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PHARMACEUTICAL ABSTRACTS

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BACTERIOLOGY (*Continued*)

Antipneumococcal and Antistreptococcal Agents. By the condensation of 4,4′-diaminodiphenyl sulfone with α-keto acids, derivatives are obtained, the sodium and other salts of which are suitable for therapeutic purposes.—MORRIS S. KHARASCH and OTTO REINMUTH, assignors to ELI LILLY AND CO. U. S. pat. 2,254,872, Sept. 2, 1941. (A. P.-C.)

Antiseptic and Detergent Solutions Containing Ethers of Glycerol. Nonirritant antiseptic and detergent solutions suitable for use in tooth pastes, hair washes, ointments, after-washing lotions, cleansing creams, sterilizing mixtures, mouth washes and the like, are formed of water together with over 5% by volume of a compound such as the active amyl, 2-pentanol or 3-pentanol ethers of glycerol.—GEO. L. DOELLING. U. S. pat. 2,255,916, Sept. 16, 1941. (A. P.-C.)

Anti-Typhoid Vaccine—Comparison of Some Methods of Sterilizing. This study is divided into the following parts: (1) strain used, (2) preparation of vaccine, (3) toxicity test, (4) animal inoculation, (5) agglutinins titer, (6) discussion, (7) summary and conclusions.—M. A. GOHAR and A. ELIAN. *J. Trop. Med. Hyg.*, 45 (1942), 41–44. (W. T. S.)

Aromatic Diamidines—Action of, Against Trypanosoma Congolense. Both single large doses (20 mg./Kg.) and repeated doses (5 mg./Kg.) of 4 : 4′-diamidino stilbene (I) and 4 : 4′-diamidino diphenoxy pentane (II) were given to cattle infected with *T. congolense* without effecting complete cures. Five to 10 mg./Kg. doses of II produced immediate poisoning and smaller doses produced delayed poisoning. Up to 20 mg./Kg. doses of I did not poison, but this size dose is impractical due to the 1.5% solubility of the compound. Both I and II premunized cattle, but not without danger. The premunized state is not as stable in trypanosome infections as it is in those of piroplasm. It would be well to determine the dosage of I which establishes premunition by repeated doses in animals. While I is claimed more efficacious in the treatment of *T. congolense* infections in mice, it seems that II is superior against the same infection in cattle. The strange delayed toxic effect of II is reported for the first time. No renal damage was noted, but the actual liver damage appears with the onset of blood sugar changes. Glycogen-depleted animals will, hence, be more susceptible.—R. DAUBNEY and J. R. HUDSON. *Ann. Trop. Med. Paras.*, 35 (1941), 175–186. (W. T. S.)

Azo Compounds for Combating Pathogenic Microörganisms. Azo derivatives of 4-nitro-4′-aminodiphenyl sulfone, obtained by diazotization and coupling with agents containing groups effecting solubilization in water, such as the sulfonic acid, carboxylic acid or quaternary ammonium functions, do not have the toxicity of the initial materials but retain their activity against microörganisms. Details are given of the production of a number of such compounds.—ANDRÉ GIRARD, assignor to LES LABORATOIRES FRANÇAIS DE CHIMIOTHÉRAPIE. U. S. pat. 2,256,261, Sept. 16, 1941. (A. P.-C.)

Bacteriological Investigation of Wounds. A satisfactory method has been devised for securing bacteriological samples from wounds encased in plaster without interfering with the treatment. The flora of wounds treated in closed plaster does not appear to differ from that of open wounds, and neither its character nor its fluctuations explain the efficacy of the closed-plaster method. Infection of such wounds during the period of hospital treatment occurs fairly often during changes of plaster, but no cross-infection has been detected at any other time. It is suggested that the multiplication of bacteria is delayed for some days in wounds which are excised and cleansed within a few hours of the accident. Some organisms appear to be permanently removed by this procedure. No evidence has been found that *Ps. pyocyanea* or any other organism inhibits the growth of hemolytic streptococci or of *Staph. aureus* in wounds.—J. ORR-EWING, J. C. SCOTT and A. D. GARDNER. *Brit. Med. J.*, 4197 (1941), 877. (W. H. H.)

Bacterium Coli in Water—Comparison of Tests for. The indol test carried out at 37° C. gave 94.6% positive results in water samples known to contain *Bact. coli.* The test was less efficient at 46° C. than at 37° C. There was nothing to choose between Ehrlich's and Kovac's reagents in carrying out the tests for indol. The Eijkman test at 46° C. gave only 68.8% success, but the Bulir test also at 46° C. was generally superior to the Eijkman, giving 80.9% efficiency. Fluorescence and acid production appeared in most tubes after 20 to 30 hrs. incubation. The author suggests the carrying out of the indol test with 1.0% lactose trypsin broth and a parallel Bulir test as an ideal combination for the rapid detection of *Bact. coli.* The former test has the advantages of detecting strains of *Bact. coli* incapable of surviving 46° C. and, at the same time, characterizes the type of *Bacterium coli* present.—K. GARTNER. *Z. Hyg. Infektionskrankh.*, 122 (1940), 661; through *Bull. Hyg.*, 17 (1942), 129. (T. C. G.)

Bact. Typhosum Ty 2—Hydrolytic Degradation of the Antigenic Complex of. The following summary is given: (1) The *Bact. typhosum* Ty 2 antigen has been shown to consist of the following constituents, into which it may be dissociated on gentle hydrolysis: a polysaccharide component (50–60%), an insoluble polypeptide (about 16%), a soluble nitrogenous component (10–20%) and a small lipid component (3–4%). (2) The polysaccharide represents the O-specific hapten of the antigen; it has a reducing value on hydrolysis of 83% in terms of glucose and is highly dextrorotatory $[\alpha]_D^{20°} = +114°$). It appears to be free from ketose, pentose and uronic acid residues but yields *d*-galactose, *d*-mannose and *d*-glucose on hydrolysis. An identical polysaccharide has been prepared directly from the dried organisms by extraction with dilute acetic acid. (3) The polypeptide component is insoluble in water and soluble in dilute alkalis. It contains 8.2% N, partly in the form of tyrosine and arginine units and about 50% of the total N is liberated as amino groups on acid hydrolysis. (4) The nature of the soluble nitrogenous component is, as yet, undetermined. (5) The antigen of *Bact. typhosum* Ty 2 is resistant to tryptic digestion.—GEORGE GROSVENOR FREEMAN and THOMAS HEMINGWAY ANDERSON. *Biochem. J.*, 35 (1941), 564. (F. J. S.)

Bile Products and Iodine—Germicidal Compounds from. Germicidal compounds suitable for therapeutic uses and which are of varying predetermined degrees of viscosity and water insolubility are obtained by adding measured quantities of powdered iodine to an aqueous solution of bile products and heating to about 60° to 100° C. for a time up to about 5 hrs. after iodine vapors are no longer emitted and until no further precipitation or solidification results.—PAUL GOEDRICH. U. S. pat. 2,233,812, March 4, 1941. (A. P.-C.)

Biotin and *p*-Aminobenzoic Acid as Growth Factors for the Acetone-Butanol Organism, Clostridium Acetobutylicum. All strains required both biotin and *p*-aminobenzoic acid.—J. O. LAMPEN and W. H. PETERSON. *J. Am. Chem. Soc.*, 63 (1941), 2283. (E. B. S.)

Biotin Requirements of Microörganisms—Use of Avidin in Studies on. A correlation was demonstrated between the biotin requirements of an organism and its growth inhibition by avidin, the

antibiotin constituent of egg white. Generally those organisms which need biotin as a growth essential are inhibited by avidin, while such organisms which synthesize biotin remain unaffected. From this evidence it appears that the following organisms need biotin: *Cl. chauvei, Cl. botulinum, histolyticum, sporogenes, D. pneumoniae, L. casei, L. acidophilus* and *B. brevis*.—MAURICE LANDY, DOROTHY M. DICKEN, MARGARET M. BICKING and WINIFRED R. MITCHELL. *Proc. Soc. Exptl. Biol. Med.*, 49 (1942), 441. (A. E. M.)

Brucella Abortus—Laboratory Infection with. Three cases of undulant fever are reported, due to laboratory infection by a stock strain of *Br. abortus* which had been continuously subcultured for two or three years. In two cases the infecting strain was known to be sulfanilamide resistant. In no case was the exact site of entry of the organism established, and it is suggested that air borne infection from surface cultures is a possibility.—H. N. GREEN. *Brit. Med. J.*, 4186 (1941), 478. (W. H. H.)

Chemotherapy—Studies in. III. Sulfones. A series of sulfones related to 4,4′-diaminodiphenylsulfone have been synthesized in endeavoring to reduce the toxicity and retain the chemotherapeutic activity of the parent compound. The preparation and properties of these sulfones are described. Two of the new sulfones, namely, 2-sulfamyl-4,4′-diaminodiphenylsulfone and 4-aminophenyl-5′-amino-2′-pyridylsulfone, were highly active against experimental streptococcal and pneumococcal infections in mice, and were much less toxic than 4,4′-diaminodiphenylsulfone. The relationship between molecular structure and chemotherapeutic activity in the sulfone series as compared with the corresponding sulfonamides is discussed.—R. O. ROBLIN, JR., J. H. WILLIAMS and G. W. ANDERSON. *J. Am. Chem. Soc.*, 63 (1941), 1930. (E. B. S.)

Clostridium Acetobutylicum (Weizmann)—Bacteriology, Growth Factor Requirements and Fermentation Reactions of. Features of this organism are the palisade arrangement of the cells in young liquid cultures, vigorous growth in wheat mash with the formation of butyl alcohol, acetone, and the growth on wheat extract agar with the development of circular, creamy white, viscid colonies, the specific nature of the "O" antigen and the inability to grow in broth or on blood agar plates. The organism requires a factor for growth conforming to a structural pattern of a di-substituted benzene ring with the substituents in the 1–4 positions. Optimal activity is developed when an amino group is one substituent and a carboxyl or carboxymethyl is the other. Thus, *p*-aminobenzoic acid (1) or compounds capable of being hydrolyzed, oxidized or reduced to this substance are the most active. The spores have the same growth requirements. Fermentation of glucose in synthetic medium containing one gives no acetone, but addition of a second factor, acetone factor, to the medium produces normal yields of acetone. This factor is probably a coenzyme. Fermentation of wheat mash produces 21% butyl alcohol, 10.5% acetone and 2.5% ethyl alcohol. Traces of copper or prolonged sterilization are inimical.—SYDNEY D. RUBBO, MARGARET MAXWELL, R. A. FAIRBRIDGE and J. M. GILLESPIE. *Australian J. Exp. Biol. Med. Sci.*, 19 (1941), 185–198. (W. T. S.)

Clostridium Septique Toxins. A study is reported of the pharmacological effects of these toxins, especially with respect to their action on circulation.—C. H. KELLAWAY, G. REID and E. R. TRETHEWIE. *Australian J. Exp. Biol. Med. Sci.*, 19 (1941), 297–309. (W. T. S.)

Cl. Welchii—Rapid Identification of. The production of a turbidity in human serum by the toxins of growing *Cl. welchii* (Nagler reaction) is a valuable aid to the rapid identification of the bacillus for diagnostic purposes. Excellent results are obtained with a mixture of equal parts of human serum and Fildes' broth incubated anaerobically. The seeding of a single *Cl. welchii* colony into such a mixture produced a strong reaction in 80% of the tests after one or two days incubation. The reaction is specifically inhibited by antitoxin. Feeble reactions are not unequivocally indicative of *Cl. welchii* since they are given by certain other species of anerobic spore-bearer. Human serum-Fildes'-agar provides a means of detecting *Cl. welchii* on plates within 24 hrs. of taking a swab.—N. J. HAYWARD. *Brit. Med. J.*, 4195 (1941), 811. (W. H. H.)

Colloidal Silver Iodide Composition Suitable for Use as an Antiseptic. A substantially dry composition easily soluble in water contains colloidal silver iodide and a colloidal zinc compound such as one prepared from zinc chloride and gelatin.—MICHAEL G. MINAEFF, JOHN P. GREZE and RUDOLF J. PRIEPKE, assignors to A. C. BARNES Co. U. S. pat. 2,250,390, July 22, 1941. (A. P.-C.)

Diphtheria—A New Concept of the Toxemia of. Comparison between the clinical results obtainable with diphtheria antitoxin when first introduced and that now in general use shows that in the development of antitoxin some essential factor has been missed. A new concept of the nature of the toxemia of diphtheria and of the specific treatment quired to combat it successfully is advanced based on the following considerations. Diphtheria toxin is composed of two substances one of which (A) is highly lethal for the guinea pig and is present in large amounts in Park-Williams No. 8 toxin as prepared in the laboratory. Little of this constituent is produced in the body of the victim of diphtheria although it has hitherto been assumed that hypertoxic diphtheria is caused by its production in excessive amounts. Conversely, laboratory toxin contains relatively little of the second constituent (B) but it is this substance, produced in excessive amounts, which determines the occurrence of hypertoxic cases of diphtheria. Corresponding to the two substances in toxin there are two antibodies in antitoxin. The avidity of antitoxin is determined by its power of neutralizing substance B, and for the treatment of the toxemia of diphtheria, antitoxins rich in the antibody to substance B are required.—R. A. Q. O'MEARA. *Lancet*, 240 (1941), 205. (W. H. H.)

Diphtheria Bacilli in Floor Dust. Diphtheria bacilli can be isolated in large numbers and in virulent condition from floor dust in the neighborhood of diphtheria patients. They may persist fully virulent in such dust for at least fourteen weeks *in vitro* and five weeks on the floor. Disturbance of such dust permits the diphtheria bacilli to rise into the air. Treatment of the floors with spindle oil reduces, and may entirely eliminate, air contamination from this source. Current disinfection procedures commonly fail to destroy the diphtheria bacilli in floor dust; for this purpose relatively strong antiseptic solutions appear to be necessary. Dust probably plays an important part in the aerial dissemination of respiratory infections.—W. E. CROSBIE and H. D. WRIGHT. *Lancet*, 240 (1941), 656. (W. H. H.)

Diphtheria Bacilli—New York City Types of. The author isolated 181 strains of diphtheria bacilli and attempted to classify them according to the characteristics described by the Leeds workers in 1931. Only 5 strains conformed to the *gravis* characteristics. Of the remaining strains 96 gave cultural and biochemical reactions resembling the *mitis* strains, while 80 strains were called *intermediates* since they did not fall into either of the above classifications. The author notes that there were

many strains which did not have clear-cut characteristics and hence he believes that the methods of classification found satisfactory by the English workers are not suitable for strains isolated in this country. Perry, Whitley and Petran in Maryland and Frobisher in Baltimore have likewise expressed their opinions that the criteria for classification used by the Leeds workers are not satisfactory in this country. No correlation was found between the clinical severity of the case and the type of organism isolated from it.—E. SELIGMANN. *Am. J. Hyg. B*, 34 (1941), 125. (T. C. G.)

Disinfectants—Bacteriostatic Effect of. The effect of various disinfectants in controlling the growth of bacteria in serum, dried and reconstituted serum, and citrate plasma has been studied. Growth of *B. subtilis* and *Staph. aureus* was prevented for six days by merthiolate 1–10,000, phenyl mercuric nitrate 1–50,000 and proflavine 1–100,000. Growth occurred in sulfanilamide 1–5000 after 24 hrs. Enterococcus was inhibited for three days by phenyl mercuric acetate 1–100,000, proflavine 1–100,000 and merthiolate 1–10,000. Growth in three days could be demonstrated in the presence of metaphen 1–10,000, phenyl mercuric nitrate 1–50,000 and sulfanilamide 1–5000. *Ps. pyocyanea* was not inhibited by any of these disinfectants. Thymol and *p*-chlor-*m*-cresol were ineffective as bacteriostatics; and these and phenyl mercuric acetate precipitate proteins in serum. Freezing at −20° C. and drying in serum did not affect the bacteriostatic power of metaphen, sulfanilamide, proflavine and phenyl mercuric nitrate; nor did the presence of the disinfectants affect the solubility of the dried serum. Molds were inhibited by 1–50,000 phenyl mercuric nitrate but not by 1–10,000 proflavine. Sulfanilamide will prevent the growth of *B. subtilis, M. tetragenus* and pseudomonas in whole blood for thirty days at 4° C. but not at 22° C.—M. E. MACKAY. *Brit. Med. J.*, 4193 (1941), 747. (W. H. H.)

Drug Resistance in Trypanosomes—Stability of. The history of a number of strains of *T. rhodesiense* made resistant to various drugs since 1929 is brought up to date. The atoxyl-fast strain has preserved its character unchanged for twelve and one-half years, during which it was passaged by blood innoculation through a series of 1500 mice. Three Bayer-fast strains were prepared and maintained by mouse passage. These strains varied in their maintenance of resistance. Two undecane diamidine-fast strains were prepared, one in mice and one in rabbits. Both lost some resistance within one year, and all within three and one-half years. The synthalin-fast strain behaved like the undecane diamidine-fast strain.—J. D. FULTON and WARRINGTON YORKE. *Ann. Trop. Med. Paras.*, 35 (1941), 221–227. (W. T. S.)

Dust-Borne Infection and Bedclothes. Attempts to render textiles bactericidal for bacteria deposited on them have been unsuccessful. A method is described for the treatment of bedclothes with medicinal paraffin dissolved in white spirit. This treatment reduces the amount of dust which can be liberated from blankets and sheets by approximately 90% without rendering them objectionally oily. The method is too laborious for large scale adoption but deserves further trial in hospital wards. If it can be simplified, it should help to prevent the spread of ward infections.—M. VAN DEN ENDE and D. G. EDWARD. *Lancet*, 240 (1941), 716. (W. H. H.)

Electron Microscope. The electron microscope represents one of the greatest scientific discoveries of the 20th century. Heretofore, the maximum magnification obtainable with light microscopes has been about 1000 diameters. Whereas, with the electron microscope useful magnifications of 60,000 to 80,000 have been employed, while theoretically it will be possible to obtain a magnification of 200,000 times when several technical difficulties have been overcome. The electron microscope operates upon an entirely different principle than light microscopes. Electrons are generated by a vacuum tube and directed to a magnetic field where they are concentrated just as the condenser in the light microscope concentrates the rays of light. Next the electrons pass through another magnetic coil which acts like the objective in the light microscope, after passing through the object which is being examined. This constitutes the first stage of magnification. A third magnetic coil acts like the eyepiece in the light microscope and projects the image on a screen which may be photographed or viewed with the eye by means of fluorescent light. Since electrons only travel in a straight line when passing through a vacuum, the whole electron microscope system must be continuously evacuated. Focusing is not done by moving any of the elements in the microscope but by varying the intensity of the magnetic fields which change the direction of the electron flow. One of the handicaps thus far encountered in perfecting the electron microscope is the development of lenses which are satisfactory. Thus far spherical aberration of the lenses has been only partly corrected and chromatic aberration not at all. Extremely small numerical apertures must therefore be used, but this fortunately increases the depth of field so that it is about 10 times greater than that found in light microscopes. The image in the electron microscope is formed by the scattering of electrons as they come in contact with the object being examined. Since a few molecules are sufficient to deflect electron beams, an extremely thin, homogenous surface must be used to hold the object being examined. For this purpose, films are prepared by dissolving collodion in amyl acetate and spreading it on distilled water. After the solvent evaporates, a film of collodion is obtained which is used in place of the glass slides in light microscopy. Staining of the object is unnecessary, since most objects display sufficient contrast without staining. The electron microscope is manufactured by the Radio Corporation of America and the cost is about $9000.—L. MARTON. *J. Bact.*, 41 (1941), 397. (T. C. G.)

Fungicidal Action of Copper Sulfate and *p*-Nitrophenol. It was found that a 2% aqueous solution of copper sulfate required 5 hrs. to kill *Tr. rubrum* and *E. floccosum.* A 5% solution took 4 hrs. to achieve the same result. Thirty minutes' application proved lethal to *E. floccosum* when a 20% solution was used but this same solution took 1 hr. to kill *Tr. rubrum.* Using a saturated aqueous solution of para-nitrophenol the same differences were seen, 30 min. being sufficient to kill the one fungus while 2 hrs. were needed to deal with the Trichophyton. Both were killed in about 15 min. when this solution was used *in vacuo;* but when the strength of the para-nitrophenol was reduced to 1%, 30 to 60 min. were necessary.—F. L. STEPHENS. *J. Roy. Nav. Med. Serv.*, 27 (1941), 273; through *Bull. Hyg.*, 17 (1942), 145. (T. C. G.)

Germicidal Compositions. An aqueous dispersion of α-terpineol or pine oil is used together with a halogenated phenolic compound such as a chlorophenol, chlorocresol or chloroxylenol.—FREDERICK W. AMES. U. S. pat. 2,253,182, Aug. 19, 1941. (A. P.-C.)

Germicide Suitable for Use on Wounds. Equal parts of phenol and oil of thyme are used in dilute alcohol solution.—FREDERICK W. AMES. U. S. pat. 2,254,129, Aug. 26, 1941. (A. P.-C.)

Hemolytic Streptococcus—Studies on the. V. The Electrophoretic Isolation of the Erythrogenic Toxin of Scarlet Fever and the Determination of Its Chemical and Physical Properties. Chemically isolated scarlet fever (erythrogenic) toxin was analyzed by electrophoresis in the Tiselius apparatus and was found to contain five electrophoretically distinct constituents. The slowest migrating constituent was identified as the erythrogenic toxic constituent and was isolated by electrophoresis. The electrophoretically separated scarlet fever toxin was shown by chemical tests, by its property of heat coagubility and by its ultraviolet absorption spectrum to be a protein. The electrophoretic mobility was found to be -1.93×10^{-5} cm.^{2} volt^{-1} sec.$^{-1}$ a pH 7 in the buffer used, the sedimentation constant 2.7×10^{-13} cm. sec.$^{-1}$ dyne^{-1}, the diffusion constant 9.5×10^{-7} cm.^{2} sec.$^{-1}$, the molecular weight 27,000 and the frictional ratio 1.1. The high toxic activity of the electrophoretically separated toxin (100 to 150 million skin test doses per mg.) and its substantial homogeneity with respect to both electrophoresis and sedimentation are evidence that this material is probably pure scarlet fever (erythrogenic) toxin.—L. E. KREJCI, A. H. STOCK, E. B. SANIGAR and E. O. KRAEMER. *J. Biol. Chem.*, 142 (1942), 785. (F. J. S.)

Horse Serum Albumin—Conjugation of, with Isocyanates of Certain Polynuclear Aromatic Hydrocarbons. A number of conjugated proteins having various polynuclear hydrocarbons as prosthetic groups have been prepared for studies of their possible immunological and carcinogenic properties. Fractionation experiments indicated that the major portion of the conjugate contains close to the average number of prosthetic groups. The characteristic fluorescence exhibited by the conjugates in ultraviolet light is recorded.—H. J. CREECH and R. N. JONES. *J. Am. Chem. Soc.*, 63 (1941), 1661. (E. B. S.)

Hypochlorites of Quaternary Ammonium Hydroxide. Stable water-soluble germicidal compounds are formed by halogenating compounds such as *N*-methylpyridinium hydroxide for the production of an *N*-alkylpyridinium hypochlorite, or other compound of the general formula $R^1R^2R^3R^4$NOH (in which R^1 is an organic radical, R^2, R^3 and R^4 are radicals of a group consisting of hydrogen and organic radicals which are linked to the nitrogen atom by a carbon atom of each of R^1, R^2, R^3 and R^4) characterized by the fact that the hypohalite contains a substantial quantity of active halogen.—IRVING E. MUSKAT, assignor to PITTSBURGH PLATE GLASS CO. U. S. pat. 2,256,959, Sept. 23, 1941. (A. P.-C.)

Infections—Composition Suitable for Treatment of. A mixture of 25% to 75% of ethyl chaulmoograte and 75% to 25% of ethyl cinnamate is used. —CYRUS F. NEWCOMB. U. S. pat. 2,248,113, July 8, 1941. (A. P.-C.)

Intestinal Protozoa—Culture of. A simple medium is described suitable for the cultivation of *Entamoeba histolytica*, *Trichomonas intestinalis* and *Balantidium coli*.—S. ADLER and A. FONER. *Lancet*, 240 (1941), 243. (W. H. H.)

Meningococcus Infection—Mode of Action of Mucin in an Experimental. The principal action of mucin in promoting meningococcus infection in the mouse is that it permits survival and growth of the organism in the peritoneal cavity. A focus of proliferation is thus established from which the blood stream is progressively invaded. Of secondary importance are the following factors: (*a*) mucin interferes with the bactericidal action of mouse serum *in vitro;* (*b*) when granules are present in the mucin solution, these interfere with phagocytosis of meningococci in the peritoneal cavity. Mucin inhibits to some degree the intraphagocytic digestion of meningococci in the peritoneal exudate, but no evidence was obtained that intracellular multiplication of organisms occurred. Mucin mixed with mouse peritoneal fluid in suitable proportions affords a favorable culture medium for the meningococcus *in vitro*.—C. MCLEOD. *Am. J. Hyg.*, B 34 (1941), 51. (T. C. G.)

Oral Flora and Saliva—Effect of Citrus Juices and Mouth Prophylaxes on the. The effect of water, orange juice, grapefuit juice, commercial tooth paste containing hexylresorcinol, commercial tooth paste containing sodium ricinoleate and a commercial liquid dentifrice containing sodium alkyl sulfate on the oral flora and saliva were studied. The most effective agents in the actual removal of microörganisms from the mouth were two commercial dentifrices, the one containing sodium ricinoleate and the other sodium alkyl sulfate. Of all the materials tested, the citrus fruit juices showed the greatest percentage of inhibitory action on bacterial growth. Citrus fruit juices effected no great change in the surface tension of saliva, while the commercial dentifrices caused a marked reduction. The agents causing greater lowering of surface tension of saliva were more efficient in removing bacteria from the mouth upon prophylaxis. Citrus fruit juices cause an increase in the buffer value of the saliva in the 5-min. interval after prophylaxis; over a subsequent 2-hr. interval it returns to approximately its original value.—H. J. FLORESTANO, M. A. ELLIOTT and J. E. FABER, JR. *J. Bact.*, 41 (1941), 605. (T. C. G.)

Paraffin—Germicidal Properties of. In connection with the use of waxed papers and containers for storage and distribution of foodstuffs, this paper reviews the recent literature on the bactericidal effect of the paraffination process, both on coated paper or board and on the paraffin surface of the finished container. Paraffin was found to be almost inert to bacterial attack and to be free from microörganisms. Paraffination accomplishes two purposes: (1) it imprisons bacteria on and in the paper and (2) the temperature at which paraffination is carried out usually destroys a high percentage of the various types of bacteria. In investigations of the bactericidal properties of hot paraffin wax, milk containers were heavily inoculated with *Escherichia coli* and an aerobic spore-former, paraffined at a temperature of 74° and 79.5° C. and stored, filled with milk or broth at room temperature and at 4.5° C. In no case did *Escherichia coli* survive the treatment.—F. W. TANNER and H. F. LEWIS. *Oil & Soap*, 17 (1940), 26; through *Bull. Hyg.*, 17 (1942), 53. (T. C. G.)

Penicillin—Response of Sulfonamide-Fast Pneumococci to. Penicillin is an effective chemotherapeutic agent against both parent and sulfonamide-fast pneumococci in mouse infection experiments.—H. M. POWELL and W. A. JAMIESON. *Proc. Soc. Exptl. Biol. Med.*, 49 (1942), 387. (A. E. M.)

Phenol Coefficient of Disinfectants—Influence of Temperature on. It is not unusual for the investigator to find that the carbolic coefficient of a disinfectant is found to be lower than that claimed by the manufacturer, but as the authors found that their results differed from those of workers in laboratories of repute in the United States, they presumed that storage or conditions in transit between the States and the Philippines were responsible. They took specimens of creolin with coefficients ranging from 1.4 to 9.4, divided them each into three portions of 100 cc. and placed these in sterile, well-stoppered bottles. One portion was heated to 60° C. for an hour in a water bath, one was kept at room temperature and one was incubated at 37° C. The first was tested after 3–4 days, the latter two after 1 to 12

months. Two or more tests were made at the same time and the average taken. They arrived at the following conclusions: (1) Exposure of the disinfectant to high temperatures (60° C.) for a short period of time (1 hr.) does not change the phenol coefficient. (2) Exposure to relatively lower temperatures (37° C.) for a long time (1 month or over) causes a lowering of the phenol coefficient. The decrease is greater the longer the time of exposure to a temperature of 37° C. (3) Samples kept at room temperature show little change in the phenol content.—J. RAMIREZ and M. V. MALLARI. *J. Philippine Med. Assoc.*, 21 (1941), 395; through *Bull. Hyg.*, 17 (1942), 131. (T. C. G.)

Phospholipid from Beef Heart—Isolation and Purification of a Serologically Active. A new phospholipid from beef heart has been isolated and purified and on hydrolysis it yields fatty acids and a phosphorylated polysaccharide. The name cardiolipin is suggested for this substance, which is essential for the reactivity of beef heart antigens in the serologic test for syphilis. Chemical and serologic studies of cardiolipin are being continued.—MARY C. PANGBORN. *J. Biol. Chem.*, 143 (1942), 247. (F. J. S.)

Placental Extract for Syphilitic Tests. The author found in 230 parallel tests that an alcoholic extract of human placenta worked as well as the standard extract prepared by the firm of Behring and recommends placenta as a cheap source which is available in large quantities in any maternity hospital. The method of preparation is as follows: The placenta is washed, the cord and amnion removed and the remainder minced and mixed with 5 times its volume of 96% alcohol. The mixture, in a corked cylinder, is put into the incubator at 37° C. for a week, being shaken twice daily. At the end of this time the mush is spread out evenly in a flat dish, the solid being covered with alcohol. When the latter has evaporated, drying is completed at 37° C. The dried product is ground up in a mortar and mixed with alcohol at the rate of 50 Gm. in 200 cc. The mixture is left for two weeks at 37° C. being shaken twice daily. The supernatant fluid is then filtered and stored in dark bottles; it is filtered again at the end of two weeks, and is then ready for use. The extract is used in a dilution of 1 : 15 to 1 : 20 without the addition of any cholesterol.—I. GYORFFY. *Z. Immunitäts.*, 99 (1941), 209; through *Bull. Hyg.*, 17 (1942), 62. (T. C. G.)

Plasmodium Gallinaceum—Active Immunization of Fowls against. Repeated injections of large numbers of inactivated sporozoites of *P. gallinaceum* into domestic fowls caused a considerable rise in the agglutination titer (against homologous sporozoites) of the serum, in every case. Fowls treated in this way were subsequently found to be susceptible to mosquito-borne infection with the homologous strain of *P. gallinaceum.* Those in which the agglutination titer was $^1/_{16,000}$ or less appeared to be as susceptible to the pathogenic effects of this infection as normal fowls (mortality 50%), but those in which the agglutination titer was $^1/_{32,000}$ or higher, developed only very mild infections in every case (mortality nil). The conclusion is reached that it is possible, by injecting large doses of inactivated sporozoites into fowls, to bring about partial active immunization against mosquito-borne infection with the homologous *Plasmodium,* when a sufficient degree of antigenic response has been elicited.—H. W. MULLIGAN, P. F. RUSSELL and B. N. MOHAN. *J. Malaria Inst. India,* 4 (1941), 25. (A. C. DeD.)

Plasmoquine Resistance in Plasmodium Knowlesi. A strain of *Plasmodium knowlesi* in *Macacus rhesus* was made resistant to plasmoquine, but a scarcity of the animals prevented the ascertaining of the stability of the resistance.—J. D. FULTON and WARRINGTON YORKE. *Ann. Trop. Med. Paras.*, 35 (1941), 233–239. (W. T. S.)

Poliomyelitis Virus—Effect of Hypochlorites on the. In an earlier report chlorine in city water in a concentration of 0.5 p. p. m. did not inactivate the poliomyelitis virus in one and one-half hrs., but did so in 4 hrs., at which time the chlorine content had dropped to 0.35 p. p. m. In the present study, the effect of chlorine on the MV strain of poliomyelitis virus was determined, using calcium and sodium hypochlorites as sources of the element. The virus material was a suspension of monkey cord having a minimal infective dose of 0.001 Gm. of tissue. A solution of calcium hypochlorite in tap water containing 1.0 p. p. m. of chlorine and acting for 25 min. had no effect on the virus. At the end of 4 hrs., the chlorine content was down to 0.2 p. p. m.; injection of the suspension into monkeys, however, produced quadriplegia. Essentially the same results were obtained when sodium hypochlorite (B-K solution) was used. In a second experiment a solution of sodium hypochlorite in tap water containing 1.5 p. p. m. of chlorine inactivated the virus in 20 min. A concentration of 0.55 p. p. m. in river water inactivated the virus in 1 hr., while a concentration of 0.2 p. p. m. in the same medium acting for an hr. had no apparent effect.—J. E. KEMPF, M. E. PIERCE and M. H. SOULE, *J. Bact.*, 41 (1941), 51. (T. C. G.)

Potassium Salicylate as an Inactivating Agent for Animal Viruses. Potassium salicylate solutions known to inactivate certain plant viruses now have been tried on animal viruses. Solutions of potassium salicylate (0.1 to 0.2 *M*) of *p*H 7 and at 22° C. rapidly inactivate more than 99% of the viruses of herpes, Shope fibroma, vaccinia and infectious myxoma. Higher concentration did not completely inactivate poliomyelitis virus. The rate of inactivation with Shope fibroma was logarithmic, and hence a distinction must be drawn between mathematical and biological inactivation since complete inactivation is obtained only after infinite time. Herpes virus when dialyzed before inoculation was rendered noninfective in mice or rabbits by twenty-four hrs. contact with 0.15 *M* potassium salicylate. The concentration of the salt necessary to render the other viruses noninfective was not well defined, but was higher. Salicylate-treated virus myxomatosum was not an effective immunizing agent when tested in rabbits.—BARBARA COOKE and RUPERT J. BEST. *Australian J. Expt. Bio. Med. Sci.*, 19 (1941), 93–99. (W. T. S.)

Proteins—Conjugates Synthesized from Various, and the Isocyanates of Certain Aromatic Polynuclear Hydrocarbons. Conjugates prepared by the interaction of isocyanates of 1,2-benzanthracene and 3,4-benzpyrene with bovine serum albumin were found to possess the same hydrocarbon content as horse serum albumin conjugates prepared under identical conditions. Only a small number of hydrocarbon groups could be introduced into egg albumin and bovine and horse serum pseudoglobulins without causing marked denaturation of the protein component. β-Anthryl isocyanate was coupled with an antipneumococcus serum to give a new type of labeled antibody. No significant degree of coupling was observed with zein.—H. J. CREECH and R. N. JONES. *J. Am. Chem. Soc.*, 63 (1941), 1670. (E. B. S.)

Puerperal Infection. A consideration of the relationship of pathological changes and bacteriological findings to prevention and treatment.—W. E. STUDDIFORD. *Bull. N. Y. Academy Med.*, 17 (1941), 567. (A. C. DeD.)

Pyridine Carboxylic and Aminobenzoic Acids—The Fungistatic Properties of. The effect of

chemical substances on bacteria and mold varies with the *p*H of the media. Bacteria prefer neutral *p*H ranges but mold will grow from *p*H 2 to *p*H 8. Previous work on the fungistatic properties of benzoic acid and related compounds is briefly reviewed. In the experimental work, a method for determination of fungistatic properties, proposed by Hoffman was used. Concentrations used were minimum at each *p*H value necessary to inhibit all visible mold growth for 48 hrs. at 37.5° C. Spores used were from a mixed culture of common molds occurring in foodstuffs, such as *Aspergillus niger, Aspergillus glaucus, Rhizopus nigricans, Penicillium frequentans.* On plates without inhibitor there was vigorous growth in 24 hrs. and heavy sporulation in 48 hrs. Media consisted of nutrient agar containing 1% glucose. Buffers were mixtures of citric acid and disodium phosphate. Results are shown by tabulation and by graph. Alpha pyridine carboxylic acid showed fungistatic property to much less degree than benzoic; nicotinic and isonicotinic acids showed no mold inhabiting properties. The *o*-aminobenzoic acid, anthranilic, is less powerful than benzoic; *m*-aminobenzoic is very weak, *p*-aminobenzoic shows fungistatic effect, the two polar groups being in widely separated positions. The resonance theory is discussed. That biological activity of a molecule is related to its structual ability as a resonance hybrid is interesting. For example, sulfanilimide is *p*-aminobenzene sulfonamide. The isomeric *meta* and *ortho* compounds are therapeutically inactive.—CHARLES HOFFMAN, T. R. SCHWEITZER and GASTON DALBY. *Jour. A. Ph. A.*, 31 (1942), 97. (Z. M. C.)

Quaternary Ammonium Hypohalites. Stable compounds very soluble in water and useful as antiseptic, sterilizing or germicidal agents, such as trimethylbenzylammonium hypochlorite or tetramethylammonium hypochlorite or trimethylphenylammonium hypochlorite, are prepared by halogenating an aqueous solution of a compound such as trimethylbenzylammonium hydroxide, tetramethylammonium hydroxide or trimethylphenylammonium hydroxide (mention being also made of the possible similar halogenation of other substituted ammonium hydroxides). Due to the fact that the quaternary ammonium hydroxides are strong bases, the preparation of the corresponding hypochlorites or active chlorine derivatives in stable form may be effected without difficulty by interaction with a hypohalogenous acid such as hypochlorous acid. The products so produced are very stable, particularly in aqueous solutions, over a period of many months. The compounds are believed to have the structural formula: $R^1R^2R^3R^4N(OCl)$ where R^1 represents a hydrocarbon or substituted hydrocarbon radical, and R^2, R^3 and R^4 represent hydrogen or hydrocarbon or substituted hydrocarbon radical. Other hypochlorites may be prepared by treatment of mono-, di- or tri-substituted ammonium hydroxide, such as triphenylammonium hydroxide, trimethylammonium hydroxide, monomethyl-, monoethyl-, or monopropyl-ammonium hydroxide, dicresyl-, diphenyl-, dibenzyl- or dinaphthyl-ammonium hydroxide, or similar organic ammonium hydroxide, with a hypohalite.—IRVING E. MUSKAT, assignor to PITTSBURGH PLATE GLASS CO. U. S. pat. 2,256,958, Sept. 23, 1941. (A. P.-C.)

Quaternary Ammonium Salts—Bactericidal. Various details are given, or general mention made, of the production of bactericidal compounds such as cholanyltrimethylammonium halides, cholanyltriethylammonium ethyl sulfate, cholanyltripropylammonium propyl sulfate, lithocholylbenzyldimethylammonium chloride, desoxycholyl-, hyodesoxycholyl-, and apocholyl-benzyldimethylammonium chlorides, cholyldimethyllaurylammonium bromide, cholyldimethylhexylammonium bromide, cholylcetyldimethylammonium bromides, and corresponding sulfates and nitrates.—ALBERT L. RAYMOND and ROBERT T. DILLON, assignors to G. D. SEARLE & CO. U. S. pat. 2,252,863, Aug. 19, 1941. (A. P.-C.)

Rabies Virus—Cultivation and Antigenicity of the. Data are presented relating to the cultural requirements, pathogenic and antigenic potency of a strain of fixed rabies virus. The virus has been cultivated in the plasma as well as in a Maitland type of medium. Successful cultivation is predicated on the use of mouse or rat embryo brain and human or monkey serum. Mass cultures can be grown in 250-cc. flasks with 25 cc. of medium per flask. The Virus has been carried through 20 serial passages in the developing chick embryo. The prerequisite for successful cultivation appears to be implantation in 5- to 6-day-old embryos. The injury to the embryo is mild and older embryos quickly become free of virus. The culture virus rapidly loses its capacity to infect mice by the intraperitoneal route. This loss in virulence is especially marked in the case of virus grown in tissue media. It is less pronounced in virus cultivated in the developing chick embryo. Both active and formalized culture virus constitute potent antigens. The use of active virus is accompanied by a degree of risk. This risk is apparently completely eliminated in so far as mice are concerned, by a single previous injection of formalized virus. Formalized vaccine given in sufficient amount (10 cc. of a culture suspension) produces demonstrable neutralizing antibody in rabbits. The addition of brain tissue to a culture or vaccine in a concentration of about 15% seems to impair antigenic potency. It is suggested that the lipoid tissue interferes in some way with antigenicity and that this would account for the greater potency of culture virus as compared with brain emulsions from infected animals.—I. J. KLIGLER and H. BERNKOPF. *Am. J. Hyg. B*, 33 (1941), 1. (T. C. G.)

Scabacides—Effects of, as Studied in Rodent Infections. A histological comparison was made of the effects of certain drugs on scabies infections in rodents. Dimethylthianthrene (mitigal) (1) applied four times in ten days destroyed all mites and their eggs in the area treated. Mitigal was then used as the standard. Comparison of tetraethylthiuram monosulfide (2), benzyl benzoate (3) and the standard showed that (2) is the most lethal for mites and eggs, and the most rapid. The methyl ester of the fatty acids of coconut oil allowed the drug to reach 90% of the mites on single application. One application of (2) destroyed 76% of mites within 24 hrs. after application to the washed skin, and 100% after three days. The eggs are somewhat more resistant to (2) than are the mites. Human scabies will probably yield to (2), but it may cause dermatitis. Surface active agents could not be proved to increase the spread and penetration of (2), but did decrease its activity.—R. M. GORDON and D. R. SEATON. *Ann. Trop. Med. Paras.*, 35 (1941), 247–268. (W. T. S.)

Scarlet Fever Toxin-Antitoxin Reaction—A Quantitative Study of the. A highly purified scarlet fever toxin was prepared from culture filtrates of two scarlatinal strains (NY 5 and 594 B) of hemolytic streptococci grown in a medium of defined composition. The flocculation reaction of Rane and Wyman was studied quantitatively and was found to be specific for scarlet fever toxin and antitoxin. The toxins from the two strains tested showed quantitatively identical immunological reactions. Pure scarlet fever toxin was found to contain 0.00023 mg. of nitrogen per Lf and close to 1.3×10^8 skin test doses per mg. of nitrogen as calculated from the data. All evidence indicated that scarlet fever toxin is a protein. Similar calculations indicated

that scarlet fever antitoxin contains 0.00093 mg. of nitrogen per unit. The toxin-antitoxin complex was readily dissociated in dilute solutions, thus differing greatly from the diphtheria toxin-antitoxin system.—G. A. HOTTLE and A. M. PAPPENHEIMER. *J. Exptl. Med.*, 74 (1941), 545. (T. C. G.).

Serum Sickness—Possible Mechanisms of. Serum sickness, apparently analogous to the exanthems occurring in man about a week after the administration of serum, develops in the rabbit 4 to 6 days after the injection of horse serum. Local serum sickness or local serum reaction can also be elicited in the rabbit. Into the ear tissue is injected 0.1 cc. of horse serum; 55 hours later 5–10 cc. of rabbit anti-horse serum is injected intramuscularly. Twelve hours subsequently acute erythema and edema occur in the ear; this fades in 12 hrs. The reaction can be obtained by variations in the technique. The antiserum may be given intravenously, and 8 hrs. later the horse serum injected into the ear, or the horse serum may be given intravenously and 16 hrs. later the antiserum injected into the ear. "Processed" horse serum was used in some experiments. Essentially this was serum heated to 55° C. with about 0.25% sodium hydroxide. The process does not completely denature serum for in anaphylaxis experiments it will still either sensitize or produce shock, and it is also precipitinogenic. This processed serum injected into the ear in the usual quantity does not cause the local serum reaction when the antiserum is subsequently injected even though the other ear injected with untreated horse serum may yield an active local reaction. Further experiments showed that the local reaction could be produced in the ear with the processed serum if the dose of antiserum injected elsewhere was much increased. The authors concluded that the alkali-heat treatment reduces materially the capacity of serum to produce local reaction but does not abolish it entirely. It has been suggested from time to time that histamine plays an important part in the production of acute anaphylaxis or of ordinary serum sickness. Histaminase has in consequence been administered to human patients suffering from serum sickness. Experiments with rabbits lend no support to this hypothesis. The administration of histaminase before or during the occurrence of serum reaction failed to alter the occurrence, character or duration.—L. R. JONES and E. C. ROBERTS. *J. Immunol.*, 40 (1941), 107; through *Bull. Hyg.*, 17 (1942), 66. (T. C. G.)

Silica Gels as Agar Substitutes. The use of silica gels to solidify bacteriological media is not new. Of the formulas tried by the author the following gave the best results; (1) glycerine 6 parts, asparagin 0.4 part, distilled water to make 100 parts (adjusted to *p*H 7.5), (2) yeast-extract broth (*p*H 7.5), (3) sodium silicate, (4) phosphoric acid 25%. For use, mix 3 parts of (1), 6 parts of (2) and 0.6 part of (3). Adjust to *p*H 7.2 with (4). Ingredients must be mixed in the cold and plates poured quickly. About 0.27 part of (4) is required. Enriching substances may be added. The medium is an improvement on those previously tried and, while it has certain deficiencies, it was found to give satisfactory growth of intestinal organisms, staphylococci and anaerobes.—K. W. CLAUBERG. *Zentr. Bakt. I Orig.*, 147 (1941), 75; through *Bull. Hyg.*, 17 (1942), 51. (T. C. G.)

Smallpox and Varicella Differentiation with Chick Membrane Cultures. It is freqently difficult for the physician to distinguish between smallpox and chickenpox when making a diagnosis in the early stage of the diseases. The authors have developed a simple laboratory test to aid the physician in making this differential diagnosis. A small quantity of fluid from one of the skin lesions is aspirated in a sterile tube, placed in a tube containing moistened cotton and sent to the laboratory. Dried scales or crusts from the patient have also been successfully used. In the laboratory the material submitted is inoculated on the chorio-allantoic membrane of a 12-day-old egg and incubated at 36–37° C. for 48 to 72 hrs. A positive diagnosis of smallpox can be made by finding characteristic pocks in the embryo, stained smears showing typical elementary bodies and membrane-to-membrane passage. Material taken from cases of chickenpox yield negative results when inoculated on the chick membrane.—J. V. IRONS, S. W. BOHLS, E. B. M. COOK and J. N. MURPHY, JR. *Am. J. Hyg.*, 33 (1941), 50. (T. C. G.)

Sodium Formaldehydesulfoxylate Diaminodiphenyl Sulfone and Sulfide. These compounds, suitable for oral administration or injection in combating streptococcic infections, are produced by refluxing sodium formaldehydesulfoxylate with diaminodiphenyl sulfone or sulfide for several hours in an alcoholic reaction medium.—GEO. W. RAIZISS, LEROY W. CLEMENCE, and MORRIS FREIFELDER, assignors to ABBOTT LABORATORIES. U. S. pat. 2,256,575, Sept. 23, 1941. (A. P.-C.)

Sporozoites—Agglutinogenic Properties of Inactivated. A method is described for inactivating sporozoites of *Plasmodium gallinaceum* in saline dissections of salivary glands of mosquitoes by exposure to ultraviolet radiation. Repeated injections of inactivated sporozoites of *P. gallinaceum* into fowls produced a specific agglutinogenix effect. The agglutinating titer of serum from fowls which received repeated injections of large doses of inactivated sporozoites of *P. gallinaceum* was higher than that observed in the serum of fowls with acute or chronic infections induced by blood inoculation of the homologous *Plasmodium*.—P. F. RUSSELL, H. W. MULLIGAN and B. N. MOHAN. *J. Malaria Inst. India*, 4 (1941), 15. (A. C. DeD.)

Sterilization of Shell Dressings—Effect of Variation in the Operating Conditions on. Supplementary Note. The sterilizer used for most of the experiments reported in this JOURNAL 14 (1941), 157, was provided with a steam jacket. Walter (*Surg. Gynecol. Obstet.*, 5 (1940), 414) has shown that in such jacketted sterilizers, although the temperature and pressure are the same throughout, superheating may occur owing to the lowering of the partial pressure of the steam caused by residual air unaccompanied (because of the air-free steam jacket) by a fall in temperature. This is a dangerous error because none of the ordinary instruments or indicators give any sign of its existence, but the bacterial spores are sensitive to it. The steam in the present experimental sterilizer was known to be saturated because (*a*) the air drain was always left open in experiments, so that no residual air remained after the first few minutes, (*b*) the steam supply was "wet," and if the air drain was closed, water accumulated and (*c*) small quantities of water issued continuously from a glass tube placed in the outlet.—R. M. SAVAGE. *Quart. J. Pharm. Pharmacol.*, 14 (1941), 252. (S. W. G.)

Sulfadiazine—Effect of, on Hemolytic Streptococci. The authors give the following summary and conclusions: (1) Sulfadiazine is bactericidal for the hemolytic streptococcus when the inoculum is small and the concentration is between 2 and 5 mg. per 100 cc. (2) Its action is enhanced by the presence of antibactericidal antibody, either natural or acquired. (3) When sulfadiazine is compared with sulfanilamide, it is found to be superior in so far as its bactericidal effect is concerned, and it is more effective as a bacteriostatic agent in lower dilutions.—C. H. RAMMELKAMP and C. S. KEEFER. *Ann. Internal Med.*, 16 (1942), 659–665. (S. W. G.)

Sulfanilamide and Sulfamethylthiazole—Effects of, on Brucellosis in Mice. Mice were injected intraperitoneally with active cultures of *Brucella melitensis*, at a previously determined dose fatal in 4 to 5 days. The drugs in aqueous suspension were injected on the basis of 5-mg. doses twice daily for two days, then once daily for three. In addition to a control group of animals receiving no medication, there were two other groups receiving the drugs without having been infected with the organism. both drugs inhibited the growth and activity of brucella, sulfathiazole proving more active.—P. MORALES OTERO and A. POMALES LEBRON. *Puerto Rico J. Pub. Health Trop. Med.*, 16 (1941), 541.
(G. S. G.)

Sulfanilamide—Condensation of, with an Enol. N^4-α-Bromotetronyl Sulfanilamide. Sulfanilamide reacts with α-bromotetronic acid when the solid compounds are ground together in a mortar and heated at 110–120°. Preliminary pharmacological investigation indicates that the compound has a very low toxicity. The compound has a protective action against β-hemolytic streptococcus that is about equal to that of sulfanilamide.—W. D. KUMLER. *J. Am. Chem. Soc.*, 62 (1940), 2560.
(E. B. S.)

Sulfanilamide Powder—Elimination of Streptococci from Superficial Wounds by. The effect of applying sulfanilamide powder to 62 superficial wounds infected with hemolytic streptococci has been investigated. In three patients with ten wounds the drug was given by mouth at the same time. Hemolytic streptococci usually disappeared from the wounds within three or four days and did not reappear. Infections with hemolytic group-D proved resistant to local treatment. Neither sulfanilamide nor sulfathiazole had consistent effects on the staphylococci, *B. proteus* or *Ps. pyocyanea* which were also present in many of the wounds.—L. COLEBROOK and A. E. FRANCIS. *Lancet*, 240 (1941), 271. (W. H. H.)

Sulfanylguanidine in Control of Salmonella Infection and Carrier State in Mice. Salmonella infection in laboratory colonies of mice may be effectively reduced if carriers are isolated and treated with chemotherapy. Sulfanylguanidine reduces the number of organisms in the stools.—PARKER R. BEAMER. *Proc. Soc. Exptl. Biol. Med.*, 49 (1942), 418. (A. E. M.)

Sulfonamides—Local, for Preventing Gas Gangrene. Experimental wounds (with crushed muscle with the presence of a foreign body) were made in guinea pigs, and large numbers of gas gangrene organisms were introduced; untreated animals died within 24 hrs. Application of sulfonamide compounds to the wounds at the same time as insertion of the organisms saved a large proportion of the animals infected with *Cl. welchii* and with *Cl. septique*, but it had only slight influence upon infections with *Cl. oedematiens*. Sulfathiazole was the most effective compound to use in all cases; sulfanilamide was superior to sulfapyridine in preventing infection with *Cl. welchii*, but it had practically no activity against *Cl. septique*. Local application of sulfathiazole to the wound was more effective in preventing infection than systemic administraton by intraperitoneal injection. Delay of 2 hrs. in applying the treatment greatly reduced its effectiveness. It is recommended that war wounds should be protected against the development of gas gangrene by the local application of sulfonamide compounds together with injection of antitoxin.—F. HAWKING. *Brit. Med. J.*, 4181 (1941), 263. (W. H. H.)

Sulfanilamidopyrimidines—Substituted. 2-Sulfanilamido-5,6,7,8-tetrahydroquinazoline (I), 2-sulfanilamido-4,5-dimethylpyrimidine (II), 2-sulfanilamidobornylenepyrimidine (III), 2-sulfanilamido-4-n-hexylpyrimidine (IV), 2-sulfanilamido-5,6,7,8-tetrahydro - 8 - isopropyl - 5 - methylquinazoline (V), and 2-sulfanilamido-4,6-dimethylpyrimidine (VI) were tested in mice infected with strain C-203 of β-hemolytic streptococci. Compounds III, IV and V were inactive and I showed only a mild protective action. A definite prolongation of survival time was caused by II and VI, but II failed to afford complete protection during therapy and VI developed a relatively high acute toxicity.—EDWIN J. FELLOWS. *Proc. Soc. Exptl. Biol. Med.*, 48 (1941), 680.
(A. E. M.)

Survival Rates of Streptococci Exposed to Natural and Artificial Light. The survival rates of streptococci that were variously illuminated (daylight, sunlight and artificial light) in simulated room environments have been studied. The organisms were sprayed into the air to simulate their distribution by sneezing and coughing and permitted to settle on sterile filter papers in opened Petri dishes. The glass covers were then replaced, and the organisms exposed to the test illumination. The dishes were then flooded with agar and incubated. Finally, the colonies that developed were counted. Daylight on clear or cloudy days was found to be a potent lethal agent for streptococci. Its effect was to multiply by 2–4 times per foot-candle illumination the death rates obtained in the absence of light. The 50% survival time of a strain of alpha hemolytic streptococci was 40 min., while that for a strain of beta streptococci (Group A) varied from 1.5 to 6 hrs. Sunlight was much more bactericidal than daylight, *e. g.*, the 50% survival time of the alpha streptococci was 5 min. The lethal power of sunlight per foot-candle was of about the same order as that of daylight, being much lower than that from blue skies and somewhat lower than that from gray skies. Artificial illumination from a fluorescent lamp was less lethal per foot-candle than daylight, but about as effective as sunlight. The practical value of this finding is questionable because of the low intensities employed.—L. BUCHBINDER, M. SOLOWEY and E. B. PHELPS. *J. Bact.*, 41 (1941), 79.
(T. C. G.)

Synthetic Detergents—Bactericidal Action of. The bactericidal action of a number of anionic and cationic synthetic detergents on four gram positive and three gram negative bacteria was investigated. Cationic detergents as a group were found to exhibit marked bactericidal effects on gram positive microorganisms and a somewhat less pronounced action on gram negative organisms. The anionic detergents were germicidal only against the gram positive organisms and they were considerably less effective than the cationic compounds. Of the anionic detergents, the most active was an alkyl sulfate derived from a branched-chain, secondary alcohol. Correlations between bactericidal action and inhibition of bacterial metabolism are considered.—Z. BAKER, R. W. HARRISON and B. F. MILLER. *J. Exptl. Med.*, 74 (1941), 611. (T. C. G.)

Tellurite Blood-Agar Medium for the Rapid Diagnosis of Diphtheria. A tellurite blood-agar. medium is described with which diphtheria diagnosis can be made in 18 hrs. Of 464 consecutive positive swabs examined, 462 were positive on the tellurite at 18 hrs. and 378 positive on the serum. The type differentiation with this medium, while inferior to certain other tellurite media, is sufficiently good to present no serious difficulty to experienced workers. —L. HOYLE. *Lancet*, 240 (1941), 175.
(W. H. H.)

Tuberculin Test—Percutaneous. Percutaneous tests were performed on nearly 1400 subjects of different age groups. It appeared that the patch

test (Lederle or Danish) gave a high degree of agreement with Mantoux test under 16 years of age and became less reliable thereafter. The Danish State Serum Institute tuberkulin salve was adopted as the patch test of choice. Percutaneous tuberculin tests appear unreliable in old age but to what extent is uncertain. In adolescents and adults the test may be of use if checked by intradermal tests when the result of two patches is negative. False positives appear to be very rare. Percutaneous (patch) tuberculin tests will be found to be of greatest use in contact schemes and in excluding tuberculous disease in childhood.—F. D. HART. *Lancet*, 240 (1941), 414. (W. H. H.)

Tuberculin Tests—Possible Sources of Error in. When dilutions of tuberculin were prepared by means of a single tuberculin syringe, the final product was found to be considerably more potent than the same calculated dilution prepared by using separate pipettes for each stage. Comparative tests in man showed that Old Tuberculin calculated as 1 in 100,000 and diluted by the single syringe method gave stronger reactions than the 1 in 10,000 diluted by the multiple pipette method. It is well known that tuberculin is extremely difficult to remove from glassware, but another fallacy is introduced by the seepage of tuberculin past the plunger of tuberculin syringes. This tuberculin enters, to an effective degree, the diluent subsequently drawn into the syringe. The authors therefore advocate the use of separate pipettes in the measurement of concentrated tuberculin on the different dilutions, that each pipette be kept for its own dilution, and that pipettes for the diluent be reserved for that fluid. Similarly, the syringes for injection should be reserved, each for one dilution. Purified Protein Derivative is easier to handle and to dilute than Old Tuberculin, but no syringe should be used for two strengths. In the hospital, dilutions should be made in the central laboratory, where all precautions can be taken.—N. ROSENBERG and A. C. ALLEN. *J. Lab. Clin. Med.*, 26 (1941), 1652; through *Bull. Hyg.*, 17 (1942), 59. (T. C. G.)

Typhoid Vaccine from Cultures Grown at 30° C. Comparable experiments were carried out to determine whether the incubation of cultures at 30° C. instead of at 37° C. enhances the antigenicity of typhoid vaccine. Standard strains and methods were used with the exception that part of the vaccine was prepared from cultures grown at 30° C. It was found that more potent agglutinins were incited in rabbits, and a higher degree of immunity was incited in white mice, by vaccines prepared from cultures grown at 30° C. than by vaccines prepared in the usual way from cultures grown at 37° C. Typhoid vaccine from the National Institute of Health was included as a control in the rabbit tests, but not in mouse tests.—H. M. POWELL and W. A. JAMIESON. *J. Bact.*, 41 (1941), 68. (T. C. G.)

Tyrothricin—Observations on Resistance of Staphylococcus Aureus to action of. Various strains of *Staphylococcus aureus* differ in their susceptibility to the action of tyrothricin. It is possible to increase the resistance of staphylococci to tyrothricin by growing the organism in increasing concentrations of the bactericidal substance. In one patient treated with tyrothricin there was a marked increased resistance of the infecting organisms after several weeks of therapy.—CHARLES H. RAMMELSKAMP. *Proc. Soc. Exptl. Biol. Med.*, 49 (1942), 346. (A. E. M.)

Vaccines Sent to China. The St. John Ambulance Association and Indian Red Cross Society have sent 10,000 doses of plague vaccine to China.—*Chemist and Druggist*, 137 (1942), 350. (A. C. DeD.)

BOTANY

Convallaria Majalis L. and Smilacina Racemosa (L.) Desf.—Dormancy in the Seeds of. Seeds of *Convallaria majalis* and *Smilacina racemosa* were found to show a type of epicotyl dormancy not previously reported. Low temperature pretreatment was required for forcing shoot growth after the root had started to grow, but was effective only if given after the shoot had started to grow and had broken through the cotyledonary sheath. Exposure to low temperatures at earlier developmental stages was without effect in breaking epicotyl dormancy. Development of the growing embryo to the proper stage for the exposure to low temperature took place more rapidly at greenhouse temperatures than at lower temperatures. At a temperature as low as 5° C. convallaria seedlings developed very slowly and smilacina seedlings failed to continue growth and died with prolonged exposure. Low-temperature pretreatment increased root production from seeds of convallaria and was essential to root formation in smilacina when plantings were made in soil in the greenhouse.—LELA V. BARTON and ELTORA M. SCHROEDER. *Contrib. Boyce Thompson Inst.*, 12 (1942), 277–300. (B. M. B.)

Dioscorea Villosa—Naming of. In the 74th of a series of articles on the meaning of plant names, C. states that *Dioscorea villosa* is named for the ancient scientist, Dioscorea. Some of the synonyms are: wild yam, yampee, quail pea, cush-cush, colic root, rheumatism root and devil's bones.—WILLARD N. CLUTE. *Am. Botanist*, 48 (1942), 47. (W. T. S.)

Fruit Tissue—Inactivation of the Browning System in Frozen-Stored. Tissue of the fruits of peaches, pears and apples, after having been peeled, cored or pitted, was dipped in dilute solutions of thiourea, NH_2CSNH_2 (also called thiocarbamide), previous to freezing in a cold room at −6° to −10° C. The tissue so frozen was stored for many months or even for more than a year without the occurrence of browning. A dipping solution of 0.1% thiourea sufficed for peaches and pears and one of 0.2% for apples. Fruit so dipped and frozen did not turn brown when thawed and exposed to air, nor after it had been thoroughly leached with water during a period of 20 to 24 hrs. (to remove the absorbed thiourea). The treatment had rendered the tissue incapable of turning brown on exposure to air. Only a short period of storage of the treated tissue in the frozen condition was needed to inactivate the browning system. For peach tissue dipped into 0.1% thiourea the time required for inactivation was one to two days, for pear tissue it was two to four days and for apple tissue dipped into 0.2% thiourea it was about ten days.—F. E. DENNY. *Contrib. Boyce Thompson Inst.*, 12 (1942), 309–320. (B. M. B.)

Fungicides—Analysis of Factors Causing Variation in Spore-germination Tests of. Variation in % germination is greatly reduced by removing nutrient material from the inoculum. A standard fungicide is used for comparison in all tests.—S. E. A. McCALLAN and F. WILCOXON. *Contrib. Boyce Thompson Inst.*, 11 (1939), 5–20; through *J. Soc. Chem. Ind.*, 59 (1940), 558. (E. G. V.)

ISCC-NBS Names Used in the Botanical Monographs in N. F. VII. A complete list of the color names for the N. F. botanical drugs is tabulated.—KENNETH L. KELLY. *Bull. Natl. Formulary Committee*, 10 (1942), 133–147. (H. M. B.)

α-Naphthaleneacetic Acid—Effect of the Vapor of the Methyl Ester of, on the Sprouting and the Sugar Content of Potato Tubers. The methyl ester of α-naphthaleneacetic acid ($C_{10}H_7CH_2COOCH_3$), when incorporated into filter papers which were then distributed among potato tubers stored in glazed

earthenware containers, inhibited the sprouting of the tubers. When the amount of the chemical was as much as 400 mg. of the methyl ester per Kg. of tubers, sprouting was inhibited completely for at least one year from harvest. When the amount applied was reduced to 100 mg. per Kg. of tubers, a small amount of sprout development occurred after six to eight months. Sprouting was definitely retarded by 30 mg., and the lower limit, under these conditions, was about 10 mg. At 10° C., tubers were stored under methyl ester treatment for at least one year without the occurrence either of sprouting or shrinkage of tubers. At 15° C., sprouting was inhibited satisfactorily for a period of at least eight months, but there was a moderate amount of shrinkage due to loss of moisture. Sprouting was inhibited for three to six months at 18° C. and at room temperature (approximately 23° C.), but some shriveling occurred. Only small changes in sugar content of tubers were found as a result of the treatments, and these changes, whether they were increases or decreases, were usually less than 1 mg. per cc. of juice.—F. E. DENNY, JOHN D. GUTHRIE and NORWOOD C. THORNTON. *Contrib. Boyce Thompson Inst.*, 12 (1942), 253-268. (B. M. B.)

Plant Tissues—Quantitative Analysis of, for Lithium, by the Ramage Flame Spectrographic Method. An adaption of the Ramage flame spectrographic method for determining the concentration of lithium in plant tissues is described, and has been applied to the determination of the concentration of lithium in various parts of healthy wheat and celery plants—both normal and lithium-treated—and also that in tomato crown galls and dead leaves. For each species of plant examined there was a high correlation between the concentration of lithium in the soil and the concentration in the plant; the greatest accumulation of lithium in wheat occurred in the oldest leaves, and in celery, in the margin of the largest leaves. The tolerance of the three species for lithium was in the decreasing order: wheat, celery, tomato. It is deduced from the results of experiments that the plants used have little power of preventing the absorption of lithium; it is suggested that accumulation of lithium in the leaves depends more on their growth rate than on transpiration.—N. L. KENT. *J. Soc. Chem. Ind.*, 59 (1940), 149-153. (E. G. V.)

Rubber Plants in North America. There are two genera of North American plants which yield real rubber. The best known specie is guayule (*Parthenium argentatum*) of the Southwest. This specie has a related form in the prairie dock (*P. integrifolium*) ranging from Minnesota and Indiana to Maryland, Georgia and Texas. Another prairie dock (*Silphium terebinthinaceum*) might also be investigated since it supplies an inferior sort of chewing gum for children. The rabbit brush (*Chrysothamnus*) of the West is a second genus, some species of which provide a kind of rubber known as chrysil.—*Am. Botanist*, 48 (1942), 56. (W. T. S.)

Santalaceæ—Parasitism in the. A report of the initial study on the root-parasitism of *Santalum album, S. lanceolatum, Thesium Wightianum, Osyris arborea, Exocarpus aphylla, Choretrum glomeratum* and *Scleropyrum Wallichianum.* Twenty-seven figures and 26 references.—L. N. RAO. *Ann. Botany*, New Series VI (1942), 131-150. **Santalaceæ—Studies in.** A study of the development, forms and functions of the floral parts, of the embryo sac, of the endosperm and the embryo of the four Indian species of *Santalaceæ:* (1) *Santalum album,* (2) *Thesium Wightianum,* (3) *Osyris arborea,* (4) *Scleropyrum Wallichianum.* Fifty-seven diagrams, one plate and 40 references.—L. N. RAO. *Ann. Botany*, New Series VI (1942), 151-175. (W. T. S.)

Symphoricarpos Orbiculatus—Germination Studies of Seeds of. In order to induce germination in seeds of *Symphoricarpos orbiculatus* it is necessary to disintegrate the seed coat as well as to after-ripen the embryo. This can be accomplished by a period of three to four months in moist peat moss at 25° C. followed by approximately five months at 10° C. The period at 25° C. can be reduced to two to four weeks if the seeds are treated with concentrated sulfuric acid for 30 to 40 min. prior to being mixed in the moist peat moss. For the production of seedlings on a large scale the best method is to plant the seeds in soil in flats in the spring and place out-of-doors in a cold frame which is covered with a board cover during the subsequent winter. Germination will occur the following spring. By combining the acid treatment with a short period at high temperature seedlings can be obtained the first spring providing the seeds are after-ripened in a cellar maintained at approximately 10° C. (50° F.).—FLORENCE FLEMION and ELINOR PARKER. *Contrib. Boyce Thompson Inst.*, 12 (1942), 301-307. (B. M. B.)

CHEMISTRY

GENERAL AND PHYSICAL

Antimony—The First Spectrum of. The spectrum emitted by neutral antimony atoms has been photographed, measured and analyzed. Measured wave lengths and estimated relative intensities are given for 466 lines, ranging from 1388.91 to 12466.75 Å. in wave length and from 1 to 2500 in intensity. Nearly 80% of these lines are classified as combinations of 60 even energy levels arising from $5s^25p^2ns$, $5s^25p^2nd$, and $5s5p^4$ electron configurations and 31 odd levels from $5s^25p^3$, $5s^25p^2np$, and possibly $5s^25p^2nf$. The average difference between observed and computed wave numbers is 0.15 cm.$^{-1}$. A paucity of lines in the visible spectrum and intense radiation of antimony atoms in the ultraviolet and infrared are seen to be consequences of the relative values of various groups of levels. Although it is not possible to give a complete quantum interpretation of all the levels, several spectral series of the type $5s^25p^3 - 5s^25p^2ns$ are proposed, and an absolute value of 69700 cm.$^{-1}$ is deduced for the ground state, $5s^25p^3 \cdot {}^4S_{1\frac{1}{2}}$, of neutral antimony atoms. From spectroscopic data, the principal ionization potential of antimony is calculated to be 8.64 volts.—WILLIAM F. MEGGERS and CURTIS J. HUMPHREYS. *J. Research Natl. Bur. Standards*, 28 (1942), 463-478. (W. T. S.)

Barbituric Acid Derivatives—Ultraviolet Absorption Spectra of. Measurements were made with a Hilger medium quartz spectrograph and "Spekker" photometer. A condensed spark between tungsten-steel electrodes was used as the normal light source. In cases where work necessitated measurements at wave lengths less than 2200 Å., Ilford Q plates in conjunction with uranium electrodes were used, producing a practically continuous spectrum down to 2100 Å. The molecular extinction coefficient ϵ is defined by the relation $\log_{10} I_0/I = \epsilon cl$, where c is the molar concentration and l is the length in cm. In making the solutions, recently distilled water was used, special precautions being taken to exclude carbon dioxide and the solutions were examined immediately against controls. The results are summarized as follows: (1) The ultraviolet absorption spectra of barbitone and phenobarbitone and their 1-methyl and 1:3-dimethyl derivatives have been examined in acid and alkaline solution and in water. (2) Evidence from absorption spectra suggests (a) that barbitone and phenobarbitone in aqueous alkaline solution undergo an amido-imidol tautomerism

involving one hydrogen atom only, namely, that in position 1, and producing a 2-hydroxy compound with an olefinic linkage, and (b) that the monosodium derivative of barbitone is almost completely enolized in $M/4000$ solution. (3) Methylation of barbitone, using dimethyl sulfate, produces only N-methylated compounds, no isomeric O-methyl compounds being isolated.—R. E. STUCKEY. *Quart. J. Pharm. Pharmacol.*, 14 (1941), 217–25. (S. W. G.)

Pigments—Dispersion of, in Aqueous Medium. I. Mechanism and Valuation of Dispersing Agents. II. Induced Dilatancy and Its Relation to Dispersion. The relation of dispersing agents to wetting and protective agents is discussed together with their respective modes of action. The application of tests based on the microscope, filtration, transparency, sedimentation, consistency, and appearance, for evaluating the degree of dispersion is described. A proprietary sulfonated compound of vegetable origin with marked dispersing power has the property of rendering a number of pigments, *e. g.*, zinc oxide, actively dilatant. Flocculation, thixotropy and passive and active dilatancies are regarded as different states of progressive dispersions, and the dilatancy test is a convenient method of evaluation dispersions of high degree.—F. K. DANIEL. *India Rubber World*, 101 (1939), Nov. 50–52, 101(1940), Jan. 33–37; through *J. Soc. Chem. Ind.*, 59 (1940), 466. (E. G. V.)

Sterols—Autoxidation of, in Colloidal Aqueous Solution. II. Δ^6-Cholestenediol-3(β), 5, a Rearrangement Product of 7(β)-Hydroxycholesterol. The new cholestenediol recently isolated from the products formed by autoxidation of cholesterol in colloidal solution has been shown to possess the structure of a Δ^6-cholestenediol-3(β),5. Its precursor is in all probability 7(β)-hydroxycholesterol, from which it is formed *in vitro* by allylic rearrangement under the influence of acid.—SUNE BERGSTRÖM and O. WINTERSTEINER. *J. Biol. Chem.*, 143 (1942), 503. (F. J. S.)

Sulfonamide Compounds—Rate of Diffusion of. The author summarizes his work as follows: During an investigation of the behavior of sulfonamide compounds when inserted into wounds, experiments were made on their rates of diffusion through agar and gelatin gels. In the first twenty-four hours after a saturated solution has been placed in contact with agar containing Ehrlich's reagent at 35° C., sulfanilamide (concentration about 1 mg. per 100 cc.) travels 4.2 cm., sulfapyridine 2.6 cm., sulfathiazole 2.7 cm., sulfadiazine 2.0 cm. and sulfanilylguanidine 3.1 cm. At twenty-four hours after a saturated solution has been placed in contact with 15% gelatin at 15° C., the concentration per 100 cc., 1 cm. away from the interface, is: sulfanilamide 31 mg., sulfapyridine 1.5 mg., sulfathiazole 2.2 mg., sulfadiazine 0.45 mg. and sulfanilylguanidine 2.6 mg. The diffusion coefficient for these compounds in 15% gelatin at 15° C. is about 0.157. Previous experiments have shown that the penetration of sulfonamides into living or dead tissues is much less extensive than these figures would suggest.—F. HAWKING. *Quart. J. Pharm. Pharmacol.*, 14 (1941), 226–233. (S. W. G.)

INORGANIC

Microcrystalline Test—Importance of, in Identification Chart for Crystallizable Chemical Substances. Sodium borate may be distinguished from sodium perborate by the following test. Dissolve the sample in a drop of water on a slide, then heat the drop until crystals appear at the edge, then allow to cool and examine under a microscope. Sodium borate forms voluminous thick prismatic crystals, while sodium perborate forms spheroidal cavities inside of which can be seen fine moving crystalline particles, resulting from the decomposition of the salt with the liberation of oxygen.—G. DENIGES. *Bull. trav. soc. pharm. Bordeaux*, 78 (1940), 129–132. (S. W. G.)

Sodium Borate and Perborate—Simple Method for Differentiation of. Add five to six mg. of the substance to a drop of glycerol on a slide. Sodium borate or borax dissolves rapidly and the mixture immediately becomes clear upon heating; sodium perborate monohydrate when treated in a similar manner gives off bubbles of oxygen and the drop has a turbid appearance, which clears up slowly. The result can be confirmed by reaction of the sample with ammonium molybdate in the presence of sulfuric acid; the perborate gives a yellow color with formation of permolybdic acid.—G. DENIGES. *Bull. trav. soc. pharm. Bordeaux*, 78 (1940), 133–135. (S. W. G.)

Sodium Thiosulfate—Anhydrous, a Primary Standard. The stability of anhydrous sodium thiosulfate has been investigated. No decomposition has been indicated by the critical method of reaction velocity measurements with sodium bromoacetate when the salt was kept at 120° C. for 79 days. The dehydration of sodium thiosulfate pentahydrate produces an anhydrous salt which fulfills the requirements of a primary standard.—H. M. TOMLINSON and F. G. CIAPETTA. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 539–540. (E. G. V.)

Thiocyanate Method for Iron. By means of a spectrophotometer a critical study has been made of the colored system resulting from the interaction of ferric and thiocyanate ions. From several hundred spectral transmission curves obtained, of which those shown are representative, the following conclusions, relating to the use of this procedure for the colorimetric determination of iron, are evident: Ammonium thiocyanate is preferable to thiocyanic acid as a color-forming reagent. Nitric acid is preferable to sulfuric acid or hydrochloric acid. With this acid, Beer's law is followed through the *p*H range 1.2 to 1.5, but not in higher acidities. Many of the 57 diverse ions studied interfere. The sensitivity is increased approximately 100% by using 60% acetone solution. This compound also improves the stability of the color. A solution of two cobaltammine salts is an improved color standard except for a slight fading after several months. In general, the thiocyanate method is inferior to several others, especially those using *o*-phenanthroline, α,-α'-bipyridyl, or mercaptoacetic acid.—J. T. WOODS and M. G. MELLON. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 551–554. (E. G. V.)

ORGANIC

Alkaloids

Alkaloid Salts and Alkaloid-Containing Drug Preparations—Behavior of, in Ultraviolet Light. The stability of drugs and their preparations is, aside from other factors, largely dependent on their light stability. The purpose of the study is to gain an insight into the following three problems: the value of the proper protection from light, the suitability of replacing the air in the containers by inert gases, and the effect of the addition of stabilizing substances to the drug solution. Several pages of the article are devoted to a theoretical discussion of the principles of light catalyzed or photochemical reactions. The effects of such factors as temperature, concentration, solvent, and gases on the experiments are considered. Without any claim for completeness, some examples of the undesirable action of light on various alkaloids are presented from the literature, as well as examples of the desirable action of light on alkaloids and other substances.

The preparations and alkaloids investigated include the following: morphine hydrochloride and a 1% solution; opium, the extract, tincture and injectable opium; atropine sulfate; cocaine hydrochloride; papaverine hydrochloride, physostigmine salicylate, strychnine nitrate and 1% solutions of each of these in water. A complete description of the apparatus is given, including a cut of the setup. Results are tabulated and plotted. The change in strength, the color and hydrogen ion concentration produced by irradiation of 11 alkaloid-containing preparations with light of a wave length of 185–600 $\mu\mu$ for 96 hrs. was determined. As was to be expected, the irradiation of powdered or crystalline substances produced only small changes. Of 8 substances studied, six (morphine hydrochloride, opium extract, opium, atropine sulfate, cocaine hydrochloride and physostigmine salicylate) showed some loss of strength and coloration upon exposure in quartz to wave lengths below 300 $\mu\mu$. Two substances (papaverine hydrochloride and strychnine nitrate) showed no fall in strength but change in color and decomposition which the authors could not fully elucidate. Wave lengths above 300 $\mu\mu$ led only in one case (opium) to a fall in strength and in two other cases (papaverine hydrochloride and physostigmine salicylate) to slight colorations. For the most part, substances exposed in ordinary glass containers showed little or no change in color or concentration. Of the 9 alkaloid-containing solutions to be irradiated with light above 300 $\mu\mu$, five (morphine hydrochloride, two injectable solutions of opium, tincture of opium and atrophine sulfate) showed no loss of potency but did show some with wave lengths below 300 $\mu\mu$. Three solutions (cocaine hydrochloride, papaverine hydrochloride, strychnine nitrate) showed absolutely no loss in strength on irradiation with light above or below 300 $\mu\mu$. One solution (atropine sulfate) exhibited no change at all and physostigmine salicylate solution showed very marked change with light below 300 $\mu\mu$. and also with light between 300 and 350 $\mu\mu$. Replacement of the air in the containers by carbon dioxide or nitrogen reduced the loss in strength induced by irradiation in two preparations (morphine hydrochloride and physostigmine salicylate) only slightly. The case of morphine hydrochloride (chlorophyll) and the case of physostigmine salicylate (vitamin C) showed that it is possible to reduce the light sensitivity of alkaloids. In conclusion, it may be stated that an action of light on the alkaloids studied takes place largely only when the wave length is less than 300 $\mu\mu$, which light is not transmitted by colorless glass of the normal thickness and which is not present in the sun light which reaches the earth's surface. The alkaloids are influenced slightly by rays between 300–330 $\mu\mu$ and only physostigmine salicylate is greatly affected by rays up to 350 $\mu\mu$ which is allowed to pass by colorless glass in varying amounts. Forty-four references.—J. BÜCHI and H. WELTI. *Pharm. Acta Helv.*, 16 (1941), 67–107. (M. F. W. D.)

Alkaloids of Tobacco. Nicotine, the most important alkaloid of tobacco was named after Jean Nicot, consul from the King of France, who in 1560 sent tobacco seed from Portugal to Paris. Vauguelin (1809) was the first to observe nicotine and Posselt and Reimann (1828) isolated this alkaloid. Since then other alkaloids, *e. g.*, anabasine, anatabine, isonicoteine, *1-N*-methylanabasine, *1-N*-methylanatabine, nicotelline, nicotimine, nicoteine, nicotyrine and nornicotine, have been discovered and isolated. Members of this series of alkaloids, with one exception, have been found only in *Nicotiana* species combined with citric, malic, oxalic and other organic acids, the one exception being the Australian plant, *Duboidia hopwoodii*, from which nicotine has been isolated. Nicotine is distributed throughout the tobacco plant, the amount being greatest in the lower leaves and gradually growing less with the age of the leaves; the top leaves contain the least alkaloid. A detailed account is also given of the various species of *Nicotiana* from which nicotine has been isolated. Numerous patents have been issued in this and other countries for the isolation commercially of nicotine from tobacco. In general, the processes consist of treating the tobacco with an aqueous solution of an alkali and steam distilling. In the burning of tobacco, there is formed at the zone of glowing, a mixture of gases and vapors consisting mainly of nitrogen, carbon dioxide, carbon dioxide and used oxygen. The vapors are chiefly of substances already present in the tobacco which have been vaporized at the zone of glowing, such as resins, resin acids, higher hydrocarbons and nicotine. On cooling, these vapors condense and, as a consequence of the high concentration, for a disperse phase in the form of a mist or fog. The various methods which have been employed for the preparation of nicotine from related substances are reviewed; the newly developed syntheses by such workers as Späth, Pictet and Craig are described. Under the heading, Physical Properties, numerous data are given from the investigations of various workers on nicotine. This portion of the review is accompanied by graphic illustrations and tabulations and is subdivided into the following topics: general characteristics; boiling point; freezing point; density; specific gravity; miscibility with solvents as water, petroleum and aqueous solutions; adsorption; volatility; viscosity; vapor pressure; surface tension; density of mixtures of nicotine with other liquids as water and nicotine, alcohol and nicotine, alcohol, water and nicotine; thermochemical and dissociation constants; electrometric titration; specific rotation; study of anomalous rotatory dispersion; magnetic rotatory dispersion; refractive dispersion; absorption spectra; selective solvent action of nicotine-water solutions on a third substance; and inhibition phenomena. The chemical properties of nicotine are extensively reviewed. Oxidation, in air, by ultraviolet light, acids, permanganate, silver oxide and potassium ferricyanide are discussed individually. A brief account is given of the reduction of nicotine by sodium and alcohol, sodium amalgam and by catalytic methods. Reactions with the elements, sulfur, selenium and the halogens, halogen acids, organic and the complex inorganic acids, together with various organic and inorganic derivatives of nicotine and methods for the identification of the alkaloid itself are discussed. The toxic action of nicotine is summarized and it is noted that eserine is a more effective antidote than strychnine. Brief mention is made of the lesser alkaloids of tobacco and the alkaloids of tobacco smoke. The review is accompanied by a bibliography of 278 references, together with 34 tables and 23 graphic illustrations.—KIRBY E. JACKSON. *Chem. Rev.*, 29 (1941), 123–197. (N. L.)

Berberine—A Note on the Microchemistry of. A drop of 10% palladium chloride brought into contact with a drop of berberine acetate on a slide produces characteristic dendrite-like crystals and a rose coloration, sensitivity 0.1 γ of berberine. Picrolonic acid can also be used, yellow crystals being produced. A new reaction with berberine and ammonium molybdate-potassium perrhenate is described sensitive to 0.5 γ of berberine. Photomicrographs of the crystals mentioned are included.—A. MARTINI. *Mikrochemie*, 28 (1940), 231–233. (R. H. B.)

Cinchona Alkaloids—Differentiation of the Important. A critical study has been made of all the reactions proposed for the differentiation of quinine, quinidine, cinchonine and cinchonidine. The type

of crystal produced and the limit of sensibility are given for the reactions of the above alkaloids with KI, $AuCl_3$, $PtCl_4$, NH_4SCN, and $HgCl_2$. Five new reagents are introduced: borax and sodium tellurite or selenite for the differentiation of cinchonine and cinchonidine, potassium cyanate for cinchonidine and silico-tungstic acid for quinidine. Six photomicrographs.—A. MARTINI. *Mikrochemie*, 28 (1940), 235–244. (R. H. B.)

Ergot—Extraction of Alkaloids from. The ergot is treated with an alkali metal alcoholate, such as sodium ethylate in ethyl alcohol, which serves to give improved extraction.—MARJORIE B. MOORE, assignor to ABBOTT LABORATORIES. U. S. pat. 2,255,124, Sept. 9, 1941. (A. P.-C.)

Lycopodium Complanatum—Alkaloids of. *Lycopodium complanatum* L. has yielded a total of eight alkaloids, six of which appear to be new. They are complanatine (L1) ($C_{18}H_{31}ON$); alkaloid L2 ($C_{18}H_{29}O_2N$); alkaloid L3 ($C_{18}H_{31}O_2N$); alkaloid L4 ($C_{16}H_{27}N$); alkaloid L5 ($C_{18}H_{28}O_2N_2$); obscurine L6 ($C_{18}H_{28}ON_2$); the known lycopodine ($C_{16}H_{25}ON$); and nicotine. It is pointed out that this is the first recorded occurrence of nicotine in a pteridophyte. The isolation of nicotine from *Equisetum arvense* L. is also recorded.—RICHARD H. F. MANSKE and LEO MARION. *Can. J. Research B*, 20 (1942), 87–92. (W. T. S.)

Quinine Sulfate—Assay of. The following procedure is recommended for the volumetric assay of quinine sulfate, and with proper modification of sample and factor may be applied to other quinine salts: "Accurately weigh a sample of about 0.25 Gm., transfer to a separatory funnel and dissolve completely in about 50 cc. of distilled water and 5 cc. of sulfuric acid T.S. Render distinctly alkaline with ammonia T.S. and completely extract the alkaloid with successive portions of chloroform, using about 50 cc. for the first extraction and about 25-cc. portions for the subsequent extractions. Wash the combined chloroformic extraction with 25 cc. of distilled water and transfer to a flask through a pledget of cotton. Add 10 cc. of chloroform to the aqueous washings, shake well and add the separated chloroform to the flask. Rinse the cotton pledget with a little additional chloroform. Evaporate nearly to dryness on a steam bath, add 5 cc. of alcohol previously neutralized to brom cresol purple, and warm to evaporate the chloroform completely. Replace alcohol evaporated during this step by the addition of neutral alcohol to approximately 5 cc. Cool, add 15 cc. $N/20$ hydrochloric acid, and distilled water, neutral to brom cresol purple, to about 100 cc. Titrate the excess acid with $N/50$ sodium hydroxide using brom cresol purple indicator and reading the end point at *p*H 6.3. Each cc. of twentieth normal hydrochloric acid is equivalent to 0.01957 Gm. of quinine sulfate.—REPORT OF THE SUB-COMMITTEE ON ALKALOID AND DRUG STANDARDS. *Proceedings, American Drug Manufacturers Association, Thirtieth Annual Meeting*, May (1941), 162–168. (N. L.)

Solanum Aviculare—Alkaloid of. I. By extracting the green berries of the shrub, *Solanum aviculare* (poro-poro), an alkaloid, previously regarded as purapurine, has been isolated and shown to be identical with solasonine.—R. CULFORD BELL and LINDSAY H. BRIGGS. *J. Chem. Soc.* (1942), 1–2. **Solanum Alkaloids. II. Solasonine.** Further analyses now support formulas $C_{45}H_{73}O_{16}N$ and $C_{27}H_{43}O_2N$ for the glycosidic alkaloid solasonine (*S. sodomaeum*) and its free base solasodine, respectively. The difference between the glycoside and the free base leads to the formulation of solasonine analogously to solanine by the union of the trisaccharide containing rhamnose, galactose and glucose units with one molecule of solasodine and not two as suggested by Oddo. Solasodine now differs from solanidine only by an extra oxygen atom and, like it, contains the steroid nucleus and resembles most other steroids in possessing one hydroxyl group in a *cis*-position at C_3 and a double bond at C_5–C_6. It forms a monoacetyl derivative soluble in acids, dihydrosolasodine on catalytic hydrogenation with palladized charcoal, and adds on two bromine atoms in acetic acid solution. Dehydration with alcoholic hydrogen chloride yields 3:5-solasodiene with an ultraviolet absorption spectra characteristic of double bonds in different rings. The nitrogen is not tertiary as previously suggested, but combined with the second oxygen atom or the related carbinolamine as a quaternary hydroxide. The action of nitrous acid yields a quaternary nitrite, which is an anhydro-salt identical with the so-called axosolasodine of Oddo. Methyl and ethyl iodide both react, forming the hydriodide in both cases and not the methiodide and ethiodide as suggested previously. Hydrogenation of solasodine and solasodiene with a platinum oxide catalyst yields tetrahydrosolasodine (dihydrochanosolasodanol) and hexahydrosolasodiene (dihydrochanosolasodan), respectively, by saturation of the normal double bonds and further, it is suggested, by opening up of the heterocyclic rings. A full formula for solasonine embodying these results is proposed.—LINDSAY H. BRIGGS, ROBERT P. NEWBOLD and NORMAN E. STACE. *J. Chem. Soc.* (1942), 3–12. **Solanum Alkaloids. III. Solanum Auriculatum.** Alcoholic extraction of the dried berries of *S. auriculatum* leads to the isolation of a glycoalkaloid, m. p. 270° (decomp.), which on hydrolysis yields a mixture of sugars and an aglycone, m. p. 222–223°. The names solauricine and solauricidine are suggested for these respective compounds and evidence is adduced that solauricidine is neither identical with nor a dimorphic form of solasodine but is extremely closely related to it in both physical and chemical properties. No structural differences between solauricidine and solasodine have yet been found. The separation of alkaloid material from the juice of the green berries affords a product, m. p. 269–270° (decomp.), which on hydrolysis gives a mixture of bases consisting mainly of solasodine with a smaller amount of solauricidine. Both the latter bases occur in dimorphic forms, the respective pairs being indistinguishable.—R. CULFORD BELL, LINDSAY H. BRIGGS, and JOHN J. CARROLL. *J. Chem. Soc.* (1942), 12–16. **Solanum Alkaloids. IV. The Glycosidic Moiety of Solauricine.** The glycosidic moiety of solauricine is shown to consist of glucose, rhamnose, and galactose. The trisaccharride portion of the molecule is therefore probably the same as that occurring in solanine and solasonine.—LINDSAY H. BRIGGS and JOHN J. CARROLL. *J. Chem. Soc.* (1942), 17–18. (W. T. S.)

Essential Oils and Related Products

Cannabis Indica. X. The Essential Oil from Egyptian Hashish. The nature of the terpene hydrocarbons in cannabis is important due to the biogenesis of cannabinol and related compounds from these hydrocarbons. An examination of the lower boiling "terpene fraction" of Egyptian hashish shows it to contain mainly *p*-cymene and small amounts of 1-methyl-4-isopropenylbenzene and an unidentified optically active material. The high boiling fractions contain humulene (α-caryophyllene). A hypothetical scheme for the biogenesis of cannabinol is presented in view of these findings.—J. L. SIMONSEN and A. R. TODD. *J. Chem. Soc.* (1942), 188–191. (W. T. S.)

Essential Oils of Ocimum Basilicum (Linn.) and Ocimum Sanctum (Linn.)—Insecticidal and Larvicidal Action of the. The results clearly indi-

cate that both *O. basilicum* and *O. sanctum* possess some insecticidal action, which is marked in the case of mosquitoes, though it cannot be compared with that of pyrethrum. The mosquito repellent action of the oil lasts for about two hours. From the practical point of view, their larvicidal action when used alone does not merit much consideration owing to the high cost of manufacture.—*J. Malaria Inst. India*, 4 (1941), 109. (A. C. DeD.)

Eucalyptus globulus—Essence of. The steam distillation of fresh leaves gives a yield of 0.7%, of dried leaves 1.3%. The essence is neutral, soluble in 70% alcohol and contains 70% of eucalyptol. The specific gravity at 17° is 0.9129. It boils at 168–190°.—MATIAS GONZALES, ATILIO LOMBARDO and M. A. MESA DE ROMERO. *Rev. farm.* (*Buenos Aires*), 83 (1941), 301. (A. E. M.)

Florida Volatile Oils. II. Mentha Piperita L. In 1930, investigation of a peppermint oil grown in Florida showed 7.23% of menthol and 80% pulegone. Report is made of further study of the nonpulegone constituents. The question of possible mistaken identity was satisfactorily answered. A contemporary oil from Oregon was included in the study. The experimental work is reported in considerable detail. Physical and chemical constants of the Florida oils show abnormal character, consisting mainly of pulegone with menthol and menthone in traces. Ester and free alcohol content determined by U. S. P. XI procedure are not reliable in the presence of large amounts of pulegone. Undue resinification or polymerization is induced by prolonged heating with potassium hydroxide. In the free alcohol determination formation of an enol acetate during acetylation where pulegone is present could explain higher ester value. Difficulty of judging the endpoint in saponification mixtures occurred with the U. S. P. method. When the Brignall method was used an average of 5.30% free alcohol, calculated as menthol, was found. Saponification after acetylation is thought to be of advantage in these oils containing pulegone. The oil from the Oregon root stock was intermediate between the other oils and the U. S. P. standards. Fractionation substantiated low menthol and high ketone content. The following constituents were identified: Inactive α-pinene, cineol, *l*-menthone, *l*-methol (both free and combined) pulegone (and its hydrolysis product 1,3-methylcyclohexane). An appreciable amount of 3,6-dimethylcoumarone tetrahydride was found in the Oregon oil.—P. A. FOOTE and A. W. MATTHEWS. *Jour. A. Ph. A.*, 31 (1942), 65. (Z. M. C.)

Florida Volatile Oils. III. Pycnanthemum Muticum (Michx.) Pers. Assay Methods and Minor Constituents. An earlier report on this mountain mint oil showed pulegone 62–72%, *d*-menthol 15% and *d*-menthone 8% and unidentified ketone, acetic and formic acids, a non-volatile acid, possibly terpenes and sesquiterpenes. More recently the plant has been cultivated in Florida and is of interest because of the possibility of utilizing its high pulegone content for production of menthol by hydrogenation. The oil is a satisfactory substitute for oil of pennyroyal. A study of the oil has been made to improve the assay of pulegone, to determine physical and chemical properties and to redetermine nonpulegone constituents. A satisfactory general method for determination of aldehydes and ketones has not been found. The bisulfite method and various modifications were tried. Best results were obtained by a modification using 10 cc. of ethyl alcohol with 10 cc. of oil and neutralizing the excess sulfur dioxide with sodium hydroxide. This procedure was superior to the hydroxylamine method and reduced assay time to five hrs. Pulegone content and physical properties for three lots of oil are reported. Limonene was identified also.—P. A. FOOTE and DOMINGO DONATE TORRES. *Jour. A. Ph. A.*, 31 (1942), 72. (Z. M. C.)

Thymol in the Volatile Oil of Pectis Texana, Cory. Steam distillation of this plant yielded 24 Gm. of oil corresponding to a yield of about 0.72% and yielded about 48% phenols and which showed the presence of thymol. This indicates that pectis is the first of the Compositae in which thymol is reported to be present.—C. CLARENCE ALBERS. *Pharm. Arch.*, 13 (1942), 29–31. (H. M. B.)

Glycosides, Ferments and Carbohydrates

Carbohydrate Characterization. III. The Identification of Hexuronic or Saccharic Acids as Benzimidazole Derivatives. A method is described for the identification of the naturally occurring hexuronic acids, *d*-glucuronic, *d*-mannuronic and *d*-galacturonic, as dibenzimidazole derivatives of the corresponding saccharic acids. The applicability of the procedure has been tested on hexuronic acids, glycuronides and polyuronides.—ROLLAND LOHMAR, ROBERT J. DIMLER, STANDFORD MOORE and KARL PAUL LINK. *J. Biol. Chem.*, 143 (1942), 551. (F. J. S.)

Coqui (Cyperus rotundus L.)—Some of the Constituents of the Tuber of. III. The Sugars. The alcoholic extractive from this plant has been examined for sugars and found to contain the following: 41.7% *d*-glucose, 9.3% *d*-fructose and 4% of nonreducing sugars. The benzimidazole procedure was used for characterization of the sugars. Details of experimental work are reported.—CONRADO F. ASENJO. *Jour. A. Ph. A.*, 31 (1942), 88. (Z. M. C.)

Periodic Acid as a Test for Polysaccharides. A polyglucose from yeast, a polygalactose from agar and laminarin represent a group of polysaccharides in which the third carbon atom of each hexose unit is engaged in linking that unit with the first carbon atom of a neighboring unit. These polysaccharides differ from starch and cellulose, and on methylation and subsequent hydrolysis yield 2:4:6-trimethylhexoses. Periodic acid affords a simple confirmatory test for these polysaccharides since it reacts with the =C(OH)—C(OH)= groups, splitting the C—C bond, and oxidizing each C(OH) to CHO. Hence, periodic acid reacts with those polysaccharides having a 1–4 linkage since they provide the =C(OH)—C(OH) groups, and not with polysaccharides having a 1–3 linkage. Data are given which show the application of the test to polysaccharides.—WINIFRED MCGETTRICK. *J. Chem. Soc.* (1942), 182–183. (W. T. S.)

Other Plant Principles

Cannabidiol—Structure of. V. Position of the Alicyclic Double Bonds. Experimental evidence is submitted which limits the positions of the two double bonds in cannabidiol to one of the four following combinations: 8,9 and 4,5; 8,9 and 5,6; 8,9 and 6,7; 8,9 and 1,2. Absorption spectra analogies exclude double bonds in the 2,3 or 3,4 positions. Ease of isomerization of cannabidiol to tetrahydrocannabinol, a molecule with one hydroxyl and one double bond eliminated and no methylene group, excludes the possibility of a 1,7 double bond and proves the presence of an 8,9 double bond.—ROGER ADAMS, H. WOLFF, C. K. CAIN and J. H. CLARK. *J. Am. Chem. Soc.*, 62 (1940), 2215. (E. B. S.)

Cannabinol—Structure of. II. Synthesis of Two New Isomers, 3-Hydroxy-4-*n*-amyl- and 3-Hydroxy-2-*n*-amyl-6,6,9-trimethyl-6-dibenzopyrans. Two new isomeric cannabinols have been prepared by condensing 4-methyl-2-bromobenzoic

acid with 4-*n*-amylresorcinol and 2-*n*-amylresorcinol followed by conversion of the pyrones obtained to pyrans.—ROGER ADAMS, C. K. CAIN and B. R. BAKER. *J. Am. Chem. Soc.*, 62 (1940), 2201. (E. B. S.)

Cannabinol—Structure of. IV. Synthesis of Two Additional Isomers Containing a Resorcinol Residue. Two isomeric cannabinols have been prepared, 1-hydroxy-4-*n*-amyl-6,6,9-trimethyl-6-dibenzopyran and 1-hydroxy-2-*n*-amyl-6,6,9-trimethyl-6-dibenzopyran. These compounds were synthesized through the condensation of 4-methyl-2-bromobenzoic acid with 4-*n*-amyldihydroresorcinol. The two isomeric lactones thus obtained were separated and dehydrogenated to the corresponding dibenzopyrones. The dibenzopyrones were alkylated by a method which avoided as an intermediate the hydroxy acid, and then treated with methylmagnesium iodide to form the corresponding pyrans. The alkylated pyrans were then dealkylated to the cannabinol isomers.—ROGER ADAMS and B. R. BAKER. *J. Am. Chem. Soc.* 62 (1940), 2208. (E. B. S.)

Cannabinol—Structure of. V. A Second Method of Synthesis of Cannabinol. A second method of synthesis of cannabinol has been devised. It consists in the condensation of ethyl 5-methylcyclohexanone-2-carboxylate with olivetol in the presence of phosphorus oxychloride to give 1-hydroxy-3-*n*-amyl - 9 - methyl - 7,8,9,10 - tetrahydro - 6 - dibenzopyrone. Dehydrogenation of this product with sulfur gives 1-hydroxy-3-*n*-amyl-9-methyl-6-dibenzopyrone which has been shown previously to give cannabinol when treated with methylmagnesium iodide.—ROGER ADAMS and B. R. BAKER. *J. Am. Chem. Soc.*, 62 (1940), 2401. (E. B. S.)

Eugenol and Its Ethers—Notes on the Conversion of, into the Corresponding Propenyl Compounds. In view of the industrial use of the oxidation products of propenylbenzene derivatives, the ease of formation of the latter from the parent allyl compound is of importance. A rapid method is described for the conversion of eugenol and its ethyl ether into the corresponding propenylbenzene derivatives in which the *trans*- predominates over the *cis*-isomeride.—T. F. WEST. *J. Soc. Chem. Ind.*, 59 (1940), 275–276. (E. G. V.)

Helenium—Constituents of a Certain Species of. IV. Concerning the Compound Melting at 233–234° Obtained from Helenium Tenuifolium. The compound, m. p. 233°, obtained from *Helenium tenuifolium* and reported as having the composition $C_{16}H_{22}O_5$ has now been shown to have the molecular formula $C_{19}H_{28}O_6$. It is an ether with properties characteristic of an acetal and is formed by a reaction involving the elimination of a molecular of water from ethylene glycol (used as a solvent in its preparation) and tenulin. The formation of this compound further substantiates the suggestion that tenulin contains a sterically hindered hydroxyl group, and that this group and the acetoxyl group of tenulin are probably adjacent to each other.—E. P. CLARK. *J. Am. Chem. Soc.*, 62 (1940), 2154. (E. B. S.)

Resin of Mexican Scammony. A sample of Resin of Mexican Scammony was prepared strictly according to the official method, subdivided and portions sent to the subcommittee members for the application of the official quantitative determinations. The findings of four laboratories for the various official determinations varied as follows: ether-soluble fraction, 88.04–95.47%; petroleum benzin soluble fraction, 0.39–2.76%; moisture, 1.75–3.01%; ash, 0.01–0.125%; alcohol-insoluble residue, 0.12–0.45%; acid number, 14.0–20.18; ester number, 128.1–182.6; saponification value, 145.1–202.8. Inspection of the above reported findings shows, within the scope of this investigation, rather wide divergences in certain analytical results. This subcommittee concludes that Resin of Mexican Scammony does not lend itself to the application of the official methods for acid number, ester number and saponification value; and that the variations encountered in the application of these methods render them unsuitable as legal requirements in connection with this particular pharmaceutical preparation. It was also indicated that the quantitative determination of the acidic nature of this resin, if at all practical, must be approached by some distinctly different means. Pending the development of more suitable methods the present unsatisfactory situation should be recognized, and it is recommended that in the forthcoming N. F. VII these three tests be deleted, unless substantial improvement shall have been made in their application.—REPORT OF CONTACT COMMITTEE, SUBCOMMITTEE ON RESIN MEXICAN SCAMMONY. *Proceedings, American Drug Manufacturers Association, Thirtieth Annual Meeting*, May (1941), 169–173. (N. L.)

Thymol and Carvacrol—Occurrence of, in the Plant Kingdom and Their Significance in Botanical Systematics. A review of the plants containing thymol and carvacrol. Eighty-one references.—C. CLARENCE ALBERS. *Pharm. Arch.*, 13 (1942), 39–48. (H. M. B.)

Fixed Oils, Fats and Waxes

Color Committee of 1939–1940—Report of the (A. O. C. S.). Modification of the standard methods to permit the use of a 1-in. (instead of a 5¹/₄-in.) column for the colorimetric examination of very dark oils is recommended, and also approved by the Committee on Analysis of Commercial Fats and Oils.—ANON. *Oil and Soap*, 17 (1940), 125; through *J. Soc. Chem. Ind.*, 59 (1940), 680. (E. G. V.)

Fat—Bati. Fruits of *Ouratea parviflora* Baill. (*Gomphia bracteosa* Wawra, *G. parviflora* DC.), extracted with light petroleum yield more than 10% of fat, melting point 30°, saponification value 192, iodine value (Hanus) 56. Commercial extraction could best be effected by treating with steam followed by centrifuging.—J. S. ROSA. *Inst. Nac. Tecn., Rio de Janeiro*, (1939); through *J. Soc. Chem. Ind.*, 59 (1940), 679. (E. G. V.)

Fatty Acids—Determination of Volatile. A method is proposed for the determination of volatile fatty acids by means of steam distillation under carefully controlled conditions as regards both apparatus and manner of distillation. The procedure and apparatus used are the same as previously described (*J. Assoc. Official Agr. Chem.*, 21 (1938), 688). A 50-cc. fraction and then a suitable number of 200-cc. fractions of distillate are collected and titrated separately. The calculations are based on the facts that, under constant distilling conditions in a given apparatus: (1) each acid of a mixture distills at the same rate as if it were alone; and (2) the rate of distillation of each acid is independent of the amount of that acid in the mixture being analyzed, *i. e.*, a given fraction of the distillate always contains the same proportion of the total amount of a given acid. The idea that prompted the investigation was that if a simple and reasonably accurate quantitative method for the determination of the individual volatile acids present in a mixture was available, it might be possible to determine the type of decomposition taking place in a food product, and also its extent. From this standpoint, the most interesting acids are formic, acetic, propionic, butyric and iso-butyric; Hillig never found all five present simultaneously as a result of decomposition or fermentation. It is quite possible that combinations of four of them may be encountered, but

combinations of three of them are common, and one of the acids is usually acetic. Examples are given of the calculations by means of which the nature and amounts of the acids can be determined in one-, two-, three- and four-acid systems. The actual proportionate amounts of the several acids in the respective distillate fractions will depend on distillation conditions and on the actual apparatus used, and should be determined by each analyst for the actual conditions and apparatus used by him. A short-cut method for solving simultaneous equations and thereby facilitating calculations is appended.—FRED HILLIG and LILA F. KNUDSEN. *J. Assoc. Official Agr. Chem.*, 25 (1942), 176–195. (A. P.-C.)

Fatty Acids of Hydrastis Canadensis Linné. The fatty acids in this drug consist of saturated acids 25%, and unsaturated acids 75% by weight. The 5 purest fractions of the saturated fatty acids, crystallized from alcohol, consisted of arachidic acid, 9.3, stearic acid, 62 and palmitic acid, 28.7%, respectively, of the total weight of the 5 fractions. The unsaturated acids consisted of linolenic, linoleic and oleic acids and the brominated unsaturated fatty acids consisted of linolenic acid hexabromide, 1.43, linoleic acid tetrabromide, 59.87 and oleic acid dibromide, 38.70%, respectively, of the total weight of the brominated unsaturated acids. The unsaponifiable matter contained a phytosterol, m. 133–134°, $[\alpha]_D^{26°}$ −37.61, and a hydrocarbon or mixture of hydrocarbons, melting about 65°.—ELMER L. HAMMOND. *Pharm. Arch.*, 13 (1942), 17–28. (H. M. B.)

Mexican Drugs—Notes on. II. Characteristics and Composition of the Fatty Oil from "Gusanos de Maguey" (Caterpillars of Acentrocneme hesperiaris). It appeared of interest to study this fatty oil because it is an example of the transformation of sugar into a fat by a relatively simple organism. The caterpillar lives in the thick leaves of the "Maguey" and is nourished by the sap of the plant which contains saccharose and invert sugar. Experimental work is reported. The oil was found to consist of the glycerides of linoleic acid (4.3%), oleic acid (60.1%), palmitic acid (30%) and stearic acid (3.6%). There was 2.3% of unsaponifiable matter.—MARCEL BACHSTEZ and ALTAGRACIA ARAGON. *Jour. A. Ph. A.*, 31 (1942), 145. (Z. M. C.)

Pongamia Oil—Variations in Quality of, with Reference to the Occurrence of Karanjin. The Karanjin in the oil is slowly precipitated on storage.—N. V. SUBBA RAO and T. R. SESHADRI. *Current Sci.*, 9 (1940), 76; through *J. Soc. Chem. Ind.*, 59 (1940), 640. (E. G. V.)

Refining Vitamin-Containing Oils Such as Fish-Liver Oils. Various details of operation are given, including subjection of the oil to the action of activated carbon for removal of free fatty acids present. Remaining free fatty acids may be removed by saponification.—LORAN O. BUXTON and ERIC J. SIMONS, assignors to NATIONAL OIL PRODUCTS CO. U. S. pat. 2,255,875, Sept. 16, 1941. (A. P.-C.)

Spectro-Analysis of Natural Substances. Absorption Spectra of Oils and Fats.—G. DORTA and M. REGGIANI. *Atti X Congr. Internaz. Chim.*, IV (1938), 277; through *J. Soc. Chem. Ind.*, 59 (1940), 545. (E. G. V.)

Vitaminic Fish Oils. Extraction of fish-liver tissue or the like is effected by use of an oil such as soybean oil, sardine-residue oil or sesame oil which has been freed of all volatile constituents by high-vacuum distillation and which contains substantially only constituents having a lower vapor pressure than the vitamins present in the tissue to be extracted. Several examples with details are given.—KENNETH C. D. HICKMAN, assignor to DISTILLATION PRODUCTS, INC. U. S. pat. 2,256,392, Sept. 16, 1941. (A. P.-C.)

Ximenia Oil, a Vegetable Fat with Especially High-Molecular Fatty Acids. Oil expressed from "Lumeque seeds" from a species of *Ximenia* from W. Africa had η (Hoppler) 400 (220) centipoises, acid value 6.5 (10), saponifying value 166.8 (167.3), I value 89.8 (84.2), cyanate value 67.0 (76.2) (figures in parentheses refer to an oil extracted by light petroleum). The fatty acids had melting point 40–42°, mean molecular weight 314, iodine value 88.0, cyanide value 69.4, saturated acids (Bertram) 6%. Examination of the acids by methyl ester fractionation, etc., indicated the presence of two higher homologues of oleic acid, *viz.*, "ximenic acid" (I) ("dehydrocerotic") acid, *i. e.*, Δ^{17}-hexacosenoic acid, apparently identical with the "ximenic acid" reported by Puntambekar and Krishna in the oil of *X. americana*, and "lumequic acid" (II), *i. e.*, Δ^{21}-tricosenoic acid. The constitution of the acids was established by the permanganate oxidation method. Erucic acid appeared to be absent. The composition of the total fatty acid of the oil is computed as: stearic 4, oleic 54, linoleic 10, cerotic 2, (I) 25 and (II) 5%. Attention is drawn to the possible biogenetic significance of the C_4-interval between the C_{14}, C_{18}, C_{22}, C_{26} and C_{30} members of the oleic series, which are the only ones of this series to have been found in vegetable oils.—H. A. BOEKENOOGEN. *Fette u. Seifen*, 46 (1939), 717–719; through *J. Soc. Chem. Ind.*, 59 (1940), 375. (E. G. V.)

Unclassified

Acylamino - N - Hydroxybenzenesulfonamides. New compounds suitable for use in combating bacterial infections such as coccus infections, and which have the general formula p-RCONHC$_6$H$_4$-SO$_2$NHOH (in which R may be alkyl, aryl, aralkyl, alicyclic or heterocyclic, saturated or unsaturated, substituted or unsubstituted, so long as it contains at least 3 carbon atoms) are readily prepared from the corresponding p-acylaminobenzenesulfonyl halides and salts of hydroxylamine (such as the hydrochloride) by reaction in a basic solvent (such as pyridine), or by suspending the p-acylaminobenzenesulfonyl halide in water, adding an aqueous solution of the hydroxylamine salt and making the mixture alkaline by the addition of a suitable basic material, such as sodium carbonate. Details are given of the production of a number of such compounds, which are white crystalline solids, difficultly soluble in water but fairly soluble in alcohol, acetone and propylene glycol, relatively stable in aqueous solution, and which on heating in acid solution readily hydrolyze, yielding the corresponding free amine.—MAURICE L. MOORE and ELLIS MILLER. U. S. pat. 2,260,632, Oct. 28, 1941. (A. P.-C.)

Alcohol—Recovery of. Optimum rates of flow of air-ethyl alcohol and air-ethyl alcohol-phenyl alcohol-benzene mixtures and water through a scrubber have been determined. The chief obstacle to the diffusion of ethyl alcohol from the gaseous to the liquid phase lies in the surface layer of the latter; diffusion is greatly increased by using dilute ethyl alcohol solutions instead of water.—B. N. RUTOVSKI and A. N. LEVIN. *Prom. Org. Chim.*, 7 (1940), 158–164; through *J. Soc. Chem. Ind.*, 59 (1940), 512. (E. G. V.)

Amine Emulsifiers for Cosmetics—Identification of. Primary and secondary amines may be identified as their benzene sulfonyl, p-toluene sulfonyl or p-bromobenzene sulfonyl derivatives (suitably prepared by the previously described method (*J. Assoc. Official Agr. Chem.*, 24 (1941), 754–757)).

The melting points of the benzene sulfonyl, *p*-toluene sulfonyl, *p*-bromobenzene sulfonyl derivatives and oxalates, respectively, of the following amines are given: monoethanolamine—liquid, liquid, 94° C., 203° C.; diethanolamine—130° C., 99° C., 105° C., —; morpholine—119° C., 148° C., 153° C., 190° to 195° C.; 2-amino-2-methyl-1,3-propandiol—75° C., 122° C., 140° C., 226° C.; 2-amino-2-methyl-1-propanol—121° C., 94° C., 132° C., 190° to 200° C.; ammonia—153°, 137° C., 166° C., decomposes below 200° C.—IRWIN S. SHUPE. *J. Assoc. Official Agr. Chem.*, 25 (1942), 227-230. (A. P.-C.)

Arsinic Acids—Industrial Synthesis of. I. Phenylarsinic Acids. The influence of concentration of sodium hydroxide, sodium carbonate, arsenic trioxide, copper sulfate and diazonium solution in Bart's reaction has been investigated. A yield of 86% is obtained by employing arsenic trioxide (35 Gm.), sodium hydroxide (20 Gm.), sodium carbonate (135 Gm), copper sulfate (3 Gm.), diazonium solution (125 cc.), water (450 cc.) and a temperature of not less than 15°. If these conditions are not observed resinous products are obtained.—L. BLAS. *Anal. Fis. Quim.*, 36 (1940), 107; through *J. Soc. Chem. Ind.*, 59 (1940), 823. (E. G. V.)

Cannabidiol—Structure of. XII. Isomerization to Tetrahydrocannabinols. New procedures for isomerizing cannabidiol have resulted in synthesizing two tetrahydrocannabinols of essentially constant specific rotation. Previously obtained tetrahydrocannabinols are assumed to be mixtures. Chemical and physical data are given on the two compounds. The physiological activity of both compounds is exactly the same in humans as that of crude hemp extract.—ROGER ADAMS, C. K. CAIN, W. D. MCPHEE and R. B. WEARN. *J. Am. Chem. Soc.*, 63 (1941), 2209. (E. B. S.)

Cannabinol—Synthesis of. A report that the method of synthesis used by Adams, *et al.*, has been in use some time by the author.—G. POWELL and T. H. BEMBRY. *J. Am. Chem. Soc.*, 62 (1940), 2568. (E. B. S.)

Chloramine-T—Interaction of, with Hydrogen Sulfide, Phosphine and Arsine. A quantitative study is reported.—JAMES R. BENDALL, FREDERICK G. MANN, and DONALD PURDIE. *J. Chem. Soc.*, (1942), 157-163. (W. T. S.)

Cyclopropane—Preparation of. Trimethylene dichloride is treated, suitably at a refluxing temperature, with a metal-reducing agent such as zinc dust in an aqueous-alcoholic medium, in the presence of a water-soluble metal bromide such as calcium bromide.—WM. A. LOTT, assignor to E. R. SQUIBB & SONS. U. S. pat. 2,261,168, Nov. 4, 1941. (A. P.-C.)

Diamidines—Aromatic, A Chemotherapeutic Comparison of Some. The direct trypanocidal action of synthalin (decamethylenediguanidin di-HCl), $NH_2—C(=NH)—NH—(CH_2)_{10}NH—C(=NH)—NH_2·2HCl$, was first demonstrated by Lourie and Yorke (*Ann. Trop. Med. Parasit.*, 31 (1937), 435) after Janscó and Janscó (*Z. Immunitätsforsch.*, 86 (1935), 1) and Artagaveytia-Allende (*ibid.*, 89 (1936), 21) had found that it was curative in mice infected with various pathogenic trypanosomes. This action was attributed to the hypoglycemic properties of the compound. King, *et al.* (*Lancet*, 233 (1937), 136) found related compounds, especially 1:11-diamidinoundecane di-HCl, to be even more trypanocidal. Sixty-six new diamidines were prepared and are tabulated with respect to such pertinent data as: (1) solvent, (2) form, (3) m. p., (4) formula, (5) analysis. A synthesis for a number of these is described along with that of the nitrile required for their preparation. These diamidines are classed according to: (1) effect of homology, (2) replacement of one or two (CH_2) groups by another bivalent linkage, (3) substitution in the amidine groups, etc. They were tested against *T. equiperdum*, *T. rhodesiense* and *T. brucei*. The greatest activity seems to lie in compounds of the type $NH_2—C(=NH)—C_6H_4—X—C_6H_4—C(=NH)—NH_2$ in which X is a simple aliphatic chain having oxygen in place of one (CH_2), or is an ethylenic linkage as in stilbene.—J. N. ASHLEY, H. J. BARBER, A. J. EWINS, G. NEWBERRY and A. D. H. SELF. *J. Chem. Soc.*, (1942), 103-116. (W. T. S.)

Dihydrodiethylstilbestrol—Synthesis of. A procedure is described for the synthesis of dihydrodiethylstilbestrol (m. p. 186°) from anethole.—A. M. DOCKEN and M. A. SPIELMAN. *J. Am. Chem. Soc.*, 62 (1940), 2163. (E. B. S.)

Ergosterol—A New Oxidation Product of. Ergosterol, in the presence of hematoporphyrin and light, can be oxidized not to the peroxide of Windaus, but to a keto acid, whose constitution the author has attempted to establish.—A. FREIHERR VON CHRISTIANI. *Mikrochemie*, 28 (1940), 183-185. (R. H. B.)

Hydrogenation Products of the 10,13-Dimethylpolyhydrocyclopentanophenanthrene Series. A process is employed which involves subjecting 3,17-diketones of the polyhydrocyclopentanophenanthrene series having the general formula $C_{19}H_mO_2$ (where $m = 28$ or 26) to the action of hydrogenating agents, and stopping the hydrogenation when a product of the general formula $C_{19}H_{30}O_2$ is obtained. This product can be used as an intermediate for the production of products having properties like male sex hormones.—LOTHAR STRASSBERGER and LUDWIG KRAFT, assignors to SCHERING CORP. U. S. pat. 2,257,137, Sept. 30, 1941. (A. P.-C.)

Magnesium Acid Citrate. A stable, free-flowing, opaque, crystalline magnesium acid citrate, sufficiently dehydrated to assay 110% to 115% as the pentahydrate, and retaining its solubility in about 5 parts of water indefinitely, is prepared by heating a crystalline soluble preparation of the pentahydrate at 75° to 135° C. for about 12 hrs.—JOHN L. DAVENPORT and CHARLES F. DE COSTA, assignors to CHARLES PFIZER AND CO. U. S. pat. 2,260,004, Oct. 21, 1941. (A. P.-C.)

Organic Borates. *2,260,336*—A method is employed for the production of germicidal and fungicidal organic derivatives of boric acid having the general formula $(RO)_3B$ (where R represents an aromatic radical) which involves heating a mixture of boric acid, a monohydric phenol and a water-immiscible organic solvent to a temperature at which a mixture of the solvent and water of reaction is steam distilled from the reaction zone. Details are given, or general mention is made, of the production of a number of such borates which hydrolyze readily in the presence of water and are somewhat soluble in various common organic solvents. *2,260,337*—This relates particularly to the production of *tris*(2-methoxyphenyl) borate and other *tris*(alkoxyphenyl) borates where the alkoxy groups contain from 1 to 8 carbon atoms. *2,260,338*—This deals especially with the production of *tris*(4-*tert*-butylphenyl) borate and closely related compounds. *2,260,339*—This relates especially to the production of *tris*(2- and 4-cyclohexylphenyl) borates and closely related compounds.—RALPH F. PRESCOTT, ROBERT C. DOSSER and JOHN J. SCULATI, assignors to THE DOW CHEMICAL CO. U. S. pats. 2,260,336 to 2,260,339, Oct. 28, 1941. (A. P.-C.)

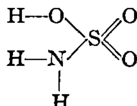
Pantothenic Acid—Improved Synthesis of. It has been found expedient to conjugate the acid

chloride of the acetylated hydroxy acid fragment with the sodium salt of β-alanine instead of β-alanine ester, in an alkaline medium.—D. W. WOOLLEY. *J. Am. Chem. Soc.*, 62 (1940), 2251. (E. B. S.)

***m*-Phenanthroline Derivatives as Antimalarials.** In the 18th of a series of papers devoted to the synthesis of possible antimalarials, the authors describe the preparation of intermediates for and derivatives of some pyridoquinolines, mainly those of (*m*-phenanthroline).—WILLIAM O. KERMACK and WILLIAM WEBSTER. *J. Chem. Soc.*, (1942), 213–218. (W. T. S.)

Polysulfanilamido Aromatic and Aliphatic Compounds. By reactions which may involve the interaction of an acylaminoarylsulfonyl chloride on an aromatic or aliphatic diamine and then hydrolyzing the acylamino groups if an unacylated amino compound is desired, bactericidal compounds and dye intermediates are obtained. Details are given of the production of a number of such compounds.—ELMORE H. NORTHEY and MARTIN E. HULTQUIST, assignors to AMERICAN CYANAMID CO. U. S. pat. 2,258,162, Oct. 7, 1941. (A. P.-C.)

Quinine Sulfamate. Sulfamic acid, made commercially by the reaction of urea and fuming sulfuric acid, has this graphic formula:



The dry acid is a stable crystalline substance. Other physical and chemical properties are reviewed. Experimental work consisted of the preparation of quinine sulfamate and bisulfamate. The sulfamate was prepared by mixing equimolecular quantities of quinine and sulfamic acid, the quinine in alcoholic solution and the acid in aqueous solution. The mixture was evaporated to dryness on a steam bath and the crude salt was crystallized from hot alcohol. The yield was practically theoretical. The quinine bisulfamate was prepared from two moles of sulfamic acid and one mole of quinine. Evaporation of mixed solution had to be at 40° C. under reduced pressure to prevent decomposition of the amide group. The crude salt then was crystallized from hot alcohol. The yield was practically theoretical. Physical and chemical properties of both were determined, crystalline structure studied and chemical formula determined. Both salts are white, crystalline, odorless and intensely bitter. Both are more soluble in alcohol and water than the corresponding quinine salts of sulfuric acid. Quinine sulfamate has the formula $C_{20}H_{24}O_2N_2 \cdot HNH_2SO_3 \cdot H_2O$; the bisulfamate is $C_{20}H_{24}O_2N_2 \cdot 2HNH_2SO_3 \cdot H_2O$. Therapeutic properties have not yet been determined.—KENNETH STAHL and R. A. KUEVER. *Jour. A. Ph. A.*, 31 (1942), 154. (Z. M. C.)

Salicylic - Acid - Sulfonylsulfanilamides. By introducing the salicylic-acid-sulfone radical into the amino group of *p*-aminobenzenesulfonic acid amide (or methyl- or dimethylamide), compounds are obtained which may be used in the treatment of rheumatism or lumbago or as urine disinfectants. Details are given of the production of a number of such compounds.—FRIEDRICH BOEDECKER and ALBRECHT HEYMONS, assignors to J. D. RIEDEL—E. DE HAEN A.-G. U. S. pat. 2,256,274, Sept. 16, 1941. (A. P.-C.)

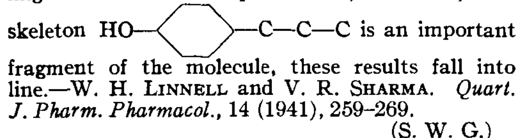
Soporific and Narcotic Compounds of the Hydrouracil Series. Soporific compounds are produced by first treating esters or amides of β-aminopropionic acid, disubstituted by hydrocarbon radicals in α-position to the carboxyl group and having at least one hydrogen atom in the amino and amido group, with derivatives of carbonic acid. Ureido or urethano compounds are thus obtained, which are converted by ring formation into the respective hydrouracil derivatives by treatment with alkaline-condensing agents. Especially suitable condensing agents are the alkali metal alcoholates, especially sodium ethoxide. Other condensing agents usual for ring formation in the barbituric acid series, such as sodamide, may, however, also be employed. The new hydrouracil derivatives from aminopropionic acid derivatives may also be obtained by a one-step process. Thus, for instance, hydrouracil derivatives may be directly obtained by treating amides of β-aminopropionic acid, disubstituted by hydrocarbon radicals in α-position to the carboxyl group, and having at least one hydrogen atom in the amino and amido group, with esters of carbonic acid in the presence of the condensing agents mentioned. This reaction may be illustrated by the following formula: $R'R''C(CH_2NHR''')CONHR'''' + CO(OR) \longrightarrow \underline{R'R''C \cdot CO \cdot NR'''' \cdot CO \cdot NR''' \cdot CH_2}$. For the production of the derivatives which are methyl-substituted at nitrogen atom No. 3, the methylamide of α-aminopropionic acid substituted by two hydrocarbon radicals in α-position to the carboxyl group is especially suitable. The preferred ester of carbonic acid for the reaction described is the ethyl ester which may be easily obtained.—OTTO DALMER, CLAUS DIEHL and HARTMANN PIEPER, assignors to MERCK & CO. U. S. pat. 2,259,925, Oct. 21, 1941. (A. P.-C.)

Soporific Malonic Acid Derivatives. Compounds such as *sec*-butylethylmalonic acid amide ethyl ester (which melts at 73° to 74° C. and boils at 127° to 130° C. under 3-mm. pressure), and the corresponding methyl ester (which melts at 52° C.), are produced from *sec*-butylalkylacetic esters containing at the α-carbon atom a group convertible into the carboxamide group, *e. g.*, the nitrile group, a carboxylic acid halide group, carboxylic acid ester group or carboxylic acid ammonium or amine salt group. The carboxlic acid halide or ester group is converted into the carboxylic acid amide group by acting thereupon with ammonia or primary or secondary amines; a carboxylic acid ammonium or amine salt group is converted into the carboxylic acid amide group by splitting off water. It is also possible to start from *sec*-butylalkylacetamides, containing at the α-carbon atom a group convertible into a carboxylic acid ester group, *e. g.*, a carboxyl group. The carboxyl group of a *sec*-butylalkyl malonic acid monoamide is converted into the carboxylic acid ester group in a manner known *per se*, for instance, by means of dialkyl sulfate or diazomethane.—WALTER KROPP, assignor to WINTHROP CHEMICAL CO. U. S. pat. 2,255,447, Sept. 9, 1941. (A. P.-C.)

Sterols. CX. The Position of the Hydroxyl Groups in Chlorogenin. Transformations have been carried out which indicate conclusively that the hydroxyl groups of chlorogenin occupy positions 3 and 6. In the course of the work a method has been developed for converting 3-hydroxy-Δ^5 sterols into the corresponding 3,6-diketones.—R. E. MARKER, E. M. JONES, D. L. TURNER and EWALD ROHRMANN. *J. Am. Chem. Soc.*, 62 (1940), 3006. (E. B. S.)

Stilbestrol—Isomers of. 3:4'-Dihydroxy-α:β-diethylstilbene was obtained as a crystalline substance melting at 153–154°. The 3-hydroxy-derivative occurred as an oil while the 3:3'-dihydroxy compound was isolated in the form of a glass. The last substance was separable into benzene-soluble and -insoluble fractions. However, acetylation and subsequent quantitative hydrolysis indi-

cated similar molecular composition as did their chemical properties and their behavior in the biological test. It is probable that they are isomeric compounds (*cis* and *trans?*). All the compounds were found to be less active than stilbestrol and, of the new compounds, the 3:4-dihydroxy derivative is the more potent. In this series the hydroxyl in the *para* position is more effective than in the *meta* position. Based upon the analogies of the structure of stilbestrol and estradiol the opposite result might have been expected. If, however, the



skeleton HO—⟨ ⟩—C—C—C is an important fragment of the molecule, these results fall into line.—W. H. LINNELL and V. R. SHARMA. *Quart. J. Pharm. Pharmacol.*, 14 (1941), 259–269. (S. W. G.)

Sulfonamides—Preparation and Study of a Series. A series of 29 N[4]-acetyl-N[1]-substituted sulfanilamides have been prepared by condensing *p*-acetylaminobenzenesulfonyl chloride and primary amines in acetone with pyridine or by fusion. The acetyl group was removed from the compounds of this series by acid or alkali to give the N[1]-substituted sulfanilamides. N[1]-(6-methoxy-3-nitrophenyl)-sulfanilamide was reduced to the corresponding amine by hydrogen and platinum black. N[1]-(2-aminophenyl)-sulfanilamide was obtained by treating the corresponding nitro compound with $Fe(OH)_2$ according to the method of Webster and Powers (*J. Am. Chem. Soc.*, 60 (1938), 1553). N[1]-(4-carbethoxyphenyl)-sulfanilamide was obtained by refluxing N[1]-(4-carboxyphenyl)-sulfanilamide and HC lin absolute ethanol for 6 hrs. By subjecting N[4]-acetyl-N[1]-(4-aminophenyl)-sulfanilamide to the Bart reaction an arseno group was introduced. None of the compounds were therapeutically valuable. In an appendix the methods used for the *in vitro* and *in vivo* tests are outlined.—C. MARCHANT, C. C. LUCAS and L. MCCELLAND. *Can. J. Research B*, 20 (1942), 5–16. (W.T.S.)

Thyroxine Produced by Oxidation of 3,5-Diiodotyrosine. By using highly purified 3,5-diiodotyrosine (I), J., *et al.*, have confirmed the finding of Mutzenbecher (*Z. physiol. Chem.*, 261 (1939), 253–256) that I is oxidized to thyroxine by incubating it with hypoiodous acid in alkaline solution. Using hypoiodate in place of the iodine in the same experiment gave slightly higher yields of thyroxine. The fact that pyruvic acid and NH_3 are secondary products of the above reaction made it possible for the authors to postulate the mechanism of the reaction. Their postulation is graphically represented and finds support in Pummerer's findings concerning the oxidation of *o*- and *p*-substituted phenols by $K_3Fe(CN)_6$ in alkaline solution at 0° C.—TREAT B. JOHNSON and LYNDON B. TEWKESBURY. *Proc. Nat. Acad. Sci. U. S.*, 28 (1942), 73–77. (W. T. S.)

BIOCHEMISTRY

Acetylsulfapyridine and Acetylsulfathiazole—Solubility of, in Urine. The following summary is given. (1) To prevent the precipitation of acetylsulfapyridine and acetylsulfathiazole in the urine, the fluid output must be sufficient to hold all of these compounds in solution. (2) The solubility of both acetylsulfapyridine and acetylsulfathiazole is greater in an alkaline urine than in an acid urine, so that enough base should always be taken with these drugs to keep the *p*H of the urine alkaline. (3) Urea seems to have some importance in the solubility of acetylsulfapyridine in the urine.—A. C. CURTIS and S. S. SOBIN. *Ann. Internal Med.*, 15 (1941), 884–889. (S. W. G.)

***p*-Aminobenzoic Acid-Achromotrichial B Factor.** A review.—ANON. *Am. Professional Pharmacist.* 8 (1942), 366, 392. (H. M. B.)

Arsenic Content of Foods. A knowledge of the arsenic content of common foods is important in all chemico-legal work. Several reports on this subject have been published in India since 1934. The Marsh-Berzelius method for arsenic and its modification by Chapman are unsatisfactory due to a general lack of an arsenic-free zinc. The Gutzeit method is satisfactory. The arsenic content of about 100 food items common in India is given. The arsenic content of these foods ranges in this order: animal foods > vegetables > cereals > fruits. Fish contain more than other meat products, the halua fish having 3.58 p. p. m. A London prawn was reported as having 1.2 grain As_2O_3 per lb. of meat.—RAI BAHADUR, K. N. BAGCHI and H. D. GANGULY. *Indian Med. Gaz.*, 76 (1941), 720–722. (W. T. S.)

Ascorbic Acid (Vitamin C) in Tea. The ascorbic acid content of tea has been determined by titration with 2,6-dichlorophenol-indophenol, and found to vary with the sample. The relative distribution of ascorbic acid in the component parts of the normal flush has been studied. It was found that while buds contained no ascorbic acid, the leaves contain more than the stalk; the second leaf contains more than the first. The loss of ascorbic acid in tea, during manufacture, occurs in the drying stage, although in fermentation it is oxidized only reversibly.—H. B. SREERANGACHAR. *J. Soc. Chem. Ind.*, 59 (1940), 272–274. (E. G. V.)

***l*-Ascorbic Acid (Vitamin C).** Numerous examples with details are given of a process which involves heating diacetone-2-keto-*l*-gulonic acid with an acid which is nonoxidizing under the conditions of the reactions, such as hydrochloric acid (suitably in methanol solution after treatment with sodium methylate.—TADEUS REICHSTEIN, assignor to HOFFMANN-LAROCHE, INC. U. S. pat. 2,265,121, Dec. 2, 1941. (A. P.-C.)

Blood Iodine—Investigations on the Nature of. Summary: (1) In the absence of previous iodine therapy, practically no iodine can be demonstrated in erythrocytes, cerebrospinal fluid, ultrafiltrates or dialyzates of serum or plasma. (2) Dialysis of serum from patients receiving iodine therapy is a convenient method for separating inorganic iodine from the clinically significant bound iodine fraction. (3) When serum globulin is separated from serum albumin by salting out with 22% sodium sulfate solution, more of the serum iodine is found in the albumin fraction. (4) When blood serum is subjected to ultracentrifugation, the sedimentation of iodine compounds occurs at a rate very nearly equal to that of serum albumin.—D. S. RIGGS, PAUL H. LAVIETES and EVELYN B. MAN. *J. Biol. Chem.*, 143 (1942), 363. (F. J. S.)

Blood Plasma and Serum Albumin. A review of blood plasma and its importance is offered. Forty-three references.—ANON. *Am. Professional Pharmacist*, 8 (1942), 287–292, 324. (H. M. B.)

Blood Plasma and Serum Albumin. A review of the importance of these products under present conditions. Forty-nine references.—ANON. *Am. Professional Pharmacist*, 8 (1942), 362–365. (H. M. B.)

Blood Urea Nitrogen—An Accurate Method for the Determination of, by Direct Nesslerization. A simple accurate method of determining urea nitrogen in blood by direct nesslerization is described. No elaborate apparatus or unusual reagents are required. In the method potassium persulfate which is used to prevent the reduction of Nessler's reagent and potassium gluconate to restrain the oxidizing action of persulfate form a

soluble mercury complex, or to do both. By these means a color is produced which is stable for a minimum of 1 hr. The final reaction mixture remains clear and sparkling for days. Spectrophotometric study of the color of the final nesslerized solution indicates that color comparisons should be made between the wave lengths of 490 and 510 mμ with 500 mμ the optimum point. Appropriate filters for photoelectric and visual colorimeters are described. As a basis for accurate comparison a new distillation procedure is outlined which gives accurate results with the amount of urea normally present in 0.5 cc. of whole blood.—CLEON J. GENTZKOW. *J. Biol. Chem.*, 143 (1942), 531. (F. J. S.)

Copper in the Livers of Various Animal Species, Polarographic Determination of. After reviewing the basic requirements for polarographic analysis, a method is given for the determination of copper in the livers of mammals and nonmammals. The copper content varies with the species; herbivorous animals containing the most, fishes the least. The amount of copper can be considered as specific for the species, although it may vary in individuals of the same species.—G. BALDASSI. *Mikrochemie*, 28 (1940), 258–279. (R. H. B.)

Cottonseed Allergenic Protein—Recovery of, from Its Picrate by Electrophoresis. It was found that protein CS-13A could be recovered from its picrate by high voltage electrophoresis. Advantage was taken of the fact that the protein picrate was soluble in 50% dioxane, in which the free protein was insoluble.—J. R. SPIES. *J. Am. Chem. Soc.*, 63 (1941), 1166. (E. B. S.)

Desoxycorticosterone—Esters of. Compounds suitable for use as therapeutic agents are produced by a process involving treatment of desoxycorticosterone or an inorganic acid ester with an acylating agent the acylating radical of which contains more than two carbon atoms, such as propionic anhydride, propionyl chloride, valeric acid anhydride, butyric anhydride, palmitic acid chloride, benzoyl chloride or stearic acid chloride.—KARL MIESCHER and WERNER FISCHER, assignors to CIBA PHARMACEUTICAL PRODUCTS, INC. U. S. pat. 2,265,183, Dec. 9, 1941. (A. P.-C.)

Drop Analysis—Quantitative. XII. Determination of Ultrafilterable Calcium of Blood. A procedure is described for the ultrafiltration of 0.1 cc. of blood serum or plasma for determination of the ultrafilterable fraction of the blood calcium. Directions are given for the assembly of a micro-ultra filter of colloidion. The results obtained indicate that the method is about as valid as the usual macro determinations.—H. C. JOHNSON and P. L. KIRK. *Mikrochemie*, 28 (1940), 254–257. (R. H. B.)

Ethyl Alcohol—Quantitative Method for, Normally Present in Blood. A quantitative method for ethyl alcohol in blood, based upon the alkoxy reaction, is presented. The outstanding features of the method are as follows: (1) Only 5.0 cc. of blood are required for the determination. (2) No preliminary precipitation or distillation of the blood is necessary. (3) Quantities of alcohol as small as 0.02 mg. can be quantitatively determined. (4) The method is specific for the alcohol (OH) group. (5) The method may be used for the analysis of blood and urine from alcoholic individuals.—ALEXANDER O. GETTLER and CHARLES J. UMBERGER. *J. Biol. Chem.*, 143 (1942), 633. (F. J. S.)

Fruit Products—Some Investigations on the Concentration and Drying of. The investigation covers apple and plum products.—V. L. S. CHARLEY. *Chemistry and Industry*, 59 (1940), 823–827. (E. G. V.)

Gastrin. I. Methods of Isolation of a Specific Gastric Secretagogue from the Pyloric Mucous Membrane and Its Chemical Properties. Crude extracts were prepared by boiling pyloric mucosa for several minutes with 0.15 *N* hydrochloric acid and then filtering either directly or after partial neutralization with dilute sodium hydroxide solution. Crude gastrin was obtained from the crude extracts by: (1) precipitation with trichloroacetic acid, or (2) salting out with 30% or concentrated sodium chloride solutions or (3) precipitation with 10% sodium chloride in presence of acetic acid. Purified gastrin can be obtained by removing about 90% of the inert protein material present in the crude gastrin by fractionation with acetone or with methanol and ether. The techniques of these various treatments are described. The preparations thus obtained contained no histamine, choline or other organic crystalloids, and were free from fatty material soluble in acetone, benzene or ether. The chemical properties of the secretagogue principle of pyloric extracts have much in common with those of secretin: it is a protein-like substance, quantitatively precipitable with 10% trichloroacetic acid and under certain conditions also with 10 to 30% sodium chloride; soluble in 80% acidulated alcohol, in 95% acidulated methanol and in 80% acetone; insoluble in absolute ether, petroleum ether and absolute or 98% acetone. Routine chemical procedures were developed for obtaining from the mucous membrane of the gastrointestinal tract nontoxic, histamine-free preparations containing either: (1) both gastrin and secretin, or (2) highly specific preparations of gastrin free from secretin. The preparation of the gastrin-secretin comprises: extraction of mucosa by boiling with 10 volumes of 0.15 *N* hydrochloric acid, partial neutralization and filtration; double precipitation with 10% trichloroacetic acid, washing the precipitate with acetone and ether and drying; extraction of the dried precipitate with acidified saline and salting out with sodium chloride; extraction (or solution) of the salted-out precipitate with acidified distilled water, precipitation with 10% trichloroacetic acid, washing with acetone and ether and drying (product is crude gastrin-secretin); extraction with acidified saline and salting out with sodium chloride; fractionation with 80% acetone in presence of 0.5% excess of acetic acid; precipitation of the acetone extract (after removal of acetone by distillation) with 10% trichloroacetic acid, washing with acetone and ether and drying, which yields purified gastrin-secretin. The isolation of secretin-free gastrin comprises: extraction of the minced mucosa by boiling with 5 volumes of 0.15 *N* hydrochloric acid (may be repeated once), filtration without previous neutralization; partial neutralization of the filtrate to a reaction slightly positive to Congo red and precipitation by saturation with sodium chloride (or by 30% sodium chloride); solution of the precipitate in 10% sodium chloride at an alkaline reaction and precipitation with 0.5% excess acetic acid, to be repeated twice (product at this stage is crude gastrin); extraction with 80% acetone; precipitation of the extract (after removal of the acetone) with trichloroacetic acid (repeat twice), washing with acetone and ether and drying (product is *purified gastrin* with potency of 6 to 10 mg. per unit); fractionation with methanol and ether (product is *purified gastrin 2* with potency of 2.5 to 4 mg. per unit).—S. A. KOMAROV. *Rev. Can. Biol.*, 1 (1942), 191–205. (A. P.-C.)

Growth Hormone Extracts—Purification of. The usual method of preparation of growth hormone was modified slightly by using sulfur dioxide instead of carbon dioxide for the elimination of lime, which offers the two-fold advantage of keeping the hormonal extract in reducing medium and of re-

moving the greater part of the white proteins. Other conditions being equal, growth-hormone extracts from bovine pituitary glands proved decidedly more potent than those from sheep. The biological material used for standardizing consists of normal or hypophysectomized rats; with normal rats the results (total increase in weight of the animal) are obtained in 20 days, while with hypophysectomized rats 10 days are sufficient. A series of isoelectric precipitations were carried out on growth-hormone preparations obtained by either the carbon dioxide or the sulfur dioxide method: isoelectric fractions obtained at *p*H values below 5.2 were inferior in potency, those obtained at *p*H values above 5.2 possessed a fair potency, and there was a marked increase in potency in the *p*H range of 5.7–6.2. The experiments, however, seem to show that the growth factor is distributed over each of the protein fractions obtained; if this is so, the growth hormone must be active in extremely small quantities and be adsorbed by large protein molecules or entrained by coprecipitation. This hypothesis does not exclude the possibility that the hormone may itself be a protein. The possibilities of purely chemical methods of purification of the growth hormone seem to have been exhausted; but modern physical or physicochemical methods such as electrolysis, cataphoresis and ultracentrifuging, may permit further notable improvements.—LÉON J. ABRAHAM. *Rev. Can. Biol.*, 1 (1942), 113–133. (A. P.-C.)

Inositol—Changes in the Form of, During Incubation of Eggs. The total amount of inositol in a hen's egg does not increase during incubation, but the proportion of the total amount which is free and extractable by water does increase.—D. W. WOOLLEY. *Proc. Soc. Exptl. Biol. Med.*, 49 (1942), 540. (A. E. M.)

Insulin—Determination of the Hydroxy Amino Acids of. Results show that of the 54 units not accounted for according to the Bergmann-Niemann theory, there are threonine, 8 units; serine, 12 units; other hydroxy amino acids, 6 units.—B. H. NICOLET and L. A. SHINN. *J. Am. Chem. Soc.*, 63 (1941), 1486. (E. B. S.)

Insulin—Precipitation of, by Organic Bases. The addition of compounds possessing strongly basic groups is more apt to decrease the solubility of insulin on the alkaline side of its isoelectric zone than is the addition of compounds possessing weakly basic groups. The number of basic groups in the compound apparently plays some role but other physical properties of the molecule also exert an influence in a manner not clearly understood at present. The size of the molecule may determine to some extent the solubility, but due to relatively slow diffusion rates, large molecules greatly affect the rate of the decomposition of the complex after injection. Certain condensation products of secondary and tertiary phenethylamine derivatives form complexes with insulin. These preparations show prolonged insulin activity when tested on rabbits.—E. H. LANG, J. S. BUCK and L. REINER. *Pharm. Arch.*, 12 (1941), 81–87. (H. M. B.)

Kidney Extracts—Identification of Amines in Anaerobic. The pressor effect of anaerobic kidney extracts prepared according to the method of Victor, Steiner and Weeks are probably due to pressor amines. Tyramine and isoamylamine have been identified in the extracts and the probable presence of phenylethylamine has been shown.—VICTOR A. DRILL. *Proc. Soc. Exptl. Biol. Med.*, 49 (1942) 557. (A. E. M.)

K Vitamins—Colorimetric Method for the Determination of the. The influence of extraneous, slowly reducing substances upon the performance of the colorimetric test for the determination of the K vitamins has been investigated. It has been shown that the error caused by this interference is eliminated by extrapolation to zero time.—JOHN V. SCUDI and RUDOLF P. BUHS. *J. Biol. Chem.*, 143 (1942), 665. (F. J. S.)

Liver—Vitamin A of. Liver from herbivorous animals is a potent source of vitamin A. Its extraction is simple in oily or alcoholic solutions and more concentrated than the best cod-liver oil. The following sources are compared: hog liver, per cent fat 12.5, I. U. per Gm. of liver 7, I. U. per Gm. of fat 62; sheep liver 1.5, 109, 7320; beef liver 4.49, 1864, 41,500; cod liver 10.5, 1650, 41,000; chicken liver 2.1, 1751, 83,600; halibut —, —, 41,000; tuna liver —, —, 46,000; Mexican bonito liver —, —, 120,000; *Ziphius gladius* liver —, —, 250,000.—A. M. BARRIGA VILLALBA. *Evolucion (Bogota)*, 3 (1941), 12. (G. S. G.)

Methemoglobin—Reduction of, by Ascorbic Acid. The following summary is given: (1) The reduction of methemoglobin by ascorbic acid has been studied *in vitro* at 0° and 25–30°; the reaction proceeds according to thermodynamic prediction (83% to 95% reduction). (2) The presence of catalytic amounts of methylene blue greatly speeds up the reaction, while the presence of indigodisulfonate is substantially without effect. (3) Chemical evidence suggests that potassium ferricyanide and sodium nitrite do not lead to the same product (methemoglobin) when allowed to react with oxyhemoglobin.—CARL S. VESTLING. *J. Biol. Chem.*, 143 (1942), 439. (F. J. S.)

Platelets and Pathological Granules in B-Avitaminotic Rats. White rats fed on thoroughly washed polished rice or on diet free from vitamin B_1 showed an increase of blood platelet count. But when polished rice of B_1-free diet is long continued or when animals draw near death or are in the paralytic stage, the count decreases. As to classification of blood platelets, the sum of spindle-shaped and small platelets show an increase when total count begins to increase or return to normal, and large platelets show an increase in the more advanced stage of B_1-avitaminosis. Vitamin B_1 makes the increased blood platelet count smaller and renders the abnormal distribution of different platelets normal. Red cell count does not decrease in the terminal stage of B_1-avitaminosis, but shows an increase when platelets reached the maximal count in most cases. There is, as far as platelet count and pathological granules are concerned, no essential difference between the rice disease and B_1-avitaminosis of rats.—M. SHINDO. *Tôhoku J. Exp. Med.*, 38 (1940), 380. (A. C. DeD.)

Pregnenediones. Pregnenediones having the physiological activity of substances obtainable from corpus luteum are produced by oxidation of unsaturated hydroxy ketones of the pregnane series, wherein the hydroxyl group is located at the 20-carbon atom and the ketone group is formed of the 3-carbon atom. The pregnen-20-ol-3-ones which are employed as starting materials can be obtained either by direct isolation from naturally occurring substances, or by synthetic processes, by the conversion of other compounds, for example, by the action of halogen upon pregnan-20-ol-3-ones and splitting off of hydrogen halide from the so-formed monohalogenated pregnanolones. Various oxidizing agents may be employed, particularly compounds of hexavalent chromium, like chromium trioxide and the like; further, the permanganate compounds of the alkali and alkaline earth metals may be used. The hydroxy ketones to be oxidized are advantageously employed in the form of their halogenated compounds which may be prepared, for instance, by causing halogen to act upon the corresponding saturated hydroxy ketones, the preg-

nan-20-ol-3-ones, whereby saturated monohalogenated hydroxy ketones are obtained. One may also subject pregnen-20-ol-3-ones to the action of halogen, whereby unsaturated halogenated compounds are obtained. Also, the oxidation of the pregnen-20-ol-3-ones to pregnendiones can be carried out with the aid of oxidizing metal oxides, such as copper oxide and the like, or with the aid of hydrogen peroxide. Numerous examples with various details are given, and from the crude product obtained after the oxidation and dehalogenation there can be recovered on purification a crystallizate which appears to be identical with that of the compound $C_{21}H_{30}O_2$ which can be isolated from corpus luteum. This synthetic product also shows the same behavior as the natural product in that it appears in two different forms, one melting at 121° and the other at 128.5° C.; further, it has the same physiological efficiency as the natural product obtained from corpus luteum.—ARTHUR SERINI, LOTHAR STRASSBERGER and ADOLF BUTENANDT, assignors to SCHERING CORP. U. S. pat. 2,256,500, Sept. 23, 1941. (A. P.-C.)

Prolactin. From a highly purified amorphous preparation of beef prolactin it has been possible to prepare a crystalline protein with a lactogenic activity very similar to that of the amorphous product. The homogeneity of this protein is indicated from three types of studies: (1) electrophoresis, (2) ultracentrifugation and (3) solubility measurements. The following additional data are also presented for prolactin: sedimentation constant, diffusion constant, approximate molecular weight, isoelectric point, elementary analysis, tyrosine, tryptophane and cystine content, heat stability at various *p*H values and alterations in biological activity occurring when the protein is hydrolyzed with acid, pepsin or trypsin. The data obtained in this study of prolactin confirm the protein nature of this anterior pituitary hormone.—ABRAHAM WHITE, ROY W. BONSNES and C. N. H. LONG. *J. Biol. Chem.*, 143 (1942), 447. (F. J. S.)

Proteins of the Seed of the Horse Bean or Broad Bean (Vicia faba). The kernel of the horse bean (*Vicia faba*) contains (on the dry basis): protein 29% to 33%, glucides 53.1%, lipids 1.1%. The ash is exceptionally rich in phosphorus, 71% of which is present in the phytic form. About 94% of the total nitrogenous matter is extractable by dilute sodium hydroxide at a *p*H of 11. The variation in the solubility as a function of *p*H is similar to that of soya in the alkaline range, but is entirely different in the acid range. The point of maximum precipitation is about 4.2 to 4.4, which is considered to be about the mean isoelectric point of the combined proteins. The general trend of the viscosity in alkaline medium of the proteins extracted in this way is parallel to that of lactic casein and rennet casein. The distribution of amino acids produced by complete hydrolysis differs from that given in the case of soya, bran, oats, barley, alfalfa. Partial fractionation of the proteins by successive solution, dialysis, electrodialysis and heating made possible a separation into: globulins, albumins, albumoses and peptones.—JULES LABARRE and LUCIEN DELCOURT. *Rev. Can. Biol.*, 1 (1942), 72–87. (A. P.-C.)

Provitamin D. A process is employed which involved protecting the hydroxyl group of a 3-hydroxy-5-cholestene against dehydrogenation by substituting the hydrogen atom thereof by an alkyl or acyl radical and subjecting the protected compound to the action of a hydrogen acceptor of the group consisting of ketones, aldehydes, quinones, sulfur, organic disulfides, azo dyes, azoxy dyes and organic nitro compounds, whereby a hydrogen atom on each of the carbon atoms in the 7- and 8-positions is removed. Numerous examples with details of procedure are given, with use of cholesterol acetate as an initial material.—NICHOLAS A. MILAS and ROBERT HEGGIE, assignors to RESEARCH CORP. U. S. pat. 2,260,085, Oct. 21, 1941. (A. P.-C.)

Quinine—Microdetermination of, in Blood and Tissues. A method is described for the estimation of quinine in tissues which consists essentially of extraction of the alkaloid with ether, followed by acid extraction of the washed ether, and quantitative determination by a direct fluorescent technique. Average recovery values for several tissues was 99.8% ± 1.5%. As little as 0.1 μ per Gm. of tissue or blood can be accurately quantitated.—F. E. KELSEY and E. M. K. GEILING. *J. Pharmacol.*, 75 (1942), 183–186. (H. B. H.)

Riboflavin, etc.—Synthesis of. A process is employed which may involve reductively condensing tetraacetyl-*d*-ribonitrile and 4,5-dimethylaniline in the presence of a palladium catalyst to form *N*-tetraacetyl-*d*-ribityl-4,5-dimethylaniline, coupling the latter with *p*-nitrophenyldiazonium chloride, reducing the reaction product in the presence of a platinum catalyst to form 1-*N*-tetraacetylribityl-amino-2-amino-4,5-dimethylbenzene and condensing the latter product with 4,5-dichlorobarbituric acid to form tetraacetylriboflavin and hydrolyzing the latter to riboflavin. 6,7-Dimethyl-9-benzylisoalloxazine is formed by heating dichlorobarbituric acid in pyridine with 1-benzylamino-2-amino-4,5-dimethylbenzene. Details are also given of numerous similar and related reactions.—MAX TISHLER and JOHN W. WELLMAN, assignors to MERCK & CO. U. S. pat. 2,261,608, Nov. 4, 1941. (A. P.-C.)

Sexual Hormone Compounds. The water-solubility of the glycosides of sexual hormones of the cyclopentanophenanthrene series is greatly increased by transforming them to phosphoric esters, as by direct phosphorylation of the glycosides or by phosphorylating the sugars and condensing the phosphorylated sugars with the sexual hormones. Details are given of the production of estradiol glucosido-phosphoric acid, testosterone glucosido-phosphoric acid, a phosphorylated derivative of the glucoside of dehydroandrosterone and related compounds.—FRITZ JOHANNESSOHN, ERICH RABALD and ADOLF HAGEDORN, assignors to RARE CHEMICALS, INC. U. S. pat. 2,263,990, Nov. 25, 1941. (A. P.-C.)

Stains Other Than Blood-Stains as Medico-Legal Evidence. A review of 16 articles on the subject of identifying semen, feces, saliva, urine, sweat and miscellaneous stains for medico-legal purposes. The limitations of the common tests are pointed out.—S. D. S. GREVAL and S. N. CHANDRA. *Indian Med. Gaz.*, 76 (1941), 737–739. (W. T. S.)

Steroid Hormones—Metabolism of the. III. The Isolation of Pregnandiol-3(α),20(α) from the Urine of Pregnant Chimpanzees. The results showed that 48.3 mg. of pregnandiol-3(α),20(α) were isolated from 61 liters of urine collected from two chimpanzees during the 5th and 6th months of pregnancy. This quantity is equivalent to 0.79 mg. per liter or an average daily excretion by each animal of 2 mg.—WILLIAM R. FISH, RALPH I. DORFMAN and WILLIAM C. YOUNG. *J. Biol. Chem.*, 143 (1942), 715. (F. J. S.)

Sterols. CXXII. A defense of the hypothesis on the formation of the Δ^5-3-hydroxysteroids as reduction products of a Δ^4-3-ketosteroid, claiming substantial analogies in previous work and elaborating the mechanisms possible for such a process.—R. E. MARKER. *J. Am. Chem. Soc.*, 63 (1941), 1485. (E. B. S.)

Sterols. CXIV. Sapogenins. XLIII. Oxidation Products from Tigogenin. Various oxidation prod-

ucts have been obtained from tigogenin and their structures have been discussed. Further support is given to the ketal structure of the steroidal sapogenin side chain.—R. E. MARKER, D. L. TURNER and P. L. ULSHAFER. *J. Am. Chem. Soc.*, 63 (1941), 763. (E. B. S.)

Sterols. CXVI. Sapogenins. XLV. The Isosarsasapogenin Configuration. The reaction of diosgenin, tigogenin and smilagenin with ethylmagnesium bromide gave the corresponding 22-ethyldihydrosapogenins. *allo*-Preganetriols-3, 16, 20 were prepared from tigogenin and *epi*-tigogenin. Evidence has been discussed indicating that the configuration of the side chain in sarsasapogenin and isosarsasapogenin differs at C-22.—R. E. MARKER, D. L. TURNER, R. B. WAGNER and P. R. ULSHAFER. *J. Am. Chem. Soc.*, 63 (1941), 772. (E. B. S.)

Sterols. CXVII. Sapogenins. XLVI. The Structure of Pseudosapogenins. Dihydropseudotigogenin diacetate and pseudotigogenin diacetate give an identical oxidation product, $C_{31}H_{48}O_7$ (*A*). Similarly pseudodisogenin diacetate gives an oxidation product, $C_{31}H_{46}O_7$ (*B*). Catalytic reduction of this gives the product *A*. Further oxidation of *A* gives 3-hydroxy-*etio*-allo-bilianic acid. Hydrolysis of *A* gives Δ^{16}-*allo*-pregnenol-3(β)-one-20. Hydrolysis of *B* gives $\Delta^{5,16}$-pregnadienol-3 (β)-one-20. Reduction of *A* with aluminum isopropylate or catalytically gives an *allo*-pregnanetriol-3, 16, 20 (*C*), while reduction of *B* with aluminum isopropylate gives a Δ^5-pregnenetriol-2, 16, 20, which can be catalytically reduced to *C*. Direct catalytic reduction of *B* followed by hydrolysis gives *C*. Reduction of *A* with sodium in alcohol gives *allo*-pregnanediol-3(β), 20(α).—R. E. MARKER, D. L. TURNER, R. B. WAGNER, P. R. ULSHAFER, H. M. CROOKS, JR., and E. L. WITTLE. *J. Am. Chem. Soc.*, 63 (1941), 774. (E. B. S.)

Sterols. CXXII. Sapogenins. XLIX. The Structure of the Side Chain of Sarsasapogenin. Anhydrosarsasapogenoic Acid.—R. E. MARKER, A. C. SHABICA and D. L. TURNER. *J. Am. Chem. Soc.*, 63 (1941), 2274. (E. B. S.)

Silbestrol and Related Compounds. To prepare $HOC_6H_4CR{:}CRC_6H_4OH$, where the 2 *R*'s are the same or different lower alkyl groups, ROC_6H_4-$CHRCRO$ is treated with a Grignard reagent prepared from ROC_6H_4X (where *X* is a halogen), treating the resulting carbinol with a dehydrating agent and treating the dehydration product with a dealkylating agent.—LOUIS F. FIESER and WALTER G. CHRISTIANSEN, CHRISTIANSEN assignor to E. R. SQUIBB & SONS. U. S. pat. 2,248,019, July 1, 1941. (A. P.-C.)

Stored Blood Transfusion—Reactions After. There is no significant difference in the nature or number of reactions which tend to occur after the transfusion of fresh blood and blood stored up to three weeks under standard M. R. C. conditions. Such difference as may occur seems to be in favor of the stored blood. When standard stored blood is used, a febrile reaction is to be expected in about 20% of transfusions and an obvious rigor in about 5%. The incidence of jaundice and febrile reactions tends to increase when blood more hemolyzed than this is used. These reactions appear to be caused not so much by the free hemoglobin introduced, but by the early disruption of effected red cells after transfusion. Stored blood, as originally prepared, can safely be used for three weeks and in some cases even longer. Modifications of the preservative solution may further increase the useful life of the blood, though the introduction of preserved plasma and serum now renders this less necessary.—E. C. O. JEWESBURY. *Brit. Med. J.*, 4191 (1941), 663. (W. H. H.)

Sulfanilamide and Its Derivatives—A Simple Micro Test for. The test is based upon the yellow color resulting from the reaction between sulfanilamide and *p*-dimethylaminobenzaldehyde, which has been stabilized and intensified by the addition of alcohol. Readings are facilitated by the use of a blue filter. In 93 parallel determinations on human blood specimens, the average difference of values obtained with the method of Bratton and Marshall and the present micro method was 0.5 mg. per 100 cc. and the maximum difference 1 mg. per 100 cc.—J. CHURG and D. LEHR. *Am. J. Med. Sci.*, 202 (1941), 687. (B. H.)

Sulfanilamide Compounds in the Milk—The Elimination of. Infants nursed by mothers who receive therapeutic doses of sulfanilamide compounds never showed signs of intoxication. The concentration of the compound in the milk is generally lower than in the blood, with the exception of sulfanilamide, sulfapyridine and sulfacetylamide. Conjugated compounds appear in decreasing quantities as follows: sulfanilamide, sulfanilmethylsulfanilamide, sulfathiazole, sulfacetylamide, sulfapyridine and sulfapyrimidine. Sulfadimethylsulfanilamide appeared in the milk only in traces.—RAUL CIBILS AGUIRRE, JULIO R. CALCARAMI, DELIO AGUILAR GIRALDES and HORACIO M. BERISSO. *Semana méd.*, 49, I (1942), 621. (A. E. M.)

Thiamine—Chemical Determination of. A chemical method for the determination of thiamine has been described by which diazotized ethyl *p*-aminobenzoate reacts with the vitamin to form a colored compound which can be extracted quantitatively from aqueous solution by the use of isoamyl alcohol. A modification of the procedure in the presence of ascorbic acid has been described. The method is specific for free thiamine. The pyrophosphate of thiamine will not give the test. The ester must first be hydrolyzed to the free vitamin. In the case of yeast preparations, this can be accomplished very simply by the action of phosphatase in the yeast. Under the conditions given, the cocarboxylase can be converted quantitatively to the free thiamine at a *p*H range from 3 to 7 during a relatively short period. A modification of the procedure has been described to make the test applicable to the estimation of thiamine in urine, without adsorption of the vitamin.—ERNST R. KIRCH and OLAF BERGEIM. *J. Biol. Chem.*, 143 (1942), 575. (F. J. S.)

Thiamine Synthesis. 5-Substituted methylpyrimidine capable of being combined by yeast to form thiamine, such as 2-methyl-5-ethoxymethyl-6-aminopyrimidine, is subjected to the action of yeast in a yeast-nutrient medium. Various examples with details are given.—ALFRED S. SCHULTZ, LAWRENCE ATKIN and CHAS. N. FREY, assignors to STANDARD BRANDS, INC. U. S. pat. 2,262,735, Nov. 11, 1941. (A. P.-C.)

***dl*-α-Tocopherol—Photoelectric Determination of, in Serum.** The amount of *dl*-α-tocopherol in samples of human serum of 10 cc. or less may be determined in the photoelectric colorimeter by a method consisting of an adaptation of the α,α'-bipyridine-ferric chloride method of Emmerie and Engel. A number of details of procedure are pointed out.—GERDA GERNSHEIM MAYER and HARRY SOBOTKA. *J. Biol. Chem.*, 143 (1942), 695. (F. J. S.)

Ultracentrifugation Results—An Alignment Chart for the Computation of. An alignment chart for the evaluation of sedimentation constants from sedimentation data was constructed and it was demonstrated that this device is accurate, convenient and capable of effecting a considerable economy in

time.—HOWARD K. SCHACHMAN. *J. Biol. Chem.*, 143 (1942), 395. (F. J. S.)

Vitamin A—Histologic Visualization of, by Means of Fluorescence Microscopy. The following evidence exists that the characteristic fluorescence is due to the presence of vitamin A: The similar behavior of the vitamin A fluorescence and that in tissue sections toward various chemical reagents. The distribution of the fluorescences in the human and animal body is similar to the known distribution of vitamin A. Rats kept on a vitamin A-deficient diet did not show the fluorescence. If they were fed vitamin A or the provitamin carotene, which is known to be split in the body to vitamin A, the rat organs showed the fluorescence again; the degree of fluorescence found agrees with the amount of vitamin A fed and the amount found chemically in the liver. Up to now, no other substance which was fed to the vitamin A-deficient rats reproduced the fluorescence. After feeding of much vitamin A, a striking vitamin A fluorescence was seen, *e. g.*, in the liver, chiefly localized in the Kupfer's cells. The agreement between the chemical assay and the vitamin A fluorescence in all vitamin A statuses permits the use of the histologic method for a simple estimation of vitamin A stores in organs. On this basis the author is trying to develop a simple assay method for vitamin A-containing oils. Livers of some salt-water fishes gave a bright vitamin A fluorescence; while livers of fresh-water fishes gave a red-brown fluorescence due to vitamin A_2 and not the green fluorescence of vitamin A. Fluorescence photomicrographs are included.—H. POPPER. *Merck Report*, 51, No. 1 (1942), 26–29. (S. W. G.)

Vitamin B Complex—Rumen Synthesis of the, on Natural Rations. Six members of the vitamin B complex in the rumen ingesta of a heifer fed a ration composed of natural feeds were determined. In most cases higher values were found in the rumen ingesta than in the rations fed. With the exception of flavin, variation of the amount of urea or protein in the grain mixture of the ration had little if any effect on the vitamin content of the ingesta.—M. I. WEGNER, A. N. BOOTH, C. A. ELVEHJEM and E. B. HART. *Proc. Soc. Exptl. Biol. Med.*, 47 (1941), 90. (A. E. M.)

Vitamin B—Interrelation of Components of. Feeding experiments on black rats confirmed previous results: that six basic factors of vitamin B (thiamine, riboflavin, nicotinic acid, pyridoxine, choline and calcium pantothenate) are adequate for seemingly normal nutrition. However, they are not adequate if either *p*-aminobenzoic acid or inositol is added to the diet. The addition of inositol precipitates a syndrome prevented by *p*-aminobenzoic acid; the addition of *p*-aminobenzoic acid precipitates a syndrome prevented by inositol. Both of these factors have been demonstrated to inhibit bacterial growth, and the utilization of various vitamins by microorganisms has been demonstrated. The addition of inositol to a diet may stimulate the growth of the organisms which destroy pantothenic acid, whereas the addition of *p*-aminobenzoic acid may inhibit the growth of these organisms, or specific stimulation may cause overgrowth of one organism and the consequent elimination of another.—G. J. MARTIN. *Am. J. Physiol.*, 136 (1942), 124; through *Abbott Abstract Service*, (1942), No. 1114. (F. J. S.)

Vitamin D Assay—Collaborative Study of the A. O. A. C. Chick Method of. Five experiments were conducted and 31 laboratories (divided into three sections according to locality) collaborated; 8130 chicks were used in a total of 419 groups; at least 20 chicks were used per group, except that 10 chicks were used in each negative control group. The three sections into which the laboratories were divided did not show any apparent differences in results. The standardization of certain procedures used in these collaborative studies did not help eliminate variables or to improve the accuracy of the method of test over that reported in other collaborative studies, by other investigators, or that experienced in individual laboratories. As these tests were so planned and conducted that the basal rations used by all collaborators were alike in all respects, and the extraction and ashing techniques were the same, it is thought that the main cause of the variations obtained must be in the the chicks themselves. Environmental conditions within a laboratory may also be an important factor. An experimental animal that will react more uniformly is needed, and this is thought possible to achieve only by developing a strain of chicks with a high vitamin D requirement and which will respond proportionately to graded doses of vitamin D. The results of potency determinations of the assay oil used (a composite of 10 commercially available fortified oils, each of which supposedly contained 400 A. O. A. C. chick units of vitamin D per Gm.) showed an estimated potency of 360 to 375 A. O. A. C. chick units per Gm. Although theoretically the use of a depletion period followed by the selection of chicks should make for greater uniformity and accuracy, the data obtained from these studies do not bear out this contention, in that there was evidently no improvement in the accuracy of the test. The use of a new basal ration, which had sufficient known nutritional essentials for the chick, except for vitamin D, produced results slightly superior to those produced by the A. O. A. C. ration. Further study along this line is indicated. The data obtained from a 4-week assay period were too limited to draw any definite conclusion; however, there seems to be nothing to be gained in accuracy by lengthening the assay period over the prescribed 3 weeks. The duplication of groups helped but little to achieve greater accuracy; the averaging of duplicate groups, however, did tend to smooth out the response curves, and from this standpoint the duplication of groups should help in the interpretation of the potency of an assay oil.—F. D. BAIRD and C. L. BARTHEN. *J. Assoc. Official Agr. Chem.*, 24 (1941), 961–973. (A. P.-C.)

Vitamin D Assay—Observations on the Chick Method for. III. Effect of Decreasing Length of Assay Period. A critical study of the chick method of vitamin D assay was conducted to determine the relative accuracy of a shortened assay period. Changes in bone ash were followed during the 21-day assay period by determining bone ash response to different levels of vitamin D in groups of chicks taken at 3-day intervals. It was found that any appreciable decrease in the length of the assay period, under 21 days, either with or without a preliminary depletion period, causes a decrease in response between the minimum and maximum bone ash percentages.—JAMES B. DEWITT, CHESTER D. TOLLE, HENRY W. LOY, JR., and LILA F. KNUDSEN. *J. Assoc. Official Agr. Chem.*, 25 (1942), 213–219. (A. P.-C.)

Vitamin D Production by Irradiation—Vaporizing and Treating Materials Such as Ergosterol under High Vacuum for. *2,262,995*—An apparatus is used for continuously treating ergosterol or other activatible material to impart the antirachitic (vitamin D) property thereto, which comprises a reservoir containing the activatible material in solid form, a chamber for treating the material, positive mechanical conveyor means for continuously and positively supplying solid activatible material from the reservoir to the treatment chamber, means for treating activatible material to impart thereto the antirachitic property, a receptacle for collecting the

antirachitic material so formed at a temperature below its melting point and means for maintaining the reservoir, the mechanical supplying means, the vaporizing chamber and the collecting means under high vacuum. Numerous structural and operative details are described. *2,262,996*—also describes apparatus and a continuous-flow process which may involve vaporizing and treating ergosterol, which comprises gradually feeding such substances in finely divided form and at a temperature below its melting point from a charge thereof into a heating and vaporizing zone, quickly vaporizing all the substance under high vacuum substantially as fast as fed, activating the vapors to impart thereto the antirachitic property, collecting the resulting material at a temperature below its melting point and maintaining the substance under high vacuum during vaporization and activation.—CHAS. G. FERRARI and LESTER F. BORCHARDT, assignors to GENERAL MILLS, INC. U. S. pats. 2,262,995 and 2,262,996, Nov. 18, 1941. (A. P.-C.)

Vitamin D_2 Double Compounds. Stable products are formed of vitamin D_2 together with cholesterol, cholestanol, coprosterol, sitostanol or stigmastanol, as by dissolving the components in a solvent such as acetone and adding water, and then allowing the material to stand for crystallization.—OTTO LINSERT, assignor to WINTHROP CHEMICAL CO. U. S. pat. 2,257,176, Sept. 30, 1941. (A. P.-C.)

Vitamin D_3 Double Compounds. Compounds of lower sensitivity to oxygen are formed, containing vitamin D_3 together with cholesterol, cholestanol or coprosterol (with various details of production being given).—OTTO LINSERT, assignor to ALBA PHARMACEUTICAL CO. U. S. pat. 2,264,320, Dec. 2, 1941. (A. P.-C.)

Vitamin E Concentrate from Wheat-Germ Oil. A concentrate of naturally occurring vitamin E and antioxidant is prepared from wheat-germ oil by esterifying the oil by treating it with methyl, ethyl or propyl alcohol containing hydrochloric acid as catalyst, separating the crude glycerol and sterols therefrom after distilling off the excess alcohol, and then vacuum distilling the crude esters resulting from the esterification, thereby producing a residue rich in vitamin E and in antioxidant.—JOHN S. ANDREWS, assignor to GENERAL MILLS, INC. U. S. pat. 2,263,550, Nov. 18, 1941. (A. P.-C.)

Vitamin P. A review dealing with this substance associated with capillary permeability. Thirty-nine references.—M. A. LESSER. *Drug and Cosmetic Ind.*, 50 (1942), 615—617, 633. (H. M. B.)

Vitamin-Containing Materials—Refining Fat-Soluble, to Remove Objectionable Tastes and Odors. *2,158,671*—Materials such as fish oils, fish-liver oils or their concentrates are heated with a sugar such as that of honey or molasses to about 100° to 200° C. *2,258,672*—Materials such as a fish-liver oil or the like are treated at a temperature of about 100° to 175° C. with formaldehyde vapors in an inert gas atmosphere and under reduced pressure. *2,258,673*—Substantially odorless and tasteless oils and fats are prepared from oils and fats having objectionable tastes and odors by bringing them into contact with an edible gum at a temperature between about 100° and about 200° C., *e. g.*, cod-liver oil may be treated with gum tragacanth and gum guaiac.—LORAN O. BUXTON and HOWARD B. COLMAN, assignors to NATIONAL OIL PRODUCTS CO. U. S. pats. 2,258,671 to 2,258,673, Oct. 14, 1942. (A. P.-C.)

ANALYTICAL

Acetylsalicylic Acid—X-Ray Study of, when Incorporated in Certain Sugars. Not less than 0.7% of aspirin in sugar candy can be detected by its sharp lines in the X-ray diffraction pattern. Evidence is obtained that aspirin incorporated in the candy at 121° passes into solid solution in the mass. —R. L. MCFARLAN and J. W. REDDIE. *J. Applied Phys.*, 11 (1940), 80; through *J. Soc. Chem. Ind.*, 59 (1940), 823. (E. G. V.)

Alkaloids and Synthetics—Microchemical Tests for. The following tests were studied collaboratively and found satisfactory, and their adoption as tentative is recommended. *Physostigmine.*—Add 1 mg. of the substance to 1 drop of distilled water on a microscope slide. Add a drop of reagent (to 1 Gm. of gold chloride and 1.5 cc. of 40% hydrobromic acid and hydrochloric acid to make 20 cc.; saturated sodium bromide solution may be substituted for the hydrobromic acid), apply a cover glass, and examine under a magnification of 100 to 150 diameters. The resulting crystals will consist of brown, fern-like dendritic aggregates. *Dilaudid.*—Dissolve a minute quantity (less than 1 mg.) of the substance in 2 drops of water. Into the solution drop a minute fragment of sodium nitroprusside. The crystalline precipitate immediately forms around the fragment, and on microscopical examination under a magnification of 100 to 150 elongated 6-sided prisms will be observed, also occurring in aggregates. *Sodium Sulfapyridine Monohydrate.*—Dissolve 1 mg. of the substance in 2 drops of water to make about 1% solution. Place a drop of the reagent (1 Gm. of gold chloride dissolved in 20 cc. of distilled water) adjacent to the solution and draw it into the margin of the test drop with a clean glass rod. Yellow rods, in x-shaped aggregates, will be observed on microscopical examination under a magnification of 100 to 150. After addition of the reagent the drop becomes yellow, gradually darkening at the periphery. *Sulfapyridine.*—To 1 mg. of the substance on a microscope slide add 1 drop of acetone and 2 drops of distilled water and stir with a clean glass rod (all the material will not dissolve at once in this mixture, but there will be sufficient for the microchemical test). Place a drop of reagent next to the test drop, drawing it in gently with a clean glass rod, without stirring or covering, and examine microscopically under a magnification of 100 to 150. Yellow rods or blades will be observed, also occurring in x-shaped aggregates.—GEO. L. KEENAN. *J. Assoc. Official Agr. Chem.*, 24 (1941), 830–833. (A. P.-C.)

Amino Acids and Their Compounds—Microscopy of. Descriptions are given of the following salts: alanine, arginine, aspartic acid, dibromotyrosine, dichlorotyrosine, diiodotyrosine, glutamic acid, glycine, histidine, hydroxyvaline, isoleucine, leucine, norleucine, norvaline, phenylalanine, hydroxyproline, serine, tryptophane, tyrosine and valine.—K. INOUYE, R. SUNDERLIN and P. I. KIRK. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 587–588. (E. G. V.)

Amino Acids—Critical Examination of Methods Adopted by New Pharmacopœia (1937) for Determination of. The methods based on Sorensen's procedure with Schiff's bases were studied in their applications to the determination of leucine, *d*-glutamic acid, *d*-lysine, *d*-arginine and in particular, to the determination of amino acid content of peptone and pancreatin. The amounts of amino acid found in known samples were up to 50% too low. These errors are due to the reversibility of the formation of Schiff's bases. The official methods specify too small an amount of formalin, and preliminary neutralization with sodium hydroxide up to only a faint pink color with phenolphthalein is insufficient. A volume of formalin equal to that of the liquid to be titrated should be used, and the preliminary neutralization should be carried out with a bromothymol blue indicator

with which amino groups do not interfere; the sodium hydroxide solution should be 0.2 *N*, and it should be added until a strong red color is obtained. The modified procedure is as follows: Dissolve 0.50 Gm. of peptone in 20 cc. of distilled water, add a few drops of bromothymol blue and neutralize with 0.2 *N* sodium hydroxide (x cc.). To a similar solution of peptone add 20 cc. of official formaldehyde solution previously neutralized with phenolphthalein, and titrate the mixture to a strong red color with 0.2 *N* sodium hydroxide (y cc.). The amount of amino nitrogen is given by the formula $0.28\ (y - x)\ 0.50$. With known samples of *l*-leucine and *d*-glutamic acid the results are 1% to 2% too low.—L. AURONSSEAU. *J. pharm. chim.*, 132 (1940), 329–341. (S. W. G.)

Aminopyrine, Acetophenetidine and Caffeine—Separation and Determination of. The following method is proposed. To 2 Gm. of the powdered mixture in a separator add 15 cc. of 10% (wt./vol.) sulfuric acid and 50 cc. of chloroform, shake, draw off the chloroform into a second separator, wash with 15 cc. of 10% sulfuric acid, filter the chloroform through cotton into a flask, extract the mixture in the first separator with 5 more 25-cc. portions of chloroform, washing each portion successively through the dilute sulfuric acid as before, filter and collect the chloroform in the flask, test for complete extract and reserve this solution for the determination of acetophenetidine and caffeine by the A. O. A. C. method (*A. O. A. C. Methods of Analysis*, (1940), 570, 32 (*b*)). Add the acid washing in the second separator to the first separator, make alkaline with ammonia, remove the aminopyrine by successive extractions with 25-cc. portions of chloroform, washing each extract in a second separator with 5 cc. of water containing a few drops of ammonia test solution, filter the solvent through cotton into a tared beaker, evaporate the solvent, add a few cc. of anhydrous ether and again evaporate, dry the residue at 80° C. and weigh as aminopyrine. A collaborative study of the method on a mixture containing 20% aminopyrine, 30% acetophenetidine and 2.5% caffeine gave recoveries of 96.9% to 101.1% for aminopyrine, 97.4% to 101.5% for acetophenetidine and 98.4% to 109.2% for caffeine. Adoption of the method as tentative is recommended.—J. CAROL. *J. Assoc. Official Agr. Chem.*, 24 (1941), 809–810. (A. P.-C.)

Amyl Nitrite. A method for the quantitative determination of amyl nitrite, adaptable for vapor-air and liquid analysis, is based on the fact that a color is produced when a compound containing an —ONO radical is combined with phenol and copper sulfate in acid solution. The method will detect amyl nitrite in air within an average deviation of 10%. The advantage of this method is that the amyl nitrite vapor can be absorbed directly in the color-producing reagent. This eliminates the need for a separate solvent for amyl nitrite and simplifies the procedure because the reagent from the sampling vessel can be poured directly into a colorimeter tube and read; when determining unknown concentrations, the development of a color in the sampling tube indicates that nitrite is present and gages the length of time required to collect an adequate sample; and although the test does not compare in sensitivity with many of those already described, it has certain advantages for sampling a large volume of vapor at a low concentration for long periods. Amyl nitrite has been determined at concentrations of 5, 10 and 20 and 100 p. p. m. Amyl nitrite is stable in air and relatively stable when exposed to artificial light, but decomposes within 2 hrs. when exposed to direct sunlight.—R. G. HORSWELL and L. SILVERMAN. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 555–558. (E. G. V.)

Analytical Reagent Chemicals—Recommended Specification for. Specifications are given for hydriodic acid, chloroform, chromium and potassium sulfate, cobalt nitrate (not low in nickel), glycerol, 8-hydroxyquinoline, lead carbonate, manganese sulfate, mercury, sodium tungstate, zinc oxide.—W. D. COLLINS, *et al. Ind. Eng. Chem., Anal. Ed.*, 12 (1940), 631–639. (E. G. V.)

Anions—Application of Salts of Complex Cations to the Microscopic Detection of. Characteristic crystalline reaction products are obtained when 1,6-dichlorotetrapyridinocobaltic chloride reacts either with the free acid or the sodium salt of the following radicals: azid, bitartrate, chromate, metavanadate, orthovanadate, permanganate, salicylate and sulfosalicylate. The reagent is particularly adapted to the detection of chromate, orthovanadate, permanganate and salicylate. Ten photomicrographs.—W. A. HYNES and L. K. YANOWSKI. *Mikrochemie*, 28 (1940), 280–284. (R. H. B.)

Arecoline Hydrobromide—Determination of. A detailed description is given of a technique based on dissolving in water an amount of sample containing 0.1 to 0.15 Gm. of arecoline hydrobromide, adding excess of sodium bicarbonate, extracting with chloroform, adding 35 cc. of fiftieth normal sulfuric acid (1 cc. = 0.00472 Gm. arecoline hydrobromide) to the extract, evaporating the chloroform and back-titrating with fiftieth normal sodium hydroxide using 2 drops of methyl red indicator.—HENRY R. BOND. *J. Assoc. Official Agr. Chem.*, 24 (1941), 817–818. (A. P.-C.)

Benzedrine—Determination of, in Inhalers. Limiting the study to methods for inhalers practically limited it to methods for the pure base, free from interfering substances, since inhalers contain only minute quantities of oil of lavender and menthol in addition to the base (or the carbonate of the base). The following method was devised, applicable to pure solutions of salts of benzedrine. Place 30 cc. of 10% sodium hydroxide solution in a 125-cc. separator, add an aliquot of the benzedrine solution containing 50 to 100 mg. of benzedrine, add 5 drops of benzoyl chloride and shake vigorously, let stand 10 min. with occasional shaking, again add 5 drops of benzoyl chloride and shake occasionally for 10 mins., add a third 5-drop portion of benzoyl chloride, shake, test the reaction of the solution with litmus paper, if necessary add more sodium hydroxide solution to maintain alkalinity throughout the determination, let stand 2 hrs. with occasional shaking (at room temperature complete hydrolysis of benzoyl chloride seems to require considerable time), extract with 3 20-cc. portions of chloroform, test for complete extraction using a 10-cc. portion of chloroform, combine the chloroform extracts in a second separator, wash with 5 cc. of water, drain the chloroform through a pledget of cotton into a tared beaker, carefully evaporate the chloroform just to dryness and allow the residue to attain constant weight in the open air without further heating; the weight of the residue multiplied by 0.565 = the weight of benzedrine. On solutions of pure benzedrine the method gave recoveries of 98% to 105%, while nitrogen determinations gave recoveries of 92% to 101%. Ammonia or amines that form chloroform-soluble compounds with benzoyl chloride interfere; benzamide, formed by the reaction with ammonia, is readily soluble in hot water and might be separated by hot filtration of the precipitated benzoyl benzedrine; interference from esters such as methyl and ethyl benzoates, which might be formed during the benzoylation, may be avoided by a preliminary dealcoholization in acid solution. With the quantities of benzedrine specified, incomplete benzoylation may be expected if much less benzoyl chloride than

specified is used, even though the amount is stoichiometrically much greater than required for the quantity of benzedrine present; this is possibly due to the fact that the hydrolysis of the reagent proceeds as rapidly as does the formation of the derivative. The benzoyl derivative of benzedrine is somewhat volatile at 100°. Excess of alkali is essential to the formation of the derivative; if a large aliquot of the acid benzedrine solution is used, it may be necessary to add more sodium hydroxide solution since the excess benzoyl chloride itself will neutralize a material amount of the alkali. The accuracy of the method is dependent not only upon complete conversion of benzedrine to the benzoyl derivative, but also upon the complete hydrolysis of the excess benzoyl chloride. The purity of the derivative obtained can be checked by determining its melting point (134° to 135° C.).—JAMES H. CANNON. *J. Assoc. Official Agr. Chem.*, 24 (1941), 803–806. (A. P.-C.)

Boric Acid—Titrimetric Determination of. I. The most satisfactory method for the determination of boric acid is the titration with sodium hydroxide to about *p*H 8 after the solution has been neutralized to *p*H about 5 and the boric acid fortified by the addition of glycerol, invert sugar or mannitol. Many cations interfere with the determination. They are precipitated when the solution is neutralized, the precipitates adsorb some boric acid and sometimes other weak acids are formed by hydrolysis and are titrated with the boric acid. In its usual form, the procedure cannot be used in the presence of zinc, lead, aluminum, iron and nickel. These elements, however, can be removed satisfactorily by addition of oxine and the excess of reagent precipitated with magnesium. As reagent, dissolve 7.5 Gm. of oxine in 50 cc. of normal sodium hydroxide and dilute to 200 cc.; the solution is 0.25 *N* in the sodium salt of oxine. To the neutral or slightly acid solution containing boric acid at 60° add a slight excess of the oxine reagent. After rotating the mixture, test with bromocresol purple indicator solution to see if the yellow indicator turns blue-violet. It is best not to add the indicator at the start. Heat 5 mins. to make sure that the precipitation is complete and after 5 mins. add 5 cc. of 2 *N* magnesium chloride solution. Filter and wash the precipitate with water at room temperature. Make the filtrate just acid to methyl red, add 0.5 Gm. of animal charcoal and after another 5 mins. filter again. Boil to remove carbon dioxide, cool, add neutral invert sugar solution and titrate with carbonate-free 0.1 *N* sodium hydroxide to an α-naphtolphthalein end point. About forty test experiments show that the method is good in the presence of zinc, lead, aluminum, iron and nickel. **II.** The above method is based upon neutralization to about *p*H 5, activation of the boric acid and then neutralization to *p*H 8. In some respects it is better to use the same *p*H end point for both titrations and approximately 100 experiments have shown that such a procedure is possible and useful. First expel carbon dioxide by boiling the slightly acid solution in a volume not exceeding 30 to 40 cc. and containing up to about 70 mg. of boron trioxide. Cool and neutralize to methyl red or preferably bromocresol purple, and treat with a suitable quantity of invert-sugar solution. This is prepared conveniently by dissolving 1 Kg. sucrose in 650 cc. of hot water, adding 8 cc. of *N* hydrochloric acid and heating at 80–90° for 1–2 hrs. Neutralize with 0.1 *N* sodium hydroxide before using. The boron trioxide solution must be made about 2 *M* in invert sugar or mannitol but with the latter it is best not to add it all at the start. Now titrate the boron trioxide solution with carbonate-free 0.1 *N* sodium hydroxide to the same indicator that was used prior to the addition of the sugar. As a rule 1 drop of 0.1 *N* sodium hydroxide at the right end point will change the *p*H from about 5 to about 7. With mannitol, which is not sufficiently soluble in water, first add a slight excess of this sugar so that a little remains undissolved. Titrate with sodium hydroxide until the indicator begins to change color. Then heat until the excess mannitol dissolves, cool carefully with ice and finish the titration in this supersaturated solution of mannitol. For the evaporation of the boron trioxide solution, 30–40 cc., the solution must be slightly basic or some boric acid will be lost and the basic solution attacks glass, which is likely to contain boron trioxide. If the solution contains a slight excess of magnesium chloride it has been found that 200 cc. of 0.5 *N* sodium hydroxide can be evaporated to 40 cc. in a Jena Erlenmeyer flask without the introduction of more than 0.1 mg. of soluble boron trioxide, whereas without the magnesium salt as much as 2.5 mg. of boron trioxide is dissolved from the glass. The above procedure is shown to give accurate results in the analysis of solutions containing zinc, nickel, cadmium, cobalt, manganese, ammonium and small quantities of arsenic trioxide, phosphorus pentoxide and arsenic pentoxide salts. Specific directions are given for applying the method to the analysis of nickel electrolytic baths and to the analysis of silicates.—I. H. SCHÄFER and A. SIEVERTS. *Z. anal. Chem.*, 121 (1941), 161–9, 170–83; through *Chem. Abstr.*, 35 (1941), 5062. (S. W. G.)

Cadmium—Determination of, as Sulfide. In order to avoid the formation of precipitates containing double salts of cadmium chloride and sulfide or cadmium sulfate and sulfide, the author suggests that the cadmium ion concentration be kept below 0.02 Gm. in 100 cc. and that 3 cc. of concentrated sulfuric acid be present in each 100 cc. of solution. The following procedure is recommended: Heat the solution to boiling, introduce hydrogen sulfide for forty-five minutes, dilute with an equal volume of cold water and continue the addition of hydrogen sulfide for another 20 min. Filter off the reddish cadmium sulfide, wash with cold water, dry at 100° and weigh. In nineteen test analyses, the largest errors were 0.2 mg. of cadmium sulfide with 10 mg. of cadmium and 0.4 mg. cadmium sulfide with 60 mg. of cadmium.—I. SARUDI. *Z. anal. Chem.*, 121 (1941), 348–350. (S. W. G.)

Cantharides—Assay of. The following method is recommended: Triturate 10 Gm. of cantharides in moderately coarse powder with 1 cc. of hydrochloric acid. Transfer completely to a continuous extraction apparatus using cotton wool to remove the last traces of powder. Add the cotton wool to the powder. Completely exhaust with 100 cc. of chloroform. (Two hours were found to be sufficient.) Transfer the chloroform solution to a 300-cc. wide-necked flask, rinsing the extraction flask with a few cc. of chloroform. Remove the greater part of the chloroform by evaporation on a boiling water bath and expel the last few cc. by a current of air. Add 70 cc. of water to the contents of the flask and boil for five minutes under a reflux condenser. Immediately filter the mixture of water and fat through a moistened filter paper, 5 cm. in diameter, into a previously warmed separator. Return the fat with the filter paper to the flask and again boil for five minutes with 50 cc. of water under a reflux condenser. Again filter as above. Repeat the boiling and filtering twice more using 50 and 40 cc. of water, respectively. Allow the mixed aqueous extract to cool and add 2 cc. of hydrochloric acid. Extract with three separate portions of 30, 25 and 20 cc. of chloroform. Wash the combined chloroform extracts with 10 cc. of water and remove the chloroform by evaporation as before, finally drying in a current of air at 60° C. Add to the residue 5 cc.

of a mixture of light petroleum (3 volumes) and dehydrated alcohol (1 volume) previously saturated with cantharidin and allow to stand for half an hour in the closed flask. Carefully decant the liquid and treat with two further quantities of 5 cc. each of the mixture. Dry the residue in an oven at 60° C. for half an hour, cool and weigh.—G. A. GUTHRIE and H. BRINDLE. *Quart. J. Pharm. Pharmacol.*, 15 (1942), 61–72. (S. W. G.)

Capsaicin—Assay of, in Capsicum. On the basis of results obtained in the laboratory with the Jordan, Rebol and Thompson method (*Bull. Natl. Formulary Committee* 10 (1942), 49), it is recommended that this method of assay be withheld from the N. F. VII.—EMERSON C. BEELER. *Bull. Natl. Formulary Committee*, 10 (1942), 94–95. (H. M. B.)

Carcasses of Small Animals and Skeletal Parts of Larger Animals—Preparation of, for Chemical Analysis. Procedures are given for preparing carcasses of small animals and skeletal parts of larger animals for analysis, by autoclaving them at 15 lbs. pressure in sealed containers and subsequently grinding in a chilled or frozen state. The autoclaved samples are sterile and therefore may be stored indefinitely before being ground. Observations on the efficiency of two grinders differing in design of flutings are presented.—GLADYS LEAVELL. *J. Assoc. Official Agr. Chem.*, 25 (1942), 159–163. (A. P.-C.)

Carotene—Determination of. A comparative collaborative study was made of the determination of carotene by spectrophotometric, photoelectric colorimetric and visual colorimetric (against 0.1% potassium dichromate) methods and of the use of activated magnesium carbonate for removal of noncarotene substances from crude carotene solutions. The visual colorimeter gave slightly higher and more divergent results than the photoelectric colorimeter. The collaborators seemed to prefer the photoelectric colorimeter to the visual colorimeter or to the spectrophotometer, even though the latter may be more accurate. The present A. O. A. C. method for carotene should be limited to dried hays and grasses. The purification process with magnesium carbonate should be used only when it is desirable to know the pure carotene content, but not for the purposes of ordinary control work; carotene in feeds is affected by so many different factors that the extent of impurity creates very little error in feeds assayed for animal feeding.—A. R. KEMMERER. *J. Assoc. Official Agr. Chem.*, 24 (1941), 859–865. (A. P.-C.)

Cerate Oxidimetry. The determination of glycerol by the use of the perchlorato cerate ion in excess in perchloric acid solution, followed by back titration using standard sodium oxalate, has a number of material advantages over the familiar dichromate-ferrous sulfate procedure. The time required for oxidation of glycerol is reduced from 180 to 15 min. and the reaction temperature required is reduced from 90–100° to 50–60° C. Colorless solutions during titration make available the use of an internal oxidation-reduction indicator—namely, nitro-ferroin—and makes unnecessary the use of a potentiometric method. The perchlorato cerate procedure in perchloric acid medium has been checked by the use of sulfuric acid solutions and sulfato cerate oxidation without much saving of time but retaining the other advantages over existing procedures. The internal oxidation-reduction indicators used in these reactions are nitro-ferroin for the perchlorato cerate procedure and ferroin for the sulfato cerate scheme. The end points in all reactions are sharp and distinct, and the accuracy attained in all cases is believed to compare favorably with existing procedures. Samples of commercially supplied materials of a variety of types have been used to illustrate the method. No hazardous reactions were encountered in the progress of this work.—G. F. SMITH and F. R. DUKE. *Ind. Eng. Chem., Anal. Ed.*, 13 (1941), 558–560. (E. G. V.)

Certified Lakes and Pigments—Analysis of. A description is given of the technique used at Washington, D. C., in the certifying of a number of lakes under the Food, Drug and Cosmetic Act. The dyes are stripped from their substrates by means of dilute hydrochloric acid, concentrated sulfuric acid or glacial acetic acid (according to the nature of the dye) and titrated with decinormal titanium trichloride in presence of a buffer (sodium bitartrate or sodium citrate). D&C Red No. 35 and Ext. D&C Orange No. 1, which are not quantitatively reduced by titanium trichloride, are determined from the organically combined nitrogen.—G. R. CLARK. *J. Assoc. Official Agr. Chem.*, 24 (1941), 904–906. (A. P.-C.)

Certified Non-Pigment Colors—Analysis of. The quantitative evaluation of pure dye in the majority of water- or alcohol-soluble colors is made by titrating a buffered solution of the color with titanium trichloride. A collaborative study was made of the determination of Brilliant blue FCF and of Orange I by the two following techniques: (1) dissolve 30 Gm. of sodium bitartrate in 200 cc. of water in a 1-1. Erlenmeyer flask, boil to expel air, and, under carbon dioxide, cool to 85° C., add 100 cc. of dye solution containing 1 Gm of the dye and titrate under carbon dioxide at 60° to 70° C.; (2) pipette 100 cc. of a stock solution of the dye (1 Gm. per 100 cc.) into a 500-cc. Erlenmeyer flask, add 15 Gm. of sodium bitartrate and 25 cc. of water, heat to boiling, introduce a stream of carbon dioxide and titrate with decinormal titanium trichloride, keeping the temperature near the boiling point. Method (2) gave better check results by the same analyst and closer agreement between the results of different analysts than method (1). Time of boiling of the solution does not seem to affect the results obtained by method (2).—S. S. FORREST. *J. Assoc. Official Agr. Chem.*, 24 (1941), 900–903. (A. P.-C.)

Chemical Constituents in Plant and Animal Tissue—Localization of. An electrographic method is described for studying the distribution of certain ionic constituents of plant tissue.—H. YAGODA. *Ind. Eng. Chem., Anal. Ed.*, 12 (1940), 698–703. (E. G. V.)

Cold Creams—Analysis of. Composition is given for typical cold and vanishing creams to serve as an aid in analysis. Qualitative tests are offered for the determination of the type of emulsion, the identity of the emulsifier and for the preservative. Quantitative tests for the components parts of cosmetic creams are proposed; these tests include nonvolatile matter, ash, borates, water and chloroform-soluble material. A typical cold cream was prepared, and the above quantitative determinations were made, giving good recoveries in all cases. Procedures are given for the analysis of the base of cosmetic creams involving the partial separation of mineral oil from beeswax and spermaceti, and beeswax from mineral oil and spermaceti. Procedures are also given for the identification of mineral oil, beeswax and spermaceti when occurring together. These procedures permit a quantitative determination of the mineral oil and a semi-quantitative determination of the two waxes. The identification of these ingredients depends on the quantitative separation involving the isolation of fatty acids of high and low molecular weights, hydrocarbons and fatty alcohols of high and low molecular weight. Quantitative results obtained

on a prepared cream for mineral oil are good, and satisfactory semi-quantitative results for beeswax and for spermaceti indicate that the method is reliable for the identification of these two substances. Physical and chemical properties are given for beeswax, spermaceti and the various derived fractions of each to aid in the identification of these waxes.—CHARLES F. BRUENING. *J. Assoc. Official Agr. Chem.*, 24 (1941), 889–899. (A. P.-C.)

Color Mixtures for Certification—Analysis of. An outline of the methods used in the Color Certification Lab. of the Food & Drug Administration, Washington, D. C., for the determination of pure dye in mixtures of coal-tar colors, classified as follows: colors reducible with titanium trichloride; mixtures of water-soluble colors, one of which does not readily reduce but may be precipitated, filtered and weighed; mixtures containing water-soluble colors and caramel; dry mixtures of oil-soluble colors with flour or rice; oil-soluble colors dissolved in vegetable oils; mixtures of water-insoluble colors; soluble or insoluble colors with castor oil; insoluble colors with carbon black; mixtures of D&C Red No. 36 and insoluble colors; mixtures of water-insoluble colors with eosin colors; mixtures of water-insoluble colors with D&C Red No. 19.—O. L. EVENSON. *J. Assoc. Official Agr. Chem.*, 24 (1941), 906–908. (A. P.-C.)

Colored Make-up Preparations (Lipsticks)—Analysis of. A list, compiled from trade publication, formularies, textbooks and patents, is given of the chief materials used in modern lipsticks, classified as: waxes (stiffening agents), oils and fats (binding, spreading and cutting agents), coloring agents (bromo acids, toners, mineral pigments), penetrating agents (soothing agents or emollients), dispersing agents (bromo acid solvents), binders, preservatives, fillers, perfumes and flavors and miscellaneous, together with the approximate percentage range in which they are used. The melting-point ranges of bases used in lipsticks are tabulated. A diagram is presented of a rather extensive scheme of separation which may be used for lipstick analysis, and methods are given for: preparation of sample, determination of water and volatile matter (drying 2 hrs. at 100° C.), separation of total bases, determination of oil-soluble dyes, unsaponifiable residue, bromo acids, other coal-tar dyes (toners), lakes, mineral pigments, heavy metals, steam-volatile matter, butyl stearate, castor oil, lanolin and rancidity. All the methods presented (with the exception of that for determination of castor oil) have been applied to commercial samples and to known samples of lipsticks and lipstick bases prepared in the laboratory. With the separation scheme given, qualitative separations were in most cases satisfactory. The methods for the extraction of oil-soluble dyes from the bases were not entirely satisfactory in that some residual color remained. The use of morpholine as a solvent for lake colors may overcome some of the difficulties encountered in dissolving the lakes.—EDWARD M. HOSHALL. *J. Assoc. Official Agr. Chem.*, 24 (1941), 879–889. (A. P.-C.)

Compound Ointment of Benzoic Acid—Analysis of. It should be possible to determine the benzoic and salicylic acids in this ointment by extracting them from the ether solution of the ointment with aqueous sodium bicarbonate (about 10%), acidifying, extracting the acids with a 2 + 1 chloroform-ether mixture, titrating, determining salicylic acid by bromination (titration with decinormal bromide-bromate solution) and benzoic acid by difference. For the titration 50% alcohol is used as solvent for the acids. For the bromination of salicylic acid in an aliquot of the titration liquid, the alcohol must be completely removed by evaporation, as little as 2% reacting with the bromine. Optimum bromination conditions were found to be: (1) 25% excess of bromine; (2) 5 cc. of hydrochloric acid in a 100-cc. volume of solution to be titrated; and (3) 30-min. reaction period. Slight deviations from these conditions should give equally satisfactory results, but wide deviations will cause poor results. It is hoped to evolve a satisfactory technique, which will be submitted for collaborative study.—WM. F. KUNKE. *J. Assoc. Official Agr. Chem.*, 24 (1941), 840–842. (A. P.-C.)

Copper—A Comparative Study of the Micro Methods for Determining. A critical review of all the methods reported for the colorimetric determination of small quantities of copper is presented. Those procedures giving colored solutions were evaluated using the photoelectric colorimeter. The absorption spectrum of the colored solution was determined to enable one to choose the proper filter to be used. Of all the methods involving organic reagents, only two were found reasonably satisfactory: dithiocarbamate and salicylate. Among the inorganic reagents, ammonia, chloride, bromide sulfide and ferrocyanide meet the basic requirements of colorimetry.—R. H. MULLER and A. T. BURTSELL. *Mikrochemie*, 28 (1940), 209–227. (R. H. B.)

Copper and Picric Acid—Identification of. Ammoniacal copper solutions when added to a boiling solution of ammoniacal ammonium picrate deposit characteristic crystals of cupric ammonia picrate on cooling. Analogous picrates of other metal ammonia complexes have not been obtained. 0.001 *M* solutions of picrate and cupric ammonia complex give satisfactory crystallizations. The test is useful in organic chemistry when compounds readily converted to picric acid by nitration may be identified.—A. C. SHEAD. *Mikrochemie*, 28 (1940), 229–230. (R. H. B.)

Cyclohexanol—Determination of Traces of Phenols in. One cubic centimeter of cyclohexanol in 100 cc. of water is heated at 100° for 10 min. with 1 cc. of Millon's reagent and 6 drops of nitric acid, and the coloration is compared with that given similarly by standard phenol solutions.—G. A. PEVTZOV. *Prom. Org. Chim.*, 7 (1940), 332; through *J. Soc. Chem. Ind.*, 59 (1940), 778. (E. G. V.)

Diethyleneglycol-Monoethyl Ether—Determination of. The method proposed (technique described in detail) is based on quantitative conversion of diethyleneglycol-monethyl ether into the corresponding xanthate by treating with excess carbon disulfide and potassium hydroxide, extraction of the xanthate with a mixture of equal volumes of alcohol-free acetone and benzene, adding petroleum benzine, extracting the xanthate with water, adding excess of potassium iodide and titrating the liberated iodine. The pure xanthate melts at 86° to 88° C. The effects of variations in the reagents and the influence of other alcohols on recoveries were studied. Analysis of mixtures of known composition gave recoveries of 95.0% to 99.1%.—IRWIN S. SHUPE. *J. Assoc. Official Agr. Chem.*, 24 (1941), 936–944. (A. P.-C.)

Dihydrorotenone—Detection and Estimation of. Among the numerous derivatives of rotenone thus far studied, only dihydrorotenone retains the high insecticidal action of the parent compound. The apparently greater stability of this derivative has led to its commercial production. Catalytic hydrogenation of rotenone produces, in addition to dihydrorotenone, the nontoxic hydrogenation products rotenonic acid, dihydrorotenonic acid and dihydrorotenol. To develop a method for the determination of dihydrorotenone in the mixture of hydrogenation products, some of the physical and chemical properties of these compounds were

examined. A combination of physical properties will give some information as to the amount of dihydrorotenone present, but a better method is based on the observation that this is the only reduction product giving an appreciable red color by the Goodhue test. The proposed method is based on this test.—L. D. GOODHUE and H. L. HALLER. *Ind. Eng. Chem., Anal. Ed.*, 12 (1940), 652–654. (E. G. V.)

Elixir of Cinchona Alkaloids—Assay of. The following method is proposed: Remove the alcohol from a 25-cc. sample of the elixir by evaporation on a steam bath. Transfer the concentrated solution to a separator or automatic extractor with distilled water. Make the solution ammoniacal and extract it completely with chloroform. Evaporate the chloroformic extract to dryness on a water bath and dissolve the residue in 10 cc. diluted sulfuric acid. Transfer the solution to a separator, make ammoniacal and extract completely with chloroform. Filter the chloroform extract and wash the filter with chloroform. Evaporate the chloroform from the solution in a tared container on a steam bath, add 10 cc. of alcohol and evaporate to dryness. Dry to constant weight at 100° C. and weigh.—R. K. SNYDER. *Bull. Natl. Formulary Committee*, 10 (1942), 147–148. (H. M. B.)

Ergometrine and Ergotoxine—Determination of, in Ergot and Its Liquid Extract. The following procedure is given: Introduce into a percolator of about 2-cm. bore a plug of cotton wool weighing approximately 0.25 Gm. then add 1 Gm. of ivory nut meal (No. 20 powder). Superimpose another pledget of cotton, another layer of ivory nut meal, then a third layer of cotton, then attach the percolator to a filtering flask. Transfer 5 Gm. of the sample in No. 60 powder to a stoppered conical flask, add 50 cc. of acetone and 0.7 cc. of dilute solution of ammonia, and shake at intervals during 20 min. Allow to settle and decant the supernatant liquid into the prepared percolator leaving as much of the drug as possible in the flask. Apply gentle suction. Wash the contents of the flask with two 10-cc. portions of acetone and pour these through the percolator. When the drug in the percolator is dry transfer it back into the flask. Add 50 cc. of ether followed by 0.25 Gm. of light magnesium oxide diffused in 5 cc. of water and shake at intervals during 20 mins.; add 2 Gm. of anhydrous sodium sulfate, shake vigorously, transfer the contents of the flask into the percolator and continue the percolation with 90 cc. of ether. Transfer the percolate to a separator, washing the filtering flask with a further 10 cc. of ether, add 10 cc. of tartaric acid solution (1% w/v), shake, allow to separate and transfer the lower layer to an evaporating dish; continue the extraction with four 10-cc. portions of tartaric acid solution. Test the last extract for alkaloids by mixing 1 cc. with 2 cc. of *p*-dimethylaminobenzaldehyde reagent (B. P.); if any appreciable color is produced, extract with additional quantities of tartaric acid solution. Remove the dissolved solvents from the combined acid extracts by submitting to reduced pressure at room temperature for about an hour, then dilute to 70 cc. with water. *Total Alkaloids.*—Transfer 10 cc. into a 25-cc. graduated flask and dilute to the mark with water. To 1 cc. of the diluted acid solution add 2 cc. of *p*-dimethylaminobenzaldehyde reagent, mix, allow to stand five minutes, transfer the colored liquid to a 1-cm. all glass cell and measure the color by means of a Lovibond tintometer. Calculate the percentage of the total alkaloids as ergotoxine on the basis that 0.05 mg. of pure ergotoxine yields a color having a blue component of 4.1 units. Alternatively, compare the color in a suitable colorimeter with that produced by similarly treating 1 cc. of a 0.012% w/v solution of ergotoxine ethanesulfonate in a 1% w/v solution of tartaric acid in water. *Separation of Ergotoxine and Ergometrine.*—Adjust the reaction of the remaining 60 cc. of the combined acid extracts to *p*H 5.5 by adding methyl red indicator and a sufficient quantity (20–30 cc.) of disodium hydrogen phosphate solution (3% w/v) to render the color of the mixture equal to that produced by adding methyl red indicator to the *p*H 5.5 buffer solution (3% w/v disodium hydrogen phosphate and 1.42% w/v tartaric acid B. P.). Transfer to a separator, add 40 cc. of ether, shake, allow to separate, draw off the aqueous layer and continue the extraction with three separate 25-cc. portions of ether. Combine the ether layers, shake with 10 cc. of the *p*H 5.5 buffer solution and add the latter to the extracted aqueous solution, which now contains all the ergometrine, while the ether contains the ergotoxine, the respective alkaloid representing six-sevenths of the original sample. *Ergotoxine.*—Add to the combined ether extracts 10 cc. of tartaric acid solution, shake, allow to separate and transfer the lower layer to an evaporating dish; complete the extraction with further 10-cc. portions of tartaric acid solution. Remove the dissolved ether by gentle warming in a current of air, allow to cool and add sufficient water to produce 100 cc., or other suitable volume; apply the colorimetric test as already described and calculate the result to percentage of ergotoxine. *Ergometrine.*—To the aqueous solution containing the ergometrine add 7 cc. of sodium hydroxide solution (B. P.) and a sufficient quantity (about 35 Gm.) of sodium chloride to produce a saturated solution and to leave a small amount undissolved. Add 40 cc. of ether, shake, allow to separate, draw off the aqueous layer and continue the extraction with three separate 25-cc. portions of ether. Add to the combined ether extracts 5 cc. of tartaric acid solution; shake, allow to separate and transfer the lower layer to an evaporating dish; complete the extraction with further 5-cc. portions of tartaric acid solutions. Remove the dissolved ether by gentle warming in a current of air, allow to cool, dilute to 25 cc., or the smallest convenient volume and apply the colorimetric test. If a Lovibond tintometer is used calculate the percentage of ergometrine on the basis that 0.05 mg. of solvent-free ergometrine yields a color having a blue component of 7.6 units. *Liquid Extract of Ergot.*—Transfer 10 cc. of the sample to a separator, add 7 cc. of sodium hydroxide solution and 50 cc. of a saturated aqueous solution of sodium chloride. Add 50 cc. of a mixture of 3 volumes of ether and 1 volume of acetone, shake, allow to separate, draw off the aqueous layer and complete the extraction with further 40-cc. portions of the mixed solvent. Test the last extract for alkaloids by evaporating a portion to dryness, dissolving any residue in 1 cc. of tartaric acid solution and adding 2 cc. of the color reagent. Mix the ether-acetone extracts, add 10 cc. of tartaric acid solution, shake, allow to separate and transfer the lower layer to an evaporating dish; continue the extraction with four 10-cc. portions of tartaric acid solution. Test for complete extraction of alkaloids. Remove the dissolved solvents from the combined acid extracts by submitting to reduced pressure at room temperature for about an hour, then dilute to 70 cc. with water. Complete the assay as directed for ergot, beginning with the part headed "Total Alkaloids."—N. L. ALLPORT and N. R. JONES. *Quart. J. Pharm. Pharmacol.*, 14 (1941), 106–115. (S. W. G.)

Flavoring Constituents—Identification of, of Commercial Flavors. XI. Vanillin by Means of the Neutral Wedge Photometer. The official A. O. A. C. colorimetric method for the determination of vanillin has been modified as follows so as to permit

of making the colorimetric comparison with the neutral wedge photometer. Place 0.0, 1.0, 3.0, 5.0 and 8.0 cc. of standard vanillin solution (0.1 mg. per cc.) in five 100-cc. volumetric flasks; to each add water to make 10 cc.; add 5 cc. Folin-Denis reagent, mix, let stand 4–5 min., add 10 cc. of 20% sodium carbonate solution, mix, let stand 10–15 mins., make to 100 cc. with water, mix, filter; read the solutions in a neutral wedge photometer using a 1-in. cell and 650-mμ or 610-mμ light filter; plot the readings on coördinate paper and construct a curve. For the determination of vanillin, to 5 cc. of vanilla extract (0.04–0.32 Gm. vanillin per 100 cc.) in a 100-cc. volumetric flask add 75 cc. of water and 4 cc. of lead solution (50 Gm. each of neutral and of Horne's dry (basic) lead acetate per liter), make to volume with water and filter through dry filter paper; pipette 5 cc. of filtrate into a 100-cc. volumetric flask, add 5 cc. of water and the reagents and proceed as for the preparation of the curve. This procedure makes possible: (1) greater accuracy of the determination; (2) extension of the range of the quantities that may be determined (0.1–0.8 mg. may be present in the final solution, whereas only 0.4–0.6 mg. should be present with the official method); (3) an increase in the time available for reading the solutions (up to 24 hrs. for the proposed method, but only 1–2 hrs. for the official method); and (4) elimination of the troublesome precipitate after preparation of the solution for reading.—JOHN B. WILSON. *J. Assoc. Official Agr. Chem.*, 25 (1942), 155–159. (A. P.-C.)

Hair Preparations—Analysis of. Diamines and aminophenols can be determined in presence of one another by a method (technique described in detail) consisting essentially in making the solution alkaline with sodium hydroxide, adding some powdered sodium sulfite, extracting the diamines (preferably in a continuous extractor to avoid oxidation by atmospheric oxygen) with ether, evaporating the solvent on the steam bath (last portions should evaporate spontaneously), and weighing; if desired the diamines can be converted into their diacetyl derivatives by addition of acetic anhydride to the ether before evaporation, and weighed as the diacetyl derivatives. The solution from which the diamines have been extracted is rendered slightly acid with concentrated hydrochloric acid, excess of powdered sodium bicarbonate is added, the solution is extracted with ethyl acetate, the solvent is evaporated on the steam bath in a current of carbon dioxide (removing from the heat to evaporate the last few cubic centimeters), and the residue of aminophenols is dried in a desiccator and weighed. On a large number of diamines and aminophenol, both singly and in admixture, 97.9% to 102.3% recoveries were obtained for the diamines by direct weighing, 96.2% to 102.1% by acetylation and 94.4% to 97.6% for aminophenols. Analysis of hair dyes containing ingredients other than amines may require special procedures. For example, a mixture of resorcinol, 2,5-diaminotoluene, 2,4-diaminoanisole and α-aminophenol in an alcoholic soap solution could be analyzed as follows (technique described in detail): (*A*) Fatty acids are extracted with chloroform from the acidified sample and weighed as such. (*B*) Resorcinol is extracted with ether from the acid solution after removal of the fatty acids, dried in a desiccator and weighed as such. (*C*) The acid aqueous solution from (*B*) is neutralized with powdered sodium bicarbonate, made alkaline with sodium hydroxide, a little sodium sulfite is added, the diaminotoluene and diaminoanisole are extracted with chloroform and weighed together. The mixed diamines are dissolved in 95% alcohol, the diaminotoluene is precipitated as the sulfate with sulfuric acid, filtered off, dissolved in dilute ammonia containing a little sodium sulfite, extracted with chloroform and weighed as such. The alcoholic filtrate is made alkaline with ammonia, the diaminoanisole is extracted with chloroform and weighed as such. (*D*) The alkaline aqueous solution from (*C*) is made acid with hydrochloric acid, neutralized with sodium bicarbonate and extracted with ether, and the extracted *o*-aminophenol is weighed as such. Applied to one such mixture, the method gave recoveries of: 98% resorcinol, 97% 2,5-diaminotoluene, 90% 2,4-diaminoanisole and 93% *o*-aminophenol. A continuous separator is preferable to separatory funnels because exposure of alkaline solutions of these amines to atmospheric oxygen causes considerable decomposition, even in the presence of sulfites. Ether is a more selective solvent than chloroform and ethyl acetate and yields extracts relatively free from colored oxidation products. Aminophenol residues contaminated with oxidation products of diamines may be purified by vacuum sublimation or by precipitation of the colored products with silicotungstic acid. The diacetyl derivatives may be fractionally recrystallized by solution in a small volume of glacial acetic acid and addition of petroleum benzin, carbon tetrachloride or other organic solvent. The *p*-diamine derivatives are the least soluble in chloroform and ether.—IRWIN S. SHUPE. *J. Assoc. Official Agr. Chem.*, 24 (1941), 871–879. (A. P.-C.)

Hibiscus Sabdariffa (Gossypifolius)—Chemical, Botanical and Pharmacological Characteristics of Karkade (Rosella). Dried fruits of *H. sabdariffa* of American and Abyssinian origin contain about 15% of water. The dry matter consists of proteins 3.5%, liquids 10%, glucides 63.5%, cellulose 11%, ash 12% (iron, manganese, aluminum, calcium, magnesium, sodium, potassium, sulfate, phosphate and chloride are present). The glucides are: organic acids 22%, reducing sugars 16%, other nonnitrogenous substances 25%. The water-soluble acids consist of: citric acid 77%, malic acid 22%, tartaric acid trace. Oxalic, gallic, tannic and lactic acids are absent in the aqueous extract. Considerable insoluble compounds (calcium oxalate, etc.) are found in various parts of the plant and fruit. The red aqueous or alcoholic extract turns green with alkali. Gossepetin is present. An anthocyanin which is red in acid and blue-green in alkali is also present. It is useful as a coloring agent in syrups, liquors and other preparations. The vitamin C content of the dried drug is only 40–50 mg. per 100 Gm.; although others have reported up to 540 mg. per 100 Gm. The gum content of the plant and especially the fruit calyxes is an important dietetic and therapeutic factor. The karkade should find considerable therapeutic use since it is free from harmful alkaloids and has a pleasant taste. The botanical characteristics are described and the culture of the plant is discussed.—G. REAUBOURG and R. H. MONCEAUX. *J. pharm. chim.*, 132 (1940), 292–305. (S. W. G.)