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ABSTRACTS . . . . R. A. Reiners, Editor

• Oils and Fats

S. S. Chang, Abstractor
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Dorothy M. Rathmann, Abstractor

Development of rancidity in lard. J. M. R. Borbolla y Alcalá de la, A. Vargas Romero, and R. Vázquez Ladron (Inst. grasa, Servilla, Spain). *Grasas y aceites* (Seville, Spain) **6**, 74–80 (1955). Development of rancidity of lard in sealed tin cans was studied. By means of the Kreis test and peroxide value, it was shown that the rancidity developed only at the surface of the lard in contact with air in the can. Rancidity was not caused by the metal of the can. (*C. A.* **50**, 1228)

Experiments on the decoloration of cotton-seed oil with anionic-exchange resin like Duslite A. L. Ninni and M. Ninni. *Prakt. Akad. Athenon* **28**, 285–93 (1953). Efficient bleaching was obtained. (*C. A.* **50**, 1339)

Reprocessing of soybean seeds for production of edible cake and oil. V. P. Rzhekhin, N. I. Pogonkina, and V. N. Chukaeva. *Masloboino-Zhirovaya Prom.* **21**(6), 9–13 (1955). Data are presented to show that in order to obtain high-quality soybean cake and oil, it is necessary to raise moisture content of crushed seed meats to 12.5–13% and age the meats for 4 hours. The temperature of the meat during cooking and pressing should be 95 and 105°, respectively. (*C. A.* **50**, 1228)

Glycerol. Brit. Standards Inst., London, S. W. 1. *Brit. Standard* 2621–5: 1955, 58 pp. Specifications for 5 grades are given. The characteristics and test methods are for the glycerol content, specific gravity, apparent density, refractive index, acidity or alkalinity, ash, total and nonvolatile residues, water, alkali absorption, As, chloride, Cu, Fe, Pb, fatty acid and ester content. (*C. A.* **50**, 1339)

The effect of salt and of antioxidants on the keeping quality of butter. A. K. R. McDowell (Dairy Research Inst., Palmerston North, New Zealand). *J. Dairy Research* **22**, 349–64 (1955). Butterfat oxidation occurred in both salted and unsalted butters during storage at 14°F. Butterfat oxidation values, after storage, were much lower in unsalted and in highly salted butters than in butter of normal salt content. Butterfat oxidation in salted butters during storage was retarded by treatment with antioxidants. These included fat-soluble and water soluble substances, surface active agents, and copper-complexing compounds. Unsalted butter, salted butter, and salted butter treated with antioxidants all developed ''storage'' flavor during storage for 8 months. Many of the antioxidants added to salted butter were effective in retarding further fat oxidation and further increase in intensity of ''storage'' flavor when the butters were transferred to a temperature of 60–65°F. after storage. (*C. A.* **50**, 1226)

Properties, technology, and economy of melted alimentary fats of southeastern Turkey. R. C. Adam. *Univ. Ankara Fac. Agr. Pub.* **67**, 99 pp. (1955). The people of southeastern Turkey use mixtures of melted milk fats from different pasture animals. Fats from the provinces of Urfa, Diyarbakir, and Kars have the following properties: m.p. 35.8° (34.2–37.4°), 35.5° (31.4–38.4°), and 33.4° (29–37°); f.p. 20.5° (18.3–22.3°), 20.4° (16.5–22.1°), and 17.9° (13.7–20.0°); *n* 1.4585 (1.4561–1.4595), 1.4591 (1.4580–1.4600), and 1.4594 (1.4559–1.4605); saponification no. 232.6 (227.9–236.6), 231.4 (226.1–237.8), and 229.7 (228.3–231.5); Reichert Meissl no. 27.82 (25.19–30.96), 28.13 (25.74–34.37), and 28.74 (27.39–29.81); Polenske no. 5.48 (4.10–8.00), 4.86 (2.70–6.55), and 3.57 (2.70–4.00); iodine no. 33.42 (29.58–37.82), 35.59 (32.54–39.58), and 38.47 (37.01–40.42), resp. The values in the parentheses are the limit values for unadulterated fats. Urfa fats contain mainly sheep- and goat-milk fat. Diyarbakir fats contain cow butter also, and Kars fats contain mainly cow butter. (*C. A.* **50**, 582)

Hydrogenation of shad oil. F. Waisgluss and R. R. Brenner. *Iudustria y quimica* (Buenos Aires) **17**(1), 13–18 (1955). The hydrogenation of shad oil to produce an edible hydrogenated oil was studied at 180° and 1 atm. pressure with 2% nickel catalyst. By using no. 3 oil (m.p. 26.0°) the iodine no. decreased 27.1 units as the m.p. rose to 40.0°. The odor was removed and the oil was almost colorless. The highest m.p. obtained was 56.3°. (*C. A.* **50**, 502)

Chemical study of the progressive development of off-flavor in frozen raw vegetables. F. A. Lee, A. C. Wagenknecht and J. C. Hening (New York Agr. Expt. Sta., Geneva). *Food Research* **20**, 289–97 (1955). Unblanched peas, sweet corn, and snap beans showed development of off-flavor in frozen storage in from 2 to 4 weeks. The crude lipide matter extracted from frozen unblanched vegetables showed a marked increase in acid after the vegetables were stored for a week, and showed a positive test for peroxides after the vegetables had been held in frozen storage as follows: peas 3 weeks, snap beans 1 month, sweet corn 2 months. The presence of peroxides in the crude lipide matter extracted from the blanched sweet corn after the vegetable was held in frozen storage for 18 months was confirmed.

The composition of Dutch butter fat. I. Seasonal variations in the unsaturated fatty acid composition of butter fat. J. Stadhouders and H. Mulder (Agr. Univ., Wageningen, Neth.). *Neth. Milk Dairy J.* **9**, 182–93 (1955). The respective minimum and maximum contents of the unsaturated fatty acids in butter fat were: oleic acid 28.1 and 40.1, conjugated dienoic acids 0.58 and 2.81, unconjugated dienoic acids 0.73 and 1.90, conjugated trienoic acids 0.015 and 0.026, unconjugated trienoic 0.35 and 0.96, conjugated tetraenoic acids 0 and 0.008, and unconjugated tetraenoic acids 0.27 and 0.60%. The iodine value of summer butter was higher than that of winter butter and was correlated with the refractive index of the butter. The conjugated dienoic acids varied with iodine values, but the unconjugated dienoic acids did not. The seasonal variation of trienoic acids was small and that of the tetraenoic acids was within the limit of experimental error. (*C. A.* **50**, 501)

The melting point and the structure of cocoa butter. S. V. Vaeck (Dept. econ. affairs, Brussels, Belg.). *Zucker u. Süsswarenwirtsch.* **8**, 718–21 (1955). The m.p. of a sample of cocoa butter stored for over a year at 17° did not rise above 34.5°. Crystals isolated from the melt at 32° showed m.p. 45°, although the m.p. of the whole was 35–36.5° when these crystals were left in the sample. A sample heated at 50°, mixed with freshly calcinated kieselguhr, filtered through very fine filter paper at 50°, and energetically mixed at 32° remained perfectly clear after 6 hours. When this experiment was repeated with addition of 0.1 g. solid cocoa butter to the molten mixture, a cloudiness was visible after 6 hours at 32°; after subsequent cooling to 22° in 10 hours and reheating with stirring, the liquid became completely clear only at 37.3°. The characteristic diffraction patterns may be caused by the presence of crystals of saturated triglycerides(palmitodistearin and stearodipalmitin) which, with the other glycerides, form an unstable solid solution slowly crystallizing into separate crystals. Heating at 32° increased the rate of separation. (*C. A.* **50**, 499)

Melon seed (Citrullus vulgaris) oil from the Sudan. P. L. K. Fairchild, R. M. Johnson, and W. D. Raymond. *Colonial Plant and Animal Products*(London) 5(1), 62–3(1955). Melon seed oil was refined to produce an edible oil of saponification no. 189.3, Iodine no. 116.8, and acid no. 4.2. The oil was less stable than soybean oil. A "stearine" precipitated on standing at 0°. (*C. A.* **50**, 587)

Fatty acids from the root of Taraxacum kok-saghyz. T. Horche, E. Rodríguez, J. J. Herrera, J. L. Linaza, and W. de Rafols. *Anales inst. nacl. invest. agron*(Madrid) 4, 153–9(1955). Palmitic, stearic, oleic, linoleic, and linolenic acid were identified as present in the non-volatile acid fraction obtained from the root of Taraxacum kok-saghyz. (*C. A.* **50**, 394)

Phase diagrams of acetic acid and vegetable oils. Em. Voyatzakis. *Prakt. Akad. Athenon* **28**, 195–205(1953). Phase diagrams of cottonseed oil and sunflower oil were studied. Small quantities of water considerably increased the critical temperature of the mixture, but the presence of oleic acid had an opposite effect. *Ibid.* **29**, 426–33(1954). Phase diagrams of acetic acid with tobacco-seed oil, olive oil, and sesame-seed oil were studied. The effect of water and fatty acids present on the critical temperature of solution in the mixtures was determined. (*C. A.* **50**, 1339)

Characteristics of sulfonated oils of Argentine manufacture. Their analytical control. M. E. Bernasconi. *Rev. fac. cienc. quím., Univ. nacl. Eva. Peron*(Argentina) **26**, 15–9(1951). Establishment of standards for the sulfonated oils used by the hide industry is recommended because present commercial products vary much in moisture(4.7–66%) and are low in combined SO_3. (*C. A.* **50**, 1339)

Chromatographic separation and determination of straight-chain saturated monocarboxylic acids C_1 through C_{10} and dicarboxylic acids C_{11} through C_{16}. Geraldine B. Corcoran(Res. Division, Armour and Co., Chicago 9, Ill.). *Anal. Chem.* **28**, 168–71(1956). A partition chromatographic method for the accurate analysis of mixtures of monocarboxylic acids C_1 through C_{10} and dicarboxylic acids C_{11} through C_{16} has been developed. The stationary phase of 2*M* aqueous glycine on silicic acid adjusted to the desired pH with either 0.5*N* hydrochloric acid or concentrated sodium hydroxide; the mobile phase is 1-butanol-chloroform in gradient elution. A series of three columns, with stationary phases of pH 2, 8.4 and 10, is employed for analysis of mixtures of monocarboxylic acids C_1 through C_{10} and a series of two columns, with stationary phases of pH 8.5 and 9, is necessary for analysis of mixtures of dicarboxylic acids C_{11} through C_{16}.

Apparatus for molecular filtration. C. F. Hiskey and A. N. Kivert(International Biochemical Corp., Brooklyn 20, N. Y.). *Anal. Chem.* **28**, 246–47(1956). A new type of molecular filter consists of a long tubular cellulosic membrane surrounded throughout its entire length by a flexible braid. This filter element is coiled and encased in a nylon bag. Closures are made at the entrant and the exit ends of the tube. The main advantage of this design is the high filtration rate, up to 500 ml. per hour at 100-pound pressure for the laboratory sizes. It may be operated continuously.

The lipids of fish. 7. Phosphate esters in the lipids of haddock and cod flesh. June Olley(Torry Research Station, Aberdeen). *Biochem. J.* **62**, 107–114(1956). Phospholipid fractions from haddock and cod muscle, containing appreciable quantities of unidentified lipids, were hydrolyzed with 0.5*N* KOH in 95% ethanol for 2 hr. under reflux. Potassium salts of phosphate esters from these hydrolysates were fractionated on the basis of their solubility in ethanol, by paper chromatography, by stability to hydrolysis at pH 4 for 7 hr. in an autoclave at 15 lb. pressure, and by stability to hydrolysis at pH 4 after a preliminary hydrolysis with *N* HCl. These methods showed the presence of a series of phosphate esters based on glycerol and small quantities of phosphoric acid in some other combinations. The method of acid-periodate oxidation has been found to be completely unspecific for glycerophosphate esters. The dangers of using even weakly acid ion-exchange resins for the separation of phosphate esters have been discussed.

The lipids of fish. 6. The lipids of cod flesh. M. Dolores Garcia, J. A. Lovern and June Olley(Torry Research Station, Aberdeen). *Biochem. J.* **62**, 99–107(1956). Cod flesh contains the same amount of total lipids as haddock flesh(about 0.6%) and the lipid mixture is very similar in the two species, that from cod containing approximately: lecithin 35, waxes and alcohols 13, free cholesterol 8, phosphatidyl ethanolamine 7, free fatty acids 6, cholesterol esters 5, triglycerides 3, inositol lipids 2 and unidentified lipids 21%. The unidentified lipids of cod flesh resemble those from haddock in containing at least two types of phospholipid. One type is apparently based on phosphorylated glycerol but not on normal glycerophosphoric acid, and probably has a fatty acid : glycerol : P ratio approximating 4:2:1. The other type also has a fatty acid:P ratio of about 4:1, but its phosphorus:glycerol relationship has not yet been studied. These phospholipids probably contain nitrogen, but the bases in question have not yet been identified.

Enrichment with monoglycerides of interesterification mixtures of oil and glycerine by means of the formation of urea adducts. R. Rigamonti, V. Riccio and R. Gay(Instituto di Chimica Industriale del Politecnico, Torino, Italy). *Olearia* 9(11/12), 247–253(1955). Experiments have been made for enriching the monoglycerides content of interesterification mixtures of olive oil and glycerine by the formation of urea complexes. Results show that this enrichment is not easy because the affinity of the monoglycerides for urea only slightly exceeds that of the diglycerides. The interpretation of a series of results obtained has allowed of ascertaining that the equilibrium constants in the formation of the adducts with the monoglycerides are only half that with the diglycerides. Moreover, notable quantities of triglycerides are embodied in the urea complexes. Starting with mixtures containing about either 68 or 40% of monoglycerides, products containing respectively 80 or 60% of monoglycerides were obtained by a single urea treatment.

Effect of cold working on dielectric properties of crystalline long-chain compounds. Joan W. Arnold and R. J. Meakins (Div. Electrotechnology, C.S.I.R.O., Australia). *Trans. Faraday Soc.* **51**, 1667–73(1955). The effect of cold working on the dielectric absorption was determined for the following series of ethers and ketones which are normally almost loss-free: di-*n*-dodecyl ether, di-*n*-tetradecyl ether, di-*n*-hexadecyl ether, di-*n*-octadecyl ether, 12-tricosanone(laurone) and 16-hentriacontanone(palmitone). The loss factor was most pronounced in the higher molecular weight compounds and was virtually absent in compounds containing less than 30 carbon atoms. During storage at 20°, or on heating, the dielectric absorption due to cold working decreased. It is proposed that the cold working causes dislocations in the crystal lattice which result in decreases in the energy differences between equilibrium positions of the molecules, thus enabling dipole orientation to occur. In *n*-dodecyl myristate and cetyl palmitate, which normally give appreciable dielectric absorption, the electrical properties were not affected by cold working.

Radio frequency adsorption in solid aliphatic compounds. J. S. Dryden and S. Dasgupta(Div. Electrotechnology, C.S.I.R.O., Sydney, Australia). *Trans. Faraday Soc.* **51**, 1661–7(1955). The dielectric properties of polycrystalline ethyl palmitate, ethyl stearate and ethyl behenate were determined at 20° at frequencies between 10^5 and 10^{11} c/s. The dielectric loss factor showed two distinct regions of dielectric absorption; in each case the lower frequency one had the greater magnitude. Loss factors at 20° between 10^8 and 10^{11} c/s are also shown for methyl behenate, butyl stearate, dodecyl laurate and cetyl palmitate, and for ethyl stearate at temperatures between 20 and −70°. Decreasing temperatures cause a marked decrease in the loss factor. The behavior of *n*-docosyl bromide was similar. The magnitude of the absorption depended on the thermal history of the sample. The significance of the data is discussed in relation to the types of imperfections which can occur in the crystals. In the series of esters, the magnitude of the absorption decreased as the dipole moved in from the end of the molecule, i.e., as the chain length decreased. Possible mechanisms for the absorption are discussed.

The interaction of monolayers of branched chain fatty acids with calcium ions in the underlying solution. K. Durham(Res. Dept., Unilever Ltd., Port Sunlight). *J. Appl. Chem.* **5**, 686–92 (1955). Pressure-area curves are shown for monolayers of the following fatty acids on dilute acid solutions at pH 3.5 and on *M*/400 calcium chloride solutions at pH 7.5: α-ethylarachidic, α-ethylstearic, α-ethylpalmitic, α-ethylmyristic, α-ethyllauric, α-methylmyristic, α-phenylmyristic, α-benzylmyristic, and α-dodecylmyristic. Fatty acids with main chains longer than C_{16} formed brittle, solid films on the substrates containing Ca^{++}. An ethyl group in the α-position of lauric, myristic and palmitic acids prevented Ca^{++} from causing the formation of solid and brittle films. The study of myristic acid derivatives showed that even a methyl group had sufficient steric hindrance to prevent film solidification by Ca^{++}.

The crystallization of cocoa butter and alternative fats. I. An adiabatic calorimeter and its application to the thermal analysis of cocoa butter. E. H. Steiner(The British Food Mfg. Indus. Res. Assoc., Leatherhead, Surrey). *J. Sci. Food Agr.* **6**, 777–90(1955). A modification of the Bailey adiabatic calorimeter is described, suitable for investigating the thermal characteristics and phase composition of fats over a wide temperature range. Specific heats and differences in heat content may be measured with maximum errors of 5% and 0.7%, respectively. Sources of error in the calculation of percentages of solid and liquid phases from the data are discussed. Six samples of cocoa butter were studied. Data on the thermal characteristics are tabulated. Graphs are presented showing the relationships between the specific heat of cocoa butter and temperature between —70 and 50°, and between the percentage of liquid phase and temperature. Possible reasons are discussed for the rise in the specific heat curve observed at about —20°. For practical purposes in calculating the heat required to melt cocoa butter from room temperature, a specific heat of 0.5 and a latent heat of 32 cal./g. may be assumed.

Production of protein, lipides and carbohydrates by culture of algae. H. A. Spoehr and H. W. Milner(Carnegie Inst. of Washington). *U. S. 2,732,661.* Green algae are cultivated in a nutrient medium in the presence of light and carbon dioxide. An increased yield of lipides is obtained by maintaining the soluble fixed-nitrogen concentration in the medium constantly at no less than 0.001 molar until the desired cell count is obtained, and thereafter at below 0.001 molar.

Apparatus for the extraction of oils from vegetable matter. T. Andrews(Rose, Downs and Thompson). *U. S. 2,733,136.* An apparatus is described for the continuous separation of meal and extract by vacuum filtration.

Cast explosive composition. C. H. Winning(E. I. duPont de Nemours and Co.). *U. S. 2,733,139.* The cast explosive consists of a blend of 50 to 20% solid trinitrotoluene, 50 to 80% of at least one solid granular inorganic nitrate, and 0.01 to 2% of a monobasic fatty acid containing at least 8 carbon atoms and having a melting point below 100°.

Shortening comprising lard and lipins. L. Kiers. *U. S. 2,733,149.* A shortening for bakery products is prepared by blending the following (by wt.): 200 parts of lard and 12 to 20 parts of a mixture of animal lipins 10, water 40, stearic acid 7, glyceryl mono- and di-stearates 12, and glyceryl esters of hydrogenated vegetable oil 11.

Coating for food containers. A. C. Edgar(Wilson & Co., Inc.). *U. S. 2,733,152.* In order to prevent sticking of proteinaceous meaty materials, metal food containers are precoated with a polyhydric alcohol partial ester of a nonhydroxy, unsaturated fatty acid containing at least 12 carbon atoms.

Molecular rearrangement process. H. K. Hawley and R. D. Dobson(The Procter and Gamble Co.). *U. S. 2,733,251.* A mixture of glycerides and Na-K alloy (75 to 3% sodium and 25 to 97% potassium) is agitated at temperatures which melt the alloy but not higher than 120°F. until the desired molecular rearrangement of the fatty acids in the glycerides has occurred.

Refining oils or fats. A. Milbers and K. Sondermann(Metallgesellschaft Aktiengesellschaft). *U. S. 2,733,253.* An apparatus and process for the countercurrent alkali refining of oils and fats are described.

Centrifugal extractor. L. L. Holzenthal(U. S. A., Secy. Agr.). *U. S. 2,734,635.* A centrifugal extractor for the solvent extraction of oil from oil-bearing materials is described.

Monoglycerides. G. Y. Brokaw and M. I. Graafeil(Eastman Kodak Co.). *Brit. 731,388.* For improved yields of monoesters fatty material is mixed with dioxane and a basic metal-soap catalyst and heated to 250–80° for 60 minutes at 130–40 lb. per sq. in. For example, cottonseed oil and a 200% excess of glycerol were mixed. To this mixture were added dioxane(30% of the total weight of oil and glycerol) and $Sr(OH)_2$(0.1% of the weight of oil). The mixture was heated to 250° for 60 minutes at 130–40 lb. per sq. in. The dioxane was then flashed off, the reaction product cooled to less than 100°, and the glycerol separated out. The resulting reaction product contained 70% cottonseed oil monoglycerides having satisfactory color. In another example, a 600% excess of glycerol was used with 40% dioxane and 0.3% $Sr(OH)_2$ to give an 80.1% yield of monoglyceride. (*C. A.* **50**, 1343)

FATTY ACID DERIVATIVES

Oxidation of C_{18}-unsaturated fatty acids with nitric acid, composition of the resulting dicarboxylic acids. P. Kirjakka and Marita Nieminen(Inst. Technol., Helsinki). Suomen Kemistilehti **28B**, 9–16(1955). The composition of the dicarboxylic acids resulting from the oxidation of C_{18}-unsaturated fatty acids with 95% nitric acid at 20–5° is determined by chromatographic analysis. Oleic acid gives mainly azelaic and suberic acid; linoleic acid gives suberic, glutaric, and pimelic acid; conjugated linoleic acid gives azelaic, suberic, glutaric, and sebacic acid; tall oil fatty acids give mainly glutaric acid, together with azelaic, suberic, and pimelic acid. The yield of C_7–C_{10} dicarboxylic acids is about 1 mole per mole fatty acid oxidized. About 3–4 moles of nitric acid are consumed for each mole of C_5–C_{10} dicarboxylic acid recovered. With 65% nitric acid and manganese dioxide catalyst at 105–10°, oleic acid gives more suberic and less azelaic acid; sulfated oleic acid gives an appreciable amount of sebacic acid, together with azelaic and suberic acid. (*C. A.* **50**, 814)

Total synthesis of dl-tuberculostearic, dl-11-methyllauric, and arachidic acids. Michael Sy, Ng. Ph. Buu-Hoï, and Ng. Dat Xuong. *Compt. rend.* **239**, 1813–15(1954). Desulfuration of derivatives of thiophene by Raney nickel was used to prepare higher fatty acids. *dl*-Tuberculostearic acid(b.p. 246–7°, m.p. 24.5–5.0°; amide, m.p. 78°), *dl*-11-methyllauric acid($b.p._{16}$ 189–90°, n_D^{22} 1.4198; acid chloride, $b.p._{18}$ 156–7°; amide, m.p. 103°) and arachidic acid($b.p._{24}$ 250–1°, m.p. 75–6°; amide, m.p. 107°) were synthesized. The following compounds are also reported: β-(2,5-dipropyl-3-thenoyl)-propionic acid, γ-(2,5-diethyl-3-thienyl)-butyric acid, and γ-(2,5-dipropyl-3-thienyl)-butyric acid. (*C. A.* **50**, 296)

The general method for synthesis of the higher dicarboxylic acids. Ng. Ph. Buu-Hoï, Michel Sy, and Ng. Dat Xuong. *Compt. rend.* **240**, 442–4(1955). Synthesis in the series of aliphatic and aromatic dicarboxylic acids was accomplished by introducing two carboxyl groups into a thiophene compound, followed by desulfuration. The following dicarboxylic acids were prepared: ω-(4-carboxyphenyl)-caproic acid(colorless prisms, m.p. 144–5° from aqueous ethanol), ω-(4-carboxyphenyl)-enanthic acid(m.p. 203–4° from aqueous acetone), azelaic acid(m.p. 107°), and 1,9-nonanedicarboxylic acid(m.p. 110°). (*C. A.* **50**, 296)

Water-in-oil emulsifying agents. VI. Esters synthesized from cholesterol derivatives. E. L. Cataline, J. E. Sinsheimer, and Lee Worrell(Univ. of New Mexico, Albuquerque). *J. Am. Pharm. Assoc.* **43**, 558–61(1954). A series of esters of 3 α-carboxy-5-cholestene, 3 α-(hydroxymethyl)-5-cholestene, and hydroxystearic acid were prepared in an attempt to gain insight into the relationship of structure to emulsifying efficiency. (*C. A.* **50**, 393)

Synthesis of derivatives of dibasic carboxylic acids. IV. Derivatives of adipic acid. A. L. Mndzhoyan, O. L. Mndzhoyan, and O. E. Gasparyan. *Doklady Akad. Nauk Armyan. S. S. R.* **18**, 129–32(1954). The following derivatives of adipic acid were prepared for biological tests, without experimental details being given: $(CH_2CH_2CO_2R)_2$, where R represents $(CH_3)_2NCH_2CH_2$, $(CH_3CH_2)_2NCH_2CH_2$, $(CH_3)_2NCH_2CH_2CH\ CH_3$, $(CH_3CH_2)_2NCH_2CH_2CH\ CH_3$, $(CH_3)_2NCH_2C(CH_3)_2CH_2$, $(CH_3CH_2)_2NCH_2C(CH_3)_2CH_2$, $(CH_3)_2NCH_2CH(CH_3)CHCH_3$, and $(CH_3CH_2)NCH_2CH(CH_3)CHCH_3$. (*C. A.* **50**, 183)

V. Derivatives of pimelic acid. *Ibid.* **19**, 19–21. The following esters of pimelic acid were prepared for biochemical tests: $CH_2(CH_2CH_2CO_2R)_2$ where R represents the same groups as in IV. (*C. A.* **50**, 184).

VIII. Derivatives of suberic acid. A. L. Mndzhoyan, O. L. Mndzhoyan, and O. E. Gasparyan. *Ibid.* **19**, 143–6. The following compounds were prepared for biological evaluation; all had lobelinelike irritating action on the respiratory centers. $RO_2C(CH_2)_6CO_2R$ where R represents the same groups as in IV. (*C. A.* **50**, 184)

The Guerbet reaction of cetyl alcohol. M. Sulzbacher(Grosvenor Lab., 25 Grosvenor Crescent Mews, London, S. W. 1). *J. Appl. Chem.* **5**, 637–41(1955). By the usual Guerbet reaction, cetyl alcohol when heated with sodium yielded a complex mixture of products containing varying amounts of unreacted cetyl alcohol, C_{32}-unsaturated and saturated alcohols, and palmitic acid. There was an almost explosive evolution of hydrogen. Prolonged heating brought the reaction nearly to completion, resulting in almost complete saturation of the products and the recovery of only small amounts of cetyl alcohol. In this case, about one mole of palmitic acid was formed for every mole of condensed alcohol. The following improved procedure caused the formation of no palmitic acid and a 79% conversion of cetyl alcohol to 2-tetradecyl-octadecyl alcohol. A mixture of 1 mole of cetyl alcohol, 0.3 mole of potassium hydroxide and 0.15 mole of boric anhydride was heated and stirred vigorously. Water was evolved between 150 and 200°. The reaction mixture was maintained at 300° for 5 hrs. Little hydrogen was evolved. Properties of the product are described; the structure was confirmed by oxidation and dehydration. The modified procedure was applied to sperm oil alcohols.

Salts of fatty acid esters of lactylic acids. J. B. Thompson and B. D. Buddemeyer(C. J. Patterson Co.). *U. S. 2,733,252.* Salts of the type $RCO(OCHCH_3CO)_xOY$ are obtained by heating a fatty acid with $H(OCHCH_3CO)_zOH$ in the presence of an alkali or alkaline earth basic catalyst. The fatty acid has a boiling point above 250°. *Y* is a cation, and *z* is no greater than *x*.

Sulfosuccinate esters of fatty acid mono- and di-glycerides. J. T. Thurston (American Cyanamid Co.). *U. S. 2,734,833.* Textiles are impregnated with a softening and nonyellowing agent which consists of a *bis*-ester of sulfosuccinic acid with about two moles of higher fatty acid mono- or diglycerides derived from oils and fats containing less than 15% by wt. of polyunsaturated fatty acids.

Saturated fatty acids from methyl alkyl ketone. Hideo Kamata and Shiro Kudo(Kyowa Fermentation Industries Co.). *Japan 3476('54).* $(CH_3)_2CHCH_2Ac$ is added to 25% NaClO (1.2 times more than theory) dropwise, stirred 30 minutes at 50°, the $CHCl_3$ removed and the product decomposed with sulfuric acid yielded 85% $(CH_3)_2CHCH_2COOH$ and 15% of its chlorine derivatives. The latter (100 kg.) when hydrogenated with 60 kg. NaOH in 300 kg. water and 1 kg. nickel-kieselguhr at 100°, for 6 hours under 20 atm. hydrogen gave 80 kg. $(CH_3)_2CHCH_2COOH$ upon acidification. (*C. A.* 50, 1074)

• Biology and Nutrition

F. A. Kummerow, Abstractor
Joseph McLaughlin, Jr., Abstractor

Vitamin D and growth. H. Steenbock and D. C. Herting(Univ. of Wis., Madison). *J. Nutrition* 57, 449–68(1955). In a series of experiments with young rats, it was found that a low-Ca diet adequately supplied with phosphorus and other dietary essentials presented optimum conditions for eliciting the maximum growth differential which can be obtained with vitamin D. The large increase in soft tissue, as well as of organic bone, when vitamin D is given, suggests that it facilitates other reactions than those concerned with the intestinal absorption and the skeletal deposition of mineral elements. It appears that the weanling rat requires vitamin D for optimum performance.

The utilization of vitamin A by normal and deutectomized chicks. D. H. Laughland and W. W. J. Phillips(Canada Dept. of Ag., Ottawa, Ontario). *Poultry Sci.* 34, 1359–62(1955). Dietary supplements of vitamin A or β-carotene resulted in liver vitamin A values in excess of those observed in chicks fed the vitamin A-deficient diet. Similar results were obtained with deutectomized chicks. It is concluded that the absorption of vitamin A and the conversion of β-carotene to vitamin A can occur in chicks less than 2 weeks of age.

Turnover of palmitic, stearic, and unsaturated fatty acids in rat liver. S. B. Tove, J. S. Andrews, Jr., and H. L. Lucas (North Carolina State College, Raleigh, North Carolina). *J. Biol. Chem.* 218, 275–281(1956). Two distinct peaks have been observed in the specific activity-time curves for the individual fatty acids of the phosphatide and neutral fat fractions of rat liver. It is apparent from these curves that the turnover of hepatic fatty acids is faster than was previously reported. There were no differences in the rates of metabolism of the various phosphatide fatty acids, neutral fat palmitic acid, or neutral fat unsaturated acids. However, the rate of metabolism of neutral fat stearic acid appeared to be slower than that of the other fatty acids. In the case of palmitic acid and the unsaturated fatty acids, the specific activity values of the phosphatide acids were similar to those of the neutral fat acids. In contrast, however, the specific activity values of the phosphatide stearic acid were about 8 times those of the neutral fat stearic acid.

Relationship between the weight of chicks and levels of dietary free gossypol supplied by different cottonseed products. B. W. Heywang and R. R. Bird(U. S. Dept. of Ag., Animal and Poultry Husbandry Res. Branch, Glendale, Arizona). *Poultry Sci.* 34, 1239–47(1955). In a series of experiments to determine the relationship between the dietary level of free gossypol and the growth of young chickens, New Hampshire and White Leghorn chicks were fed diets containing ground raw decorticated cottonseed, or screwpress, hydraulic, solvent-extracted, or prepress solvent-extracted cottonseed meals, or pure gossypol. The dietary levels of free gossypol furnished by those sources varied from about 0.008 to 0.075 percent in different experiments. The feeding of the diets was started when the chicks were one day old and ended when they were six weeks old, except that some of the diets containing pure gossypol were fed for five weeks only. The data obtained on growth, diet consumption, and efficiency of diet utilization indicated that the free gossypol content of diets should not be greater than 0.016 percent when they are fed to New Hampshire chicks. Growth rate was not increased when diets containing 0.008 percent or less free gossypol were fed in one experiment. Growth was depressed when cottonseed meals were fed at high dietary levels in one experiment, but free gossypol did not appear to be responsible for this depression. Mortality was low in each experiment, and amounted to about 1½ percent of all the chicks used.

Polyunsaturated fatty acids in normal human blood. J. D. Evans, J. M. Waldron, and N. L. Oleksyshyn(Temple Univ. School of Medicine, Philadelphia, Pa.) and R. W. Riemenschneider. *J. Biol. Chem.* 218, 255–59(1956). Spectrophotometric analyses have been made to determine the amounts of polyunsaturated fatty acids in the blood of seven normal human males in the postabsorptive state. The data suggests that there is a characteristic distribution of polyethenoid acids in the fatty acids of both plasma and blood cells. Linoleic acid is the predominant polyunsaturated fatty acid in the plasma, whereas arachidonic acid is predominant in the cells.

Plant phospholipase D. I. Studies on cottonseed and cabbage phospholipase D. H. I. Tookey and A. K. Balls(Purdue Univ., Lafayette, Indiana). *J. Biol. Chem.* 218, 213–24(1956). An enzyme which releases ethanolamine and choline from phospholipides is reported in cottonseed. It is obtained as a stable dry product with a specific activity against phosphatidyl ethanolamine 86 times that of defatted cottonseed meal. The similar enzyme from cabbage is shown to release ethanolamine from phospholipide. An inhibitor in cabbage juice is described.

The nutritive value of herring meals. 3. The effects of heat treatment and storage temperature as related to oil content. J. Biely and B. E. March(Univ. of British Columbia, Vancouver, B. C., Canada). *Poultry Sci.* 34, 1274–79(1955). In experiments with chicks it was found that the nutritive value of herring meal was not improved when the oil was removed by extraction with hexane. This was true of commercial flame-dried herring meal and of a low temperature dried meal. When a low temperature dried herring meal was extracted with hexane, the folic acid in the extracted meal was less stable than that in the original meal. The nutritive value of herring meals stored for one year at −25°, 21° and 37° was apparently unaffected. The basal ration in which the herring meals were used was well fortified with both fat and water soluble vitamins.

Metabolism of the essential fatty acids. II. The metabolism of stearate, oleate, and linoleate by fat-deficient and normal mice. J. F. Mead, W. H. Slaton, Jr., and A. B. Decker(School of Medicine, Univ. of Calif., Los Angeles, Calif.). *J. Biol. Chem.* 218, 401–407(1956). Normal and fat-deficient mice were given orally carboxy-labeled methyl stearate, oleate, or linoleate. The C^{14} content of the respiratory carbon dioxide and various body lipides was determined. Fat-deficient mice metabolized stearate and linoleate at a significantly greater rate than did normal mice and oleate at a lower rate. The incorporation of C^{14} into cholesterol seemed to bear an inverse relationship to that in total respiratory CO_2. No evidence could be found for the conversion of oleate to linoleate *in vivo*, but linoleate may be converted to arachidonate.

Experimental obesity. I. Production of obesity in rats by feeding high-fat diets. O. Mickelsen, S. Takahashi and C. Craig (Dept. of Health, Education, and Welfare, Bethesda, Maryland). *J. Nutrition* 57, 541–54(1955). Obesity has been produced in normal male rats by the *ad libitum* feeding of a diet containing 63% of fat and adequate amounts of vitamins, minerals and protein. When weanling rats were fed this diet, they gained weight at a higher rate than the rats on the "best" low-fat or stock diets. Three strains of rats have shown the same response. The maximum weight attained on the high-fat diet was 1655 gm. Approximately 70% of the weanling rats of the Osborne-Mendel strain randomly secured from the stock colony have attained weights over or close to 1000 gm. when fed the high-fat diet. It is believed that the obesity does not result from any genetic or hormonal disturbance.

The effect of fat intake on incorporation of acetate-2-C^{14} into liver lipide and expired carbon dioxide. Esther Brice and Ruth Okey(Univ. of Calif., Berkeley, Calif.). *J. Biol. Chem.* 218, 107–114(1956). The data indicate that a high fat diet leads to an increased rate of oxidation of acetate, possibly concomitant with accelerated acetate production by β oxidation of fatty acids.

The digestion of acetylated monoglycerides and of triglycerides. D. C. Herting, S. R. Ames, M. Koukides and P. L. Harris (Distillation Products Ind., Div. of Eastman Kodak Co., Rochester, N. Y.). *J. Nutrition* 57, 369–87(1955). The digestion of the distilled acetylated saturated monoglycerides prepared from hydrogenated lard coincided with that of hydrogenated lard. The digestion of distilled, acetylated, mixed saturated and unsaturated monoglycerides prepared from lard was intermediate between those for the saturated and unsaturated triglycerides. Analogous to that of other fats, the absorption of the digestive products of the distilled acetylated monoglycerides depended largely on their fatty acid composition.

The concomitant use of fat and methionine in broiler diets. H. R. Rosenberg and J. T. Baldini(E. I. duPont de Nemours and Co., Inc., Newark, Delaware), M. L. Sunde, H. R. Bird, and T. D. Runnels. *Poultry Sci.* 34, 1308–13(1955). Using a simple corn-soybean oil meal type diet, a small improvement in performance was observed when 0.05% DL-methionine was added to the ration. The supplementation of the basal ration with 3% to 6% fat of vegetable or animal origin brought about considerable improvement in performance, especially in the efficiency of feed utilization. When both fat and methionine were added, an even greater improvement was observed.

Comparison of the chick growth inhibition of unheated linseed hull and cotyledon fractions. K. F. Schlamb, C. O. Claggett and R. L. Bryant(North Dakota Ag. Experiment Station, Fargo, North Dakota). *Poultry Sci.* 34, 1404–07(1955). The linseed meal inhibition of chick growth reported by a number of workers has been studied using meal separated into hulls and cotyledons. The hulls support surprising good growth in comparison to the whole meal and cotyledons. This casts serious doubt on a previous report that mucilage of the hulls might be responsible for the inhibition. The cotyledon and whole unheated meal supported very poor growth.

Cellulolytic-factor activity of certain short-chain fatty acids for rumen microorganisms in vitro. O. G. Bentley, R. R. Johnson, T. V. Hershberger, J. H. Cline, and A. L. Moxon(Dept. of Animal Science, Ohio Ag. Experiment Station, Wooster). *J. Nutrition* 57, 389–400(1955). Analytical results showed that the activity of the volatile fatty acid fraction of rumen juice was primarily due to valeric acid. Biotin and para-amino benzoic acid were also required by the microflora for maximum cellulose digestion. This vitamin short-chain fatty acid combination duplicated but was not identical to the microbial cellulolytic factor(s) previously found to be present in certain natural feedstuffs fed to cattle and sheep.

Biological synthesis of lanosterol and agnosterol. R. B. Clayton and K. Bloch(Converse Memorial Lab., Harvard University, Cambridge, Mass.). *J. Biol. Chem.* 218, 305–18(1956). The unsaponifiable fraction of rat liver obtained on incubation of the homogenized tissue with radioactive acetate has been shown to contain two radioactive C_{30} sterols, lanosterol, and agnosterol. When carrier ''iso-cholesterol'' is present during incubation, a much greater proportion of the radioactivity in the unsaponifiable fraction can subsequently be isolated in the lanosterol fraction.

The biological conversion of lanosterol to cholesterol. R. B. Clayton and K. Bloch(Harvard University, Cambridge, Mass.). *J. Biol. Chem.* 218, 319–25(1956). The conversion of lanosterol to cholesterol in rat liver homogenates has been demonstrated with the aid of biologically labeled lanosterol.

Effect of heparin on triglyceride and free fatty acid concentrations in lymph. W. Young and N. K. Freeman(Donner Lab. of Medical Physics, Univ. of Calif., Berkeley, Calif.). *Proc. Soc. Exp. Biol. and Med.* 90, 463–466(1955). The glyceride and free fatty acid contents of thoracic, intestinal, and hepatic lymph of rabbits, and thoracic lymph of rats were determined before and after intravenous administration of heparin. The principal effects observed were the following: the turbidity that was always observed initially in thoracic or intestinal lymph was diminished or disappeared. Hepatic lymph was not originally turbid. In all cases the glyceride content was reduced and free fatty acids increased. Trielaidin was fed to rats and heparin given intravenously during absorptive phase. Elaidic acid was detected in free fatty acids subsequently appearing in lymph. Post-heparin rabbit lymph was capable of producing lipolysis of a fatty substrate *in vitro*.

Effect of coenzyme A on the metabolic oxidation of labeled fatty acids: rate studies, instrumentation and liver fractionation. B. M. Tolbert, Ann M. Hughes, M. R. Kirk and M. Calvin (Radiation Lab., Univ. of Calif., Berkeley, Calif.). *Arch. Biochem. Biophys.* 60, 301–319(1956). The effect of pantothenic acid deficiency in rats given sodium acetate-2-C^{14} or sodium heptanoate-7-C^{14} has been studied. The rate of excretion of breath $C^{14}O_2$ has been measured using a method not previously described, in which a sensitive ionization chamber and electrometer directly and continuously record carbon-14-excretion. The effect of coenzyme A on the oxidative metabolism of normal and pantothenic acid-deficient(PAD) was measured. The differences in the rate of excretion of $C^{14}O_2$ show that the methyl carbon of acetate is oxidized faster and in greater amount in PAD than in normal rats, but is slower in animals given CoA as compared to animals not given CoA. These results are consistent with previous data on fatty acid metabolism. The oxidation of the methyl(omega) carbon of heptanoic acid to $C^{14}O_2$ is much more depressed by CoA than is the oxidation of the methyl carbon of acetic acid.

New olive oil emulsion for lipase and new observations concerning "serum lipase." H. Tauber(Univ. of North Carolina, Chapel Hill, N. C.). *Proc. Soc. Exp. Biol. and Med.* 90, 375–378 (1955). A stable olive oil emulsion has been described. Using this new emulsion the lipase activity of a series of biological materials has been studied. Series of some species of mammals had a wide range of activity, whereas, those of others had no activity. Wheat germ ''lipase'' splits olive oil only slightly. Highly purified plasma cholinesterase was almost inert indicating that this enzyme is not involved in fat digestion. Hemoglobin is a powerful inhibitor, and Lima bean inhibitor, a powerful activator of serum lipase. A method for demonstrating antilipase in serum has been presented.

Concerning the identity of pancreatic cholesterol esterase. L. Swell, R. E. Dailey, H. Field, Jr., and C. R. Treadwell(Dept. Biochem., School of Medicine, George Washington Univ., Washington, D. C.). *Arch. Biochem. Biophys.* 59, 393–397(1955). Lipase and cholesterol esterase activity were measured in pancreas homogenates which were pretreated with acid, alkali, and heat. Lipase was stable when pretreated for 15 min. at temperatures from 37 to 55°. From 55 to 65° there was a partial loss in activity and complete inactivation at 70°. Cholesterol esterase was progressively inactivated above 37° with complete inactivation at 65°. Lipase was more stable at acid and alkaline pH's than cholesterol esterase. Tributyrin, olive oil, methyl butyrate, and ethyl oleate were split in the absence of bile salts. No cholesterol esterase activity was obtained in the absence of bile salts.

Catalysis of linoleate oxidation by pea lipoxidase. A. M. Siddiqi and A. L. Tappel(Dept. Food Technology, Univ. of Calif., Davis, Calif.). *Arch. Biochem. Biophys.* 60, 91–99(1956). Pea extracts contain an enzyme which does not possess fatty acid oxidase or fatty acid dehydrogenase activity, yet oxidizes linoleate but not oleate. Hence, the enzyme behaves like a true lipoxidase. The absorption spectrum of the oxidation products of pea lipoxidase catalysis shows a maximum at 280 mμ besides the usual chromophore at 233 mμ. The implications of the information found in relation to the production of ''off odors'' in underblanched frozen peas is discussed. The antioxidants nordihydroguaiaretic acid, propyl gallate, and alphatocopherol were found to strongly inhibit the pea lipoxidase-catalyzed oxidation of linoleate. The possible role of lipoxidase in the formation of lipoidal plant films is discussed.

Effects of oxidized fatty acids on ascites tumor metabolism. C. W. Shuster(Dept. Zoology, Duke Univ., Durham, N. C.). *Proc. Soc. Exp. Biol. and Med.* 90, 423–426(1955). Extracts of irradiated methyl linolenate and methyl linoleate inhibited respiratory and glycolytic activities of Ehrlich ascites tumor cells. Respiration showed a greater sensitivity than glycolysis to the oxidation products of both esters. The oxidation products of methyl linolenate inhibited both glycolysis and respiration at lower concentrations than those for methyl linoleate. In contrast to the normal tissues of the mouse, the oxidation of tumor cell lipids by aerobic incubation and ultraviolet light could not be demonstrated by the TBA reaction. Analyses of unsaturated fatty acids of ascites tumor cells are presented.

Effect of thyroxine and related compounds on heparin-activated fatty acid liberating enzyme. B. Shore(Donner Lab., Univ. of Calif., Berkeley, Calif.). *Proc. Soc. Exp. Biol. and Med.* 90, 415–418(1955). L-thyroxine and L-triiodothyroxine inhibit the heparin-catalyzed release of fatty acid from lipoprotein triglycerides, the former inhibiting significantly at $3 \times 10^{-4} M$ and being about 3-fold more effective than the latter at equimolar concentrations. The inhibition does not result from removal of calcium or magnesium ions or heparin.

Effects of intravenous infusion of experimental "instant" fat emulsion into volunteer subjects. G. P. Shafiroff and J. H. Mulholland (Lab. Experimental Surgery, N. Y. Univ. College of Medicine). *Proc. Soc. Exp. Biol. and Med.* **91**, 111–113 (1956). An ''instant'' fat emulsion prepared by manual mixing of oil, emulsifier, alcohol, and water was developed and tested. This type of emulsion obviated high pressure homogenization and was freshly prepared for each infusion. A total of 63% of the infusions were fairly well tolerated while in the other 37% reactions were observed.

Concentration and distribution of cholesterol in muscle and adipose tissue. A. DelVecchio, A. Keys, and J. T. Anderson (Lab. Physiological Hygiene, Univ. Minn.). *Proc. Soc. Exp. Biol. and Med.* **90**, 449–451 (1955). Analyses are reported for cholesterol contents of muscles and adipose tissue from beef, veal, pork, pig, mutton, lamb, rabbit, chicken, and man. It is shown that a large proportion of the cholesterol in muscle is not attributable to residual adipose tissue or any tissue of similar composition. Concentration of cholesterol in muscle, apart from associated adipose tissue, is of the order of 40 to 50 mg. per 100 g. in the adult mammals studied and in the dark meat of chickens. Higher values were found in two elderly human beings. The corresponding cholesterol concentration in the white meat of chickens is of the order of 30 mg. per 100 g. There is a general tendency for muscle cholesterol concentration to be considerably higher in young, growing animals than in adults of the same species. This reinforces the theory that most of the cholesterol in muscle has a definite metabolic or structural function.

The role of vitamin C in oxidized flavors. E. S. Guthrie (Cornell Univ., Ithaca, N. Y.). *Proc. Ann. Conv. Milk Ind. Foundation, Lab. Sect.* **47**, 58–65 (1954). The mechanism of oxidized flavor development in milk involving enzymes, phospholipide, proteins, ascorbic acid, and fats is discussed. Control of this off-flavor by processing methods and packaging is described also. (*C. A.* **50**, 498)

Synthesis of α-dl-tocopherol. Cheng Kuo Hui (Kumamoto Univ. Med. School). *J. Vitaminol.* (Japan) **1**, 8–12 (1954). *α-dl-*Tocopherol (*p*-nitrophenylurethan, m.p. 130°) was synthesized from coal-tar cumene (b.p. 160–8°). The final product was purified by chromatographic method using alumina as absorbant and a mixture of methyl alcohol, acetone, and ethyl ether (3:2:10) as eluent. (*C. A.* **50**, 320)

Vitamin A epoxide to vitamin A alcohol. M. Cormier. *Bull. soc. chim. biol.* **36**, 1255–64 (1954). When vitamin A alcohol dissolved in an organic solvent is left in contact with manganese dioxide in the dark for several days, not only is vitamin A aldehyde (retinene) formed as reported by Meunier, *et al.* (*C. A.* **46**, 2526), but under certain described conditions the epoxide of vitamin A alcohol is also formed. The possible mechanism of the reactions is discussed. (*C.A.* **50**, 259)

Production of arteriosclerosis in birds by prolonged feeding of dihydrocholesterol. C. W. Nichols, Jr., Stuart Lindsay, and I. L. Chaikoff (Univ. of California, Berkeley). *Proc. Soc. Exptl. Biol. Med.* **89**, 609–13 (1955). Beginning at 5 months of age, White Leghorn cockerels were fed a diet containing 0.5% dihydrocholesterol for 6 months. They developed severe arteriosclerosis of the thoracic and abdominal aortas identical with that produced by feeding cholesterol. Hepatic enlargement was similar to that observed previously in cholesterol-fed birds and was due in part to reticuloendothelial storage of dihydrocholesterol. (*C. A.* **50**, 450)

Particulate fat absorption and secretion. H. Singer, J. Sporn, and H. Necheles (Michael Reese Hosp., Chicago). *Gastroenterology* **26**, 299–302 (1954). Bile salts and pancreatic lipase are not necessary for particulate fat absorption. The chylomicrograph resulting from fat absorption from a thiry fistula is described. A new particle named ''enterolipomicron'' is discussed. The possibility that this represents the form in which fat is secreted into the lumen of the intestine is considered. (*C. A.* **50**, 1146)

Fat absorption and alimentary lipemia after feeding of fat. H. Redetzki and R. Th. Gronow (Allgem. Krankenhaus St. Georg, Hamberg, Ger.). *Klin. Wochschr.* **33**, 701–5 (1955). Fasting normal human subjects were fed 1 g. of olive oil per kg. body weight by duodenal tube. Of 36 subjects, 18 showed max. absorption in 195 min., 16 at 135 min., and 2 at 95 min. Feeding commercial pancreatic lipase preparations decreased the time required to reach max. absorption, while bile and plant lipase preparations were without effect. (*C. A.* **50**, 450)

Metabolic experiments with fatty acid of intermediate chain length. I. Fatty acid of intermediate chain length in basal metabolism. G. Weitzel, H. Schön, F. Gey, and H. Kalbe (Marx-Planck-Ges., Göttingen, Ger.). *Hoppe-Seyler's Z. physiol. Chem.* **301**, 118–31 (1955). The fat of both the rat skin and, to a somewhat greater degree, the human skin contains small amounts of octanoic and decanoic acids. When their glycerides were fed to rats, these fats were found to accumulate in the skin fat, octanoic and decanoic acids forming 7% of the total skin fatty acids. Undecanoic and undecenoic acids, which are not normally found in the body, were also deposited in the skin fat of rats fed the triglycerides (10% of feed). The longer the feeding, the greater the amount accumulated. Deposition of fatty acids was also noted in the rat subcutis, but only from the C_{10} group on to C_{14} and over. (*C. A.* **50**, 451)

II. Intermediate fatty acids in basal metabolism with choline-deficient diet. *Ibid.* 132–42. Rats were fed a choline-deficient diet plus 10–40% by weight of food of intermediate fatty acids or 40% olive oil or lard. The intermediate fatty acids were administered as mixed glycerides of octanoic, decanoic, and dodecanoic acids or as individual glycerides of the first two acids. With intermediate fatty acids only slight or no fatty liver degeneration occurred even when there was a marked increase in animal weight. No lipotropic effect of choline on the fat metabolism of the skin could be demonstrated in these experiments. (*C. A.* **50**, 451)

III. Feeding experiments with lauric acid esters. H. Schön, F. Gey, F. J. Strecker, and G. Weitzel. *Ibid.* 143–55. Lauric acid which was fed to rats as glyceride, methyl, or ethyl ester was deposited in the cutis and the subcutis fat, the total fatty acid of which showed up to about 7% lauric acid. With small amount of lauric acid (10% of feed), cutis stored more lauric acid than subcutis and choline deficiency showed no direct effect on such deposition. When large amounts of lauric esters (35–40%) were added to a choline deficient diet, the loss of rats so fed, due to heart injury, was very small (5 animals out of 53), in contrast to data of other authors. Histologically, however, the rats which succumbed and those subsequently killed all exhibited cardiac injury. (*C. A.* **50**, 451)

Utilization of lard by baby pigs. H. M. Cunningham and G. J. Brisson (Can. Dept. Agr., Ottawa). *Can. J. Agr. Sci.* **35**, 371–6 (1955). Twelve 2-day baby pigs were fed liquid purified diets containing 1.5, 3.0, and 4.5% fat. The level of lard fed had no effect on the apparent digestibility of the fat, casein, or glucose, or on the efficiency of energy utilization. The fat digestibility increased from 83.8 to 90.3% between the second and fourth week of one trial, with no further increase from the fourth to ninth week. The metabolic fat excretion averaged 70.4 mg. per kg. body weight per day or 0.105% of the dry matter intake. On the low-, medium-, and high-fat diets the true digestibility of the fat was 1.23, 0.70, and 0.59% higher, respectively than the apparent digestibility. (*C. A.* **50**, 449)

Vitamin A in dairy products. IV. Influence of feed on stability of vitamin A in ghee on storage. K. M. Narayanan, C. P. Anantakrishman, and K. C. Sen (Dairy Research Inst., Bangalore). *Indian J. Dairy Sci.* **7**, 205–12 (1954). Ghee prepared from the cream of cow milk retained its vitamin A content through 6 months of storage at 37° better than did ghee from buffalo cream. Although an increase in green-grass supplement increased initial vitamin A content, the loss in storage was still about 16% for cow ghee and 20% for buffalo ghee. A shark-liver-oil supplement doubled initial vitamin A content, but the decrease in storage was at about the same rate. Cottonseed as supplement reduced the loss to about 4.6% and was more effective than cottonseed meal or coconut meal. Loss in vitamin A content was the same in containers of glass, aluminum, and tin but occurred at a much faster rate in mud pots. Destruction of carotene occurred at about the same rate as loss in vitamin A content. (*C. A.* **50**, 500)

Cholesterol metabolism in man. M. D. Siperstein and Anne W. Murray (Natl. Inst. Health, Bethesda, Md.). *J. Clin. Invest.* **34**, 1449–53 (1955). Cholesterol-4-C^{14} was injected intravenously into a man with complete biliary drainage. Of the administered cholesterol, 39.6% was eliminated by all routes of excretion in a 50-hour period. Over 98% of the excreted cholesterol appeared in the bile, 1.3% in the alcoholic feces, and 0.2% in the urine. No $C^{14}O_2$ was found in the expired air. In man the major pathway of cholesterol metabolism involves the conversion of cholesterol to bile acids. The chief excretory product of cholesterol in the bile of man was identified as glycocholic acid. (*C. A.* 50, 458)

Studies on lipides, proteins, and lipoproteins in serum from newborn infants. S. Rafstedt and B. Swahn (Univ. Lund, Sweden). *Acta Paediat.* 43, 221-34 (1954). New micromethods made it possible to determine in 0.6 ml. serum the concentration of total and free cholesterol, phospholipides, and total lipides, and to perform electrophoretic separation of the protein fractions as well as of the various lipide fractions. Serums from the blood of the umbilical cord and from capillary blood of 50 infants, 1-6 days old, were analyzed. Cholesterol, total lipides and phospholipides increased 70-80% during the first few days of life. The marked increase in the serum lipides after birth was ascribed especially to the striking increase in the β-fraction, as well as to the lipides in the fraction termed "chylomicrons." The α_1-fraction showed a moderate but statistically significant increase. During the first few days of life the α- and β-globulins revealed a statistically significant increase, while the γ-globulin showed decrease. The albumin fraction did not change significantly. (*C. A.* 50, 452)

Histochemistry of lipide aldehydes. W. D. Belt (Ohio State Univ., Columbus). *Univ. Microfilms (Ann Arbor, Mich.), Publ.* No. 12, 160, 101 pp. Dissertation Abst. 15, 1160 (1955). (*C. A.* 50, 1111)

Digestibility of cholesterol in the rat. P. Favarger, J. Gerlach, and M. Roth (Univ. Geneva, Switz.). *Helv. Physiol. et Pharmacol. Acta* 13, 245-8 (1955). Rats were fed tallow containing 1-20% of D-labeled cholesterol. The cholesterol was absorbed to an extent of 40-45% when its concentration in the tallow was 1-10%; with higher concentrations the proportion absorbed declined while the absorption of fat remained constant. Other experiments showed that the rate of absorption of cholesterol was about the same as that of tripalmitin. (*C. A.* 50, 1142)

Digestibility of fats in the presence of certain sterols. M. Roth and P. Favarger. *Ibid.* 249-56. When rats were fed olive oil or tallow with or without 5-15% of D-labeled sterol, the fat absorption remained constant. When rats were fed D-labeled tripalmitin alone or with a D-labeled sterol, the absorption was 46% for cholesterol, 28% for sitosterol, and 27% for cholestanol while absorption of tripalmitin was about 66% in all cases. The sterol content of the intestinal wall was about twice as high during absorption of cholesterol as during absorption of sitosterol. (*C. A.* 50, 1142)

The nature of the lamprey visual pigments. F. Crescitelli (Dept. Zoology, U. Calif., Los Angeles). *J. Gen. Physiol.* 39, 423-35 (1956). Pigments were extracted from dark-adapted eyes of the land-locked sea lamprey, *Petromyzon marinus*, and the Pacific Coast lamprey, *Entosphenus tridentatus*. Detailed studies of the absorption spectra of the extracts, both before and after selective bleaching by light of different wave lengths, led to the conclusion that the photolabile pigments were members of the rhodopsin group. Thus, the lamprey is shown to be an animal spawning in fresh water but containing rhodopsin, rather than porphyropsin, in the retina. The primitive phylogenetic position of the lamprey suggests that rhodopsin was the visual pigment of the original vertebrates.

Injectable penicillin repository preparation containing oil and gelled oil. W. M. Ziegler (by mesne assignment to American Cyanamid Co.). *U. S. 2,734,844.* An injectable antibiotic preparation, capable of maintaining effective therapeutic blood levels over an extended period of time, is prepared by coating particles of a therapeutic salt of penicillin with a gel consisting of an innocuous non-toxic oil and 1 to 10% of a ferric salt of a higher fatty acid.

• Drying Oils and Paints

Raymond Paschke, Abstractor

Proposed standards and methods of test. Anon. *Off. Dig.* 28 (372), 5 (1956). The A.S.T.M. tests described include (1) heptane number of hydrocarbon solvents, (2) nitrocellulose diluting power of hydrocarbon solvents, (3) roundness of glass spheres, and (4) total chlorine in polyvinyl chloride polymers and copolymers used for surface coatings.

Isophthalic acid challenges P. A. markets. Anon. *Chem. Eng.* 63 (3), 142 (1956). It is said that isophthalic acid (1) is more stable, (2) forms higher polymers, (3) makes higher melting resins, (4) produces tougher films, (5) is less toxic, (6) has lower vapor pressure, and (7) doesn't cake. Phthalic anhydride proponents claim (1) 25 years' experience, (2) rapid formation of half-esters, (3) lower melting point, (4) greater solubility, and (5) lower price.

Lanolin in putty. C. A. Acaster (Croda, Ltd., England). *Off. Dig.* 28 (372), 27 (1956). Replacement with lanolin of about half the linseed oil content of putty gives a product of improved storage stability and durability. A slight change in manufacturing technique is required, and the product is rather harder to handle in cold weather.

A survey of novelty finishes. H. Burrell (Interchemical Corp., Cincinnati, Ohio). *Org. Finishing* 17 (1), 16 (1956). This article covers pearlescent, mirror, and multicolor finishes.

Coatings. H. Burrell (Interchemical Corp., Cincinnati). *Ind. Eng. Chem.* 48, 28A (1956). The 1955 annual review.

Glyceride oils for surface coatings. Treatment with di-tert-butyl peroxide. R. W. Tess and H. Dammenberg (Shell Dev. Co., Emeryville, Calif.). *Ind. Eng. Chem.* 48, 339 (1956). Treatment of vegetable and fish oils with 3 to 8% of di-tert-butyl peroxide at 135° to 175° increased molecular weight without increase in acidity or appreciable loss of unsaturation. These changes, evident to different degrees in sardine, herring, and linseed oils, were dependent on amount of peroxide and manner of treatment. Physical constants and ultraviolet and infrared absorption spectra of the products were consistent with a chemical mechanism for dehydrodimerization accompanied by isomerization of double bonds. The process offers a new method for the preparation of oils of increased molecular size. Compared to heat-bodied oils of equal molecular weight, the treated oils have higher iodine values, lighter colors, lower viscosities, lower acid numbers, and better drying properties.

Accelerated tests for mildew resistance of oil paints. R. M. Evans and E. G. Bobalek (Case Institute, Cleveland, Ohio). *Ind. Eng. Chem.* 48, 122 (1956).

Comparative properties of protective coatings. G. F. Gilbert, Jr. (Atlas Mineral Products Co.). *Paint Ind. Mag.* 70 (12), 10 (1955). All the important types of coatings were compared. Properties especially noted were resistances to (1) sunlight and weather, (2) stress and impact, (3) abrasion, (4) water, (5) heat, (6) salts, (7) solvents, (8) alkalies, (9) acids, and (10) oxidation.

Beta tung oil. J. Greenfield (Nat. Tung Oil Marketing Coop., Inc.). *Am. Paint J.* 40 (2), 100 (1956). A comparison of the properties of the alpha and beta forms of the oil is given. The faster reactions of the beta form are emphasized.

A procedure for preparing free paint films. J. Harris (Nat. Res. Council, Ottawa, Canada). *Off. Dig.* 28 (372), 30 (1956). The paint film is applied to the gelatin surface of double weight matte or semi-matte photographic paper. When dry, the film is removed by placing the back of the paper in contact with a wet blotter, the absorbed water softening the gelatin.

Comparison of paint odors by sensory panel techniques. K. S. Konigsbacher and M. Berdick (Evans Res. and Dev. Corp., New York). *Off. Dig.* 28 (372), 32 (1956).

Some aspects of conjugation in drying oils. J. D. von Mikusch (Res. Lab., Unilever N.V. Hamburg-Harburg, Ger.). *Off. Dig.* 28 (372), 44 (1956). A comprehensive review with 60 references. The chemical history of conjugation, its role in analysis, and its effect upon technological properties is described.

Infrared analysis of paint vehicles based on alkyd-nitrogen resin blends. C. D. Miller and O. D. Shreve (E. I. du Pont Co., Phila., Pa.). *Anal. Chem.* 28, 200 (1956). A satisfactory chemical method is given for estimating the urea formaldehyde-melamine resin ratio in a paint vehicle comprising both of these in admixture with an alkyd resin. The method is based on infrared absorbance measurements at 5.8, 6.1, and 12.55 microns on thin vehicle films and affords a rapid means for estimating each individual resin component in typical two- and three-component alkyd-nitrogen resins blends. Results obtained on synthetic mixtures of known composition indicate a degree of accuracy and precision sufficient for many practical applications.

Glycerine alkyds using isophthalic acid. C. S. Miner and John D. Hind (The Miner Laboratories, Chicago, Illinois). *Off. Dig.* 28 (372), 17 (1956). The advantages of making mixed-isomer alkyds containing optimum proportions of phthalic anhydride and isophthalic acid are: (1) Economy in the use of glycerine. (2) Glycerine resins can be advanced to the highest useful viscosities in a wide oil-length range without danger of premature gelation. (3) Films which show better color, good gloss, good through-drying, and a higher degree of hardness with undiminished abrasion resistance and flexure and impact strength. These advantages are most evident whenever the amount of isophthalic acid used is sufficient to give a high degree of polymerization, for then the unique strength and toughness of very long glyceryl phthalate molecules is fully realized. The critical amounts of isophthalic acid necessary depend on oil length and have been determined for a series of soy-oil resins.

Trends in glycerine sources and demand. E. S. Pattison(Assoc. Am. Soap and Glycerin Producers, Inc.). *Am. Paint J.* 40(22), 40(1956).

Organic finishing progress in 1955. H. Preuss. *Org. Finishing* 17(1), 4(1956). A review with 56 references.

Preparation and properties of polyurethane coatings. C. B. Reilly and M. Orchin(U. Cincinnati). *Ind. Eng. Chem.* 48, 59 (1956). The leading edges of high speed aircraft are rapidly eroded by flight through rain. An organic coating to protect aluminum against such rain erosions should, among other things, adhere strongly to the metal and be elastic and abrasion resistant. A polyurethane coating prepared from 2,4-tolylenediisocyanate and poly-(ethylene adipate) and cross linked by reaction with ethanolamine gave outstanding performance in mockup tests. The polymer had an extremely high tensile strength. The probable effect on chemical structure of varying the molar proportions of ingredients is discussed.

Glycidyl ether reactions with alcohols, phenols, carboxylic acids, and acid anhydrides. L. Shechter and J. Wynstra(Bakelite Co., Bloomfield, N. J.). *Ind. Eng. Chem.* 48, 86(1956). Epoxy resin curing processes are complicated in their chemistry in that competitive reactions are possible. Model compound reactions and analytical procedures were set up to estimate the relative significance of the different possible routes in the reactions of a glycidyl ether with alcohols, phenols, carboxylic acids, and acid anhydrides. Noncatalyzed, these reactions were sluggish enough to require temperatures of 200° or higher to proceed at a reasonable rate; all the possible competing reactions were found to take place. With the addition of a base catalyst these reactions were considerably accelerated, and with acidic reactants they became highly selective. A generalized reaction mechanism suggested by these results is proposed, and certain other phenomena are shown to be consistent with it.

Glycidyl ether reactions with amines. L. Shechter, J. Wynstra, and R. P. Kurkjy(Bakelite Co., Bloomfield, N. J.). *Ind. Eng. Chem.* 48, 94(1956). The chemistry of cure of epoxy resins by amine hardeners was studied using model compound reactions and suitable analytical procedures. The aliphatic amine-glycidyl ether reaction was inherently very rapid but strongly influenced by steric factors. Aromatic amines were much less reactive. Hydroxyl groups generated during the reaction or provided by the addiiton of solvent accelerated an amine-glycidyl ether reaction markedly. In all cases the hydroxyl groups served only as a catalyst for the reaction and not as a serious contender for epoxide in competition with amine. A mechanism to explain this accelerating effect is proposed and should be useful in assessing present-day hardeners and designing new ones for epoxy resins.

The protection of structural steel. The physical examination of paint in relation to their practical performance. H. W. Talen(Paint Res. Inst., Rijswijk, Netherlands). *Chemistry and Industry* 1955, 1564.

• Detergents

Lenore Petschaft Africk, Abstractor

A spectrophotometric method for the determination of cationic detergents. A. V. Few and R. H. Ottewill(Cambridge Univ., Cambridge, Engl.). *J. Colloid Sci.* 11, 34–8(1956). A method has been developed for the determination of cationic detergents in aqueous solution at concentrations of ca. 10^{-5} *M*. The analysis depends upon the formation of a complex between the detergent and an anionic dye, and the quantitative extraction of the complex into an organic phase in which the dye itself is insoluble. The intensity of color in the organic phase is then directly proportional to the concentration of detergent. Satisfactory analyses have been achieved using octyltrimethylammonium bromide, dodecyltrimethylammonium bromide, cetyltrimethylammonium bromide, and dodecylpyridinium bromide. The method is insensitive to wide variations in pH and salt concentration of the detergent solution.

Some aspects of occupational dermatoses. J. V. Klauder(Philadelphia). *J. Am. Med. Assoc.* 160, 442–8(1956). Causes of occupational dermatoses are reviewed. They include primary irritants, direct or indirect result of accident or injury, sensitizing substances causing allergic dermatitis, wet work-water alone, soap and water, and alkaline salt detergents—and cleansing agents applied to the skin.

Structure of the sodium soaps from sodium butyrate through sodium stearate. G. T. Kokotailo(Temple Univ., Philadelphia, Pa.). *Univ. Microfilms*, Publ. No. 12,872, 84 pp. *Dissertation Abstr.* 15, 1519(1955). (*C. A.* 50, 1340)

Glycerol. Its production in soap manufacture. Advantages and disadvantages of its treatment by ion-exchange resins compared with distillation. R. Eckelaers. *Rev. francaise corps gras* 2, 681–90(1955). **Cooling and molding of soap by the process "Meccaniche Moderne."** M. Libault. *Ibid.* 691–4. **The Mazzoni process.** J. Ricard. *Ibid.* 695–8. (*C.A.* 50, 2189.)

Rapid method for determination of the amount of fatty acids in toilet soap. A. S. Moldavskaya and E. S. Dmitrieve. *Masloboina-Zhirovaya Prom.* 21(6), 21–2(1955). An indirect method is described for determining the amount of fatty acids in toilet soap (I) when Chizhova's apparatus for determination of moisture in I is used. It consists essentially of 2 horizontal Al plates electrically heated to 160–170° between which I to be dried is placed in paper envelopes. Percentage of fatty acids $= 100 - (x + 0.6 + 0.5 + 1.5)/1.08$, where x is percentage of moisture in I, 0.6 and 1.5 are its average electrolyte and glycerol contents, respectively, 1.08 is the transference number for the fatty acids as determined by the neutralization procedure, and 0.5 the ZnO content of I. The agreement between standard- and proposed-method values was well within the limits of experimental error. (*C. A.* 50, 2193)

A contribution to the problem of ash deposition in textile material during washing. R. Monch. *Textil-u. Faserstofftech.* 5, 434–6(1955). Experiments on 5 hanks of Perlon, Trelon, viscose rayon, cuprammonium rayon and spun rayon yarn, which were washed 50 times for 30 min. at 95° (goods to liquor ratio 1:20) with various detergents, have shown that the ash contents of the washed yarn depend not only upon the washing process(hardness formers, and their reaction products, with the chemicals, especially alkali, used for washing) but also upon the textile material, increasing in the order Perlon, Trelon, cuprammonium rayon, viscose rayon, spun rayon. This fact is due to the structure of the polyamides which, owing to the very few and minute intermicellar spaces, offer little room for the deposition of the inorganic substances. The very high ash value in spun rayon yarn is not only associated with the fiber structure but results from subsequent deposits between the individual fibers in the yarn system. The incrustations generally increase with the use of alkali in addition to detergents, many of which, alone, are able to reduce even the original ash content of the fibers. The detergents used in the experiments did not include special products containing cellulose glycollate and/or anhydrous phosphates. The results are discussed and tabulated.

Determination of anionic detergents in surface waters and sewage with methyl green. W. A. Moore and R. A. Kolbeson(U. S. Dept. of Health, Education and Welfare, Cincinnati, Ohio). *Anal Chem.* 28, 161–4(1956). The methyl green procedure was designed to eliminate or lower interferences encountered in the determination of anionic detergents by the methylene blue method. Interferences from thiocyanate, nitrate, and nitrite ions were reduced greatly. The methyl green procedure is not affected by high concentration of sulfate, chloride, sulfite, and phosphate. Recoveries of alkyl sulfate added to river and lake waters as well as to domestic sewage were more consistent and more accurate when the methyl green procedure was used.

Salt solids removal from a glycerine recovery system. H. M. Muir(North Hollywood, Calif.). *Soap and Chem. Specialties* 32(1), 45–6, (1956). A brief description of the two most cammon types of salt removal systems now in operation is presented along with a newly developed unit process that allows an operation quite similar to the continuous centrifugal process, at a considerable reduction in initial operating and maintenance costs. The first stage of the unit process makes use of a countercurrent evaporator feed entering into a specially designed salt settling leg where the primary washing and classifying effects take place. The second stage of the process makes use of an efficient vibratory separating screen fitted with the secondary washing effect to wash and dewater the solids satisfactorily before final discharge.

High activity alkylolamide detergents. H. L. Sanders, O. E. Libman, and Y. D. Kardish(Ninol Labs., Inc., Chicago, Ill.). *Soap and Chemical Specialties* 32(1), 33–6(1956). A new series of high activity amine condensates containing over 90 per cent amide are described and designated as the Ninol "Extras." The "Extra" series are not as water soluble as the regular Ninols, due to the absence of the solubilizing by-products. They exhibit outstanding thickening and foam stabilizing power, and are highly effective in formulations such as liquid dishwashing detergents and shampoos.

Biochemical behavior of synthetic detergents. C. N. Sawyer, R. H. Bogan, and J. R. Simpson (Mass. Inst. Techn., Cambridge, Mass.). *Ind. Eng. Chem.* **48**, 236–40 (1956). The anionic and nonionic detergents used in commerce today appear to be subject to biological attack, but they vary greatly in their susceptibility even among a given class. This variation is believed to be largely related to differences in chemical structure and molecular size. Adaptation or acclimation of biological forms is important in evaluating their behavior. Tetrapropylene benzene sulfonate, the most important detergent in terms of current-day use, is extremely resistant to oxidation.

Role of polyphosphates in the wetting step of detergency. C. H. Schneider (Lehigh Univ., Bethlehem, Pa.). *Univ. Microfilms*, Publ. No. 13,047, 80 pp. *Dissertation Abstr.* **15**, 1509 (1955). (*C. A.* **50**, 1341)

Optical brighteners in detergents. A. E. Siegrist (Ciba, Ltd., Basel, Switz.). *Soap and Chem. Specialties* 31 (11), 44–7, 179, 181; (12) 58–61, 113 (1955). This is a review on production, suitability in various detergents, resistance to alkalies and Cl, behavior of various products with cotton, spun viscose, acetate rayon, wool, nylon, etc. 15 references.

New technique for applying detergents as spotting agents. H. E. Stanley (du Pont) and M. E. Davis (Atlas Powder Co.). *Soap and Chem. Specialties* 32 (1) 40–3, 163 (1956). To effect better soil removal, a number of surfactants, particularly non-ionics, were applied to the soiled area directly on the dry fabric. The surfactant was worked in thoroughly and the fabric flexed sharply. Then water was added and the surfactant and oily soil flushed away. This technique removed soil from synthetic fabrics more effectively than normal washing methods.

Detergent compositions. Thomas Hedley & Co., Ltd. *Brit. 739,817.* A detergent composition in finely divided solid form consists of a detergent, a water-soluble salt of an alkyl aryl sulfonic acid, and a caking inhibiting amount of a water-soluble salt of methyl sulfate which can be introduced in the course of a series type sulfonation.

Antiseptic detergent compositions. D. J. Beaver, P. J. Stoffel and R. S. Shumard (Monsanto Chem. Co.). *U. S. 2,730,502.* An antiseptic detergent composition consists of a detergent soap and from 1 to 3% by weight of a halogenated tris-phenol such as 4-chloro-a,a′-bis(5-bromo-2-hydroxy-m-tolyl)-2,6-xylenol.

Detergent and brightening composition. S. Pressner. *U. S. 2,730,503.* A detergent and whitening composition for synthetic materials such as nylon consists of an aminocoumarin type compound, which exhibits blue to violet fluorescence and is insoluble in water, dispersed in water containing a non-ionic surface-active agent and combined with an anionic detergent.

Method of making dustless soap powder. P. Bradford (Swift & Co.). *U. S. 2,730,507.* A method of treating comminuted soap to agglomerate soap dust particles into free flowing granules and eliminate the soap dust comprises mixing alkali with the comminuted soap, adding to the mixture at least about 5% by weight of a saponifiable higher fatty acid to wet thoroughly the soap particles and then thoroughly mixing the ingredients to form well-defined granules, the alkali present in sufficient quantity to saponify the higher fatty acid.

Soap manufacture. P. Bradford (Swift & Co.). *U. S. 2,730,539.* A low moisture content soap is made by adding to a mixture of saponifiable matter, containing only a small percentage of free fatty acids and solid alkali, the amount of water desired in the final product, saponifying the mixture at a temperature below the boiling point of water by the application of an intensive mechanical shearing action while applying high mechanical pressures to the mixture, and recovering as the product of such saponification, a soap of the desired moisture content.

Nitrogen-containing tarnish inhibitors in detergent compositions. H. S. Sylvester (Colgate-Palmolive Co.). *U. S. 2,731,420.* A built detergent composition normally tending to cause tarnishing of a copper base alloy in water solution consists of about 10 to 50% by weight of a synthetic detergent, about 10 to 80% of a water-soluble polyphosphate and about ½ to 5% of a nitrogen-containing compound such as diammonium phosphate, ammonium nitrate, diethylene diamine, etc., to inhibit the tarnishing.

Detergent compositions. R. D. Stayner (California Research Corp.). *U. S. 2,731,421.* A detergent composition characterized by a high degree of foam persistence in dilute aqueous solutions under conditions of agitation and in the presence of soil consists essentially of a water-soluble salt of a C_9–C_{18} mono-alkyl benzene sulfonic acid as its major organic detergent ingredient and from 5–20% by weight of a water-soluble salt of an N-alkyl imino diacetic acid, in which the alkyl group contains from 10 to 16 carbon atoms as a foam persistence improver and an inhibitor of skin irritation.

Non-soap detergent compositions. J. Ross (Colgate-Palmolive Co.). *U. S. 2,731,422.* The incorporation of minor amounts of fatty alcohols of about 12 to 18 carbon atoms in synthetic water-soluble sulfated and sulfonated aliphatic acyl-containing detergents having an acyl radical of about 8–22 carbon atoms, gives improved foam stability and detersive power at certain selected washing concentrations.