Discussion

Table I presents the data obtained in the plasticizer screening tests for the divinyl sulfone-eleostearate adducts compounded with nitrile rubber. All of the experimental adducts milled satisfactorily in the nitrile rubber formulation. The hydrogenated divinyl sulfone-tung oil adduct however became incompatible as shown by exudation after 21 days of shelf aging. The divinyl sulfone adducts of methyl *alpha*-eleostearate and of tung oil were superior to the hydrogenated counterparts and to the control, dibutyl sebacate, in plasticizing efficiency, *i.e.*, lower modulus and greater elongation. Moreover the divinyl sulfone-tung oil adduct yielded a rubber which met the low-temperature flexibility requirements (−40°C.) of the automotive industry. All the compositions containing the experimental adducts exhibited modulus, elongation, and weight loss properties which were either comparable to or better than the control, plasticizer formulation. When subjected to the accelerated aging tests, the divinyl sulfone-methyl *alpha*-eleostearate adduct and its hydrogenated counterpart produced rubber stocks which had satisfactory low-temperature brittle points.

Acknowledgment

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ABSTRACTS . . . . **R. A. REINERS, Editor**

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H. S. Liles, Louise R. Morrow, and E. G. Perkins

• Fats and Oils

THE EFFECT OF METHOD OF CARE ON THE FRYING LIFE OF FAT. M. Elizabeth Rust and Dorothy Harrison (Depts. of Institutional Management and Foods and Nutrition, Kansas State Univ., Manhattan). *Food Tech.* 14, 605-609 (1960). The purpose of this study was to determine the effect of 4 methods of care used in restaurants on the length of the frying life and deteriorative changes in the fat. Regardless of method of care, there was a significant negative correlation between the acid number of the fat and the acceptability of French fried potatoes. The method of care significantly affected the viscosity of the fat and the percentage weight loss of fat and potatoes during frying. In general, there was little correlation between values for a chemical and a physical method used to determine the percentage of fat in the fried potatoes.

EFFECT OF CHEMICAL ADDITIVES ON THE SPREADING QUALITY OF BUTTER. I. THE CONSISTENCY OF BUTTER AS DETERMINED BY MECHANICAL AND CONSUMER PANEL EVALUATION METHODS. J.G. Kapsalis, J.J. Betscher, T. Kristoffersen, and I.A. Gould (Dept. of Dairy Tech., Ohio Agr. Exp. Station, Columbus). *J. Dairy Sci.* 11, 1560-69 (1960). An instrument, the Consistometer, was perfected for measuring spreadability (by a knife) and hardness (by a wire) of butter. The instrument differentiated between butters with 120 to 500 g. of hardness and 260 to 1,542 g. of spreadability. Such butters ranged between easy to difficult to spread on the basis of a consumer panel evaluation. Evaluation of 109 commercial butter samples obtained from 14 different states located in different parts of the country revealed a high degree of correlation between the instrument and the consumer panel. The results indicated that the most desirable butter consistency from the consumer's standpoint represents a range on the Consistometer of 400 to 900 g. resistance to the knife, or 140 to 200 g. resistance to the wire, under the conditions of the study.

SPECTROPHOTOMETRIC DETERMINATION OF STERCULIC ACID. A.J. Deutschman, Jr., and I.S. Klaus (Dept. of Agri. Biochem., Univ. of Arizona, Tucson). *Anal. Chem. 13,* 1809-10 (1960). The cyclopropene configuration present in sterculic and malvalic acids has been found to be toxic to non-ruminants. The reaction conditions for carrying out the Halphen test for this structure have been studied and a procedure is proposed that results in reproducible color development. The reaction has been used as the basis for a spectrophotometric determination of the cyclopropene structure. The absorbance curve of the solution is presented. Purified sterculic acid was used for the preparation of a standard absorbance curve at 505 mμ. Standard error estimate is ± 0.2 X 10^{-4} gram of sterculic acid in 10 ml. of solution with an accuracy of ± 10% at 95% confidence at the mid-point of the range for which the procedure is suggested.

EMULSIFYING AGENTS IN SHORTENING AND PROCESS OF PRODUCING SAME. H.H. Young and K.H. Spitzmueller (Swift & Co.). *U.S. 2,963,371.* A shortening composition consists of a major amount of glyceridic material having shortening properties and a small amount of the mixture produced by the reaction between *beta*-propiolactone and fatty acids having from about 6 to about 22 carbon atoms.

USE OF ORTHO-PHTHALIC-ETHYLENE GLYCOL POLYESTER IN GAS LIQUID CHROMATOGRAPHIC ANALYSIS OF FATTY ACID ESTERS. B.M. Craig (Prairie Regional Lab., Natl. Res. Council, Saskatoon, Saskatchewan, Can.). *Chem. and Ind.* **1960**, 1442. The polyester was dissolved in chloroform and applied to 40–60 mesh acid washed C-22 firebrick in the ratio of 1 to 4.5 w/w. An 8 ft. by 3/16 in. O.D. column was operated at 215° with a helium flow-rate of 50 ml. per minute to separate the methyl esters of rapeseed oil in 40 minutes. The separation factor for oleic/stearic was 1.11. The "polarity" of the packing with the *ortho*-phthalic polyester can be altered by mesh size of solid and by the ratio of liquid to solid phase. This polyester shows limited bleeding at 225°. It has three to six times the capacity of the aliphatic polyesters making it useful in preparative work.

PRODUCTION OF A SMOOTH, UNIFORM, AIR-FREE ALUMINUM STEARATE GREASE. J.F. Richards and R.A. Thompson, Jr. (Esso Res. & Eng. Co.). *U.S. 2,962,440.* Aluminum stearate (1 to 7 parts by weight) is dispersed in mineral lubricating oil (25 to 75% of the total 100 parts of oil) and heated to 250 to 450°F. The dispersion is then cooled to about 120°F. or lower under an absolute pressure of about 0 to 7.7 p.s.i.a. with stirring and the balance of the oil is added.

ALKALI FUSION PRODUCTS OF CYCLOHEXENONES IN LUBRICANT MANUFACTURE. A.J. Morway and J.H. Bartlett (Esso Res. & Eng. Co.). *U.S. 2,962,441.* In a lubricating oil is dispersed (a) a mixture of 2 to 75 molar proportions of a C_1 to C_6 fatty acid, 0.05 to 5.0 molar proportions of a C_6 to C_{30} fatty acid, and 1 molar proportion of a cyclic hexenone and (b) an alkali or alkaline earth metal base. The dispersion is heated to a temperature of about 400 to 700°F. and held for about ½ to 2 hours.

PAN OIL COMPOSITION AND PROCESS OF MAKING SAME. H. Brody and A.E. Fahlen (Swift & Co.). *U.S. 2,963,372.* The described pan dressing consists of an edible fatty material having incorporated in it small amounts of aluminum stearate and lecithin.

HARD WAXES AND PROCESS FOR THEIR MANUFACTURE. J. Kaüpp, G. von Rosenberg, and H. Träger (Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning). *U.S. 2,963,379.* Hard waxes which yield films with high gloss are produced by the esterification of an aliphatic carboxylic acid containing more than 18 carbon atoms with one of the following products: (A) aromatic dimethylol compound in which all hydroxyl groups are bound to aliphatic carbon atoms, (B) mixtures of dimethylol compounds with aromatic methylol compounds other than the dimethylols, (C) mixtures of product A or B with dihydric to tetrahydric aliphatic alcohols.

STABILIZED SOAP COMPOSITION. R.C. Harshman and V.C. Fusco (Olin Mathieson Chem. Corp.). *U.S. 2,963,438.* An alkali metal soap of an aliphatic monocarboxylic acid containing from 12 to 18 carbon atoms is stabilized by the addition of a hydrazide such as acetic acid hydrazide, sebacic acid dihydrazide, carbohydrazide, lauric acid hydrazide, myristic acid hydrazide, or stearic acid hydrazide in an amount from 0.05 to 1% by weight on the soap.

• Fatty Acid Derivatives

IDENTIFICATION CONSTANTS FOR MONO- AND DICARBOXYLIC METHYL ESTERS. T.K. Miwa, K.L. Mikolajczak, F.R. Earle, and I.A. Wolff (N. Utilization Dev. Div., U.S. Dept. of Agr., Peoria, Ill.). *Anal. Chem.* **13**, 1739–42 (1960). Readily reproducible numerical constants were determined for characterizing mono- and dicarboxylic methyl esters by gas-liquid chromatography. For a specified column packing and carrier gas, these constants, called equivalent chain lengths, are independent of experimental conditions. A combination of two values, obtained by use of polar and nonpolar packing, is sufficient to characterize most fatty acids.

SEPARATION AND IDENTIFICATION OF THE NEUTRAL COMPONENTS FROM BREAD PRE-FERMENT LIQUID. D.E. Smith and J.R. Coffman (Gen. Mills, Inc., Minneapolis, Minn.). *Anal. Chem.* **13**, 1733–37 (1960). Gas-liquid chromatography was used to separate, isolate, and identify the ether-soluble neutral components present in a bread pre-ferment liquid. Identification of the components was further established by infrared spectroscopy, mass spectrometry, and derivative formation. Twenty-seven neutral components were detected. Included in these neutral components were aldehydes, ketones, alcohols, esters, and diols. Many of these neutral components are known products of yeast fermentation. Components not previously reported as fermentation products included ethyl formate, γ-butyrolactone, the monoacetate of 1,3-propanediol, and β-phenylethanol. The predominant compounds present were ethyl alcohol and the levo and meso isomers of 2,3-butanediol. Gas-liquid chromatography is a very effective method for the separation and identification of these isomers.

ISOMERIZATION OF SATURATED 2-MONOGLYCERIDES ON PROLONGED STORAGE IN THE SOLID STATE. F. Aylward and P.D.S. Wood (Dept. of Chem. & Food Tech., Borough Polytechnic, London, S.E. 1). *Chem. and Ind.* **1960**, 1442–1443 (1960). Conversion of 2-monoglycerides to the 1-isomer occurred in the solid state at room temperature with certain saturated monoglycerides, the rate apparently depending on the chain length of the fatty acid component. A large increase in 1-isomer occurred with synthetic monolaurin mixtures, while a definite but slower increase of 1-isomer occurred with monomyristin mixtures. Monopalmitin showed no significant change of composition after 9 months. In contrast to results obtained with synthetic mixtures, purified 1-monolaurin and 1-monomyristin showed no tendency to isomerize on prolonged storage.

• Biology and Nutrition

METABOLISM OF ESSENTIAL FATTY ACIDS. IX. THE BIOSYNTHESIS OF THE OCTADECADIENOIC ACIDS OF THE RAT. A.J. Fulco and J.F. Mead (Lab. of Nuclear Medicine and Radiation Biology of the Dept. of Physiological Chemistry, School of Medicine, Univ. of Calif., Los Angeles). *J. Biol. Chem.* **235**, 3379–84 (1960). Orally administered *cis*-12-octadecenoic-1-C^{14} acid serves inefficiently, if at all, as a precursor of linoleic acid in the rat. Activity appearing in the linoleic acid fraction has been shown to be in large part due to 8,11-octadecadienoic acid, presumably synthesized from 1-C^{14} acetate derived by degradation of the fed acid. This finding may explain the activity found in the linoleic acid fractions by some investigators after the administration of C^{14}-acetate. Finally, evidence for the presence of two trienoic acids (6,9,12- and 5,8,11-octadecatrienoic acids) is presented. Both acids were highly labeled, but the explanation of the phenomenon must await further experimentation.

X. CONVERSION OF 8,11,14-EICOSATRIENOIC ACID TO ARACHIDONIC ACID IN THE RAT. D.R. Howton and J.F. Mead. *Ibid.*, 3385–86 (1960). Analysis of fatty acids isolated from rats 4 hours after feeding the methyl ester of 8,11,14-eicosatrienoic-2,3-C^{14} revealed that this substance is efficiently converted to arachidonic acid by dehydrogenation in the 5 position. This finding furnishes evidence for the validity of the last step in a proposed pathway of conversion of linoleate to arachidonate via γ-linolenate and 8,11,14-eicosatrienoate.

NONSYNTHESIS OF LINOLEIC ACID FROM ACETATE-1-C^{14} BY THE LAYING HEN. N.L. Murty, Mary Williams, and R. Reiser (Dept. of Biochem. and Nutrition, Texas Agricultural Experiment Station, College Station, Texas). *J. Nutrition* **72**, 451–54 (1960). The laying hen does not synthesize linoleic acid *de novo*. Any of this important nutrient which occurs in the egg must first be in the diet. This is contrary to the conclusion of previous studies based on the presence of small amounts of linoleic acid in hens' eggs after hens received a fat-free diet for one year.

COENZYME Q. XIX. ALKOXY HOMOLOGS OF COENZYME Q_{10} FROM THE METHOXY GROUP EXCHANGE. C.H. Shunk, D.R. Wolf, J.F. McPherson, B.O. Linn, and K. Folkers (Merck Sharpe and Dohme Res. Labs., A Div. of Merck and Co., Inc., Rahway, N.J.). *J. Am. Chem. Soc.*, 22, 5914–18 (1960). The reactivity of the methoxy groups of coenzyme Q_{10} has been utilized to prepare the diisoamoxy- and diisopropoxy homologs of coenzyme Q_{10}. The monoethoxy homolog of Q_{10} obtained during the isolation of Q_{10} from beef heart has been shown by degradation and synthetic studies to be a mixture of the two monoethoxy derivatives, indicating comparable reactivity of the two methoxy groups of Q_{10}. The syntheses have made available the new 4-ethoxy-2-methyl-3,5,6-trimethoxy- and 5-ethoxy-2-methyl-3,4,6-trimethoxyphenyl acetic acids.

ENZYMIC SYNTHESIS AND METABOLISM OF MALONYL COENZYME A AND GLUTARYL COENZYME A. G.K.K. Menon and J.R. Stern (Dept. of Pharmacology, School of Medicine, Western Reserve Univ., Cleveland, Ohio). *J. Biol. Chem.* **235**, 3393–97 (1960). During the course of studies on the prevalence of enzymic Coenzyme A (CoA) transfer reactions in animal tissues and yeast, evidence was obtained for the occurrence of the following new reactions of this type:

$$\text{Acetoacetyl-CoA} + \text{malonate} \rightleftharpoons \text{malonyl-CoA} + \text{acetoacetate}$$

$$\text{Acetoacetyl-CoA} + \text{glutarate} \rightleftharpoons \text{glutaryl-CoA} + \text{acetoacetate}$$

The present paper describes the experiments which led to the identification of these reactions and which demonstrated that they are catalyzed by the previously described enzyme, succinyl-*β-ketoacyl-CoA transferase*. The conversion of both synthetic and enzymically prepared malonyl-CoA to acetyl-CoA in pigeon liver is also demonstrated.

EFFECTS OF OLEIC AND OTHER FATTY ACIDS ON THE GROWTH RATE OF AGRIA AFFINIS (FALL.) (DIPTERA: SARCOPHAGIDAE). H.L. House and J.S. Barlow (Entomology Research Inst. for Biological Control, Research Branch, Canada Dept. of Agriculture, Belleville, Ontaria, Canada). *J. Nutrition* **72**, 409–14 (1960). This investigation was prompted by the discovery that lard or a mixture of 5 fatty acids—palmitic, stearic, oleic, linoleic, and linolenic—promoted growth of *Agria affinis* (Fall.), using chemically defined diets. Feeding tests with these fatty acids plus palmitoleic and arachidonic acids showed that, individually, oleic acid had the greatest effect. This was independent of any effects of biotin or cholesterol. Palmitic and stearic acid also increased the growth rate to a lesser extent. Interactions were found between oleic and palmitic, oleic and stearic, and palmitic and stearic acids. The data were inadequate to determine precise requirements, but if the diet contained an optimum amount of oleic acid (0.2%), the addition of between 0.044 and 0.132% of palmitic acid, or between 0.04 and 0.12% of stearic acid, or any combinations of the two in these ranges, resulted in growth equal to that when using the complete mixture. Linoleic, linolenic, palmitoleic and arachidonic acid apparently are not required.

FAT UTILIZATION IN THE FLUORIDE-FED RAT. J.W. Suttie and P.H. Phillips (Dept. of Biochem., University of Wisconsin, Madison). *J. Nutrition* **72**, 429–34 (1960). Fluoride ingestion had no effect on the level of metabolic fat. Although all fractions were elevated in the fluorotic rats, the neutral portion of the fecal lipid was raised to a greater extent than free or soap-bound fatty acids. Dietary free fatty acids were efficiently utilized by fluoride-fed rats. When the fluoride intake was equalized, more fat was observed in the feces of animals receiving fluoride by stomach intubation than by intraperitoneal injection. There was an indication of a lowered lipase activity in the intestine of rats receiving fluoride in the diet, but not in rats given fluoride intraperitoneally. Under the experimental conditions studied, the distribution of the end products of lipolysis was not effected by fluoride ingestion. It was concluded on the basis of these results that the high level of fecal lipid in fluorotic animals can be explained in part on the basis of a partial inhibition of lipase activity in the intestine.

EFFECT OF FEEDING VITAMIN K-DEFICIENT DIETS TO FEMALE RATS. V.C. Metta and B.C. Johnson (Div. of Animal Nutrition, Univ. of Illinois, Urbana). *J. Nutrition* 72, 455–58 (1960). The female rat was very much less susceptible to vitamin K deficiency than the male. This increased resistance of the female rat to vitamin K deficiency was not affected by the prevention of coprophagy, nor was it due to lower food intake or slower rate of growth, but was apparently the result of a true sex difference presumably under hormonal control.

EFFECT OF INTRAVENOUS INJECTION OF OXIDIZED METHYL ESTERS OF UNSATURATED FATTY ACIDS ON CHICK ENCEPHALOMALACIA. T. Nishida, H. Tsuchiyama, M. Inoue, and F.A. Kummerow (Dept. of Food Tech., Univ. of Illinois, Urbana). *Proc. Soc. Exptl. Biol. Med.* **105**, 308–12 (1960). Cerebellar disorders developed in chicks 1–5 hours after intravenous injection of 10 mg. of the hydroperoxide of methyl linoleate or of linoleic acid emulsified in 1 ml. of serum. No cerebellar disorders were noted, after injection, in birds kept on an identical diet but supplemented with 8 mg. % α-tocopherol. Injection of reduced hydroperoxide, methyl 12-oxo-*cis*-9-octadecenoate or fresh methyl linoleate caused no cerebellar disorders indicating only lipohydroperoxide initiated symptoms. The data suggests that nutritional encephalomalacia may be initiated by accumulation of sufficient, though still immeasurable, levels of lipohydroperoxide *in vivo*.

PREVENTION OF DECLINE OF α-KETOGLUTARATE AND SUCCINATE OXIDATION IN VITAMIN E DEFICIENT RAT LIVER HOMOGENATES. L.M. Corwin and K. Schwarz (National Inst. of Arthritis and Metabolic Diseases, Lab. of Nutrition and Endocrinology, National Insts. of Health, Bethesda, Md.). *J. Biol. Chem.* **235**, 3387–92 (1960). Liver homogenates from rats fed a diet deficient in vitamin E are unable to maintain α-ketoglutarate or succinate oxidation over a period of 1½ hours. The decline of α-ketoglutarate oxidation can be completely prevented by dietary α-tocopherol and *N,N'*-diphenyl-*p*-phenylenediamine or by supplementation *in vitro* of small quantities of α-tocopherol, menadione, *N,N'*-diphenyl-*p*-phenylenediamine, methylene blue, and the Simon tocopherol metabolite. Succinate decline can be limited to a low rate by increased quantities of these compounds.

VITAMIN A AND CAROTENOID INTER-RELATIONSHIPS IN BOVINE PLASMA AND LIVER. R.H. Diven, O.F. Pahnish, C.R. Roubicek, E.S. Erwin, and H.M. Page (Dept. of Animal Science, Univ. of Arizona, Tucson). *J. Dairy Sci.* 11, 1632–38 (1960). Arithmetic and log functions of bovine liver and plasma vitamin A and carotenoid were correlated in all possible combinations within each of four sampling periods. Little or no relationship existed between plasma and hepatic vitamin A or between hepatic carotenoid and plasma vitamin A. Positive relationships were found to exist between plasma carotenoid and hepatic carotenoid, hepatic carotenoid and hepatic vitamin A, plasma carotenoid and plasma vitamin A, and hepatic vitamin A and plasma carotenoid. The correlation coefficients were, however, so small that any known variable had little predictive value.

EFFECTS OF AN UNSATURATED AND SATURATED LIPID ON EXPERIMENTAL CHOLESTEROL IN RABBITS. J.M. Merrill (Research Lab., Veterans Admin. Hospital and Dept. of Med., Vanderbilt Univ. School of Med., Nashville, Tenn.). *Proc. Soc. Exptl. Biol. Med.* **105**, 268–70 (1960). Adding fat to the diet of the rabbit which contains cholesterol increased serum cholesterol. The increased serum cholesterol was associated with increased aortic tissue cholesterol. It is proposed that addition of the lipid to the diet increased absorption and retention of cholesterol and this intensified the cholesterol atherosis.

SERUM CHOLESTEROL AND RELATIVE BODY WEIGHT OF CORONARY PATIENTS IN DIFFERENT POPULATIONS. A. Keys and F. Fidanza (Lab. of Physiological Hygiene, Univ. of Minnesota, Minneapolis; and the Inst. of Human Physiology, Univ. of Naples Med. School, Naples, Italy). *Circulation* 22, 1019–1106 (1960). Men under 66 years of age suffering from unequivocal coronary heart disease in the Twin Cities of Minnesota and in Naples, Italy, were compared with clinically healthy men matched in place of residence, age, type of occupation, and socioeconomic status. The serum total cholesterol concentration was significantly higher in each of the 3 groups of coronary patients than in their corresponding controls and the 3 groups, control and coronary, formed a sharp progression from high to low cholesterol values in the order: Twin Cities, Naples upper class, Naples working class. The differences in serum cholesterol were accounted for by cholesterol in *beta*-lipoprotein. None of the 3 control groups differed in *alpha*-lipoprotein cholesterol concentration but in each of the 3 populations the coronary patients tended to have lower *alpha* values than their controls. The cholesterol data are compatible with the hypothesis that the 3 populations have different frequency distributions of cholesterol values, the coronary patients in each population tending to be drawn from the upper end of the corresponding population distribution, with no general critical level distinguishing all coronary patients as a total group.

DEPOSITION OF C^{14}-LABELLED CHOLESTEROL IN THE ATHEROMATOUS AORTA. J.L. Rabinowitz, R.M. Myerson, and G.T. Wohl (Vet. Admin. Hospital, Philadelphia, Pa.). *Proc. Soc. Exptl. Biol. Med.* **105**, 241–43 (1960). The results suggest that circulating cholesterol exchanges with available cholesterol pools of intima of human aorta. This exchange is slow. Cholesterol in the atheromatous plaques appears to exchange or accept circulatory cholesterol with the greatest difficulty. The highest exchange or depositions were observed for area of the arch of human aorta; abdominal part of aorta showed a smaller exchange. The media showed about the same cholesterol rate of exchange through length of aorta. A disk technic suitable for various types of quantitative assays of intima, media, etc., of the aorta was described.

INFLUENCE OF HAIR GROWTH CYCLE ON LIPID COMPOSITION OF MOUSE EPIDERMIS AND DERMIS. C. Carruthers, B. Davis, and W.C. Quevedo, Jr. (Roswell Park Memorial Inst., Springville and Buffalo, N.Y.). *Proc. Soc. Exptl. Biol. Med.* **105**, 259–61 (1960). Water and lipid composition of epidermis and dermis (including adipose and muscle layers) were determined during the anagen VI (growing) and telogen (quiescent) stages of the hair growth cycle. These stages of the hair growth cycle represent times of maximum morphological differences in thickness of the corium and adipose layers. Yet total lipid, phospholipid, neutral lipid, cholesterol esters, cholesterol and triglyceride content of epidermis during anagen VI and telogen stages of the hair growth cycle are not significantly different. The same is true for the lipid composition of the dermis. However, independent of hair growth activity, epidermis has a lower water content and a much greater level of cholesterol, cholesterol esters and phospholipid than dermis. The fast acting sterols of epidermis are limited largely to the esterified fraction.

INTERACTION OF METHEMOGLOBIN AND DEOXYCHOLATE. J.C. Turner (Dept. of Medicine, College of Physicians and Surgeons, Columbia Univ., and the Presbyterian Hospital, New York, N.Y.). *J. Biol. Chem.* **235**, 3426–29 (1960). Methemoglobin has been shown to react with deoxycholate to form an ionic type of complex involving the prostetic group and detergent anion. The complex becomes incorporated into miscelles of deoxycholate. It has a characteristic absorption spectrum much like that of cyanmethemoglobin. It can be dissociated by dilution; the deoxycholate anion is readily displaced by cyanide. Other hemoglobin derivatives show no similar reaction with deoxycholate, nor does catalase. Paper electrophoresis of proteins in buffers containing deoxycholate gave no evidence of complexing between detergent and peptide chains on the alkaline side of the isoelectric point.

THE EFFECT OF STEROIDS ON ELECTRON TRANSPORT. K.L. Yielding, G.M. Tomkins, Janet Munday, and I.J. Cowley (National Inst. of Arthritis and Metabolic Diseases, National Institutes of Health, Public Health Service, U.S. Dept. of Health, Ed., and Welfare, Bethesda, Md.). *J. Biol. Chem.* **235**, 3413–16 (1960). This communication presents further data on the effect of steroids on the DPNH-cytochrome *c* reductase reaction. Localization of the site of steroid inhibition has been made more precisely and, in some tissues, an alternate, steroid-insensitive route of electron transport has been found.

ALTERATIONS PRODUCED BY STEROIDS IN ADENOSINE TRIPHOSPHATASE ACTIVITY AND VOLUME OF LYMPHOSARCOMA AND LIVER MITOCHONDRIA. M. Blecher and A. White (Dept. of Biochem., Albert Einstein College of Medicine, Yeshiva Univ., New York 61, N.Y.). *J. Biol. Chem.* **235**, 3404–12 (1960). This paper presents direct evidence for a stimulating action of steroids on the adenosine triphosphatase activity of lymphosarcoma and liver mitochondria. Some aspects of steroid-stimulated ATPase activity, as well as steroid specificity studies are described. In addition, data for volume changes in lymphosarcoma and liver mitochondria are described in terms of the influence on mitochondria permeability of the several components of the steroid-augmented ATPase system. The data obtained establish that certain steroids should be added to thyroidal hormones as endogenously produced hormones which alter mitochondrial permeability and ATPase activity.

THE ROLE OF INTESTINAL SYMBIONTS IN THE STEROL METABOLISM OF BLATTELLA GERMANICA. R.B. Clayton (Conant Chem. Lab., Harvard Univ., Cambridge, Mass.). *J. Biol. Chem.* **235**, 3421–25 (1960). The principal sterol synthesized from acetate in the German cockroach, *Blattella germanica*, under nonaseptic conditions, has been shown to be 22-dehydrocholesterol. Evidence is presented for the derivation of this material from ergosterol synthesized by the intestinal flora of the insect. The metabolic conversion of ergosterol to 22-dehydrocholesterol is shown to be independent of the microbial population of the intestine. The possible significance of trace amounts of sterols synthesized in aseptic as well as nonaseptic roaches is discussed.

CONVERSION OF 4-HYDROXYMETHYLENE-Δ^7-CHOLESTEN-3-ONE TO CHOLESTEROL. J. Pudles and K. Bloch (James B. Conant Labs., Harvard Univ., Cambridge, Mass.). *J. Biol. Chem.* **235**, 3417–20 (1960). The chemical synthesis of 2-T, 4-C^{14}, 4-hydroxymethylene-Δ^7-cholesten-3-one is described. In liver homogenates this compound is converted to $C^{14}O_2$ and tritium-containing cholesterol. Under anaerobic conditions the principal product is Δ^7-cholestenol rather than cholesterol.

THE LOCATION AND TENTATIVE IDENTIFICATION OF STEROIDS ON PAPER CHROMATOGRAMS BY MEANS OF A SYSTEM OF COLOR TESTS. S. Katz (Yeshiva Univ., New York, N.Y.). *Arch. Biochem. Biophys.* **91**, 54–60 (1960). Over 30 steroid color tests were checked and four were studied in detail to determine their utility as "general" tests for locating microgram quantities of steroids on paper chromatograms. The Carr-Price reagent and a system consisting of *p*-anisaldehyde, sulfuric acid, antimony trichloride, and chloroform were found to be the most promising on the basis of sensitivity and wide range of reactivity. The presence of certain structural groups in the steroid molecule can be predicted and certain categories of conformational isomers can be distinguished from each other on the basis of their characteristic reactions with these reagents. A scheme for the tentative identification of steroids which requires on 50–100 μg. of sample based on "profiles" constructed from chromatographic data and the results of these color tests are presented.

STUDIES OF THE MECHANISM OF VITAMIN E ACTION. V. SELENITE AND TOCOPHEROL INHIBITION OF LIPID PEROXIDATION IN THE CHICK. H. Zalkin, A.L. Tappel, and J.P. Jordan (Univ. of California, Davis). *Arch. Biochem. Biophys.* **91**, 117–122 (1960). *In vivo* and *in vitro* lipid peroxidation products in the tissues of the vitamin E deficient chick have been measured. Dietary vitamin E and selenite inhibit the reaction. Certain organic selenium compounds such as selenomethionine and phenylselenoglycine exhibit antioxygenic activity in model systems. On the basis of this evidence and the known incorporation of inorganic selenium into tissue proteins, the authors suggest that dietary selenite functions by forming lipid antioxidants in the animal.

FATTY ACIDS AND GLYCERYL ETHERS IN ALKOXYDIGLYCERIDES OF DOGFISH LIVER OIL. D.C. Malins (U.S. Fish and Wildlife Service, Seattle, Wash.). *Chem. and Ind.* **1960**, 1359–1360. The fatty acids from the alkoxydiglycerides of dogfish liver oil were characterized by a low degree of unsaturation. About 98% of the fatty acids were found to be saturates, monoenes, and dienes. The acids of the C_{18} and C_{20} series consisted almost entirely of monoenes; the C_{22} series consisted primarily of dienes. Trienoic acids were found in trace amounts only. Fatty acids having more than 3 double bonds were identified mainly in the C_{22} series, but an eicosapentaenoic acid was also found. The main constituents of the α-glyceryl ethers were 44% α-octadecenylglyceryl ether (selachyl alcohol), 24% α-hexadecylglyceryl ether (chimyl alcohol), and 18% α-octadecylglyceryl ether (batyl alcohol). About 6% α-decylglyceryl ether, 1.6% α-tetradecylglyceryl ether, and 2% α-docosylglyceryl ether, together with trace amounts of α-dodecylglyceryl ether and eicosylglyceryl ether were found. The presence of small amounts of polyunsaturated glyceryl ethers was also indicated.

THE SKIN SURFACE FILM. G. T. Walker. *Drug Cosmetic Ind.* **87**, 618–619, 694 (1960). The composition of the film present on the surface of the skin and hair as reported in the literature is reviewed. The fats of the surface film are extremely complex. Whereas internal body fats consist, in the main, of triglycerides of stearic, oleic, and palmitic acids, surface fats contain free fatty acids, wax alcohols, and trace amounts of nitrogen and phosphorus as well as sterols and hydrocarbons. In human hair the fatty acids belonged to a series of normal straight-chain monobasic acids possessing from 7 to 22 carbon atoms with those containing 14, 16, and 18 carbon atoms the most predominant. The C_{18} fraction contained over 80% oleic acid, 15% linoleic, together with small amounts of linolenic and stearic acids. Straight-chain wax alcohols, saturated and unsaturated, with 16 to 26 carbon atoms have also been found. Three sterols in addition to cholesterol have been reported: dihydrocholesterol, 7-hydroxycholesterol, and an unidentified sterol. Also present are glycerol, squalene, vitamin D, and possibly vitamins A and E.

A STUDY OF FAT INTAKE AND PLASMA LIPIDS. I. PLANNING, PREPARATION, AND CALCULATION OF DIETS. Mary C. Hampton and M. Lee (Univ. of California, Berkeley). *J. Am. Dietet. Assoc.* **37**, 562–565 (1960). A method of modifying "exchange" values for calculating the nutrients supplied by diets rich in an unsaturated fat (safflower oil) and a saturated fat (coconut oil) is reported. Use of these values in calculating the nutrient intakes in an experimental study of the effect of substituting safflower oil and coconut oil, respectively, for some 80% of the fat in a prison diet is described.

II. SELECTION OF SUBJECTS. *Ibid.* 566–567. The procedure in selecting a fairly homogeneous group of about 30 subjects for a study on the effect of alteration in the dietary fat on the composition of blood lipids, from a total population of a large state institution, is described. The authors have found that success in an investigation of this kind is in a large part due to careful initial screening and to a reasonably thorough presentation to the volunteers of the objectives of the experiments and methods to be used.

PURIFICATION OF STEROLS. F.L. Cunningham, K.W. Riebe, and J.W. Greiner (Upjohn Co.). *U.S. 2,963,494.* A crude sterol mixture containing not more than 20% nonsterol impurities is dissolved in a mixture of a halogenated aliphatic hydrocarbon containing from 1 to 4 carbon atoms and an aliphatic hydrocarbon containing from 5 to 8 carbon atoms. The solution is heated to at least 50°, and water is added in the range of 0.9 to 2.0% (on weight of dissolved solids). The resulting mixture is cooled to a temperature within the range of 35° to −10° to form relatively fine crystals of the sterol.

• Drying Oils and Paints

METHOD FOR DETERMINING END POINT OF POLYAMIDE MODIFIED VEHICLE COOKS. N.F. Toussaint and T.J. Anagnostou (T.F. Washburn Co.). *U.S. 2,962,461.* A thixotropic vehicle for protective coatings is prepared by heating a reaction mixture containing a polyamide resin formed by the reaction of a polymerized unsaturated fatty acid with an alkylene polyamine and an ester base (glyceride oils, oil-modified alkyl resins, or varnish esters). A sample of the reaction mixture is dissolved in a solvent in which both the ester base and the reaction product are soluble both when hot and cold and the polyamide resin is soluble when hot, but insoluble in the cold. The mixture is cooled to precipitate the unreacted polyamide and form a suspension in the solution. The light transmissibility of the suspension is determined and the further reaction time necessary is read from a standard graph relating transmission of the reaction mixture to reaction time.

RESINOUS COMPOSITIONS CONTAINING EPOXIDIZED VEGETABLE OILS. S.P. Rowland and R.F. Conyne (Rohm & Haas Co.). *U.S. 2,963,-455.* Vinyl resins are plasticized with an epoxidized triglyceryl vegetable oil having an oxirane-oxygen content of at least 5% and a degree of unsaturation no greater than that represented by an iodine number of about one.

• Detergents

PROPERTIES AND PERFORMANCE CHARACTERISTICS OF DETERGENT ALKYLATES. W.W. Steward (Imperial Oil, Ltd., Toronto). *Soap Chem. Spec.* **36**(12), 57–60, 154–157 (1960). The preparation, performance, and properties of dodecyl benzene and higher molecular weight alkyl benzenes are described.

DETERGENT COMPOSITION. V. Dvorkovitz, N.W. Berst, and G.G. Leist (Diversey Corp). *U.S. 2,962,448.* The addition of at least 0.1% by weight (on total solids) of N-lauroyl sarcosin or its water-soluble salts to a synthetic organic detergent such as sodium higher alkylbenzene sulfonates or higher alkylphenyl ethers of polyethylene glycol reduces the skin irritation that is normally induced by nonacid detergent compositions.

PROCESS OF BLEACHING DETERGENT SALTS. I.J. Krems and F.W. Gray (Colgate-Palmolive Co.). *U.S. 2,962,526.* A solid water-soluble higher alkylbenzenesulfonate detergent in which the alkyl group contains from 10 to 16 carbon atoms is mixed with water in an amount sufficient to form a slurry of 40% to 60% water. The slurry is then treated with gaseous ozone to oxidize the oxidizable color bodies present.