-hexyl-1-nitrite, *n*-octadecyl nitrite, isoamyl lactate, propyl glycollate, butyl glycollate, heptyl glycollate, isoamyl lactate nitrate, propyl glycollate nitrate, butyl glycollate nitrate, isomannide dinitrate, isosorbide dinitrate and erythritan dinitrate. Some of these are of therapeutic interest. A number of others were prepared also, but the analyses indicated that they were not obtained pure.—SYLVAN E. FORMAN, C. JELLEFF CARR and JOHN C. KRANTZ, JR. *Jour. A. Ph. A.*, 30 (1941), 132. (Z. M. C.)

Amino Alcohol Esters (Anesthetics)—Manufacture of. Amino alkyl esters, useful as local anesthetics, are prepared by interaction of an acyl halide p-$OR.C_6H_4.COX$, where X = halogen and R = alkyl, with not less than 1 molecule of an alcohol $NR(R'.OH)_2$ where R = alkyl and R'-alkylene. The preparation of β-N-ethyl-N-β'-hydroxyethylaminoethyl β-ethoxy-, boiling point 218–225°/8 milimeters, and p-n-butoxy-, boiling point 216–220°/3 milimeters, -benzoate is described.—W. W. TRIGGS. From E. R. SQUIBB AND SONS. Brit. pat. 520,179; through *J. Soc. Chem. Ind.*, 59 (1940), 566. (E. G. V.)

2-Aminobenzthiazole—Aminoalkyl Substitution Products of. The authors proposed to prepare several compounds related to the aminoquinoline derivatives used in the chemotherapy of malaria, which were characterized by the benzthiazole nucleus in place of the quinoline ring. A number of derivatives of 2-aminobenzthiazole were prepared in which the amino group was substituted by acetyl group and the aromatic ring substituted in the 4-position by chlorine or methoxy and in the 6-position by chlorine, ethoxy, amino, acetyl and nitro groups. The synthesis of these compounds is described.—KYOSUKE TSUDA, SHUSAKU SAKAMOTO, HIDEBUMI MATSUDA and TAKEO KANNO. *J. Pharm. Soc. Japan*, 60 (1940) (*Transactions*, in German, 184–189). (N. L.)

Amino Ketones and Amino Alcohols Containing the ac-Tetrahydro-β-Naphthylamine, Tetrahydroisoquinoline, or β-Phenylethylamine Nucleus. One conclusion from published work on adrenaline, ephedrine and related compounds is that substitution on the side chain nitrogen by large alkyl or aryl groups reduces or destroys vasopressor activity. Groups, which in themselves might possess vasopressor action, have been attached to the nitrogen with a hope of producing stronger vasopressors. α-Bromoacetophenone, α-bromopropiophenone, α-chloro-p-hydroxyacetophenone, α-bromo-β-acetonaphthone, phenylethylbromide and phenoxyethylbromide were condensed separately with ac-tetrahydro-β-naphthylamine, tetrahydroisoquinoline or phenylethylamine to give a series of amino ketones. These were catalytically reduced to the amino alcohols most of which were then converted to the benzoates so that they might be tested for local anesthetic as well as vasopressor activity. 1-Phenyl-2-ac-tetrahydro-β-naphthylaminoethanol HCl (I) and the corresponding propanol compound (II) produced anesthesia of longer duration than that of cocaine. 1-p-Hydroxyphenyl-2-ac-tetrahydro-β-naphthylaminoethanol HCl (III) and 1-phenyl-2-tetrahydroisoquinolinethanol HCl (IV) were less effective than cocaine. 1-Phenyl-2-tetrahydroisoquinolinoethane HCl (V) and 1-p-hydroxyphenyl-2-tetrahydroquinolinoethanol HCl (VI) showed no anesthetic activity. Compound I in doses of 3–5 mg. (injected in cats) produced a rise in pressure of 30 mm. of mercury. Compounds I, II, IV and V are slightly irritating, compound VI more so and compound III severely so. The presence of a phenolic (OH) decreased activity in compound III and destroyed it in VI. This group increased irritation in the case of III and VI. Compound V (non-active) differs from IV (moderately active) only in the absence of a side chain hydroxyl. Compound I was more toxic than cocaine and II less toxic than cocaine. Full laboratory directions are given for the syntheses and the compounds are tabulated with respect to formula, m. p. and analytical data.—ARTHUR L. ALLEWELT and ALLAN R. DAY. *J. Org. Chem.*, 6 (1941), 384–400. (W. T. S.)

Amino-1,5-Pyridopyridines. A halonitro-1,5-pyridopyridine, such as 2-chloro-3-nitro-1,5-pyridopyridine for the production of 3-amino-1,5-pyridopyridine, is subjected to catalytic hydrogenation for the production of therapeutic or intermediate compounds.—ARTHUR BINZ and OTTO VON SCHICK, assignors to SCHERING CORP. U. S. pat. 2,226,111, Dec. 24, 1940. (A. P.-C.)

Ascorbic Acid—Production of. Esters of 2-keto-hexonic acids are converted into the corresponding ascorbic acids by treatment in water, water-ethyl alcohol, water-dioxan, etc., with magnesium, iron, nickel, cobalt, manganese or zinc, *e. g.*, methyl 2-keto-1-gulonate (41.6) in water (75 cc.) and methyl alcohol (25 cc.) with magnesium (2.3 Gm.) at the boil for 15–20 minutes gives ascorbic acid in 84% yield.—C. PFIZER AND CO. Brit. pat. 521,-831; through *J. Soc. Chem. Ind.*, 59 (1940), 641. (E. G. V.)

Chlorination—Recent Progress in. The literature of 1937–1940 discloses much active interest in the chlorination of organic compounds. Some of the recent discoveries in this field are reviewed and discussed. Among them are the substitutive chlorination of olefins, peroxide-catalyzed chlorinations with sulfuryl chloride, chlorinations in intimate contact with a liquid mass of metallic chlorides, preparation of polychloropropanes, chlorination of natural gas, chlorination of aromatic compounds, chlorinolysis of paraffin hydrocarbons, high-pressure chlorination of paraffin hydrocarbons, hexachloroethane as a chlorinating agent, the use of a capillary for introducing chlorine into material to be chlorinated, chlorination of esters and chlorination of rubber.—E. T. MCBEE and H. B. HASS. *Ind. Eng. Chem.*, 33 (1941), 137–142. (E. G. V.)

Cholesterol—Mercuration of. Mercuric acetate in acetic acid mercurates cholesterol at position 6. The mercurated product has been converted by a series of reactions to 6-ketocholestanol.—R. H. LEVIN and M. A. SPIELMAN. *J. Am. Chem. Soc.*, 62 (1940), 920–921. (E. B. S.)

Diazo Compounds and Their Application. The production and application of diazo compounds in commerce are briefly reviewed and the difficulties in their preparation and utilization broadly described. The use of stabilizers is discussed and the necessity for supplying uniform finely-ground amines or their mineral salts, which should be readily soluble, is stressed.—N. A. SICHRA. *Bull. Acad. U. R. S. S., Cl. Sci. Tech.*, No. 1 (1939), 102–104; through *J. Soc. Chem. Ind.*, 59 (1940), 513. (E. G. V.)

Ethylamine Derivatives—Unsaturated. *2,230,-753*—Unsaturated derivatives of ethylamine having antispasmodic properties, and which have the general formula $R'CH(NR''R''')CH_3$ (where R' is an alkenyl radical containing 4 carbon atoms, R''

is hydrogen or a lower alkyl radical containing at least 2 carbon atoms and R''' is a radical from the group consisting of lower alkyl, lower alkenyl, cycloalkyl and phenyl-lower-alkyl radicals) are produced by treating the alkenylethylamine of the formula $R'CH(NHR'')CH_3$ (where R' is an alkenyl radical with at least 4 carbon atoms in a straight or branched chain with the exception of methyl-2-penten-2-yl and R'' is hydrogen, or an alkyl, or alkenyl radical) with alkylating, alkenylating, cycloalkylating or aralkylating agents. If desired, the production of the alkenylethylamine, for example, by the condensation of the corresponding alkenyl methyl ketone, can be carried out at the same time as the alkylation. *2,230,754*—This patent relates in general to the production of compounds of the general formula $R'CH(NHR'')CH_3$ (where R' is a lower alkenyl radical from the group consisting of straight-chained alkenyl radicals having 6 carbon atoms and branched-chained alkenyl radicals having 6 carbon atoms, where the branch is upon a hydrogenated carbon atom, and R'' is a radical from the group consisting of lower alkyl, lower alkenyl and cycloalkyl radicals) by condensing alkenyl methyl ketone of the general formula $R'COCH_3$ with primary amines of the general formula $R''NH_2$ (where R'' is an alkyl, alkenyl or cycloalkyl radical) and reducing the product. The condensation and the reduction may take place simultaneously or successively.—WILFRID KLAVEHN and ANTON WOLF, assignors to E. BILHUBER CORP. U. S. pats. 2,230,753 and 2,230,754, Feb. 4, 1941. (A. P.-C.)

Fluorene—Remarks on the Structure of. 2-Acetoxyfluorene and 2-acetoxyfluorenone, on Fries rearrangement, give the 1-acetyl-2-hydroxy compounds. From 2-allyloxyfluorenone, both 1- and 3-allyl-2-hydroxyfluorenones are obtained in the form of a molecular compound. These facts support the conclusion that no fixed "fine structure" exists in fluorene; the dibenzocyclopentadiene formula, however, seems to prevail.—E. BERGMANN and T. BERLIN. *J. Am. Chem. Soc.*, 62 (1940), 316–317. (E. B. S.)

Indandiones—Hydrogenated. By condensing compounds such as 1-methyl-1-cyclopenten-4,5-dione and 1-vinyl-3,4-dihydro-6-methoxynaphthalene, products are obtained which have the properties of sexual hormones.—ELISABETH DANE, assignor to SCHERING CORP. U. S. pat. 2,230,233, Feb. 4, 1941. (A. P.-C.)

Mercuration—Aromatic. In general, mercuration proceeds easily with the formation of mono-, di- and polymercurated compounds. For numerous compounds the ease of di- and polymercuration is so pronounced that it is impossible to obtain the monomercurated compound in satisfactory yield by direct mercuration. The methods of direct mercuration have been tabulated for hydrocarbons, amines, phenols, acids, nitro compounds and heterocyclic compounds. The methods of indirect mercuration are given. Orientation in direct mercuration is frequently anomalous, particularly when meta-orienting groups are present. Other factors, such as solvent and temperature, are discussed. Because of the ease with which the mercuri group reacts, these compounds are useful intermediates in the preparation of substituted aromatic compounds. Many aromatic mercurials are used extensively as pharmaceuticals. Methods of preparation are shown. The lack of information on various phases of mercuration is shown and the need for further research pointed out.—K. A. KOBE and T. F. DOUMANI. *Ind. Eng. Chem.*, 33 (1941), 170–176. (E. G. V.)

Methylaspartic Acids and Their Methylation. The synthesis of β-methylaspartic acid is described. Both α- and β-methylaspartic acids on methylation under prescribed conditions yield about 70 per cent of the theoretical amount of mesaconic acid, together with tetramethylammonium sulfate. The betaines of the two acids may be obtained on precipitation with phosphotungstic acid but on decomposition with barium hydroxide are decomposed with the formation of additional mesaconic acid, amounting to almost 30 per cent of the theoretical amount, and trimethylamine. Hydrolyzed casein on methylation gives fumaric acid equivalent to 4.7 to 4.93 per cent of aspartic acid. No mesaconic acid could be detected and it is concluded that neither α- nor β-methylaspartic acid is among the amino acids derived from casein.—H. D. DAKIN. *J. Biol. Chem.* 141 (1941), 945. (F. J. S.)

9-Methyl-3,4-Benzfluorene. 9-Methyl-3,4-benzfluorene has been synthesized for comparison with the actively carcinogenic 10-methyl-1,2-benzanthracene.—L. F. FIESER and L. M. JOSHEL. *J. Am. Chem. Soc.*, 62 (1940), 957–958. (E. B. S.)

Naphthoquinone Oxides. It is supposed that the high potency of the oxides of vitamin K_1 and of methylnaphthoquinone is due to the reduction of the oxides again in the organism.—L. F. FIESER, M. TISHLER and W. L. SAMPSON. *J. Am. Chem. Soc.*, 62 (1940), 1628–1629. (E. B. S.)

Nitroalcohols—Esters of. The propionic, butyric and isobutyric esters of all the monohydroxy nitroalcohols which can be formed by the condensation of nitromethane, nitroethane, 1-nitropropane, 2-nitropane, 1-nitrobutane and 2-nitrobutane with formaldehyde, acetaldehyde, propionaldehyde, butyraldehyde and isobutyraldehyde have been made, and certain of their properties determined. The esters are all colorless, mobile liquids boiling with slight decomposition between 210° and 275° C. at atmospheric pressure.—J. B. TINDALL. *Ind. Eng. Chem.*, 33 (1941), 65–66. (E. G. V.)

Pantothenic Acid—Process of Preparing. The process used involves fusing a mixture made up of β-alanine and α,γ-dihydroxy-β,β-dimethylbutyric acid or α-hydroxy-β,β-dimethylbutyro-γ-lactone. The materials are heated to above 178° C. for about 15 minutes or longer.—MARJORIE B. MOORE, assignor to ABBOTT LABORATORIES. U. S. pat. 2,234,680, March 11, 1941. (A. P.-C.)

Phenothiazine. A review is given of the literature for the preparation, analysis, toxicology and therapeutic use (especially veterinary use) of phenothiazine (Danish: fentiazin), 2,7-dihydroxyphenothiazine, (leucothianol) and 7-hydroxyphenothiazone-2 (thianol). Thirty-one literature references are cited.—A. LANNUNG. *Arch. Pharm. Chemi*, 48 (1941), 141. (C. S. L.)

Phenylarsenoxides—Preparation of, in Relation to a Projected Study of Their Chemotherapeutic Activity. I. Monosubstituted Derivatives. A series of monosubstituted phenylarsenoxides has been prepared with a view to studying their action against *Treponema pallidum*. Five new compounds have been described, being nitro, amino, hydroxy, chloro and acid derivatives. Additional data have been obtained on some of the known arsenoxides.—G. O. DOAK, HARRY EAGLE and H. G. STEINMAN. *J. Am. Chem. Soc.*, 62 (1940), 168–170. (E. B. S.)

1-Phenyl-2-Ethylmethylamino-1-Propanol and Its Addition Salts. 1-Phenyl-2-ethylmethylamino-1-propanol is prepared by treating 1-phenyl-2-methylamino-1-propanol with diethyl sulfate, and is recovered by precipitation from aqueous solution as the oxalate. The free base melts at 29° to 30° C. It forms a methiodide and salts with picric, hydrochloric, phosphoric, acetic, sulfuric, propionic, lauric, oleic, stearic, lactic and succinic acids. It is suitable for therapeutic use and has but little effect upon the blood pressure.—ROBERT S. SHELTON, assignor to THE WM. S. MERRELL CO. U. S. pat. 2,234,933, March 11, 1941. (A. P.-C.)

Polyhydrocyclopentanophenanthrene Series—Compounds of. Therapeutic or intermediate compounds are produced by a process which involves replacing by hydrogen a halogen or diazo group in the side chain of a compound of the series which is substituted in the 17-position by the side chain $—COC(:R_2)R_1$ in which R_1 is hydrogen, a hydrocarbon radical, an alkyl-substituted carboxyl group or a cyanogen group, and R_2 is a member of the group consisting of two halogen atoms, a halogen and a hydrogen atom, a halogen atom and a hydrocarbon radical, a halogen atom and an alkyl-substituted carboxyl group, a halogen atom and a cyanogen group, and the diazo group, by treating the compound with a reducing agent capable of replacing the member of the group consisting of the halogen and the diazo group in the side chain by hydrogen. Various examples with details are given.—TADEUS REICHSTEIN and ALBERT WETTSTEIN, assignors to CIBA PHARMACEUTICAL PRODUCTS, INC. U. S. pat. 2,229,818, Jan. 28, 1941. (A. P.-C.)

Procaine Citrates. Details are given of the preparation of various compounds such as mono- and diprocaine citrates, which are soluble in alcohol and water and are suitable for use in stabilizing alkaline anesthetic solutions, etc. Diprocaine citrate melts at 120° to 121° C.—DAVID CURTIS. U. S. pat. 2,227,633, Jan. 7, 1941. (A. P.-C.)

Proflavine—Synthesis of, from *m*-Phenylenediamine and Its Derivatives. Proflavine is generally obtained by nitrating 4:4′-diaminodiphenylmethane, heating this with $SnCl_2$ to form diaminodihydroacridine which is oxidized to proflavine. According to patent literature, a cheaper method is that of heating *m*-phenylenediamine (1 mol), glycerol (2 mols), $ZnCl_2$ (1.33 mols), and oxalic acid dihydrate (1 mol) for 2 hours at 190° to give a 60% yield. This procedure in the hands of the author gave only tar, but by doubling the amount of glycerol and heating at 155° for 45 minutes 55–65% yields of proflavine were obtained. The author records the yields from this reaction using various sets of conditions, such as: different proportions of reactants, various condensing agents, etc. Other procedures are outlined for obtaining proflavine up to 70% yields from *m*-amino-oxanilic acid or from mono (or di)-formyl-*m*-phenylenediamine. The mechanism of the first stages of the reaction is discussed. Certain derivatives and by-products of proflavine are described. The reaction was deemed important since it produces expensive acridine derivatives from simple derivatives of benzene.—ADRIEN ALBERT. *J. Chem. Soc.*, (1941), 121–125. (W. T. S.)

***p*-Quinones and Quinols, Particularly ψ-Cumoquinone and ψ-Cumoquinol—Manufacture of Substituted.** Benzene compounds having two free para positions and substituted in the remaining nuclear positions by alkyl and at least one halogen are nitrated and reduced to give a *p*-diamine, which is oxidized to the quinone and this reduced to the quinol; a dehalogenation step is applied at any stage after the nitration. In the examples, the reduction of the stannichloride of 5-bromo-3:6-dinitro-ψ-cumene to the corresponding diamine stannichloride (I) and oxidation of the latter (with ferric chloride) to ψ-cumoquinone, and the oxidation of I to 5-bromo-ψ-cumoquinone and conversion to this by (simultaneous or stepwise) dehalogenation and reduction into ψ-cumoquinol is described. One claim covers the preparation of *m*-xylo-quinone and -quinol from 4:6-dihalogeno-*m*-xylenes.—H. B. FRASER, and G. E. H. SKRIMSHIRE. Brit. pat. 519,398; through *J. Soc. Chem. Ind.*, 59 (1940), 515. (E. G. V.)

Sodium Antimonylpyrocatecholthiosalicylate. This compound, a white solid having therapeutic properties and soluble in water, is made by reaction of antimonylpyrocatechol with sodium thiosalicylate. Various similar reactions are described.—HAROLD P. BROWN and JAMES A. AUSTIN, assignors to JENSEN-SALSBERY LABORATORIES, INC. U. S. pat. 2,226,530, Dec. 31, 1940. (A. P.-C.)

Sterols. LXXV. Oxidation of Sarsasapogenin Acetate with Potassium Permanganate. Sarsasapogenin acetate upon oxidation with potassium permanganate yields the C_{22} keto acid, the C_{22} lactone and sarsasapogenoic acid.—R. E. MARKER and E. ROHRMANN. *J. Am. Chem. Soc.*, 62 (1940), 222–223. (E. B. S.)

Sterols. LXXXIV. Progesterone from Hyodesoxycholic Acid. The Barbier-Wieland degradation applied to hyodesoxycholic acid produced 3,6-diacetoxy-*etio*-cholanyl methyl ketone. This compound was converted into progesterone by a method described for the conversion of 3,6-cholestanediol diacetate into cholestenone.—R. E. MARKER and J. KRUEGER. *J. Am. Chem. Soc.*, 62 (1940), 79–81. (E. B. S.)

Sulfanilamide Compounds. II. Arylidine Derivatives of N^1-Substituted Sulfanilamides. A detailed procedure is given for a general method of preparing N^4-arylidine sulfanilamides; the preparation of N^4-(4-methoxy)-benzylidine-N^1-(4-nitro)-phenylsulfanilamide is described as an example. On the basis of preliminary biological studies, introduction of the arylidine group causes some diminution in activity, and a significant decrease in toxicity.—H. G. KOLLOFF and J. H. HUNTER. *J. Am. Chem. Soc.*, 62 (1940), 158–160. (E. B. S.)

Sulfanilamide—Preparation of. *p*-Chlorobenzenesulfonyl chloride, aqueous ammonia and a copper catalyst are heated to about 150° C.—JOHN K. SIMONS, assignor to PLASKON CO. U. S. pat. 2,237,372, April 8, 1941. (A. P.-C.)

Sulfanilyl Derivatives of Heterocyclic Amines. II. Thiazoles and Thiazolines. Continuing work on sulfanilyl compounds begun by Jensen in 1939 the preparation of sulfanilyl compounds of thiazoles and thiazolines was studied. There appears to be a tautomerism between 2-acetylsulfanilamide and 2-iminothiazoline (2-thiazoloneimide). When 2-acetylsulfanilamide was coupled with 2-bromothiazole 2-acetylsulfathiazole was formed. On methylation the methyl group entered the 3 position to give 2-acetylsulfanilimido-3-methylthiazoline, and the same compound was formed if 3-methylthiazole was coupled with *p*-acetylaminobenzolsulfone chloride (called A below). Hence 2-acetylthiazole must be able to convert to the tautomer: 2-acetylsulfaniliminothiazoline. From the behavior of the red-violet copper complex of acetylsulfathiazole it was concluded that there is resonance between a form in which Cu is bound to the side chain N on position 2 by primary valence and by residual valence to the ring N (position 3) of the iminothiazoline form, and a form in which the Cu is bound by primary valence to the ring N, and by secondary valence to the side chain N of the aminothiazole form. It was not found possible to prepare 3-acetylsulfanilimidothiazoline. When A was reacted with 2-aminothiazole, two compounds formed, namely: 2-acetylsulfanilamidothiazole, and also the disulfonyl compound: 2-acetylsulfanilimido-3-acetylsulfanilylthiazoline (obtained as a hydrate with one mol. of water, m. p. 156° C.). Similar 2-sulfonimido-3-sulfonyl-thiazolines and 2-sulfonamido-thiazoles were obtained by reacting other sulfone chlorides in pyridine solution with 2-aminothiazole (using *p*-toluolsulfone chloride, *p*-brombenzolsulfone chloride, and *p*-nitrobenzolsulfone chloride); both the mono and disulfonyl derivatives being obtained from each reaction. The substituted thiazoles gave violet copper complexes, showing that the substitution in the para position did not affect complex for-

mation. On reacting A with 2-methylaminothiazole, the product obtained was probably 2-acetylaminobenzolsulfonemethylimidothiazoline, but it was not found possible to check the structure by reaction of acetylsulfanilmethylamide with 2-bromothiazole, as a tar was obtained. Other acid chlorides were also reacted with 2-aminothiazole. One mole of benzoyl chloride gave a mono-benzoate, 2-benzamidothiazole, soluble both in bases and alkalies. Starting from substituted 2-aminothiazoles the following derivatives were obtained by reaction with A in pyridine solution and subsequent saponification of the acetyl group: 2-sulfanilamido-4-methylthiazole (B), 2-sulfanilamido-5-methylthiazole (C), 2-sulfanilamido-4,5-dimethylthiazole (D), 2-sulfanilamido-4-methyl-5(β-hydroxyethyl)thiazole, 2-sulfanilamido-4-phenylthiazole, 2-sulfanilamido-4,5-benzothiazole, 2-sulfanilamido-4-methylthiazole-5-carboxylic acid, and 2-sulfanilamidothiazolyl-4-acetic acid. With some of the substituted aminothiazoles disulfonylthiazoline derivatives were obtained, and these could be hydrolyzed to monosulfonylthiazoles, but disulfonylthiazolines were not obtained from 2-amino-4-phenylthiazole, 2-amino-4-methylthiazole-5-carboxylic acid ethyl ester or 2-aminothiazolylacetic acid ethyl ester. These reacted with difficulty and even on warming gave only monosulfonyl derivatives. Compound C (above) gave a red-violet copper complex, but the 4-substituted compound, B, did not, although the 4,5-substituted compound, D, gave an insoluble, violet Cu complex. The structural reasons for this are discussed. Sulfathiazole could be alkylated with dimethyl or diethyl sulfate, giving 2-sulfanilimino-3-alkylthiazolines, and acetylsulfathiazole yielded similar alkylated acetyl derivatives. Their constitution was checked by the reaction of A with 2-imino-3-methylthiazoline, yielding the same acetyl compound, and the same free thiazoline on saponification, as were the products of methylation of sulfathiazole and acetylsulfathiazole. Likewise 2-aminothiazoline (here the thiazoline with two CH_2 groups in the 4,5-positions in the ring) could exist in the tautomeric form: 2-iminothiazolidine, and on reaction with A, followed by saponification gave 2-sulfanilimido-3-sulfanilylthiazolidine and 2-sulfanilamidothiazoline. Under proper conditions it was also possible to obtain 2-imino-3-acetylsulfanilylthiazolidine, and the same product could be obtained by reacting acetylsulfanil-β-bromoethylamide with potassium rhodanide. The *in vitro* bacteriostatic action of all the above cited compounds was stated to be practically equal to that of sulfathiazole. Detailed preparation methods and melting points are given for 50 compounds. Thirty-four literature references are cited.—K. A. JENSEN and T. THORSTEINSSON. *Dansk Tids. Farm.*, 15 (1941), 41. (C. S. L.)

Sulfonamide Derivatives of Arylureas. The preparation and properties of a series of sulfonamide derivatives of some of the arylureas, as well as the intermediate derivatives, are described. The parent substance, *p*-acetylphenylureasulfonamide (N^4-carbamylsulfanilamide), shows no activity in experimental streptococcal infections in mice.—E. H. COX. *J. Am. Chem. Soc.*, 62 (1940), 743–744. (E. B. S.)

Tantalum—Organic Compounds of. Tantalum pentachloride reacted with phenyl magnesium bromide and also with ethyl magnesium bromide to make a very unstable tantalorganic compound from each.—B. N. AFANASYEV. *Chemistry and Industry*, 59 (1940), 631–633. (E. G. V.)

Temperatures—Colors Indicating, in Industry and the Laboratory. The following inorganic combinations with methenamine and water are listed as agents for indicating temperatures based on color changes: $CoCl_2.2C_6H_{12}N_4.10\ H_2O$, color change at 35°, color change rose-blue; $CoBr_2.2C_6H_{12}N_4$. 10 H_2O, 40°, rose-blue; $CoI_2.2C_6H_{12}N_4$. 10 H_2O, 50°, rose-green; $Co(CNS)_2.2C_6H_{12}N_4$. 10 H_2O, 60°, rose-blue; $Co(NO_3)_2.2C_6H_{12}N_4$. 10 H_2O, 75°, rose-purple; $CoSO_4.C_6H_{12}N_4$. 9 H_2O, 60°, rose-violet; $NiCl_2.2C_6H_{12}N_4$. 10 H_2O, 60° and 100°, bright green-violet and yellow-violet; and $NiBr_2.2C_6H_{12}N_4$. 10 H_2O, 60°, bright green-blue. Other temperatures not indicated in the table may be obtained by various combinations of the products listed.—WALTER MEYER. *Wien. Pharm. Wochschr.*, 74 (1941), 96. (H. M. B.)

Trichloroacetic Acid—Formation of, from Perchloroethylene by Atmospheric Oxidation. Experiments designed to stabilize perchloroethylene against atmospheric oxidation revealed that both trichloroacetic acid and carbonyl chloride result from the oxidation of this substance. Ten cc. of perchloroethylene and 0.2 cc. water exposed to sunlight for 4 months yielded 2 Gm. of trichloroacetic acid probably from oxidation by ozone or peroxide formed by the sunlight. Perchloroethylene is known to yield trichloroacetic acid on oxidation by peracetic acid (Prileshaeva and Prileshaev, *J. Gen. Chem. Russia*, 9 (1939), 1766).—KENNETH C. BAILEY and W. S. E. HICKSON. *J. Chem. Soc.*, (1941), 145. (W. T. S.)

N-Trimethylglycylcholine—Synthesis of. In the hope of obtaining a base of pharmacological interest, trimethylglycylcholine has been synthesized by the condensation of trimethylamine and a halogenoethyl ester of a halogenoacetic acid. The base possessed an extremely weak muscarine-like activity.—THOMAS S. WORK. *J. Chem. Soc.*, (1941), 190–191. (W. T. S.)

Trimethylhydroquinone—Ethers of. Compounds of the general formula $C_6H(CH_3)_3(OH)OR$ (where *R* is an alkyl radical, an alkylene radical or a hydroaromatic radical derived from an aliphatic saturated alcohol, aliphanic unsaturated alcohol or hydroaromatic alcohol containing from 15 to 25 carbon atoms) may be obtained by a process, *e. g.*, which involves treating trimethylhydroquinone with an aliphatic saturated alcohol, aliphatic unsaturated alcohol or hydroaromatic alcohol, containing from 15 to 25 carbon atoms or esters of halides thereof, and serve to overcome "resorption sterility" when administered to female rats. Details are given of the production of several such ethers.—WALTER JOHN and OTTO DALMER, assignors to MERCK & Co. U. S. pat. 2,235,884, March 25, 1941. (A. P.-C.)

Urane Compounds—Production of. Fractional crystallization of the neutral ether-soluble, nonphenolic carbinol fraction (I) of pregnancy urine, preferably with a preliminary oxidation to convert alcohols into ketones, affords urane compounds. The preparation of uranetriol and its acetate, uranetrione and its bromine derivative, urenetrione, melting point 196°, and its allomorphic form, melting point 212°, urane, and urane-3:20-dione is described.—R. E. MARKER. Brit. pat. 522,066; through *J. Soc. Chem. Ind.*, 59 (1940), 641. (E. G. V.)

Vitamin B_1—Synthesis of the Pyridine Analog of. Pairs of compounds, one containing a ring sulfur atom and the other an ethylenic linkage in the position occupied by the ring sulfur of the former, have been termed "isosters." Striking similarity in physical, chemical and pharmacological properties often exists between isosters, *e. g.*, sulfathiazole is isosteric with sulfapyridine. To develop this idea and to elucidate the chemistry of the thiamine isoster, the authors give detailed experimental procedures which were used to synthesize 2-methyl-3-(β-hydroxyethyl) pyridine which was condensed

with the pyrimidine component of thiamine to yield the pyridine analog or isoster of thiamine.—ANN H. TRACEY and ROBERT C. ELDERFIELD. *J. Org. Chem.*, 6 (1940), 54–62. (W. T. S.)

Vitamin E—Chemistry of. XXI. Dealkyation of Hydroquinone Ethers Related to the Tocopherols. Carbinols derived from 1-(3,6-dimethoxy-2,4,5-trimethylphenyl)-butanone-3 by action of Grignard reagents, have been demethylated by heating with excess reagent. The structure of the carbinol has been proved by converting it to the same 3,5-dinitrobenzoate as that obtained from 2,2,5,7,8-pentamethyl-6-hydroxychroman by a series of reactions involving oxidation to a quinone, reductive methylation of the quinone and conversion of the dimethoxy compound to the 3,5-dinitrobenzoate. These reactions also prove the structure of the 2,2,5,7,8-pentamethyl-6-hydroxychroman and show definitely that when Grignard reagents react with dihydrocoumarins, the products are 2,2-dialkylchromans.—L. E. SMITH, H. E. UNGNADE and W. B. IRWIN. *J. Am. Chem. Soc.*, 62 (1940), 142–144. (E. B. S.)

Vitamin K—Diene Synthesis of 2,3-Dialkyl-1,4-Naphthoquinones Related to. As a route to 2,3-dialkyl-1,4-naphthoquinones of high molecular weight which might show vitamin K activity, a study has been made of the addition of suitable dienes to α-naphthoquinone and the partial dehydrogenation of the products. Two satisfactory syntheses were developed and applied to the preparation of C_{20}-quinones of the type desired. Neither of these substances shows activity.—L. F. FIESER and C. W. WIEGHARD. *J. Am. Chem. Soc.*, 62 (1940), 153–155. (E. B. S.)

BIOCHEMISTRY

Adenine—Estimation of. Adenine, and, under certain conditions, guanine, can be determined by precipitation with sodium picrate solution, and titration of the precipitates with standard sodium hydroxide solution.—GEORGE H. HITCHINGS and CYRUS H. FISKE. *J. Biol. Chem.*, 141 (1941), 827. (F. J. S.)

Antiscorbutic Values of Fruits and Vegetables. Figures are given of the amount of ascorbic acid normally found in certain fruits and vegetables; of the effect of cooking, especially with added soda, on these figures; and of the effects of canning and jam-making.—M. OLLIVER. *Lancet*, 239 (1940), 190. (W. H. H.)

Arginine—Micromethod for the Determination of. A micromethod for the determination of arginine in biological fluids and tissue extracts is described. The advantages of this new method are that a complete separation of arginine from glycocyamine is effected, and that it gives satisfactory results in the presence of common biological substances which interfere in the procedure of previous methods.—JACOB W. DUBNOFF. *J. Biol. Chem.*, 141 (1941), 711. (F. J. S.)

Bacteria—Growth Factors for. XIII. Purification and Properties of an Eluate Factor Required by Certain Lactic Acid Bacteria. A method for the preparation of concentrates of the norit eluate factor is presented. The active principle is an acid and probably contains an amino group. The nutritional importance of the compound is indicated by its indispensable role in the nutrition of certain bacteria and its probable requirement by the chick.—B. L. HUTCHINGS, N. BOHONOS and W. H. PETERSON. *J. Biol. Chem.*, 141 (1941), 521. (F. J. S.)

Bile and Bile Preparations. A review with 33 references.—M. A. LESSER. *Drug and Cosmetic Ind.*, 49 (1941), 265–267, 172. (H. M. B.)

Biotin—Effect of Certain Reagents on the Activity of. Biotin can be inactivated by vigorous treatment with acid and alkali. Although biotin is inactivated by many reagents known to react with α-amino acids, its activity is not affected by ninhydrin. The latter fact strongly indicates that biotin is not an α-amino acid. The activity of biotin is not destroyed by the use of acylating or alkylating reagents, nor by the use of carbonyl reagents. Biotin also contains an easily oxidizable group or groups.—GEORGE BOSWORTH BROWN and VINCENT DU VIGNEAUD. *J. Biol. Chem.*, 141 (1941), 85. (F. J. S.)

Biotin—Effects of, upon Fat Synthesis and Metabolism. Impure solutions of biotin from several sources and pure biotin, given to rats in conjunction with thiamine, riboflavin, pyridoxine and pantothenic acid, caused fatty livers similar to those produced by feeding a fraction from beef liver. The fatty livers were characterized by a high content of cholesterol. The effect of biotin was prevented by simultaneously feeding egg white, lipocaic or inositol. It is concluded that beef liver fraction owes its activity to its content of biotin. Biotin had, also, an additive effect upon body weight, similar to that ascribed to factor W.—GERTRUDE GAVIN and E. W. MCHENRY. *J. Biol. Chem.*, 141 (1941), 619. (F. J. S.)

Bismuth Nicotinates. A therapeutic material containing 10% to 52% of nicotinic acid is prepared by reaction of bismuth subnitrate with nicotinic acid in hot water.—EDWIN DOWZARD and LEO A. FLEXSER, assignor to THE NEW YORK QUININE & CHEMICAL WORKS. U. S. pat. 2,230,616, Feb. 4, 1941. (A. P.-C.)

Blood and C.S.F.—Colorimetric Standards for Emergency Estimations of Certain Constituents of. Permanent artificial color standards are described for the estimation of urea, non-protein nitrogen and proteins. The standards may also be used for the approximate estimation of blood sugar and hemoglobin.—E. J. KING. *Brit. Med. J.*, 4161 (1940), 445. (W. H. H.)

Blood Stored in Different Preservatives—Changes Occurring in. Glucose in a final concentration of 0.1 and 1 per cent favors the preservation of red cells in stored blood through its effect on red cell fragility. Red cell counts on stored blood must be made using plasma as diluent.—J. DUBASH, O. CLEGG and J. VAUGHAN. *Brit. Med. J.*, 4162 (1940), 482. (W. H. H.)

Blood Substitutes in Acute Hemorrhage. Since blood cannot be stored longer than a few weeks, a substitute capable of being accumulated in large stocks is needed. Under standard experimental conditions the therapeutic actions of various blood substitutes have been compared with those of whole blood and the conclusion is reached that plasma is the only one which, in the cat, consistently gives results approximate to those obtained with whole blood. The other substitute solutions the authors place in the following descending order of value: serum, hemoglobin-Ringer, gum-saline, red cells in crystalloid solution, isotonic saline and isotonic glucose. The authors conclude that filtration is the best method of overcoming the danger of plasma infection.—G. A. H. BUTTLE, A. KERWICK and A. SCHWEITZER. *Lancet*, 239 (1940), 507 (W. H. H.)

Blood—Survival of Stored, after Transfusion. Stored blood survives for considerable periods after transfusion. Red cells stored for less than a week show about 70 per cent of survival 14 days after transfusion. If storage is between 7 and 14 days more than half the transfused cells are still present in the recipient's circulation 14 days after trans-

fusion. During storage normal cells lose potassium and take up a great excess of sodium. Within twenty-four hours of transfusion the chemistry of stored cells is restored to normal.—M. MAIZELS and J. H. PATERSON. *Lancet*, 239 (1940), 417. (W. H. H.)

Blood Typing in Establishing Paternity. The blood group of children corresponds to one or other of the parents. It is only of negative value in determining paternity.—EUGENIO ALONSO. *Cebu Med. Soc.*, 1 (April 1940), 13; through *Rev. Filipina Med. Farm.*, 31 (1940), 160. (G. S. G.)

Blood Volume—Estimation of, in Plasma Transfusion. When a known volume of plasma is rapidly transfused the patient's blood volume can simply be calculated from the hematocrit readings, hemoglobin estimations or red cell counts immediately before and after the transfusion.—S. R. M. BUSHBY, A. KERWICK and L. E. H. WHITBY. *Lancet*, 239 (1940), 540. (W. H. H.)

Calcium and Phosphorus Metabolism. From a study of the calcium content of the soft tissues of albino rats with rickets and in hypervitaminosis D, it was concluded that calcination of soft tissue depends not only on the increase calcium content of the blood and tissues but on other factors apparently necessary for calcium deposition.—V. N. PATWARDHAN and R. G. CHITRE. *Indian J. Med. Research*, 28 (1940), 353–360. (W. T. S.)

Cerebrosides—Determination of. The method of Miller and Van Slyke for the determination of sugar by direct titration with ceric sulfate was applied to the analysis of cerebrosides. Difficulties were encountered in the hydrolysis of cerebrosides when carried out according to published procedures for their quantitative determination. Under mild conditions hydrolysis is incomplete while under more severe conditions destruction of galactose may occur. A procedure for the quantitative determination of cerebrosides is described.—FLORENCE C. BRAND and WARREN M. SPERRY. *J. Biol. Chem.*, 141 (1941), 545. (F. J. S.)

Chlorides—Determination of, in Biological Fluids by the Use of Adsorption Indicators. The Use of Eosin for the Volumetric Microdetermination of Chlorides in Acetone Filtrates of Biological Fluids. A rapid, precise method is presented for argentometric microtitrations of chlorides in acetone filtrates of various biological fluids with eosin as an adsorption indicator. The method may be used in acid solution, *e. g.*, acetic acid, above pH 1 or in the presence of oxidizing agents, *e. g.*, H_2O_2, and gives excellent recoveries of added NaCl. Chlorides in whole blood, plasma, serum, cerebrospinal fluid and pleural fluid have been determined with an average error of less than ± 1 per cent.—ABRAHAM SAIFER, JAMES HUGHES and FRANK SCUDERO. *J. Biol. Chem.*, 141 (1941), 495. (F. J. S.)

Corpus Luteum Hormone—Derivatives Having the Activity of. Various examples with details are given of the production of compounds such as $\Delta^{4,5}$-pregnene-3,20-dione, which have the same physiological activity as the so-called corpus luteum hormone present in the corpora lutea of the ovaries. The method employed may involve treating a bisnorcholenic acid of the formula $C_{21}H_{32}(R)(COOR')$ (where R is in the 3-position and is alcoholic hydroxyl or a substituent which by hydrolysis can be reconverted into an alcoholic hydroxyl group, while $COOR'$ is at the C-20 position and R' represents a hydrocarbon radical) with an organo-metallic compound of the Grignard type, dehydrating the so-obtained secondary-tertiary dialcohol by splitting out water between the tertiary hydroxyl group and the adjacent tertiary hydrogen atom, and oxidizing the resulting unsaturated alcohol to the extent of splitting up the double bond in the side chain so as to form the corresponding pregnenolone compound. During the oxidation or course of the reaction, the double bond in the ring is protected by intermediate saturation with halogen.—ADOLF BUTENANDT, assignor to SCHERING CORP. U. S. pat. 2,232,438, Feb. 18, 1941. (A. P.-C.)

Cortical Hormone. The hydroxy ketone fraction described in U. S. pat. 2,166,877 is acetylated as described in that patent and the resulting mixture of acetates is dissolved in a mixture of benzene and pentane in equal proportions, the solution is filtered through a column of activated alumina and, by elution with benzene, 21-acetoxy-4-pregnene-3,20-dione is obtained. Subsequent elutions are now effected with benzene, mixtures of benzene and ether in the proportions 9:1, 8:2, 7:3 and 5:5, with absolute ether and finally with a mixture of ether and acetone in the proportion of 1:1. From the extracts with benzene-ether 5:5, with absolute ether and from the first extracts with ether-acetone 1:1, 21-acetoxy-4-pregnene-3,20-dione is obtained in the pure state, *e. g.*, by recrystallization by acetone. From 2.7 Gm. of the hydroxy ketone fraction some 50 mg. of the new hormone are obtained in this way. From the acetate so obtained the free 4-pregnene-17,21-diol-3,20-dione is obtained by saponification with potassium bicarbonate in methanol at room temperature. Upon recrystallization of the product from absolute ethanol, colorless crystals are obtained which melt at about 210° C. (corrected), the melting point being somewhat dependent on the velocity of heating.—TADEUS REICHSTEIN, assignor to ROCHE-ORGANON, INC. U. S. pat. 2,228,706, Jan. 14, 1941. (A. P.-C.)

Cupric Chloride Crystallization Patterns—Modification of, by Traces of Proteins. Minute quantities of proteins can greatly modify the cupric chloride crystallization patterns produced by polysaccharides and similar substances. This modification is apparently not due entirely to surface tension effects. The specificity of the patterns so far described appears to be due to the polysaccharides, whereas the action of the proteins is entirely non-specific. The protein effect seems to depend upon the total amount of protein present, rather than on the proportion of protein to polysaccharide.—DANIEL LUZON MORRIS and CAROL TILDEN MORRIS. *J. Biol. Chem.*, 141 (1941), 515. (F. J. S.)

Erythrocytes—Survival of Transfused, of Stored Blood. Twenty-six transfusions of stored blood were given to twenty patients and the survival of the donor's cells was followed quantitatively by differential agglutination. In four cases two transfusions of blood stored for different periods were given simultaneously to the same patient. The fate of the cells of each transfusion was followed separately by a method employing the sera both of the ABO and MN systems. In this way a direct comparison of the survival of stored blood and fresh blood was made. A high proportion of the erythrocytes of stored blood survive transfusion. Furthermore, the total time of survival is little less than that of fresh blood. These observations suggest that the present method of storage employed at the London blood supply depots is good and that little more than the normal ageing process takes place, at least in blood stored for 18 days or less.—P. L. MOLLISON and I. M. YOUNG. *Lancet*, 239 (1940), 420. (W. H. H.)

α-Estradiol—Fate in Man of Injected. A total of 250 mg. of purified α-estradiol was administered intramuscularly to a normal male subject in order to ascertain the nature of the urinary excretory products. Recovered unchanged were 9.8 mg. (3.9 per cent), while oxidized to estrone (isolates as such) were 16.2 mg. (6.4 per cent). No estriol or β-estra-

diol was obtained. Thorough exploration of the urine by systematic fractionation and chromatographic analysis failed to separate any other compounds which could be recognized as estrogen metabolites. Isolated were the usual steroids of the normal male urine, androsterone, dehydroisoandrosterone, etiocholan-3(α)-ol-17-one, pregnane-3-(α),-20(α)-diol, and cholesterol, together with very small quantities of three unidentified substances. The fate of the remaining 90 per cent of the hormone, which is inactivated in the body, is discussed.—R. D. H. HEARD and M. M. HOFFMAN. *J. Biol. Chem.*, 141 (1941), 329. (F. J. S.)

Filtrate Factor and Pantothenic Acid—Growth and Graying of Rats Influenced by. Calcium pantothenate stimulates growth and prevents pattern graying, but not stippling, in filtrate factor deficient rats. The requirement for growth is less than that for prevention of graying. Liver filtrate stimulates growth to a higher degree and completely prevents graying, which proves that pantothenic acid does not completely replace liver filtrate. An ether extract from cane molasses was fully active whereas a chloroform extract was inert. Inositol did not noticeably improve the activity of pantothenic acid.—GLADYS A. EMERSON and HERBERT M. EVANS. *Prov. Soc. Exptl. Biol. Med.*, 46 (1941), 655. (A. E. M.)

Food Materials—Application of a Method of Capillary Analysis to. Applications of the method to the determination of acidity in wines and of the purity of fats and oils are described.—R. DUBRISAY. *Atti X Congr. Internaz. Chim.*, IV (1938), 566–578; through *J. Soc. Chem. Ind.*, 59 (1940), 562. (E. G. V.)

Glandular Succedaneum (Adrenal Cortical Hormone)—Manufacture of. A preparation of cortical hormone free from adrenaline (I) is obtained by triturating adrenal glands or the separated cortical tissue therefrom, with or without previous maceration in slightly alkaline physiological salt solutions, with a mixture of glycerin (90) and ethyl alcohol (10%), further ethyl alcohol being added until it forms 98% of the solvent, then filtering the extract, and removing or destroying the I, *e. g.*, by aerating the solution while gently heating to remove ethyl alcohol.—J. M. ROGOFF and G. N. STEWART. U. S. pat. 2,096,342; through *J. Soc. Chem. Ind.*, 59 (1940), 567. (E. G. V.)

Gonadotropic Hormone Purification. The process of purifying the gonadotropic hormone occurring in the blood of pregnant equine animals during early pregnancy involves producing a substantially alkaline solution of the hormone and its naturally occurring impurities in water and acetone or alcohol, controlling the concentration of the solvent to make the mixture capable of holding the hormone in solution and incapable of holding a portion of the impurities in solution, adjusting the pH of the mixture to make it acid and capable of retaining the hormone in solution and substantially incapable of retaining the balance of the impurities in solution, separating the supernatant liquid, increasing the concentration of the solvent in the supernatant liquid to a point at which the supernatant liquid is incapable of holding the hormone in solution, and separating the precipitated hormone.—GEO. F. CARTLAND, assignor to THE UPJOHN CO. U. S. pat. 2,238,868, April 15, 1941. (A. P.-C.)

Human Plasma—Electrophoretic Measurements on Normal. Electrophoretic data on twelve additional normal human plasmas are presented and a statistical treatment of the variations of electrophoretic components in twenty-five normal human plasmas is made. Mention is made of a previously unobserved small component with high mobility usually occurring in plasma and serum in the presence of a barbiturate buffer.—DAN H. MOORE and JOHN LYNN. *J. Biol. Chem.*, 141 (1941), 819. (F. J. S.)

Hydroxylysine—Determination of, in Proteins. Hydroxylysine in protein hydrolysates has been determined by precipitating it with the other diamino acids as phosphotungstate and determining the ammonia evolved from the —CH(OH).CH(NH_2)— group of the hydroxylysine when the diamino acids are treated with alkaline periodate. Under the conditions employed for the periodate-ammonia reaction with hydroxylysine, the other amino acids with the —CH(NH_2).CH(OH)— group, *viz.*, serine, threonine and β-hydroxyglutamic acid, also give quantitative yields of ammonia; no amino acid without this group has been found to yield ammonia. In the analysis of protein hydrolysates for hydroxylysine, the other ammonia-yielding amino acids are completely separated from the hydroxylysine by recrystallization of the diamino acid phosphotungstates. In a series of 16 proteins analyzed for hydroxylysine only 6 were found in which hydroxylysine contained over 0.1 per cent of the total nitrogen, and in only gelatin and collagen did the amount approach 1 per cent of the total protein nitrogen.—DONALD D. VAN SLYKE, ALMA HILLER and DOUGLAS A. MACFADYEN. *J. Biol. Chem.*, 141 (1941), 681. (F. J. S.)

Ketosteroids—Biochemical Manufacture of. Steroids containing more than one hydroxyl group capable of dehydrogenation are subjected to the action of a biochemical dehydrogenating agent such as an "impoverished" yeast, and the polyketo compounds thus formed are subjected to the action of a biochemical hydrogenating agent. Thus, dehydroandrosterone may be converted to androstendione and the latter to testosterone. Various examples with details are given.—HEINRICH KOESTER, LUIGI MAMOLI and ALBERTO VERCELLONE, assignors to SCHERING CORP. U. S. pat. 2,236,574, April 1, 1941. (A. P.-C.)

K Vitamins—Colorimetric Oxidation-Reduction Method for the Determination of the. A colorimetric, oxidation-reduction method for the determination of the K vitamins has been described. The test is performed in butanol solution. This increases the stability and spectral purity and doubles the optical density of the 2,6-dichloroindophenol reagent. The method is applicable to solutions containing as little as 5 γ of vitamin K_1 per cc. A means for applying the method to colored extracts has been presented. The vitamin K content of a number of materials has been reported. The specificity of the method has been discussed and it has been shown that vitamin K_1 can be differentiated from 2-methyl-1,4-naphthoquinone and the tocopherylquinones. Evidence has been presented to show that extraneous, slowly reducing substances present in certain extracts are tocopherylquinones. The method is quantitatively applicable to the determination of the tocopherylquinones and the tocopherols, after oxidation to the corresponding quinones.—JOHN V. SCUDI and RUDOLF P. BUHS. *J. Biol. Chem.*, 141 (1941), 451. (F. J. S.)

Lanthionine—Formation of, on Treatment of Insulin with Dilute Alkali. When 2.95 Gm. of amorphous insulin (iletin powder W-1002, 21 to 22 units per mg.) were treated with 40 cc. of 2 per cent sodium carbonate at 100° for one hour, 88 per cent of the cystine, as determined by the Sullivan method (*Pub. Health Rep., U. S. P. H. S.*, suppl. 86 (1930)), was destroyed. The sample was then hydrolyzed with HCl and lanthionine was isolated by the procedure of Horn, Jones and Ringel (*J. Biol. Chem.*, 138 (1941), 141). Twenty-nine mg. of the typical triangle-like crystals of mesolanthionine were isolated. This represents a yield of 5.5 per cent of the

total sulfur of the insulin as mesolanthionine and is of the same order of magnitude as the yield obtained from wool. This sample contained 15.16 per cent sulfur (theoretical value 15.40). The benzoyl derivative melted at 208° (corrected), and when mixed with an authentic sample, showed no depression of the melting point. It was found that lanthionine was also formed by the action of *N*/30 NaOH on insulin. A 500-mg. sample was treated with 8 cc. of *N*/30 NaOH at 38° for 96 hours, at which time 92 per cent of the cystine was found to have been destroyed. This sample was then hydrolyzed and about 5 mg. of the typical mesolanthionine crystals were isolated.—VINCENT DU VIGNEAUD, GEORGE BOSWORTH BROWN and ROY W. BONSNES. *J. Biol. Chem.*, 141 (1941), 707. (F. J. S.)

Magnesium Metabolism in Man. From 20 magnesium metabolism experiments on adults living on Indian cereal diets, it was concluded that the maintenance of magnesium for an adult is 0.429 Gm. per day. Addition of milk to the diet did not raise magnesium retention. It appears that whole wheat diets are superior to rice in their effect on magnesium metabolism. The average Indian diet needs supplements of vegetables and legumes to provide adequate magnesium.—K. P. BASU and M. C. MALAKAR. *Indian J. Med. Research*, 28 (1940), 333–343. (W. T. S.)

Male Sex Hormone Derivatives. *2,231,017*—A process for the preparation of epiallopregnan-3-ol-20-one (which melts at about 164° C. and forms an acetate that melts at about 140° C.) from the carbinol residues after extraction of phenolic compounds from human pregnancy urine, involves converting the alcohols in the mixture to the mixture of the corresponding water-soluble monoester salts of a dibasic organic acid in water-immiscible solvent, dissolving out the mixture of salts by means of aqueous liquid from the water-insoluble impurities, and converting the purified monester salt mixture back into the corresponding mixture of monoesters by treatment with acid and saponifying the monoesters by treatment with acid and saponifying the monoesters to a purified mixture of epiallopregnan-3-ol-20-one with non-ketonic alcohols. The products possess male sex hormone activity and may be used as intermediates for the preparation of other compounds. *2,231,018*—This patent relates to reactions such as the production of epipregnan-3-ol-20-one (which melts at about 136° C. and forms an acetate that melts at about 99° C.) by a process which may involve treating a carbinol fraction of human pregnancy urine, from which phenols and phenolic estrogenic hormones have been removed, with a dibasic organic acid acylating agent to convert the alcohols in the carbinol fraction into acid monesters, treating the acid monoesters with a basic reagent to convert them into their water-soluble ester salts, separating the ester salts in aqueous solution from water-insoluble impurities, converting the separated and purified ester salts into their acid monoesters by treatment with acid, saponifying the monesters to produce a purified mixture containing epiallopregnan-3-ol-20-one and epipregnan-3-ol-20-one, removing the pregnanolones from non-ketonic alcohols by treating them with a ketone reagent, separating the two ketone derivatives obtained, crystallizing out the least soluble of the two derivatives from an organic solvent in which they have different solubilities, crystallizing out the more soluble pregnanolon derivative from the mother liquors of the first crystallization and separately regenerating and separating out purified epiallopregnan-3-ol-20-one and epipregnan-3-ol-20-one. *2,231,019*—This relates to making epiallopregnane-3,20-diol (melting point about 207° C.) by a catalytic hydrogenation of epiallopregnan-3-ol-20-one. The product forms a diacetate that melts at about 124° C.—RUSSELL E. MARKER, assignor to PARKE, DAVIS & Co. U. S. pats. 2,231,017 to 2,231,019, Feb. 11, 1941. (A. P.-C.)

Methionine—New and Highly Specific Colorimetric Test for. A new and highly specific colorimetric test for methionine is presented, based on the reaction of methionine with sodium nitroprusside in an alkaline medium followed by acidification. The methionine content of casein and edestin has been determined by this procedure with reproducible values in good agreement with existing data. The procedure is simple, and appears to give satisfactory values even with brief periods of hydrolysis.—TIMOTHY E. MCCARTHY and M. X. SULLIVAN. *J. Biol. Chem.*, 141 (1941), 871. (F. J. S.)

Nicotinic Acid—Colorimetric Method for the Estimation of. Using cyanogen bromide and aniline (König, *J. Prak. Chem.*, 69 (1904), 105) the author has described a colorimetric method for estimating nicotinic acid in body fluids. The conditions for developing the maximum color are outlined and the amounts of acid used in the experiments, *i. e.*, 10 μg. to 200 μg., are mentioned.—B. D. KOCHHAR. *Indian J. Med. Research*, 28 (1940), 385–396. (W. T. S.)

Nicotinic Acid in Foodstuffs—Adsorption Method for the Estimation of. Of the many methods suggested for estimating nicotinic acid most are complex and time-consuming. The authors suggest a shorter method which depends on the adsorption of nicotinic acid on medicinal charcoal in an acid medium and its elution by hot alcohol-sodium hydroxide solution. The nicotinic acid is colorimetrically estimated in the elutrient by the cyanogen-*p*-aminoacetophenone method of Harris and Raymond (*Biochem. Jour.* 33, 2037). The method was found applicable to a number of foodstuffs as cereals, animal products and yeast.—K. V. GIRI and B. NAGANNA. *Indian J. Med. Research*, 29 (1941), 125–132. (W. T. S.)

Nicotinic Acid—Synthesis of, by the Rat. It has been shown by direct measurement of the body nicotinic acid of rats growing on a diet low in nicotinic acid that the rats were able to synthesize nicotinic acid. During the second month of life, while they ingested about 5γ of nicotinic acid daily, the body content increased daily by an average amount of the order of 200γ. No measurements of nicotinic acid in the urine and feces were made, but it has been shown by Perlzweig and Huff that excretion of nicotinic acid by the rat continues even when none is ingested; therefore the figures for body increase less ingestion represent a minimum figure for the amount of synthesis. The evidence obtained suggests that the place of synthesis is within the body of the rat, and that it is not due to the symbiotic activity of microörganisms in the intestine. This evidence appears to leave no doubt that nicotinic acid is not a vitamin for the rat, as has been suggested in the past. —W. J. DANN. *J. Biol. Chem.*, 141 (1941), 803. (F. J. S.)

Pantothenic Acid—Determination of, in Normal Blood and Urine by Microbiological Technic. A microbiological technic employing *Proteus morganii* as the test organism for the assay of pantothenic acid has been applied to evaluating the level of this vitamin in blood and urine. The content of blood from 17 normal persons ranged between 0.030 and 0.099 gamma per cc. of blood with an average of 0.059. The 24-hour specimen of urine from 9 persons ranged from 1.46 to 6.79 mg.—MICHAEL J. PELCZAR, JR., and J. R. PORTER. *Proc. Soc. Exptl. Biol. Med.*, 47 (1941), 3. (A. E. M.)

Pantothenic Acid—Microbiological Assay for. A convenient method of determining the pantothenic acid content of biological materials has been developed on the basis of the essential nature of this

vitamin for a lactic acid bacterium. Crude suspensions of the sample are fermented by the organism, and the acid produced, as determined by direct titration of the entire culture, is a measure of the pantothenic acid in the sample. The method gives results which agree well with values determined by chick assay, and is applicable to a wide range of natural materials. No expensive or unusual apparatus is required. One worker can assay approximately 15 samples per day.—F. M. STRONG, R. E. FEENEY and A. EARLE. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 566–570. (E. G. V.)

Phospholipids—Oxidation of, in the Presence of Ascorbic Acid and Carcinogenic Chemicals. The following conclusions are given: (1) The oxidation of phospholipids in the presence of ascorbic acid was studied with the aid of the manometric technique, and the effect of carcinogenic chemicals, hydroquinone, and copper on this system was observed. (2) Phospholipid oxidation was catalyzed by the presence of ascorbic acid at pH 4. (3) The catalyzed phospholipid oxidation was inhibited by the presence of carcinogenic chemicals and hydroquinone.—H. F. DEUTSCH, B. E. KLINE and H. P. RUSCH. *J. Biol. Chem.*, 141 (1941), 529. (F. J. S.)

Phytate Phosphorus in Blood—Method for the Determination of. The method of Michel-Durand in which phytic acid is precipitated as the calcium salt has been adapted to the determination of phytate phosphorus in trichloroacetic acid filtrates of blood.—ERNST LEVA and S. RAPOPORT. *J. Biol. Chem.*, 141 (1941), 343. (F. J. S.)

Plasma—Concentration and Drying of. Two methods for the concentration and drying of plasma have been described: (1) using spray distillation *in vacuo;* and (2) using the principle of evaporation through cellophane tubes under sterile conditions, followed by low temperature drying of the concentrate. These methods enable large amounts of plasma to be concentrated and dried without undue cost. Serum may also be concentrated or dried by these methods, and may prove more satisfactory than plasma.—F. X. AYLWARD, B. R. S. MAINWARING and J. F. WILKINSON. *Brit. Med. J.*, 4165 (1940), 583. (W. H. H.)

Potassium and Phosphate Content of Plasma from Stored Blood. Blood has been stored with heparin and citrate as anticoagulants with and without the addition of saline, glucose, and dextrin. The efficiency of a glucose-citrate mixture in retarding hemolysis has been further demonstrated and plasma removed from blood stored 14 days in this mixture contained less than 50 mg. of hemoglobin per 100 cc. Plasma removed from blood stored in eight different solutions, after 14–16 days, contained large amounts of potassium, the mean figure being 116 mg. per 100 cc. undiluted plasma. None of the preservatives was effective in retarding this increase, which is independent of the rate of hemolysis. Plasma removed after 3–5 days also showed increased potassium levels (mean 67 mg. per 100 cc.) demonstrating that diffusion of potassium from the cells is very rapid in the early period of storage. The changes in the inorganic phosphate content of the plasma were relatively small. The possibility of toxic reactions due to the potassium content of blood or plasma are considered and it seems desirable to separate the plasma from stored blood as soon as possible.—B. R. S. MAINWARING, F. X. AYLWARD and J. F. WILKINSON. *Lancet*, 239 (1940), 385. (W. H. H.)

Prothrombin—Estimation of. The estimation of prothrombin is much simplified by the use of a commercial preparation of Russell-viper venom as the thrombokinase. The results are similar to those obtained with tissue extracts.—H. W. FULLERTON. *Lancet*, 239 (1940), 195. (W. H. H.)

Quinine—New Colorimetric Determination of, in Biological Liquids and Organs. Addition of several drops of a 2% solution of eosin to a 1% solution of a quinine salt forms a red precipitate which is soluble in a little chloroform to which it imparts an intense red color. With a solution containing 0.001 mg. of quinine salt in 10 cc. of water, addition of the eosin produces no precipitate, but on shaking with chloroform a rose color becomes evident in the chloroform layer. Cinchonine, ephedrine, eserine, pilocarpine, atropine, and other alkaloids give similar reactions, but caffeine gives no color reaction with eosin and chloroform. The maximum color is produced when the reaction mixture has a pH between 6.5 and 7.5; below pH 2 and above pH 10 the chloroform remains colorless. *Urine.* Prepare the standards as follows: Place 10 cc. of urine in each of a series of tubes, add quantities of neutral quinine sulfate ranging from 0.01 mg. to 2.0 mg. to the tubes, add 5 cc. of 10% solution of neutral lead acetate to each tube and, after several seconds, filter. To 12 cc. of each filtrate add 5 drops of sulfuric acid, mix and, after several minutes, filter repeatedly through the same filters until perfectly clear filtrates are obtained. To 9 cc. of each filtrate add one drop of litmus solution (does not react with quinine), neutralize with several drops of sodium hydroxide solution to a lilac color, then add 2 cc. of a buffer solution (13.617 Gm. potassium dihydrogen phosphate in 300 cc. of water mixed with 41.566 Gm. of disodium hydrogen phosphate dihydrate in 700 cc. of water) to adjust to pH 7. Add 4 drops of 2% eosin solution, mix, add 3 cc. of chloroform and shake vigorously. The chloroform layers are colored proportionately with the concentration of quinine. After four hours transfer the chloroform layers to hemolysis tubes which are then sealed to prevent evaporation of the chloroform. Keep the tubes in a dark place. Ten cc. of the urine sample containing quinine is treated as above and the color in the chloroform layer is compared with the standard series prepared as above. *Blood and Serum.* Place ten cc. of the blood, previously treated with powdered potassium oxalate, in each of a series of tubes and add quantities varying from 0.005 mg. to 0.1 mg. of neutral quinine sulfate to each tube. Add 20 Gm. of powdered crystalline sodium sulfate and 7 cc. of *N* sulfuric acid to each tube. Stir the liquids until they are homogeneous and place in a water bath at 45–50° for thirty minutes with occasional stirring. Filter on a Buchner funnel, cool, decant the liquid from the crystallized sodium sulfate, and take 10 cc. of the clear solution. Neutralize with *N* sodium hydroxide solution, using phenolsulfonphthalein as an outside indicator, then add 2 cc. of the phosphate buffer solution and 6 drops of the eosin solution. Mix, add 3 cc. of chloroform, shake vigorously, let stand for 6 hours, then decant into small hemolysis tubes and stopper well. The blood to be tested is added to the powdered potassium oxalate and 10 cc. is treated as above. The same procedure is used for blood serum. *Organs and Tissues.* Finely grind 10 Gm. of the organ or tissue in a mortar with 30 Gm. of crystalline sodium sulfate and little quartz sand if necessary. Transfer the paste to a small flask, wash the mortar with 10 cc. of water and transfer the washings to the flask. Add 10 cc. of *N* sulfuric acid, heat on a water bath at 45–50° for thirty minutes, filter, cool, then decant 10 cc. of the clear liquid into a tube. Continue as above under the procedure for blood. Standards are prepared by adding different amounts of quinine sulfate to the ground organ or tissue in a mortar. With fresh normal organs a coloration is obtained in the chloroform layer equivalent to 0.01 mg. of quinine; therefore this amount should be deducted when working with fresh organs. When the organs are putrefying the results are too high. The compound

formed by quinine and eosin is devoid of bitterness and has no antimalarial action. The compounds formed by eosin with other alkaloids may be differentiated by their ultraviolet absorption spectra. —R. O. PRUDHOMME. *J. pharm. chim.*, 1 (1940), 8–17. (S. W. G.)

Red Cells—Transfusion of, in Anemia. A method is described for the preparation and the use of a concentrated red cell suspension. It is suggested that this concentrated suspension has the following advantages over whole stored blood in the treatment of anemia: (*a*) Less than half the usual volume of fluid will produce the same rise in hemoglobin. (*b*) The plasma of whole stored blood can be saved for a shocked patient. (*c*) Reactions are fewer. (*d*) The danger of transfusing potentially incompatible agglutinins when using Group O (IV) blood is greatly lessened. Sixty-one cases have been treated with the cell concentrate; the incidence of rigors was 6.5 per cent. This figure is contrasted with that found in a similar series of transfusions with whole stored blood, in which 22 per cent of rigors occurred. —D. H. G. MACQUAIDE and P. L. MOLLISON. *Brit. Med. J.*, 4164 (1940), 555. (W. H. H.)

Riboflavin and Thiamine—Combined Determination of, in Food Products. A rapid and accurate method has been developed for determination of thiamine and riboflavin on the same sample. The method is in close agreement with biological assays and has been applied to grains, milk products, and fresh and frozen vegetables. A study of the destruction of riboflavin by light in aqueous solutions at pH values ranging from 2 to 8 showed that rapid destruction of the vitamin occurred, irrespective of the pH, when the solutions were exposed to the diffused light of the laboratory. The destruction from exposure to artificial illumination was slower and appeared to be dependent upon the pH. Ferrebee's procedure for the absorption of riboflavin on Supersorb has been modified to use a smaller extraction column. A study has been made of Corning glass filters suitable for the fluorometric determination of riboflavin. Filter 511 has been selected for transmitting the incident light and No. 351 for transmitting the fluorescent light.—R. T. CONNER and G. J. STRAIB. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 385–388. (E. G. V.)

Riboflavin Assay. Determination of riboflavin in yeast and dried skim milk was studied collaboratively by three different methods (techniques described in detail): (1) an improvement on the previously described colorimetric method (*J. Assoc. Official Agr. Chem.*, 23 (1940), 346), (2) the fluorometric method of Hodson and Norris (*Ind. Eng. Chem., Anal. Ed.*, 11 (1939), 346), and (3) the microbiological method of Snell and Strong (*J. Biol. Chem.*, 131 (1939), 621). The results and comments of the collaborators show that methods (2) and (3) are more reliable than (1). The results are considered very promising, and show that either (2) or (3) can be used with a fair degree of accuracy for dried skim milk and yeast. Data are presented that indicate the necessity of developing a primary standard for checking standard riboflavin solutions. Part of the variations in the results of the collaborators may be accounted for by variations in the standard riboflavin solutions used.—A. R. KEMMERER. *J. Assoc. Official Agr. Chem.*, 24 (1941), 413–423. (A. P.-C.)

Riboflavin—Chemistry of, and Its Biologic Significance. A discussion of the historical development of the yellow enzyme and riboflavin is given. The occurrence, synthesis and biologic significance of riboflavin are reviewed.—C. R. ADDINALL. *Merck Rept.*, 50 (1941), No. 3, 17–21. (S. W. G.)

Riboflavin—Fluorometric Determination of, in Urine and Other Biological Fluids. An analytical procedure is described for the estimation of riboflavin in biological fluids based on its fluorescence in a nonaqueous medium, butyl alcohol. The advantages of this procedure are discussed.—VICTOR A. NAJJAR. *J. Biol. Chem.*, 141 (1941), 355. (F. J. S.)

Scrotal Eczema Caused By Avitaminosis. Analysis of the diet in a Travancore Institution, in which an outbreak of scrotal eczema occurred, showed a deficiency of vitamins A and B_2.—C. O. KARUNAKARAN and P. KRISHNAN. *Indian J. Med. Research*, 28 (1940), 371–383. (W. T. S.)

Selenium. The New Enigma. A discussion of some of the biological and medical aspects of selenium.—L. L. WOODS. *J. Chem. Educ.*, 17 (1940), 483–484. (E. G. V.)

Sex Hormone Equilenin and Its Stereoisomers—Total Synthesis of. The total synthesis of the sex hormone equilenin and its three stereoisomers is described.—W. E. BACHMANN, W. COLE and A. L. WILDS. *J. Am. Chem. Soc.*, 62 (1940), 824–839. (E. B. S.)

Sodium Fluoride and Sodium Iodoacetate—Effect of, on Glycolysis in Human Blood. The rate of glycolysis in human blood was estimated from the changes in glucose and lactic acid. Either iodoacetate or sodium fluoride alone did not stop glycolysis completely. Complete inhibition of glycolysis was observed with a mixture of 1 per cent sodium fluoride and 1 per cent sodium iodoacetate. When suitable precautions were used, it was found that the normal lactic acid values in human blood ranged from 5 to 10 mg. per cent.—ERNEST BUEDING and WALTER GOLDFARB. *J. Biol. Chem.*, 141 (1941), 539. (F. J. S.)

Sodium Pregnanediol Glucuronidate—Titrimetric Method for the Determination of, in the Urine of Pregnant Women. A new method for the determination of sodium pregnanediol glucuronidate in the urine of pregnant women is given. The method differs from other procedures in that the compound is precipitated as the lead salt from aqueous solutions and then finally determined by measuring the amount of glucuronic acid liberated by acid hydrolysis. The glucuronic acid is measured with the Shaffer-Hartmann-Somogyi alkaline copper reagent.—WILLARD M. ALLEN and ELLENMAE VIERGIVER. *J. Biol. Chem.*, 141 (1941), 837. (F. J. S.)

Sterol from Apple Seeds and Cherry Seeds. Report is made of the isolation of sitosterol from apple seeds and cherry seeds. Refractive index, acid number and saponification number of the oil from both seeds are given.—HAROLD M. SELL and ROLAND E. KREMERS. *Jour. A. Ph. A.*, 30 (1941), 134. (Z. M. C.)

Sterols. LXXXII. Estrane Derivatives. Estrenedione has been prepared from estranedione-3,17. The major monohydroxyestrane resulting from the reduction of estrone in acidic medium appears to be an estranol-17(α). Evidence to this effect is presented.—R. E. MARKER and E. ROHRMANN. *J. Am. Chem. Soc.*, 62 (1940), 73–75. (E. B. S.)

Sterols. LXXXIII. Oxidation Products of Sarsasapogenin. Studies on the C_{22} Lactone. Oxidation of the acetate of the C_{22} lactone formed by chromic anhydride oxidation of sarsasapogenin with chromic anhydride yielded the C_{22} keto acid. The C_{22} lactone has been degraded to the C_{19} dibasic acid.—R. E. MARKER and E. ROHRMANN. *J. Am. Chem. Soc.*, 62 (1940), 76–78. (E. B. S.)

Sulfanilamide as a Preservative in Stored Blood. Sulfanilamide in concentrations of 1:1000 to 1:5000 is effective as a preservative in blood stored in the refrigerator at 2° C. The possibility of using the method to assist in the preservation of stored blood

for transfusion purposes is discussed.—R. F. HUNWICKE. *Brit. Med. J.*, 4159 (1940), 380.
(W. H. H.)

Sulfanilamide Determination in Blood—Comparative Study of a New Simple Method for. With the increase in the use of sulfonamide compounds in the treatment of various disease conditions, simple method for the determination of their concentration in the blood or in spinal fluid becomes desirable. The method of Marshall has been adopted by most workers as satisfactory; however, recent modification by Werner seems to be considerably simpler and more time saving. The present authors undertook to compare the results of 50 samples by these two methods, and found the new method equally satisfactory. At the same time, the test can be finished in 15 minutes instead of the 45 required for the older method. The procedure is as follows: To 2 cc. of oxalated blood are added drop by drop from a pipette 7 cc. of 5% trichloracetic acid, to precipitate the protein which can be easily filtered off. To 4 cc. of this filtrate are added 3 cc. of $N/4$ sodium hydroxide, followed by 1 cc. of Ehrlich's reagent (para-dimethylaminobenzaldehyde). A yellow color promptly develops which can be readily compared with the standard in a colorimeter.—M. C. ANDREWS and A. F. STAUSS. *Jour. Clin. Lab. Med.*, 26 (1940), 887; through *Chinese Med. J.*, 59 (1941), 491. (W. T. S.)

Testosterone—Colorimetric Reaction for. A color reaction has been developed for testosterone. Of the eighteen compounds besides testosterone tested, only Δ^4-androstenedione-3,17, testosterone propionate, and testosterone oxime give the reaction. From absorption spectral studies of the colored compound, it has been found that its maximum absorption is at about 6390 Å. Androsterone and dehydroandrosterone do not interfere appreciably with the testosterone color when mixtures are studied.—VIRGIL L. KOENIG, FRANCISCA MELZER, CLARA M. SZEGO and LEO T. SAMUELS. *J. Biol. Chem.*, 141 (1941), 487. (F. J. S.)

Thiamine (Vitamin B_1) in Urine, Milk and Cereals Products—Thiochrome Method of Estimating. The authors have improved the technique of the Pyke modification (*J. Soc. Chem. Ind.*, 58 (1939), 338T) of the Wang and Harris thiochrome method for determining vitamin B_1. The main improvement consists of incubating with taka-diastase without previous peptic digestion. The improved technique has been successfully applied to urine, milk, and cereals. The recovery of added thiamine was quantitative but the reproducibility of the method depends on the accuracy of the final matching which is about 10 to 15 per cent. The results of the assays are tabulated in 9 tables.—E. C. SLATER. *Australian J. Med. Research*, 19 (1941), 29–32.
(W. T. S.)

α-Tocopherol—Synthesis of. Trimethylhydroquinone is condensed with phytol in the presence of phosphorus pentoxide (suitably with heating to about 140° C.).—FRITZ VON WERDER, assignor to MERCK & CO. U. S. pat. 2,230,659, Feb. 4, 1941.
(A. P.-C.)

Urine—Critical Observations on Significance of pH of. The following summary is given. (1) Normality of urine reaction is characterized by variability within the range of pH 4.6 to 8.0, lower values being observed much more frequently than higher ones. (2) Abnormality of urine reaction is characterized by fixation at levels typical of the disease. (3) Alkalosis (relative excess of plasma sodium bicarbonate) in conjunction with base deficit is associated with acid urine. The administration of adequate amounts of saline is followed by excretion of "alkaline" urine. (4) "Acetone breath" and ketonuria are usually associated with acidosis but will also occur in conditions covered by the term "alkalosis." Ketones may be found in abnormal amounts in urine of any reaction. (5) Elevated plasma pH and carbon dioxide C.P. together with acid urine may be encountered both in diabetes and renal therapy. (6) The reaction of the urine is not a safe guide in the avoidance of alkalosis due to sodium bicarbonate therapy. (7) The acidosis of terminal nephritis is accompanied by urine close to neutrality in reaction, the blood and urine pH values moving toward each other. (8) The acid-base ratios of the tissues, blood and urine do not rise and fall concomitantly. The former possess compensating mechanisms in which the kidneys play an important role. Adjustment so secured of necessity requires the formation of urine of markedly different reaction from that within the body. Urinary pH *per se*, therefore, is of limited significance. (9) The response of patients to acidification or alkalinization is highly variable and conditioned by manifold factors including such intangible ones as emotional states. Some of these factors are mentioned. (10) The means of changing urine reaction and the reasons therefor are discussed. (11) The pitfalls encountered in acidifying or alkalinizing measures are cited. (12) Any arbitrary attempt to fix or shift urinary reaction in the direction of greater alkalinity should be regarded in the same light as alteration of gastric acidity—a matter undertaken only by the competent physician on cases presenting definite pathology and achieved by means which do not ignore the body's other needs. The daily removal of the acid end-products of metabolism is not a thing to be deplored and the urine promptly alkalinized, this may defeat the purpose of urine formation.—M. A. BRIDGES and M. R. MATTICE. *Ann. Internal Med.*, 14 (1941), 1123–1136.
(S. W. G.)

Vitamin Adsorbates. An adsorbent such as fuller's earth or bentonite is successively treated with solutions containing different vitamins such as vitamins B and G, with intermediate and final dryings, to obtain a product of high vitamin content. Various details of procedure are given.—HENRY A. SMITH, assignor to NATIONAL OIL PRODUCTS CO. U. S. pat. 2,229,876, Jan. 28, 1941. (A. P.-C.)

Vitamin Concentrates from Oils Such as Pollack or Shark Liver Oils. An oil containing a vitamin in ester form is subjected to high-vacuum, unobstructed-path distillation and a distillate is separated containing a concentrate of the vitamin ester; the distillate is saponified, the vitamin alcohol is removed from the saponification mixture and it is treated with an acid derivative such as acetyl chloride to form a vitamin ester. Several examples with details of procedure are given.—KENNETH C. D. HICKMAN, assignor to DISTILLATION PRODUCTIONS CO. U. S. pat. 2,229,173, Jan. 21, 1941.
(A. P.-C.)

Vitamin A—Absorption Experiments with. The paper is summarized as follows: (1) Quantitative experiments on the absorption of orally administered vitamin A by humans indicate that 88 to 96 per cent of the vitamin ingested cannot be accounted for in blood and feces as vitamin A. (2) A substance was found in blood and feces after ingestion of large doses of vitamin A which seems to be a closely related oxidation product. (3) Strong evidence that this related substance is an oxidation product of vitamin A has been obtained by purely chemical investigation. (4) The nature of the oxidizing system and the importance of the fate of the oxidized product remain to be determined. (5) Incidental to the work, blood levels of vitamin A during absorption from the intestinal tract have been determined for several persons.—G. A. LEPAGE and L. B. PETT. *J. Biol. Chem.*, 141 (1941), 747. (F. J. S.)

Vitamin A Assay. In the spectrophotometric determination of vitamin A in cod liver oil better results are obtained by using a conversion factor based on direct comparison of with extinction coefficient of the unknown oil with the U. S. P. reference cod liver oil than by using a previously established conversion factor. While the specificity of the spectrophotometric determination of vitamin A may be increased by using a saponification process the variability of the results obtained is increased. While the results obtained in the present study show no apparent advantage in using a saponification process, recognition must be given to the fact that in some instances grossly erroneous results may be obtained if only the raw oil is examined. The magnitude of the error introduced by the saponification procedure, while objectionable, does not appear to be sufficiently large to preclude its use for practical purposes. The maximum coefficients of variation found when optional saponification methods were used indicate the need for a definite saponification procedure. The magnitude of the coefficients of variation indicates that work on both the apparatus and the saponification procedure may be continued to good advantage. Even with the limitations indicated previously, there appears to be no technical reason for not tentatively accepting the spectrophotometric method for the assay of vitamin A.—J. B. WILKIE. *J. Assoc. Official Agr. Chem.*, 24 (1941), 400–403. (A. P.-C.)

Vitamin A Content of Some Indian Fish Liver Oils. A spectrophotometric assay for the vitamin A content of some 35 samples of marine fish liver oils is reported and the results tabulated. The vitamin A content of 25 samples of shark liver oil and 4 samples of sawfish liver oil ranged from 10,000 to 12,000 I. U. per Gm., respectively.—B. N. MAJUMDAR. *Indian J. Med. Research*, 29 (1941), 95–98. (W. T. S.)

Vitamin A Materials—Spectrographic Characteristics of. There appears to be a continuous change in absorption of the U. S. P. reference cod liver oil with use in the laboratory over an extended period of time, and as a standard for spectrographic measurements more rigid limitations are necessary than are now in use for biological assay. Fresh U. S. P. reference cod liver oil gives good agreement with the absorption values published by other experimenters. Care must be exercised in using the spectrographic method to evaluate commercial cod liver oils and concentrates, because of the variability of the extraneous absorption. The distilled vitamin A esters show negligible change in their absorption properties upon saponification. Within experimental error the absorption curve shapes of the distilled vitamin A esters and the unsaponifiable fraction of the fresh U. S. P. reference oil are identical. Beer's law appears to hold over the wave-length range 3,100 to 3,500 Å. of the vitamin A absorption curve.—R. L. MCFARLAN, P. K. BATES, and E. C. MERRILL. *Ind. Eng. Chem., Anal. Ed.*, 12 (1940), 645–647. (E. G. V.)

Vitamin A—Nature of Deficiency of. Vitamin A is a derivative of the carotenoid pigments from plants. It is now thought that carotene breaks down in the body to form two molecules of vitamin A. In the human body the liver is the main organ concerned with the transformation, although the pigment epithelium of the retina may play some part in changing vitamin A to other forms. The manifestations of a vitamin A deficiency consist of atrophy of the epithelial cells, reparative proliferation of the basal cells and differentiation of the new product into keratinized, stratified squamous epithelium. The gross pathological features in man and in animals are the outcome of the accumulation of keratinized epithelial cells in glands and in their ducts and in the skin. These changes are commonly in the eyes, respiratory tract, skin and genitourinary tract as well as in the ducts of many glands. The average daily requirement of vitamin A for the adult is 3,000 units, and for the growing child 8,000 units.—P. R. MCDONALD. *Can. Med. Assoc. J.*, 44 (1941), 589; through *Abbott Abstract Service*, (1941), No. 939. (F. J. S.)

Vitamin A—Physical and Chemical Determination of. A review.—J. B. WILKIE. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 209–211. (E. G. V.)

Vitamin A—Quantitative Determination of. I. Colorimetric Method of Carr-Price Reaction. II. Polarimetric Method. Comparison of the two methods indicated that the values determined agree quite well. Under certain conditions the concentration of vitamin A can be calculated by the value E in polarimeter.—TOSHIMASA SAKAMOTO. *Tokyo Ijishinshi*, No. 3182, April 1941; through *Kitasato Arch. Exp. Med.*, 17 (1940), 3. (W. T. S.)

Vitamin A—Spectrophotometric Determination of. The maximum extinction coefficient or $E\,{}^{1\%}_{1\,cm.}$ value can be accurately determined spectrophotometrically under a carefully controlled procedure. It is therefore possible, by employing the proper conversion factor, to evaluate satisfactorily the vitamin A potency of fish liver oils in units per Gm.—D. T. EWING, J. M. VANDERBILT, A. D. EMMETT and O. D. BIRD. *Ind. Eng. Chem., Anal.Ed.*, 12 (1940), 639–644. (E. G. V.)

Vitamin B Complex (A Review). Recently the B complex has come to be understood. Five crystalline B complex vitamins are available: thiamin (vitamin B_1), riboflavin (part of B_2), nicotinic acid (part of B_2), pyridoxine (vitamin B_6 identical with B_6). All are well characterized and are being synthesized. All five occur in actively metabolizing tissue, such as liver and kidney; in yeast and bacteria, in seeds and sprouts of plants. Each functions as the active grouping of an enzyme system concerned with intermediary metabolism and they affect rate of metabolism adversely, if deficient. Each is water-soluble and forms soluble protein complexes. All stimulate growth of rats, chickens, and dogs and certain species of plants and microörganisms. Some interesting details in the history of the discovery of these B-complex vitamins and their chemical structure is given. Chemical or microbiological methods of analysis are available now for each of the five compounds. The thiochrome method is used for thiamin. B_6 reacts with diazotized sulfanilic acid, the Folin-Denis reagent, and 2,6-dichloroquinone chlorimide. The reaction of nicotinamide and nicotinic acid with cyanogen bromide and an aromatic amine has been adapted to photoelectric colorimetry. Microbiological assay methods have great promise for routine testing. The assay of riboflavin and pantothenic acid can be done with lacto-bacillus casei with slight variation in technique. Pharmacologically, the margin of safety between effective dose and lethal dose is extremely large. The daily human need is: thiamin, 2–3 mg., riboflavin, 3–4 mg., nicotinic acid 15–25 mg., pyridoxine 2–3 mg. (estimated), pantothenic acid 15–20 mg. (estimated). There is discussion of newer members of the B complex. Choline seems to be related; inositol and biotin are recognized; others need confirmation. Finally, comparative nutritional requirements of species are discussed. Many citations in literature are included with the review.—DOUGLAS FROST. *Jour. A. Ph. A.*, 30 (1941), 221. (Z. M. C.)

Vitamin B Concentrate. A cereal material such as rice polish is extracted with water, the extract is filtered, its pH is adjusted to about 5.5 to 5.6 and it is

filtered after heating to flocculate precipitated material, and the filtrate is evaporated (suitably to dryness).—GEO. C. SUPPLEE, GEO. E. FLANIGAN and RAYMOND C. BENDER, assignors to THE BORDEN CO. U. S. pat. 2,229,684, Jan. 28, 1941. (A. P.-C.)

Vitamin B_1—Improved Thiochrome Method for the Estimation of. There have been published numerous recommendations for the modification of Jansen's method (*Rec. trav. chim.*, 55 (1936), 1046–1052) for estimating thiamine, which is based on the measurement of the intense blue-violet fluorescence of its oxidation product, thiochrome. The present paper is a report of a reinvestigation of various methods proposed for extracting thiamine from tissues and the optimum amount of the reagents employed in the thiochrome test. The procedure is described and the results are tabulated and discussed. —W. D. MCFARLANE and R. A. CHAPMAN. *Can. J. Research B*, 19 (1941), 136–142. (W. T. S.)

Vitamin B_1—Nutritive Value of White Flour with. The nutritive value of straight-run white flour (73 per cent extraction), tested on young growing rats, has been found inferior to that of whole meal flour, even when the defects of the former in protein, minerals and vitamin B_1 have been corrected. The inferiority must be attributed to lack of B_2 vitamins. Experiments are now in progress to determine in which member or members of this group white flour is most seriously deficient.—H. CHICK. *Lancet*, 239 (1940), 511. (W. H. H.)

Vitamin B_6 in Foods—Chemical Test for. The author gives a method for removing interfering substances and then describes a test for determining vitamin B_6 in foods. The test is based on the color of the azo dye produced when the vitamin in an alkaline medium is acted upon by diazotized sulfanilic acid and *p*-nitroaniline, respectively. The method is sensitive to 5 μg. of the vitamin. The results with 22 different food stuffs are included.—M. SWAMINATHAN. *Indian J. Med. Research*, 28 (1940), 427–439. (W. T. S.)

Vitamin C Contents of Various Plants. The author investigated 141 kinds of plants for their ascorbic acid content by the dichlorophenolindophenol method. The results may be summarized: (1) With the consideration of the season of collection and of the conditions under which the materials were placed after their collection it may be said that the different families contain different amounts of ascorbic acid and with the same family its content differs with the group. The plants of the *Iridaceæ* and *Yucca* families contain the most vitamin C; *Ebenaceæ*, *Leguminosæ*, and *Umbelliferæ* have large amounts while the *Compositæ* group contain small quantities of vitamin C. (2) Of all the plants investigated, the leaves of *Diosyros* contain the greatest amount of acid (8 mg. per Gm.). (3) The seasonal effect on ascorbic acid content is definite. —MITIO IDA and MASAHURI MURAKAMI. *J. Pharm. Soc. Japan*, 60 (1940), 488–493 (in English, 191–192). (N. L.)

Vitamin C in Philippine Camotes. An analysis for vitamin C in camotes compared with potatoes exhibited 17.2% for white, 16.6% for yellow camotes and 12.04% for potatoes. Average loss through boiling was 26.7%. Camotes also showed a higher potency of vitamin A and higher caloric value than potatoes.—SOFIA L. BONA and ISABELO CONCEPCION. *Manila Med. Soc.*, Aug 14, 1940; through *Rev. Filipina Med. Farm.*, 31 (1940), 192. (G. S. G.)

Vitamin C—Quantitative Determination of. Care in Using Dubosq Type of Colorimeter and Removal of Protein. In using an ordinary colorimeter in the colorimetric method devised by Gujita and Ebihara copper sulfate standard solution may be used instead of ascorbic acid. But in such case Merke's phosphoric acid sometimes does not remove protein sufficiently. This shortcoming may be avoided by adding tungsten-phosphate. This can be applied in iodo-colorimetric method of glutathione. It may also be used in indo-phenol method, but it is a source of error when it is used in colorimetric method.—AKIJI FUJITA and ISAMU NUMATA. *Tokyo Ijishinshi*, No. 3182, April 1940; through *Kitasato Arch. Exp. Med.*, 17 (1941), 3. (W. T. S.)

Vitamin C—Rapid Method for Determining. In a study of the effect of citrus fruits on the human organism it was necessary to develop a rapid method for determining vitamin C. Time was limited because the test had to be applied during the same fasting period and also vitamin C is unstable in the air. The plasma was diluted with 5 per cent acetic acid and used directly with the dye, 2,6-dichlorophenolindophenol, in a specially constructed photoelectric comparator, structural details of which are given. The comparator is operated so as to compensate for variations in the color and turbidity of plasma samples. The vitamin C content is read directly from empirical calibration curves prepared by adding known amounts of ascorbic acid to plasma. Outside of preparing the curves the method is quite rapid and the maximum total error with samples containing from 0 to 3.5 mg. of reduced ascorbic acid per 100 cc. was $\pm$0.1 mg. per 100 cc.—MYRON A. ELLIOTT, ALFRED L. SKLAR and S. F. ACREE. *J. Research Natl. Bur. Standards*, 26 (1941), 117–128. (W. T. S.)

Vitamin C—Use of Bacteria in the Chemical Determination of Total. The quantitative determination of total vitamin C in biological materials can be accomplished by reduction of dehydroascorbic acid to ascorbic acid with a resting suspension of *Bacterium coli*, followed by direct titration of the ascorbic acid with 2,6-dichlorophenol indophenol in acid solution. The reduction can be carried out in 15 minutes at pH 6.2 to 6.6 and 40° with a suspension of the bacteria in the presence of glucose. The method has been applied to milk, fruit juices, and urine.—I. C. GUNSALUS and DAVID B. HAND. *J. Biol. Chem.*, 141 (1941), 853. (F. J. S.)

Vitamin D Assay—Observations on the Chick Method for. II. A Modified Basal Ration. The following modified basal ration (designated as No. 13) for use in the chick method for the assay of vitamin D was subjected to a critical study: ground yellow corn 54, ground whole wheat 20, ground rolled oats 10, crude domestic acid-precipitated casein 11.5, non-irradiated yeast (minimum nitrogen content 7%) 2, precipitated calcium phosphate 0.5, precipitated calcium carbonate 1, common salt (0.02% potassium iodide) 1, add 0.2 Gm. of manganous sulfate per kilo of mixture. Comparative feeding experiments showed that it possessed the following advantages over the present A. O. A. C. basal ration: (1) the total spread in % bone ash between the minimum and maximum levels of vitamin D intake is greater, resulting in an increased sensitivity of the method; (2) the reproducibility of response to given levels of vitamin D intake as measured by % bone ash in repeated experiments is more satisfactory; (3) the mean difference between % bone ash for chicks weighing more than 100 Gm. and that for all chicks regardless of weight is significantly decreased; (4) the average standard deviation of the % bone ash for all chicks regardless of weight is decreased; (5) the variation between the individual and group ashing procedures is reduced; (6) the probability of overlapping of the % bone ash of adjacent levels of vitamin D intake is decreased; (7) the influence of the body weight of the chicks on the % bone ash is less marked.—

HENRY W. LOY, JR., JAMES B. DEWITT and LILA F. KNUDSEN. *J. Assoc. Official Agr. Chem.*, 24 (1941), 432–440. (A. P.-C.)

Vitamin D Assay. The Use of Reference Cod Liver Oil and Skim Milk as the Reference Substance. A Uniform System of Scoring. A brief discussion of replies to a questionnaire regarding the merits of the use of non-vitamin D skim milk in conjunction with U. S. P. cod liver oil, and on the adoption of a uniform numerical system of expressing the degrees of healing obtained in vitamin D milk assays.—WALTER C. RUSSELL. *J. Assoc. Official Agr. Chem.*, 24 (1941), 403–405. (A. P.-C.)

Vitamin D Assays—Laboratory Apparatus and Procedure for Preparing Permanent Records of Biological. Since results of vitamin D assays should be available for considerable periods subsequent to the conclusion of the assay, it is essential that they be preserved in permanent form and as free as possible from the personal factor of the person performing the assay. Where there is possibility of legal controversy or court action, availability in permanent form is very important. Accordingly, apparatus and procedure are given in detail. Illustrations include pictures of the lethal chamber equipment for staining and developing tibiae, equipment for examining tibiae, equipment for photographing tibiae and a book for permanent records.—ARTHUR D. HOLMES, MADELINE G. PIGOTT and ARTHUR N. TERRY. *Jour. A. Ph. A.*, 30 (1941), 153. (Z. M. C.)

Vitamin D—Observations on the Chick Method for the Assay of. I. Relative Accuracy of Group and Individual Ashing Procedures and Relation of Chick Weight to Per Cent Bone Ash. The results of a critical study of the chick method for the assay of vitamin D indicated that the group ashing procedure is as reliable as the more laborious and involved individual ashing procedure. Statistical study of the data reveals a linear relationship between body weight and % bone ash of chicks for all levels of vitamin D studied. The data obtained indicate that body weight should not be made a basis for discarding chicks in the vitamin D assay procedure. —HENRY W. LOY, JR., JAMES B. DEWITT and LILA F. KNUDSEN. *J. Assoc. Official Agr. Chem.*, 24 (1941), 190–196. (A. P.-C.)

Vitamin E. A review of this vitamin. Forty-five references.—M. A. LESSER. *Drug Cosmetic Ind.*, 49 (1941), 43–45, 65. (H. M. B.)

Vitamin E—Chemistry of. XX. Preparation of *o*-Xylohydroquinone. This paper reports an improved preparation of *o*-xyloquinone and hydroquinone from *o*-xylene with an overall yield of 21% of quinone from hydrocarbon. The yield previously reported for this method is 12%.—O. H. EMERSON and L. I. SMITH. *J. Am. Chem. Soc.*, 62 (1940), 141–142. (E. B. S.)

Vitamin K. The author presents an extensive review on the discovery of antihemorrhagic compounds and the isolation of vitamins K_1 and K_2. The chemical constitution of both of these vitamins is thoroughly discussed: evidence as to the quinoid structure and oxidative degradation reactions of the vitamins are given. The structure of vitamin K_1 as 2-methyl-3-phytyl-1,4-naphthoquinone and the most propable structure of vitamin K_2 are formulated. A summary of the Fieser, Binkley and Almquist-Klose syntheses of vitamin K_1 is given. It is indicated that, to date, a synthesis of vitamin K_2 has not been reported. The physical and physiological properties of these vitamins are summarized. One section of this review deals with the investigations of the hemorrhagic activity of other compounds possessing the 1,4-naphthoquinone structure. The review also contains 6 tables and a bibliography of 203 references.—EDWARD A. DOISY, S. B. BINKLEY and SIDNEY A. THAYER. *Chem. Reviews*, 28 (1941), 477–517. (N. L.)

Vitamin K Assay by Curative Biological Test. The assay described is a comparison under specified conditions of the antihemorrhagic potency of any product with a C.P., standard, antihemorrhagic compound in controlling the blood prothrombin levels of chicks. Since this is a first attempt at prescribing an official quantitative procedure, the reasons for the various steps in the method are discussed in some detail. The basal vitamin K-free ration proposed is as follows: ether-extracted sardine meal 17.5%, U. S. P. cod liver oil 1.0%, ether-extracted dried brewers' yeast 7.5%, ground polished rice 72.5%, calcium carbonate 0.5%, common salt (containing 0.5% manganese as sulfate or carbonate) 1.0%. 2-Methyl-1,4-naphthoquinone (or the more stable 2-methyl-1,4-naphthohydroquinone diacetate) is suggested as standard of activity, and it is suggested that the unit be defined as the antihemorrhagic activity of 1γ of this compound. The manner of calculating the potencies of tested substances is indicated. As a general rule, repeated assays of the same substance will agree within a 10% deviation range.—H. J. ALMQUIST. *J. Assoc. Official Agr. Chem.*, 24 (1941), 405–413. (A. P.-C.)

Vitamins—Chemical and Biological Nature of. A brief review of the chemistry and important biological effects of Vitamins A, A_2, D, B_1, B_2, C, E and K. —ANTONIO VERDA. *Pharm. Acta Helv.*, 15 (1940), 164–170; 216–225. (M. F. W. D.)

Vitamins of the B Group. The Tilden lecture delivered before the Chemical Society.—A. R. TODD. *J. Chem. Soc.*, (1941), 427–432. (W. T. S.)

ANALYTICAL

Acetylsalicylic Acid, Acetophenetidin and Salol—Report on the Separation of. Two methods (techniques described in detail) were studied collaboratively, which were essentially as follows: (1) separation of the acetylsalicylic acid from the other ingredients by means of cold sodium bicarbonate solution, acidification of the bicarbonate solution and subsequent extraction of the liberated acetylsalicylic acid with chloroform; determination of the acetophenetidin and salol by the A. O. A. C. alkaline hydrolysis method; (2) removal of salol from acetylsalicylic acid and acetophenetidin by means of petroleum benzin and separation of acetylsalicylic acid from acetophenetidin by means of sodium bicarbonate. Better agreement between collaborators was obtained by the first method than by the second, and the results by the former are considered to be as satisfactory as could be expected in a mixture of this type where all three ingredients are determined quantitatively on a single sample.—DONALD C. GROVE. *J. Assoc. Official Agr. Chem.*, 23 (1940), 752–757. (A. P.-C.)

Acetylsalicylic Acid, Phenacetin, and Caffeine—Determination of, in Tablets. Acetylsalicylic acid is determined by dissolving about 0.5 Gm. of the powdered material in alcohol and titrating with 0.1 *N* sodium hydroxide. Excess of alkali is then added, and, after refluxing, the liquid is titrated back with acid. The phenacetin and caffeine are determined together by dissolving in water with a little alkali, and shaking out with chloroform. The extracted material is refluxed with dilute sulfuric acid and the caffeine is shaken out with chloroform and weighed. The acid solution remaining is neutralized with sodium bicarbonate. After the addition of a few drops of acetic anhydride, the mixture is shaken out with chloroform. This operation is repeated four times, the chloroform solution is evaporated to dryness and the phenacetin is weighed.—P. SORG-

DRAGER. *Pharm. Tijdschr. Nederland. Indie*, 17 (1940), 227; through *Quart. J. Pharm. Pharmacol.*, 14 (1941), 74. (S. W. G.)

Acriflavine and Acriflavine Hydrochloride—Method of Assay. The following method of determining the chlorine content is proposed: Transfer about 0.25 Gm. of the hydrochloride, dried to constant weight over sulfuric acid and accurately weighed, to a suitable beaker, dissolve in 10 cc. water and add about 0.5 Gm. of silver nitrate previously dissolved in water; add 10 cc. sulfuric acid and finally 2 Gm. of potassium permanganate in several portions. Cover the beaker with a watch glass and digest on a steam bath for at least 30 minutes, decolorize the mixture by the addition of hydrogen peroxide or alcohol with the aid of heat. Filter through a tared Gooch crucible and wash the precipitate thoroughly with nitric acid (1:2) followed by a small amount of water. Dry to constant weight at 105° C. Each Gm. of silver chloride is equivalent to 0.2474 Gm. of chlorine.—R. K. SNYDER. *Bull. Natl. Formulary Committee*, 9 (1941), 248–249. (H. M. B.)

Adenosine-5′-Phosphoric Acid and Its Homologs—Method for the Determination of. A method for the determination of small amounts of adenosine-5′-phosphoric acid and its homologs is described. This method is based on the coenzyme properties of these compounds in the enzymatic splitting of phosphopyruvic acid. Some examples of the specificity of the method and of its application in nucleotide chemistry are described.—F. SCHLENK and T. SCHLENK. *J. Biol. Chem.*, 141 (1941), 311. (F. J. S.)

Aloe Vera Leaf—Phytochemical Study of. The work reported was in connection with an attempt to isolate and characterize the principle in *Aloe vera* leaf which is responsible for its activity in promoting the healing of third degree X-ray reactions on white rats. Previous workers have reported the presence of volatile oil, non-volatile oil, resin, gum, emodin, an anthraquinone compound, chrysophanic acid and aloin. Experimental procedures are given in detail and results are given for the whole leaf, rind and pulp. The alcoholic-insoluble portion of the leaf was found to be a mucilage. Simple reducing sugars and hydrolyzable sugars were found. Fructose was identified. An oxidase, a catalase and an amylase were found. Pectin, alkaloids, phenols, tannins, vitamins A and D were absent. No aloin was found in fresh pulp or rind but small amounts were obtained when the rind macerated a long time in alcohol. Absence of tannin pectin, vitamins A and D and the small amount of nitrogenous material indicate that the healing property of *Aloe vera* leaf is not due to any of them or to urea.—THOS. D. ROWE and LLOYD M. PARKS. *Jour. A. Ph. A.*, 30 (1941), 262. (Z. M. C.)

Amino Acids—Determination of Free, by Titration of the Carbon Dioxide Formed in the Reaction with Ninhydrin. A titration method is described for determining free amino acids by titration of the CO_2 evolved from their carboxyl groups during reaction with ninhydrin. The only special apparatus required consists of two 25-cc. Erlenmeyer flasks connected by a U-tube. The reaction occurs in one flask; the CO_2 then distils *in vacuo* during 2 to 3 minutes into standard barium hydroxide in the other flask, where the excess hydroxide is titrated. The same apparatus serves for macro- and micro-analyses. For amounts of carboxyl carbon above 0.4 mg. the mean variability of results is of the order of ± 0.3 per cent of the amounts measured. Micro-analyses with samples down to 0.04 mg. of carboxyl carbon can be done with a mean error under 1 per cent.—DONALD D. VAN SLYKE, DOUGLAS A. MACFADYEN and PAUL HAMILTON. *J. Biol. Chem.*, 141 (1941), 671. (F. J. S.)

Aromatic Drugs—Principles and Practices in the Evaluation of. The apparatus and procedures employed by this author are discussed with reference to their relative utilities.—OTTO MORITZ. *Deut. Apoth. Ztg.*, 55 (1940), 507–509, 516–518; through *Chem. Abst.*, 35 (1941), 1931. (H. M. B.)

Arsenic—Determination of Traces of. The results of collaborative study of the Cassil-Wichmann method (*J. Assoc. Official Agr. Chem.*, 22 (1939), 436–445) modified along previously suggested lines (*J. Assoc. Official Agr. Chem.*, 23 (1940), 297) indicated that longer time (possibly 10 minutes) should be allowed for arsine evolution, that the solution should be brought to a boil more slowly (5 to 6 minutes), and that the precipitate on the leucite tube be given 1 to 2 minutes to dissolve.—C. W. MURRAY. *J. Assoc. Official Agr. Chem.*, 24(1941), 336–337. (A. P.-C.)

Arsenic—Extension of the Rapid Volumetric Micromethod for Determining. The range of the rapid volumetric method for determining arsenic (*J. Assoc. Official Agr. Chem.*, 22 (1939), 436), previously considered as 0.005 to 0.500 mg., has been extended to 10 mg. of arsenic trioxide. After the necessary sample preparation, a determination can be completed in less than 10 minutes. Results are presented showing that the accuracy of the method is 99.26%, with a standard deviation of 1.14%. The technique used and the apparatus required are described in detail.—C. C. CASSIL. *J. Assoc. Official Agr. Chem.*, 24 (1941), 196–202. (A. P.-C.)

Ascorbic Acid as a Primary Standard. Ascorbic acid fills several of the requirements of a primary standard in that it is commercially available in pure form at reasonable cost, contains no water of crystallization and is not hygroscopic. It is highly reactive and accordingly offers the possibility of being used in several ways. Its applicability as a standard for alkalimetry, argentometry, iodimetry and oxydometry was studied. As a primary standard for alkalimetry, weighed samples were titrated directly with 0.1*N* sodium hydroxide. Iodine could be determined directly or by back titration methods using starch as an indicator. The standardization of silver nitrate was carried out by treating the ascorbic acid with an excess of silver nitrate and titration of an aliquot of the filtrate according to Volhard. The values varied so that it may not be applied satisfactorily. Its use in the standardization of potassium permanganate is not at all satisfactory. It does appear possible to use it as a primary standard in alkalimetry and iodimetry.—L. ROSENTHALER. *Pharm. Acta Helv.*, 15 (1940), 213–216. (M. F. W. D.)

Ascorbic Acid in Fruits—Determination of. Tannins interfere with the estimation of ascorbic acid in fresh and dried fruits by titration with *p*-dichloroindophenol. Extraction with 5% trichloracetic acid, followed by precipitation with lead acetate or extraction by boiling with 5% metaphosphoric acid for four to five minutes, may be used to avoid this. The titration must then be carried out rapidly. Anthocyanin pigments are usually insoluble in a mixture of toluene and amyl alcohol. By titrating in the presence of these solvents the end-point can be observed in the supernatant layer. Oxydases cause the color of the end point to persist on standing. The green pericarp of berries, especially that of *Juglans regia*, is very rich in ascorbic acid. Galenical preparations of *Juglans regia* contain little ascorbic acid.—A. MIRIMANOFF and M. MORI. *Schweiz. Apoth.-Ztg.*, 78 (1940), 685, 704; through *Quart. J. Pharm. Pharmacol.*, 14 (1941), 199. (S. W. G.)

Ash Determinations in Foods with an Alkaline Balance. Decomposition of Alkali, Calcium, and Magnesium Carbonates. Potassium carbonate heated in air is decomposed only slightly below 700° C. Precipitated calcium carbonate heated in air decomposes markedly between 600° and 650° C., and magnesium carbonate between 300° and 400° C. At usual ashing temperatures, therefore, the stable compound of magnesium is the oxide, but the other two exist as carbonates. Both magnesium and calcium carbonates are more stable under heat treatment in the presence of potassium carbonate, due to the formation of complex carbonates or mass action effect, or both. Carbonation in mixtures of lime and magnesium followed by heat treatment produces no dolomite. Adding potassium carbonate to such mixtures produces no triple alkali-alkaline earth carbonates.—H. J. WICHMANN, *J. Assoc. Official Agr. Chem.*, 24 (1941), 441–454. (A. P.-C.)

Belladonna, Hyoscyamus, and Stramonium—Assay of. The Finnish official method for the assay of these drugs is the same as the German. The results obtained for the alkaloidal content are not satisfactory, and may be as much as 100% too high owing to the presence in the ether solution of finely dispersed matter, which not only obscures the endpoint but also contains adsorbed ammonia. The error is greatest when dealing with extracts, owing to the high content of extractive. With tinctures of belladonna and stramonium, satisfactory results are obtained if the treatment of the ethereal solution with tragacanth is omitted, but results are still unsatisfactory with extract of hyoscyamus.—H. ÖHBLOM. *Farm. Notisbl.*, 42 (1940), 191; through *Quart. J. Pharm. Pharmacol.*, 14 (1941), 188. (S. W. G.)

Benzoic Acid of High Purity—Preparation of. A comparative study was made of methods for preparing benzoic acid of a purity not less than 99.99 mole per cent. The methods studied were fractional distillation in vacuum, recrystallization from water and from purified benzene, fractional freezing, oxidation of purified toluene with subsequent recrystallization from water and hydrolysis of purified benzoyl chloride. The best preparations were obtained by repeated crystallization from benzene, by hydrolysis of benzoyl chloride and by fractional freezing. They had a purity of 99.999 mole per cent as determined by the freezing range and by specific heat measurements. The freezing point of benzoic acid is tentatively given as 122.36 ± 0.01° C.—FRANK W. SCHWAB and EDWARD WICHERS. *J. Research Natl. Bur. Standards*, 25 (1940), 747–757. (W. T. S.)

Calcium—Manganometric Determination of. The results from over a hundred experiments show that the manganometric determination of calcium is capable of yielding excellent results provided the calcium oxalate monohydrate is formed by adding twice the theoretical quantity of the oxalate to a dilute solution containing sufficient hydrochloric acid to prevent precipitation and then, while boiling, adding sufficient ammonia solution to cause complete precipitation. If, however, the solution contains alkali cations or any considerable quantity of sulfate, it is advisable to dissolve the washed precipitate and repeat the precipitation; otherwise the results will vary in a manner hard to predict. The oxalate precipitate should be washed thoroughly with a saturated solution of calcium oxalate.—A. IEVIŅŠ and F. OSIS. *Z. anal. Chem.*, 120 (1941), 401–410. (S. W. G.)

Carbon and Hydrogen—Microdetermination of. Under routine analytical conditions the Abrahamczik type of absorption tubes, with minor structural modifications, compared favorably with those of Pregl design in accuracy, ease of handling and absorption capacity. In addition, they were practically unaffected by high or low humidity, changes in temperature or standing idle for long periods. The use of Abrahamczik tubes brings about economics of time corresponding to two to three carbon and hydrogen determinations in a normal working day. Experiments leading to these conclusions are described and illustrated, as are the details of the tubes and analytical procedures.—R. O. CLARK and G. H. STILLSON. *Ind. Eng. Chem., Anal. Ed.*, 12 (1940), 494–498. (E. G. V.)

Carboxyl Groups in Free Amino Acids—Gasometric Determination of. An analytical method for free amino acids is described in which CO_2 from their carboxyl groups is evolved in a few minutes by reaction with ninhydrin and is measured in the Van Slyke-Neill manometric apparatus. The same apparatus and technique serve for micro- and macroanalyses. The precision and rapidity of the method are such that it affords a convenient criterion of the analytical purity of isolated amino acids. Each of the known amino acids yielded by protein hydrolysis evolves at properly chosen pH, 1 mole of CO_2, except aspartic acid and cystine, which evolve 2. Glutamic acid, unlike aspartic, evolves CO_2 from only one carboxyl group. The CO_2-forming reaction is uniquely specific for free amino acids, because it requires the presence, in the free, unconjugated state, of both the carboxyl group and of the NH_2 or (in proline and hydroxyproline) the $NH(CH_2)$ group. Peptides as a class yield no CO_2, or only traces, in the analysis. An exception among peptides is glutathione, in which glutamic acid is so linked that the $—CH(NH_2).COOH$ group is free. Chloramine-T as a decarboxylating reagent gives results similar to those of ninhydrin, but less sharply quantitative. When combined with the nitrous acid method for amino nitrogen, the ninhydrin carboxyl method serves to estimate certain amino acids in mixtures with others. In mixtures of the diamino acids, the excess of NH_2 over COOH serves to measure the lysine plus hydroxylysine. In mixtures of aspartic acid with glutamic acid, alanine, etc., the excess of determinable COOH over the NH_2 or total nitrogen serves as a measure of the aspartic acid. In protein digests carboxyl determinations indicate the amounts of free amino acids formed. Crystalline trypsin was thus shown to digest casein to peptides, without liberation of free amino acids.—DONALD D. VAN SLYKE, ROBERT T. DILLON, DOUGLAS A. MACFADYEN and PAUL HAMILTON. *J. Biol. Chem.*, 141 (1941), 627. (F. J. S.)

Chemical Glassware—Comparative Test of. A series of comparative tests have been run on four brands of chemical glassware which are made in the United States and used to fashion beakers, flasks and other common laboratory apparatus. The wares tested are: Tamworth-Glasbake, Kimble No. N51a, Chemical Pyrex, and Vycor (Corning Glass Works' 96-per cent silica glass No. 790). The chemical composition, the thermal expansivity, the resistance to acid, alkaline and neutral chemicals, the resistance to mechanical shock and thermal shock of these four wares are tabulated. The average coefficient of linear expansion $\times 10^6$, between 20° and 300°, for the four wares in the order named is 3.7, 4.9, 3.3 and 0.8. Omitting Vycor, the average weight of a 250-cc. flask of the remaining three wares in the order named is 90.6, 62.2 and 80 Gm. while the impact energy in ft. lb. necessary to break them is 0.44, 0.15 and 0.29, respectively. The average breaking temperature for the same three wares after use was 230°, 210° and 267°. A Vycor flask heated to redness was placed under a water tap without breaking.—EDWARD WICKERS, ALFRED N. FINN and W. STANLEY CLABAUGH. *J. Res. Natl. Bur. Standards*, 26 (1941), 537–556. (W. T. S.)