ABSTRACTS . . . R. A. REINERS, Editor

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• Oils and Fats

Determination of acetic and isovaleric acids in butter by the partition coefficients of the soluble volatile acids in water and carbon tetrachloride. New indexes. V. Chioffi (Lab. chim. provinciale, Rovigo, Italy). *Boll. lab. chim. provinciali (Bologna)* **7**, 105–10 (1956). The distillate from the Reichert value determination is extracted with carbon tetrachloride, the aqueous layer is again extracted with carbon tetrachloride. Titration of the aqueous and carbon tetrachloride layers of both extractions with sodium hydroxide solution gave two partition coefficients. Tabulation of these coefficients for various mixtures gives evidence of various degrees of adulteration of butter with dolphin oil and foreign fats. (*C. A.* **51**, 5322)

Detection of hydrogenated fish oils in butter. G. Cerutti (Univ. Modena, Italy). *Latte* **29**(12), 3–7 (1955). Alternate drops of melted, decolorized, and filtered butter and fish oils placed 5 cm. apart linearly 3 cm. from the basal edge of a sheet (30 by 40 cm.) of Schleicher and Schull paper, eluted upwards 16 hours with pure isobutyl alcohol gave fluorescent chromatograms with dolphin, whale, and mixed fish oils but no fluorescence with butter or cacao butter. The presence of foreign fats in butter is detectable down to 5%. (*C. A.* **51**, 5321)

Detection of vegetable-oil products in ghee. R. N. Chakravarti and S. Dash. *Bull. Calcutta School Trop. Med.* **4**, 165–6 (1956). Use of sesame oil as an indicating agent is unsatisfactory. A chemical of appropriate stability and having a specific method of detection like quinine makes a more satisfactory indicating agent. (*C. A.* **51**, 5321)

A continuous (industrial) installation "Leningrad" for the extraction of fat. A. A. Lapshin (Technol. Inst. Refrigerating Ind., Leningrad). *Myasnaya Ind. S.S.S.R.* **27**(5), 22–4 (1956). An industrial installation for the continuous extraction of fat, called "Leningrad" is described. Hot pork and beef fat is taken just after killing of the animals, heated to 80°, and subjected to the hot extraction under the water-steam pressure of 100–30 kg. per cm. The efficiency of the extraction is 1500 and 1250 kg. per hour of pork and beef fat respectively. (*C. A.* **51**, 6033)

A simple determination of vitamin A in margarine. I. A simple method to remove the artificial dyes, yellow AB and OB. Koji Naito and Takajiro Mori (Tokyo Univ.). *J. Vitaminol* **2**, 283–6 (1956). **II. The reaction between yellow AB or OB and aldehydes.** *Ibid.* 287–95. Yellow AB and OB condense with acetaldehyde to form phenylazoacetaldehyde 2-naphthylimide or o-tolylazocetaldehyde 2-naphthylimide which are easily removed by acetic acid. (*C. A.* **51**, 6033)

Oil and protein content of seed of leading cotton varieties in Oklahoma. J. M. Green, E. S. Oswalt and S. M. Ayoub. *Oklahoma Agr. Expt. Sta. Circ.* **M-283**, 9 pp. (1956). Seed of 12 varieties grown in the Paradise community in 1954 were analyzed for percentage kernels, hulls, linters, oil in kernels, protein of whole seed, and weight of seed. Kernel percentage was most directly related to percentage oil in whole seed in all varieties. Oil in whole seed varied from 15.93 to 20.71%. The oil content of seed of 11 varieties grown in 6 eastern Oklahoma locations, and of 9 varieties at 4 western Oklahoma locations, also show significant variety and location differences, varying from 13.7 to 20.8%. Protein content determined in 1955 showed less differences than did the oil, varying from 19.8 to 25.3%, but variety and location effects were still significant. (*C. A.* **51**, 6188)

Improved fat extraction from bones. S. Matrozova and S. Safonov. *Myasnaya Ind. S.S.S.R.* **27**(5), 34–5 (1956). Bones freed from external fat were heated to 60–70° and then hot centrifuged for 2–3 min. with a Russian made "TsFL-2-25 industrial centrifuge" to facilitate the fat extraction. Cattle bones yield 4.2–8.7% fat by the method. (*C. A.* **51**, 6187)

Solvent segregation of vegetable oils. II. Safflower oil. G. K. Loshi, D. Rebello and S. M. Shah (Univ. Bombay). *J. Appl. Chem.* **6**, 281–3 (1956). It was not found possible to effect separation of an unsaturated fraction by using furfural or mixtures of furfural and hexane. (*C. A.* **51**, 6188)

The solid isooleic acid contents of natural fats. R. Narayanan and A. R. S. Kartha (Indian Agr. Res. Inst., New Delhi). *J. Sci. Ind. Research (India)* **15B**, 368–75 (1956). The solid isooleic acid content is calculated from weight of lead salts formed and iodine value. Results show that solid positional isomers of oleic acid are found in all fats and oils in small quantities. The presence of small amounts of these acids indicates that any predominant unsaturated monoethenoid acid can be accompanied by small proportions of various positional isomeric acids. It is suggested that the fatty acid synthesizing enzyme system cannot limit production to a single monoethenoid fatty acid, and the fatty acid dehydrogenation enzyme cannot limit dehydrogenation to one particular position. (*C. A.* **51**, 6187)

Analysis of mixtures of higher saturated normal fatty acids. Comparison of reversed-phase partition chromatography and ester fractionation. G. A. Garton and A. K. Lough (Rowett Res. Inst., Aberdeenshire, Scot.). *Biochem. et Biophys. Acta* **23**, 192–5 (1957). The reversed-phase partition chromatographic method of Howard and Martin for higher fatty acid analysis was extended to include the odd-numbered normal acids, with 9–19 carbon atoms. No odd-numbered fatty acids were detected chromatographically in the whole groups of mixed saturated fatty acids, though traces of tridecanoic acid were detected when the fatty acids from individual ester fractions were analyzed chromatographically. (*C. A.* **51**, 6187)

The sterols of vegetable oils. II. Sulfur olive oil. J. Gracián Tous and J. Martel. *Grasas y aceites* (Seville, Spain) **7**, 202–4 (1956). Sterols are separated from oilve press cakes by extracting with petroleum ether and precipitating as digitonides in alcoholic solution. The sterols are similar to those found in olive oil (melting point 132–5° and $[\alpha]_D^{25°}$ 32.1–32.8). By this method 0.35–0.37% sterols were isolated. (*C. A.* **51**, 6188)

Production of hydrogenated fat for candy-chocolate industries. N. V. Vengerova and Z. M. Askinazi. *Masloboino-Zhirovaya Prom.* **22**(8), 19–21 (1956). Two batches of hydrogenated peanut oil; melting point 35.5 and 36.8°; transparency 37, 38; solidifying point 28, 29°; and hardness 580 and 780 g./cm. were used successfully in concentrations of 10–15 and 35% respectively, as substitutes for cocoa butter in manufacture of chocolate candy. Hardest chocolate was produced when the above were used, whereas hydrogenated sunflower oil produced the softest, and hydrogenated cottonseed and sesame oil produced chocolate of intermediate hardness. (*C. A.* **51**, 6187)

Behavior of dolphin oil on sulfonation. Gh. Alexa, Eug. Popa, and N. Ioan. *Bul. inst. politeh. Iasi* **1**(1–2), 137–47 (1955). A description is given of a method for sulfonation of dolphin oil. (*C. A.* **51**, 6188)

Trace elements in edible fats. III. Some applications of Weisz's "annular stove" microtechnique. A. Vioque. *Grasas y aceites* (Seville, Spain) **7**, 195–201 (1956). By use of the technique of Weisz, Al, Cu, Fe, Mn, Sn, and Zn were detected in edible fats. As little as 5–10 p.p.m. of iron were determined semiquantitatively. (*C. A.* **51**, 6033)

Calculation of the solubility of the higher fatty acids in water from statistical thermodynamics. S. Baykut (Univ. Istanbul). *Rev. fac. sci. univ. Istanbul* **21**, 92–101 (1956). Calculations involving the physical properties of the acid in terms of refractive index and the number of carbon atoms in the molecule are made and a formula is developed. The formula for the odd number of carbon atoms differs from that for the even series. The fatty acids form solvated solutions. (*C. A.* **51**, 5507)

Flour lipides. D. K. Mecham and J. W. Pence (U. S. Dept. of Agr., Albany, Calif.). *Baker's Dig.* **31**, 40–6, 79 (1957). A review.

The examination of waxes. C. L. Jones. *Paint Technol.* **20**, 361–4 (1956); **21**, 9–10, 13 (1957). Evaluation and control testing of waxes is described. (*C. A.* **51**, 6188)

Wax and wax-like materials. G. W. LeMaire(Colorado School Mines, Golden). *Quart. Colo. School Mines* 52(1), 72 pp.(1957). Review with 41 references. (*C. A.* **51**, 5448)

Hydrogenation of cottonseed oil with Raney nickel catalyst. D. V. Sokol'skii and I. I. Voloshin. *Izvest. Akad. Nauk Kazakh. S.S.R., Ser. Kihm.* **1956**(10) 63–8. The hydrogenation curves of cottonseed oil with Raney nickel are shown. Hydrogenation is possible at 40–150°, optimum at 130–40°. With 0.15–0.25% catalyst hydrogenation takes 3–4 hours and the catalyst can be used up to 4 times. The catalyst is prepared by caustic leaching the aluminum-nickel alloy at 120–30°. At 40–150° range of temperature of hydrogenation, the activation energy for the hydrogenation is 4000–5000 cal./mole. At temperatures over 160° the catalyst becomes inactive. (*C. A.* **51**, 5447)

Vegetable fats. I. Mexican coyol. F. Giral and Celina Peralta (Natl. Univ., Mexico). *Ciencia* **16**(1–3), 7–9(1956). The seed of coyol(*Acrocomia mexicana*) yields 68.6% petroleum ether extract with the constants d^{25}_{25} 0.9141, n^{25}_{D} 1.4575, unsaponifiable 0.92%, acid number 49.9, saponification number 248.9, iodine number 15.6, and Hehner index 85.6%. The acids have the following composition: capric 6.2, lauric 44, myristic 10.5, palmitic 11.9, stearic 1.9, oleic 20.2, and linoleic 5.3%. (*C. A.* **51**, 5445)

Detection of parathion in olive oil. II. Detection in artificially colored oils. R. Biffoli(Lab. chim. provinciale, Florence). *Boll. lab. chim. provinciali(Bologna)* **7**, 111–2(1956). Olive oils artificially colored with fat-soluble dyes when submitted to reduction, diazotization, and coupling give the same red color as oils containing parathion. Interference is prevented by exhaustive extraction with methyl cyanide followed by shaking with active carbon. The loss in oils containing parathion by adsorption on active carbon is compensated by comparative determinations on oil samples with added parathion. (*C. A.* **51**, 5447)

Effect of antioxidants on the stability of orange oil. W. M. Gearhart, B. N. Stuckey and E. R. Sherwin(Eastman Chem. Prod., Inc., Kingsport, Tenn.). *Food Tech.* **11**, 260–1(1957). It is shown that BHA or BHT can effectively stabilize the autoxidation of D-limonene and orange oil with the BHA showing slightly better results than the BHT. An active oxygen method, run at a temperature of 65°, was used as a rapid test for determining the stability of orange oil, the end point being 20 meq. of peroxide per kg. of oil. The critical peroxide value for the end of the induction period of orange oil is 40 meq. per kg. of oil.

Operating variables in hydrogenating cottonseed oil. I. A. Eldib and L. F. Albright(Univ. of Oklahoma, Norman, Okla.). *Ind. Eng. Chem.* **49**, 825–931(1957). Cottonseed oil was hydrogenated in a dead-end hydrogenator over wide ranges of temperatures, pressures, nickel catalyst concentrations, and agitation. Sufficient agitation was provided in most runs to eliminate mass transfer resistances. When the mass transfer resistances were negligible, rate of hydrogenation was directly proportional to pressure and catalyst concentration and linear with respect to temperature. Effects of the operating variables were determined for selectivity and iso-oleic acid formation. A mechanism for selectivity is proposed, based on preferential physical adsorption of linoleic acid as compared to oleic acid. The mechanism of Allen and Kiess explains isomerization. The rate-controlling step of hydrogenation is probably the surface reaction between atomic hydrogen which may be chemisorbed, and physically adsorbed unsaturated fats.

Determination of 2,6-Di-tert-butyl-p-cresol in edible fats by ultraviolet spectrophotometry. Marjorie A. Phillips and R. D. Hinkel(Research Dept., Koppers Co., Inc., Verona, Pa.). *J. Ag. and Food Chem.* **5**, 379–384(1957). 2,6-Di-*tert*-butyl-*p*-cresol is a very effective agent for inhibiting oxidation in organic substances, including edible fats. To maintain effective control over food processing operations and ensure adherence to governmental regulations, a quantitative method was developed for determining 20 to 200 p.p.m. in lards in the presence of other allowable preservatives.

Catalytic liquid-phase hydrogenation. R. H. Price and D. B. Schiewetz(University of Cincinnati, Cincinnati, Ohio). *Ind. Eng. Chem.* **49**, 807–813(1957). Effects of known variables were experimentally evaluated in a kinetic study of catalytic liquid-phase hydrogenation in a semiflow system. It is concluded that in the major part of the work, the observed rate of reaction was controlled by mass transfer of hydrogen from the bulk solution to the solid-liquid interface. The criterion that effects of mass transfer are eliminated when observed reaction rate is independent of stirring speed, is a necessary but not sufficient condition. Data given indicate the importance of hydrodynamic factors for such stirred systems, which must be more fully explored before fundamental relationships useful for engineering design can be formulated.

Catalytic hydrogenation of methyl laurate to lauryl alcohol. J. M. Church and M. A. Abdel-gelil(Dept. of Chem. Engineering, Columbia Univ., New York, N. Y.). *Ind. Eng. Chem.* **49**, 813–817(1957). Optimum conditions for hydrogenating methyl laurate to the corresponding alcohol were studied, the type, amount, and method of preparing catalyst, together with temperature, pressure, and time. The most effective catalyst was prepared from copper nitrate and sodium dichromate by calcining the precipitated copper chromate at 300° under carefully controlled conditions. Using 4% of this catalyst at a temperature of 300° and pressure of 2700 pounds per square inch, the hydrogenation rate was fast, and a theoretical yield of over 90% of alcohol was obtained. Repeated hydrogenations re-using the same catalyst gave no loss of catalytic activity and yields of alcohol were sustained. These results suggest that a commercial-scale continuous hydrogenation process could be developed for rapidly converting various fatty esters to their corresponding alcohols in good yield.

Application of gas-liquid partition chromatography to the study of volatile flavor compounds. W. G. Jennings(Dept. of Dairy Industry, University of Calif., Davis). *J. of Dairy Sci.* **40**, 271–279(1957). Small amounts of compounds of bacterial and of chemical origin are not usually detected in milk products by ordinary chemical methods. Gas-liquid partition chromatography will, in some cases, remove this quantitative barrier and make it possible to more easily classify off-flavors.

Displacement separation of some of the component fatty acids of milk fat. S. Kuramoto, J. J. Jezeski(Dept. of Dairy Husbandry, University of Minn., St. Paul), and R. T. Holman. *J. of Dairy Sci.* **11**, 314–322(1957). Nine fatty acids of milk fat, from butyric to stearic, were separated by displacement chromatography. This method appears to be adaptable to the separation of volatile and nonvolatile fatty acids by first saponifying the fat and then acidifying the soaps on the column just prior to carrier displacement analysis.

The activation factor of atmospheric origin in the acidification of palm oil. L. Thuriaux(INEAC, Yanggambi, Belgian Congo). *Compt. rend 27ᵉ congr. intern. chim. ind., Brussels,* **1954**, 3; *Industrie chim. belge* **20**, Spec. No. 915–8(1955). The activation factor, probably of atmosphere origin, is destroyed by heating at 80°. (*C. A.* **51**, 4028)

An oxygenated fatty acid from the seed oil of Hibiscus esculentus. Mary J. Chisholm and C. Y. Hopkins(National Research Council, Ottawa). *Can. J. Chem.* **35**, 358–364(1957). The fatty acids of okra seed oil (*Hibiscus esculentus* L.) were examined. Acetylation of the oil, followed by saponification and separation of the acids, gave 12,13-dihydroxyoleic acid. From this and other evidence it is concluded that 12,13-epoxyoleic acid is present as a constituent of the glycerides. An oxygenated acid has not been identified previously in seed oils of this plant family (*Malvaceae*). 9-Hexadecenoic acid was also found. The total fatty acid composition was determined by distillation of the methyl esters and analysis of the distilled fractions. The percentages of the acids identified were estimated as follows: 9-hexadecenoic 0.6, palmitic 29, linoleic 39, oleic 23, stearic 2, 12,13-epoxyoleic 3, arachidic <1. Myristic, eicosenoic, and trienoic acids were not detected and, if present, are judged to have been in amounts less than 1% of the total.

Greases prepared by alkali fusion of fatty materials. A. J. Morway and A. Beerbower(Esso Research & Engineering Co.). *U. S. 2,790,769.* Lubricating greases for use at high temperatures are prepared by saponifying a mixture of a mineral oil and members of the following groups: (a) mixtures of saturated high molecular weight fatty acids and glycerine, (b) mixtures of unsaturated fatty acids and glycerine in amounts equivalent to those in triglycerides, and (c) glycerides of high molecular weight fatty acids. The amount of sodium hydroxide used for saponification is 100 to 125% of the acid equivalents. After saponification is completed, heating is continued at 530 to 570°F. until evolution of hydrogen ceases. The mass is cooled before being packaged.

Pie crust mix. R. W. Callaghan and T. R. Freer(General Mills, Inc.). *U. S. 2,791,506.* A dry pie crust mix is made by blending flour and 25 to 42% of fat, and then working the mixture under high pressures to thoroughly grease the shortening into the flour and form a cohesive, substantially homogeneous dough-like mass. The product is finally formed into blocks and packaged.

Process for refining tall oil. C. R. Outterson and J. W. Eldridge (The Albemarle Paper Manufacturing Co.). *U. S. 2,791,577.* The crude tall oil is water-washed, preheated to a maximum temperature of 325°F. and then mixed with not over 10% by wt. of concentrated phosphoric acid. Sludge and residual acid are removed, and the tall oil is distilled under vacuum.

Processes of enhancing phosphatides and other organic materials. D. J. Hennessy and R. J. Mosby(American Lecithin Co., Inc.). *U. S. 2,791,594.* Lecithin is modified by treatment with peracetic acid and then with a dioxane-sulfur trioxide complex at 25 to 50°.

Obtaining pure palmitic acid from vegetable oil acids. F. C. Magne, E. L. Skau and R. R. Mod(U.S.A., Secy. Agr.). *U. S. 2,791,596.* The raw material is a mixture of acids in which palmitic acid (P), other saturated fatty acids (S), and unsaturated fatty acids (U) are present in weight proportions such that $P/(P+S)$ is greater than 7/10 and $P/(P+S+U)$ is less than 1/2. The mixed acids are converted to amine salts by mixing with a member of the group consisting of cyclohexylamine, benzylamine, and a solution of cyclohexylamine or benzylamine in a liquid amine that forms a palmitic acid salt melting below 65°. The quantity of cyclohexylamine or benzylamine is sufficient to neutralize the palmitic acid. The resulting amine salts are dissolved in an inert organic solvent from which the palmitate is allowed to crystallize. The crystals are removed and decomposed by the action of a strong acid. The isolated palmitic acid is substantially pure.

Stabilization of organic compounds. J. A. Chenicek(Universal Oil Products Co.). *U. S. 2,792,307.* Fatty material is stabilized against oxidation by the addition of a β-alkylthioamide having at least two carbon atoms in a straight chain arrangement with the carbonyl group, a sulfur atom in the beta position to the carbonyl, and a nitrogen atom attached to the carbon of the carbonyl group.

Processing vegetable oils. L. P. Hayes and H. Wolff(A. E. Staley Manufacturing Co.). *U. S. 2,792,411.* As an improvement in the usual refining operation, the degummed vegetable oil is washed with an aqueous solution of tannic acid.

Formylated and acylated fatty compounds and the corresponding hydroxylated compounds. D. Swern, H. B. Knight and R. E. Koos. *Brit. 755,731.* Unsaturated fatty compounds are treated with formic or acetic acid above 70° in the presence of mineral catalyst, e.g. $HClO_4$, to prepare acylated compounds which may then be hydrolyzed to the corresponding hydroxylated compounds including their isomers. The reaction probably occurs at either end of the double bond of the unsaturated fatty compounds to give a mixture of the possible isomers. (*C. A.* **51**, 5448)

Mixtures of mono-, di-, and triglycerides containing above 45% monoglycerides. *E. Mares. Czech. 85,770.* The addition of phosphoric acid, acetic acid, or acetic anhydride to products of esterification prevents, by inactivating the catalyst, disproportionation and raises yields of monoglycerides from 41 to 53% on the average. (*C. A.* **51**, 6189)

Dehydrated castor oil. M. A. Sivasamban, S. A. Saletore and S. H. Zaheer. *Indian 55,423.* Refined castor oil (1 kg.) is heated under a vacuum of 20–4 inches to 240°. Sodium bisulfate 4, sodium sulfite or zinc dust 5, and sodium bisulfate 20 g. are then added. The temperature is maintained at 240° until no more water passes over. The oil is quickly cooled in vacuum. (*C. A.* **51**, 6184)

Oleomargarine. Kaichi Oshiba and Tokuko Oshiba. *Japan. 1385.* A mixture of 72 l. whole milk pasteurized for 35 minutes at 65° and 1 l. of an oil containing vitamin B_1 and vitamin C is homogenized. The emulsion is treated by spraying a homogenized mixture of 26.25 kg. hydrogenated oil (melting point, 36–40°) and 11.25 kg. peanut oil with high pressure and allowed to stand for 72 hours for natural fermentation. The product is churned to separate water, fermented for 15 hours below 65°, and then worked into the butter form free from odor of hydrogenated oil. (*C. A.* **51**, 6040)

Purification of animal and vegetable oils. Shinichi Toyama, Hideo Marumo and Seiho Takao(Lion Fats and Oils Co.). *Japan. 2035.* The crude oil is treated with 1 or more alkali or alkaline earth metal compounds, with or without solvent. The impurities in the oil, such as mono- and diglycerides of fatty acids, are removed by treating with phthalic, maleic, or succinic acid or their anhydrides at temperatures below 200°. (*C. A.* **51**, 6189)

Polymerization of oils. M. V. Benenson, S I. Gorlovskii and N. Ya. Davydov. *U.S.S.R. 104,222.* For the polymerization of oils at 280–90°, polystyrene is used as catalyst in amounts of 0.2–1.5%. The catalyst is added either at the beginning of the process or after partial polymerization. (*C. A.* **51**, 6228)

FATTY ACID DERIVATIVES

Preparation of dicarboxylic acids. J. L. Ohlson and K. H. Spitzmueller(Swift & Co.). *U. S. 2,791,607.* A C_{10} to C_{24} chlorohydroxy substituted monocarboxylic acid or derivative is reacted with an alkali metal hydroxide at elevated temperatures. Dicarboxylic acids are separable from the reaction products.

Rust preventive composition. L. W. Sproule and J. L. Tiedje (Esso Research and Engineering Co.). *U. S. 2,791,510.* The composition comprises a predominantly nonaromatic hydrocarbon solvent having a boiling point between 150 and 450°F., 8 to 12% by wt. of paraffin wax having a melting point between 100 and 120°F. and a mol. wt. between 300 and 400, and 1 to 5% of a partial long-chain fatty acid ester of a polyhydric alcohol.

Basically substituted fatty acid 2-halo-6-methylanilides. Cilag Ltd. *Swiss 307,799.* The subject anilides, $2,6\text{-}QMeC_6H_3NHCORX$ ($Q = Cl$ or Br, $R =$ straight- or branched-chain alkyl, $X =$ secondary or tertiary amino group), and their salts having valuable local anesthetic properties, are synthesized. (*C. A.* **51**, 5117)

Basically substituted fatty acid amides. Cilag Ltd. *Swiss 311,645.* $PhOCH_2CH_2NMeCOCH_2N(C_2H_5)$, useful as a local anesthetic and intermediate, is synthesized by condensing $PhOCH_2CH_2NMeCOCH_2X$ with excess $NH(C_2H_5)_2$ or in the presence of basic condensation agents. $X =$ halogen or RSO_3 and $R =$ alkyl or aryl. (*C. A.* **51**, 5117)

• Biology and Nutrition

Serum lipide analysis by chromatography and infrared spectrophotometry. N. K. Freeman, F. T. Lindgren, Y. C. Ng and A. V. Nichols(Univ. of California, Berkeley). *U. S. Atomic Energy Comm.* **UCRL-3500**, 24 pp.(1956). A tentative method has been developed for the analysis of serum lipides by using chromatography and infrared spectrophotometry. The extracted lipides are separated into three fractions by successive elutions from a silicic acid-celite column with chloroform-hexane, chloroform, and methanol. By suitable infrared absorption measurements of these fractions in carbon disulfide solution, the amounts of cholesteryl esters, glycerides, total phosphatides, cholesterol, and free fatty acids can be estimated. The accuracy for a given component is somewhat dependent on the composition of the sample. In general, the probable error is about ±10% for the major components, slightly greater for unesterified cholesterol and fatty acids. (*C. A.* **51**, 5176)

The lipoproteins of stored liquid plasma. Laura E. Krejci, Lucile Sweeny, and J. Hambleton(Biochem. Research Foundation, Newark, Del.). *J. Franklin Inst.* **262**, 313–15(1956). Two lipoprotein components were found in liquid human plasma stored 19 months at room temperature when analyzed for lipoproteins by the technique of Gofman *et al.* (*C. A.* **44**, 4995). No lipoprotein was detected in plasma after storage for 6 years at room temperature followed by 6 years under refrigeration. (*C. A.* **51**, 5252)

The vitamin A content in different organs and tissues of cattle and horses. N. Nakonechnyi(Zoovet. Inst., Novocherkassk). *Myasnaya Ind. S.S.S.R.* **27**(5), 55–6(1956). The vitamin content in mature cattle and horse liver fluctuated between 23.4 and 915 and 101.8 and 1097.5 I.U./g. tissue; the values for pancreas were between traces and 32.5 and between 0 and 10.3 for cattle and horse, respectively. The calf, sheep and pork livers contained about 39, 459, and 45 I.U./g. tissue, respectively. The vitamin A content in the tissue depends on the vitamin supply with the feed and therefore it is much greater (1.5 times for cattle and about 3 times for horse) during the grazing period than during the winter feeding of the animals. (*C. A.* **61**, 5940)

Evaluation of a new method of serum cholesterol determination by direct colorimetry. P. Vannini(Univ. Bologna, Italy) and A. D. Vecchio. *Arch. ''E. Maragliano'' patol. e clin.* **12**, 793-801(1956). The method of Zlakis, *et al.* (*C. A.* **47**, 6487) was applied to 165 and 17 serums of healthy and icteric subjects, respectively, in comparison with the method of Abell *et al.* (*C. A.* **46**, 5120) based on the colorimetric reaction of Liebermann-

Burchard. Although the values by the method of Zlatkis were higher by 7% and although an interference of bilirubin and bile salts on the reaction was observed, nevertheless the method is considered useful for routine work because of its simplicity, rapidity, and the small amount of material required. (*C. A.* **51**, 5177)

Determination of unsaturated fat acids in biological materials. F. Corsini(Univ. Bologna, Italy). *Clin. pediat.* **38**, 403–15 (1956). A critical review and discussion of spectrophotometric methods for determining linoleic, linolenic and arachidonic acids in milk and blood. (*C. A.* **51**, 5177)

Detection of the participation of fatty acids from dietary or depot fats in the formation of liver fat and in the fattening of the liver resulting from lack of choline. H. Wagner, Esther Seelig and K. Berhard(Univ. Basel, Switz.). *Hoppe-Seyler's Z. physiol. Chem.* **306**, 96–103(1956). The data showed that fatty acids from dietary and depot fats were involved in the formation of liver lipides and that the effect is much more pronounced in the case of choline deficiency (*C. A.* **51**, 5226)

Food value of cottonseed, cake, and oil collected from oil mills in Texas. J. C. Goodbery, S. D. Lesesne and S. A. Tremazi. *Texas J. Sci.* **8**, 470–3(1956). Six cottonseed samples showed the following range in composition: moisture 6.59–10.72; oil 16.17–17.42; nitrogen (dry basis) 2.94–3.30%. Expeller cake and hexane cake had moisture 7.79, 7.49; oil 9.79, 0.49; and nitrogen on dry basis 6.38, 6.30%. Five samples of crude oil had the following range: *d* 0.913–0.933, *n* 1.4649–1.4694, acid value 3.26–21.60, saponification value 190.3–200.2, and iodine value 100.9–110.5. (*C. A.* **51**, 5325)

Differential effect of dietary fat and weight reduction on serum levels of beta-lipoproteins. W. J. Walker, N. Weiner, and L. J. Milch(Brooke Army Hosp., Fort Sam Houston, Tex.). *Circulation* **15**, 31–4(1957). Twenty-five subjects, most of whom had coronary artery disease, were given a diet in which animal fat composed approximately 73% of the calories. While on this diet, the subjects sustained an average weight loss of 21.7 lb. After this, weights were kept constant as the high fat diet was ingested in increased quantities. Finally, the subjects were kept at constant weight on a diet containing less than 50 g. per day of fat. Serum levels of S_f 0–12 beta-lipoproteins rose on the high fat diet and fell on the low fat diet apparently independent of weight change. The S_f 20–400 fraction was lowered by negative caloric balance and weight reduction despite ingestion of high amounts of fats. The S_f 12–20 responded less strikingly to weight reduction and fat intake. (*C. A.* **51**, 5229)

The biological utilization of fats. L. Bianchi Cayama(Inst. nacl. nutric., Caracas). *Arch. venezolanos nutric.* **6**, 139–73 (1955). Fats were fed as 14% of the nutritionally adequate diets of rats for 10 weeks. Differences in nutritive value were evaluated in terms of body-weight increase, body-weight increase per g. food intake, and weight increase per 100 cal. eaten. On the basis of body weight alone, the group fed lards showed the greatest growth, coconut oil was second, and the other oils were third. On the basis of food and caloric efficiency, the group fed cottonseed oil, which showed the poorest body-weight response, showed good food-utilization value. Body-weight data are not a reliable index of the nutritive value of fats. The caloric efficiencies of two vegetable oils and lard were similar and were significantly superior to the caloric efficiencies of the hydrogenated oils. Coconut and cottonseed oils and lard showed the highest digestibilities and their digestibilities were significantly higher than those of hydrogenated oils. The more digestible oils showed better food utilization values than did the hydrogenated oils. No significant differences were found in the rate of absorption of the several oils and fats studied. (*C. A.* **51**, 5228)

Blood coagulation after a fat meal. R. Buzina and A. Keys (Univ. of Minnesota, Minneapolis). *Circulation* **14**, 854–8 (1956). The blood studies were made on blood drawn from 20 men at intervals of 1, 2.5, 4, and 5.5 hours after a meal of 300 ml. of 40% butterfat cream and after a meal similar in calories, but very low in fats. Whole blood coagulation time was shortened after the fatty meal, especially at 2.5 to 5.5 hours, but was essentially unaltered after a nonfatty meal or during continued fasting. There was a trend toward shortened prothrombin time after a fatty meal, but this was of less significance because of a similar, although slighter trend after a nonfatty meal and during fasting. There was some prolongation of the heparin tolerance after both types of meals, especially the nonfatty, as compared with continued fasting. (*C. A.* **51**, 5229)

Atherosclerosis induced by cholesterol and its inhibition mechanisms. I. Balaguer-Vintro. *Rev. españ. fisiol.* **10**, 1–8(1954). Month old chickens treated for twelve weeks with cholesterol added to their diet were very much affected with atherosclerosis. By adding potassium iodide, methionine or magnesium inositol to their cholesterol diet, the lesions were generally less constant. The highest cholesterolemias found were in those which had cholesterol and potassium iodide. (*C. A.* **51**, 5976)

Serum lipoproteins and the evaluation of atherosclerosis. J. W. Gofman(Univ. of California, Berkeley). *Ann. N. Y. Acad. Sci.* **64**, 590–5(1956). A review is given of the factors leading to the ultracentrifugal measurement of the serum lipoproteins. The atherogenic index (AI) is defined as 1/10(Std. S_f 0–10 1.75 Std. S_f 12–400). The AI was found predicative of coronary heart disease in studies made on 1500 human male subjects. Factors essential to a study employing AI as a criterion in pharmacological agent evaluation are presented. (*C. A.* **51**, 5975)

The effect of a low-lipide diet and lipotropic agents in cerebral atherosclerosis. G. Lindqvist and B. Isaksson(Vasa Hosp., Gothenburg, Swed.). *Acta Med. Scand.* **156**, 109–20(1956). Seventeen patients with atherosclerosis, who had mental symptoms and persisting disturbances in motility after cerebral thrombosis or parkinsonism, were treated for 11 weeks with a low-lipide diet (25 g. fat and 75 mg. cholesterol per day). Ten patients were also given lipotropic agents. Eleven patients showed improvement of the mental conditions which led to improvement of motility in 8 cases. Lipotropic agents showed no accentuating effect. Restriction of lipide caused a decrease in total serum cholesterol, more marked upon administration of lipotropic agents. The nonlecithin phospholipide decreased, whereas the lecithin fraction was unchanged or increased. The ratio of total cholesterol to lecithin decreased especially in patients receiving lipotropic agents. There was no correlation between clinical results and the changes in serum lipide. (*C. A.* **51**, 5967).

Comparative reproduction and lactation of rats fed butter or vegetable fat included in a basal ration free of animal products. L. P. Dryden, J. B. Foley, P. F. Gleis, L. A. Moore, and A. M. Hartman(Dairy Husbandry Research Branch, Agr. Research Service, U. S. Dept. of Agr., Beltsville, Maryland). *J. Nutrition* **61**, 185–194(1957). The effects of butter or butterfat have been compared with those of a hydrogenated vegetable fat product or the fat rendered from it in regard to reproduction and lactation of rats fed these fats over several generations in a basal ration free of any animal product. Fairly rigorous conditions of reproduction and lactation were used. In most respects, no significant differences were found among the various fats in regard to the various aspects of reproduction and lactation. Such differences as were observed were not large. In the F_2 to F_4 generations combined, average weaning weights of the young were found to be significantly higher for butterfat as compared to the hydrogenated vegetable fat but not for whole butter as compared to the whole vegetable fat product.

Studies on the kidney in vitamin E deficiency. V. M. Emmel (Dept. of Anatomy, Univ. of Rochester School of Medicine and Dentistry, Rochester, N. Y.). *J. Nutrition* **61**, 51–65(1957). A newly recognized renal manifestation of vitamin E deficiency is described in animals kept for 6 weeks or longer on the vitamin E-deficient regimen, the rate of post-mortem autolysis in the kidney is markedly increased. This abnormality is most conspicuous in the proximal convoluted tubules and is characterized by more extensive histologic changes and more rapid rise in tissue NPN. A relatively high intake of unsaturated fatty acids appears to be necessary for the development of this renal abnormality, since the latter was not found in animals whose diet contained lard in place of the linseed fatty acids. The renal abnormality is completely prevented by the prophylactic administration of α-tocopheryl acetate; but when it has become established the abnormality is not readily reversible by tocopherol therapy.

Growth response and liver fat deposition in rats fed bread mixtures with varying levels of non-fat milk solids and lysine. Jane Jahnke and Cecilia Schuck(Dept. of Foods and Nutrition, Purdue Univ., Lafayette, Ind.). *J. Nutrition* **61**, 307–315(1957). The growth response and liver fat deposition of rats fed diets consisting of bread mixtures containing these levels of non-fat milk solids (3, 6 and 12 parts per 100 parts flour) and these same levels of milk solids plus 0.25 parts of lysine have been reported. The elevation of liver fat levels was small and there was no statistically significant difference among the experimental diets.

The digestion and absorption of fat in dog and man. L. K. Knoebel and E. S. Nasset (Dept. of Physiology and Vital Econ., Univ. of Rochester School of Medicine and Dentistry, Rochester, N. Y.). *J. Nutrition* 61, 405–419 (1957). Small amounts of endogenous lipid of fairly constant composition were recovered from all parts of the small intestine of dogs fed fat-free test meals. Fat recovered from fistula dogs fed diglycerides was very similar in composition to that produced during the first one-half hour of the hydrolysis of diolein *in vitro*. Fat may be hydrolyzed, therefore, in much the same manner *in vivo* as *in vitro*. Hydrolysis of monoglycerides fed to dogs was very rapid in the duodenum. The proportion of diglycerides and triglycerides was greatly increased in the intestine, suggesting that synthesis and hydrolysis occur simultaneously.

Nutritional studies on rats on diets containing high levels of partial ester emulsifiers. III. Clinical and metabolic observations. B. L. Oser and Mona Oser (Food Research Laboratories, Inc., Long Island City, N. Y.). *J. Nutrition* 61, 149–166 (1957). During the chronic rat feeding studies of the partial fatty acid esters numerous observations of a biochemical and metabolic nature were made. The external appearance and behavior of the rats at all levels of partial ester emulsifier were quite normal through the 2-year feeding test except for those whose diarrheal condition resulted in inflammation and unthrifty appearance around the anal region. The animals thus affected were in the 20% Myrj 52 and Tween groups. Laxative action was seen only at the 20% Myrj level and 10 and 20% Tween levels. The coefficients of digestibility of the fatty acid moieties of the partial ester emulsifiers were determined. The mean values found for Myrj 45, Myrj 52, Span 60, Tween 60, Tween 65, Tween 80, and Primex were 80.4, 96.0, 53.5, 97.7, 84.1, 100.0, and 93.5, respectively.

Nutritional studies on rats on diets containing high levels of partial ester emulsifiers. B. L. Oser and Mona Oser (Food Research Laboratories, Inc., Long Island City, N. Y.). *J. Nutrition* 61, 235–252 (1957). In this 4th and final report on the two-year study of rats fed diets containing high levels of partial ester emulsifiers, observations are presented with respect to duration of life span, causes of death, and post-mortem pathological findings in dead or sacrificed animals. Particular attention was directed to the condition of the liver, kidneys, and bladder in view of the questions raised in the report of the Food Protection Committee on the safety of polyoxyethylene stearate as a food additive.

Comparison of the metabolic energy contributions of foods by growth under conditions of energy restriction. E. E. Rice, W. D. Warner, P. E. Mone, and C. E. Poling (Research Laboratories, Swift & Company, Chicago, Ill.). *J. Nutrition* 61, 253–266 (1957). A method has been devised for measuring the available energy of foodstuffs in terms of one-week gains in the weight of young rats fed calorically restricted diets under carefully controlled conditions. When tested with lard, tallow, hardened tallow, glucose, sucrose, casein, and celluflour the theoretical values for available energy were obtained. The method permits approximation of the energy contributions of foodstuffs without resort to complex and laborious balance studies.

Thromboplastic cell component, the lipoprotein of erythrocytes and platelets. G. Y. Shinowara (Dept. of Pathology, Ohio State Univ., Columbus, O.). *J. Biol. Chem.* 225, 63–76 (1957). A highly purified lipoprotein fraction prepared by differential ultracentrifugation of human blood cell homogenates consists of peptide, free cholesterol and phospholipide in about equal proportions. Evidence is presented suggesting that the fatty acids are highly unsaturated. Electrophoretic analyses disclose a single boundary and a mobility 50% greater than that of albumin. Ultraviolet and electron microscopy data are also reported. The lipoprotein has thromboplastic cell component activity; 0.034 γ can quantitatively convert 1 unit of prothrombin into 1 unit of thrombin (National Institutes of Health) in the presence of thromboplastic plasma component and ionic calcium. This activity is associated in normal human blood with both erythrocytes and platelets.

Plasma lipid and organ changes associated with the feeding of animal fat to laying chickens. H. S. Weiss and H. Fisher (Dept. of Poultry Sci., Rutgers Univ., New Brunswick, N. J.). *J. Nutrition* 61, 267–269 (1957). Depending on the age of birds and the duration of feeding trial, 5 to 10% of added animal fat to laying rations resulted in the development of an apparent derangement in lipid metabolism characterized by one or more of the following symptoms: elevated plasma cholesterol and total plasma lipid; excess deposits of body fat; friable and fatty livers; fatty deposits in and around the kidney; and greater severity of aortic atherosclerosis.

The comparative effects of cottonseed oil and lard on cholesterol levels in the tissues of rats. Lilla Aftergood, H. J. Deuel, Jr., and Roslyn B. Alfin-Slater (Dept. of Biochem. and Nutrition, School of Medicine, Univ. of Southern Calif., Los Angeles). *J. Nutrition* 62, 120–142 (1957). Plasma and liver cholesterol levels and liver lipids of male and female rats maintained on diets containing 15% lard or 15% cottonseed oil, with and without cholesterol, were determined after 6, 12, 18 and 24 weeks. In all cases, higher cholesterol concentrations were found in the livers of animals on the lard diets. Differences in plasma cholesterol levels and total liver lipids were not apparent unless cholesterol was present in the diet, at which time animals receiving the cholesterol-supplemented lard diets exhibited higher cholesterol concentrations in these categories as well.

Dietary fat and cholesterol metabolism. I. Comparative effects of coconut and cottonseed oils at three levels of intake. Ruth Okey and Marian M. Lyman (Dept. of Home Economics and the Ag. Experiment Station, Univ. of Calif., Berkeley, Calif.). *J. Nutrition* 61, 523–533 (1957). Data are reported on lipid and cholesterol in liver and serum of rats fed, respectively, 5, 10, and 15% of coconut oil and of cottonseed oil slightly hardened by the addition of some of the completely hydrogenated fat, each with and without 1% cholesterol. When cholesterol was fed, the linoleic acid-rich cottonseed oil led to more storage of liver cholesterol ester than did coconut oil. Ten per cent dietary coconut oil showed some tendency to produce higher serum cholesterol levels than did the same percentage of cottonseed oil.

Distribution of radioactivity in cholesterol-C^{14} of different origins. G. J. Alexander, Ann Colton, and E. Schwenk (Worcester Foundation for Experimental Biol., Shrewsbury, Mass.). *Science* 125, 700 (1957). For samples of cholesterol-C^{14} derived from different sources, the same quotient, nearly identical with the theoretical quotient, is found; this indicates that the pathway of biosynthesis is the same for cholesterol of various origins. The different patterns of distribution of this substance in biological experiments must therefore be caused by other factors.

Determination of stigmasterol in soybean sterol mixtures by infrared method. J. L. Johnson, M. F. Grostic and Alice C. Jensen (Research Div., The Upjohn Co., Kalamazoo, Mich.). *Anal. Chem.* 29, 468–469 (1957). Soybean sterols are elaborate mixtures containing stigmasterol and a predominance of sitosterols. Stigmasterol is the useful component in chemical synthesis. The infrared absorption of the trans–CH=CH–group in the stigmasterol side chain differentiates this material from the sitosterols and affords the basis for an assay method.

Determination of stigmasterol in soy sterols by radioactive isotope dilution. R. A. Donia, A. C. Too, and N. Drake (Research Div., The Upjohn Co., Kalamazoo, Mich.). *Anal. Chem.* 29, 464–467 (1957). Sterol mixtures were assayed for stigmasterol, the desired component for chemical syntheses, by an isotope dilution technique which obviated the requirements for quantitative yield.

Nutritional studies on edible fats and oils. K. Kakinuma, H. Naito, H. Tsuihiji, M. Matsumoto, T. Tomono, H. Onoe, S. Abe, Y. Endo, S. Kanno, A. Takagi, and K. Nakagawa (Univ. of Tokyo, Japan). *J. Japan Soc. Food Nutrition* 3, 156–72 (1950). Growth experiments on albino rats showed the nutritional value in the order of natural butter, soybean oil, finback-whale oil, and sperm-whale oil. The relative values were about 104, 100, 100, and 80. The specific dynamic action as determined on human subjects was similar (2.61–5.08%) for all the fats and oil (butter, margarine, soybean oil, polymerized finback-whale oil, refined finback-whale oil, and shark oil). No significant differences were observed among butter, soybean oil, finback-whale oil, and shark oil in the components of human blood after taking the oil. Experiments on human subjects showed that sperm-whale oil was inferior, while nutritionally satisfactory finback-whale oil was not much improved by polymerization or hydrogenation.

Bactericidal action of oleic acid for tubercle bacilli. I. Quantitative and analytical survey of the action. K. Minami (Dept. Bacteriology, Fukushima Medical College, Fukushima, Japan). *J. Bacteriol.* 73, 338–44 (1957). The effects of oleic acid on the growth, oxygen uptake and dehydrogenase activity of a strain of *Mycobacterium avium* were determined. The bactericidal activity of oleate depended on its concentration and time of contact but was independent of cell density. This action was inhibited by Tween 80, Triton A-20, saponin, lecithin, cholesterol, charcoal and starch only when these were added before the oleate. The bactericidal effect was somewhat diminished by the addition of an energy-supply substance such as glucose, glycerol, succinate, malate, etc. Oxygen uptake by the cells was increased at 10^{-4} *M* oleate and markedly inhibited at 10^{-3} *M*. Dehydrogenase activity was affected in the same manner. The mechanism of oleate action is discussed in terms of its binding to cell surface.

II. Morphological response. *Ibid.*, 345–52. The morphological aspects of the bactericidal action of oleate against tubercle bacilli were studied by means of the electron microscope. Electron transparent areas developed in cells treated with 10^{-3} *M* oleate or linoleate. These areas did not appear at lower concentrations (10^{-5} *M*) at which cells were killed.

Growth-enhancing factor for human tubercle bacilli using minute inocula. I. Yamane (Dept. Bacteriology, Fukushima Medical College, Fukushima, Japan). *J. Bacteriol.* **73**, 334–7 (1957). A crystalline fraction capable of promoting growth of tubercle bacilli was extracted with ether from acetone-dried egg yolk, and repeatedly crystallized from alcohol. The factor appears to be lipid in nature but is not cholesterol.

Utilization of inositol, an essential metabolite for Schizosaccharomyces pombe. H. F. Yarbrough, Jr. and F. M. Clark (Dept. Bacteriology, Univ. Illinois, Urbana). *J. Bacteriol.* **73**, 318–23 (1957). The growth of an inositol-dependent yeast, *Schizosaccharomyces pombe*, was determined in relation to rate of inositol uptake and production of ''bound'' inositol. Much of the inositol within the cell appeared to be bound to lipids, possibly in lecithin-like compounds. Little or no cephalin-like compounds were found. Nucleoprotein and water-soluble protein fractions contained no inositol. Residues after removal of lipids and nucleoproteins still contained 16 to 20% of the original cell content of inositol in a firmly bound form. No measurable amounts of phytin-like compounds were found. It is suggested that the bound form of inositol in the supernatant medium resulted from cell autolysis.

An evaluation of the egg-yolk reaction as a test for lecithinase activity. D. J. Kushner (Forest Insect Lab., Sault Ste. Marie, Ontario, Canada). *J. Bacteriol.* **73**, 297–302 (1957). In a culture filtrate and a purified α-toxin from *Clostridium perfringens* the heat stabilities of turbidity production in egg-yolk saline, phospholipase activity and lecithinase activity were identical. In a concentrated enzyme preparation and culture supernatants from *Bacillus cereus* strains, the phospholipase and lecithinase activities were much more sensitive to heat than was turbidity production. Thus, the *B. cereus* preparations appeared to contain at least one factor capable of producing turbidity in egg-yolk saline without having lecithinase activity. The egg-yolk reaction is a quantitative measure of lecithinase activity in *C. perfringens* but not in *B. cereus.*

Metabolism of lipids and lipid derivatives by a soil actinomycete. L. M. Adelson, A. Schatz and G. S. Trelawny (Research Lab., Natl. Agr. College, Doylestown, Bucks County, Pa.). *J. Bacteriol.* **73**, 148–53 (1957). These studies were made with a soil actinomycete which appeared to be a strain of *Streptomyces griseus* and was capable of demyelinating bovine spinal cord *in vitro*. The highest respiratory quotients were obtained on media containing inositol lipid (from corn phosphatide), yeast extract [Difco] and proteolipid (from bovine spinal cord). All phospholipids (lecithin, cephalin, sphingolipid and sphingomyelin) increased oxygen consumption and supported growth. Lecithin and cephalin increased the oxygen uptake to about the same rate. The hexose-containing cerebroside was metabolized almost seven times as rapidly as glucose. Palmitate, tristearin, cholesterol acetate, glycerophosphate, acetylcholine, and ethanolamine allowed the organism to develop but either depressed the respiratory quotient or increased it only slightly. Diacetin, triacetin, monostearin, cholesterol, choline, and ethylamine failed to support growth. Of these, only monostearin increased oxygen uptake significantly. Lipids from human atherosclerotic plaques inhibited oxygen uptake. Mechanisms are suggested which may be operative during demyelination.

Composition of hen's egg phospholipids. D. N. Rhodes and C. L. Lea (Univ. of Cambridge). *Biochem. J.* **65**, 526–533 (1957). The extraction and purification of hen's egg phospholipids have been examined, and a mild procedure yielding 97% of the total material has been devised. Chromatographic separation on alumina into choline-containing and non-choline-containing fractions, and on silica acid to obtain the two major constituents in a practically pure condition. The egg phospholipid examined contained phosphatidylcholine 73.0, lysophosphatidylcholine 5.8, sphingomyelin 2.5, phosphatidylethanolamine 15.0, lysophosphatidylethanolamine 2.1 and inositol phospholipid 0.6, all as moles %. The plasmalogen content of the whole phospholipid was 0.9%, most of which was present in the lecithin fraction. The phosphatidylethanolamine fraction contained a small proportion (0.2% of the total phospholipid) of amino acid-containing phospholipid.

Metabolism in the rat of naturally occurring (+)-14-methylhexadecanoic acid. Muriel Livingston, Muriel E. Bell, F. B. Shorland, T. Gerson and R. P. Hansen (Fats Res. Lab., Dept. Scientific & Ind. Res., Wellington, New Zealand). *Biochem. J.* **65**, 438–440 (1957). Rats were fed on a ''fat-free'' diet and a similar diet augmented by (+)-14-methylhexadecanoic acid at the rate of 0.1 g./rat/week, seven supplements being given. It was found that 8–10% of the acid was stored, about 10% was excreted and approximately 80% was metabolized. Furthermore, the presence of traces of the C_{15} anteiso-acid in the experimental animals, but not in the control animals, affords evidence for degradation of the C_{17} anteiso-acid included in the diet. The addition of (+)-14-methylhexadecanoic acid to the ''fat-free'' diet at the rate of 0.1 g./rat/week was without influence on the growth rate of the rat.

Phospholipid metabolism in rat liver slices. Dorothy Kline and R. J. Rossiter (Univ. of Western Ontario, London, Ontario). *Can. J. Biochem. & Physiol.* **35**, 143–150 (1957). Effect of hypophysectomy and adrenalectomy on the labelling of phospholipids with acetate-1-C^{14} was studied. In rats fed *ad libitum* the labelling of the acetone-insoluble lipids (phospholipids) of liver slices respiring in the presence of acetate-1-C^{14} was decreased 2 days after the removal of either the pituitary or the adrenal glands. The effect was not observed 4 days after hyperphysectomy. It is concluded that the decrease in the labelling of the acetone-insoluble lipids in liver slices from operated rats was primarily the result of a change in the nutritional status of the operated animals. The data are insufficient to permit any conclusions concerning the cause of the decrease in labelling of either the fatty acids of the acetone-soluble lipids, or the non-esterified cholesterol.

Neutral fat of the perirenal fat depots. E. M. Boyd and A. H. Lower (Queen's Univ., Kingston, Ontario). *Can. J. Biochem. & Physiol.* **35**, 157–160 (1957). The possibility was investigated that perirenal fat depots which have high levels of neutral fat also have high levels of phospholipid and free cholesterol, associated with increased ability to actively store fat. Lipid and water levels per unit nonlipid dry weight were measured upon perirenal fat depots in 27 male and 24 female albino rats. Mean levels of water, free cholesterol, and phospholipid were significantly higher in female than in male rats. In perirenal depots containing high levels of neutral fat, (a) weights of the organ were low in females but not significantly so in males, (b) levels of phospholipid were unaffected, and (c) levels of ester cholesterol, free cholesterol, and water were high in both males and females. The results indicate that storage of increased levels of neutral fat in perirenal fat depots of the albino rat is associated with increased levels of cholesterol, cholesterol esters, and water per unit nonlipid dry weight.

Nature of substances in dietary fat affecting the level of plasma cholesterol in humans. J. M. R. Beveridge, W. F. Connell, and G. A. Mayer (Queen's Univ., Kingston, Ontario). *Can. J. Biochem. & Physiol.* **35**, 257–270 (1957). Three dietary experiments have been performed in which 52, 48 and 38 male students and a few members of the staff participated as experimental subjects. Under the diet used and when both β-sitosterol and α-tocopherol were used it was found that only β-sitosterol caused a highly significant decrease in plasma cholesterol. In the other two experiments there was 60% of calories from corn oil in one experiment and 30% corn oil and 30% butter as compared to the 60% from butter in the first experiment. The results are given in this article, as to the values obtained. It has been postulated that the potent plasma cholesterol elevating action of butterfat is at least partly dependent upon the presence of the unsaponifiable fraction.

• Drying Oils and Paints

Calcium plumbate, a post-war development in anti-corrosive paint pigments. N. J. Read (Associated Lead Manf. Research Lab.). *Paintindia* **6**, 23–28 (1957). Calcium plumbate constitutes an important and novel addition to the few existing rust-inhibitive pigments for the protection of iron and steel. Like red lead it provides protection by a combination of basic and oxidizing characteristics, as well as film-forming properties by interaction with linseed oil.

Synthetic glyceryl esters in the varnish industry. C. R. Malyan. *Paint Technol.* 21, 121–4(1957). The applications of glyceryl esters in varnishes are reviewed under the headings: synthetic resins, synthetic drying oils, partial esters, polyester resins, and other polymeric glycerol compounds. 32 references.

Non-yellowing baking finish. S. H. Shapiro and Anna K. Susina(Armour & Co.). *U. S. 2,791,568.* A baking finish is prepared from a melamine-formaldehyde or urea-formaldehyde resin plasticized with a modified baking alkyd resin. This alkyd is formed by reacting glycerin with a mixture of acids containing (A) at least one of a group consisting of phthalic, maleic and succinic acids and anhydrides, (B) at least one C_8 to C_{18} saturated fatty acid, and (C) disproportionated rosin.

• Detergents

The De Laval soapmaking process. Anon. *Soap, Perfumery, Cosmetics* 30, 489–95(1957). The characteristic chemical basis of the De Laval process is the use made of certain inherent physical properties of the soap itself at the saponification stage. By plotting time against degree of saponification and comparing the curves for (a) fat and lye only and (b) free fat, lye and pre-formed soap, the fact readily becomes apparent that the presence of soap in the mixture to be saponified exerts a marked accelerating action on the saponification. This effect, which may be characterized as catalytic, depends on the ability of the soap micelles (agglomerates of molecules) to absorb and dissolve the fat. As a consequence, the contact surface between fat and lye becomes very large, and the saponification takes place in a homogeneous phase within the middle (steep) and upper parts of the time-saponification curve. Details of the working plant and flow sheets for production of various types of soaps are given.

Detergent research related to water and sewage. F. J. Couglin (Procter & Gamble Co., Cincinnati, O.). *Public Works* 87(3), 180–2(1956). Results of investigations already completed appear to indicate that the presence of detergents in domestic sewage is not the cause of frothing at activated sludge plants. Continued research into coagulation problems in water treatment is described. (*C. A.* 51, 6916)

Relation of surface activity to the safety of surfactants in foods. W. J. Darby, P. R. Cannon, H. E. Carter, J. M. Coon, G. C. Decker, D. B. Hand, E. A. Maynard, E. M. Mrak, and R. B. Smith, Jr. *Natl. Acad. Sci. Natl. Research Council Publ.* No. 463, 10 pp.(1956). Biological effects of surfactants are reviewed. Since no toxic effects common to all surfactants are found, surface activity by itself is not a measure of toxicity. Toxicity is dependent more on the chemical structure of the compound. Each surfactant must be tested separately for toxicity before being used in food. (*C. A.* 51, 6025)

The interference of nonionic emulsifiers with preservatives. III. M. G. DeNavarre. *J. Soc. Cosmetic Chemists* 8, 68–75(1957). Some of the factors influencing the interference of nonionic emulsifiers with preservatives are discussed. It can now be stated that practically all nonionics based on the addition of ethylene or propylene oxide to fatty acids, alcohols, esters or polyglycols, interfere with the preservative properties of compounds containing either a phenolic or carboxylic hydroxyl group in the molecule. This interference is apparently due to the formation of complexes by hydrogen bonding. Anionics sometimes used with nonionics may favorably prevent this interference if used at higher concentrations. Roccal and Hyamine 10X of a group of quaternary compounds showed possibilities in preventing preservatives from being inactivated by nonionics.

Use of fluorescent indicators for the determination of small amounts of surface-active compounds II. Determination of organic quaternary salts and bases. M. Dolezil and J. Bulandr (Vyzk. ustav pro zuslecht. rud. Prague). *Chem. listy* 51, 255–8 (1957). Determination is described of quaternary salts (I), bases, and amines (II) with 10^{-2} *M* Na lauryl sulfate. Use of eosin as an indicator in ultraviolet light enables sharp determination of equivalency and avoids the troublesome and nonprecise extraction procedure. Determination of I is independent of pH, II must be titrated in an acidic medium (pH 3.5–4.5). (*C. A.* 51, 6425)

Fatty acyl alkylolamides. K. R. Dutton and W. B. Reinisch. *Manuf. Chemist* 28, 124–7, 176–80(1957). Extensive review article covering chemistry, manufacture and detergent applications of the fatty acyl alkylolamides.

Alkali and washing treatments of synthetic fibers. E. Dyhrenfurth. *Textil-Rundschau* 11, 573–87, 656–68(1957). Orlon, Acrilan, Dynel, Vinyon N, Terylene, nylon and Grilon fabrics were washed in a small washing machine to study the effects of sodium perborate and various concentrations of alkali on the mechanical and chemical changes in the fibers by determining, respectively, their breaking strength and viscosity, loss of weight and, in acrylonitrile fibers, the nitrogen content. X-ray examination was also carried out. Polyacrylonitrile-containing fibers were found to be more or less severely damaged and their structure altered without significant effect on the viscometric molecular weight. Degradation in polyamides was reflected in reduced molecular weight. Terylene was only eroded by alkali, but chemically degraded by sulfuric acid. The degradation rate of all fabrics caused by sodium perborate depended upon the alkali concentration in the liquor.

Toxic effects of synthetic surfactants. M. Gaultier and E. Fournier. *World Congress on Surface-active Agents* 2, 793–809(1954). Examination was by oral administration, intravenous, subcutaneous, intramuscular and intraperitoneal injections, patch tests, and mucous-membrane application. In general, non-ionics and anionics show feeble toxicity, but 2–5 g./kg. doses may be dangerous to children. Certain cationics are lethal at 200 mg./kg. Preliminary results of investigations into bronchial poisoning due to their use in laying dust (silicosis prevention) are favorable. The danger in application to the skin or mucous membranes appears small, but attention in drawn to the more real danger of concentrated, alkaline products. Known allergens do not appear to be intensified by wetting agents.

The decay of synthetic anionic detergents in natural waters. C. Hammerton(Metropolitan Water Board, London. *J. Appl. Chem.* (London) 5, 517–25(1955). Synthetic anionic detergents containing straight-chain alkyl groups are easily attacked, whereas those containing branched-chain alkyls are resistant to oxidation by bacteria present in waters. (*C. A.* 51, 7042)

Detergency of alkylpolyethylene oxides. II, III. M. Kehren and M. Rosch. *Melliand Textilber* 37, 1308–12, 1421–7(1956). Detergencies of a series of oxyethylates of aliphatic alcohols for soiled wool were compared in specially built washing equipment at 15-min. wash cycles, and 50° wash water temperature containing 0.1% detergent. The soil removal was measured photoelectrically. With standard tallow-mineral oil-street dust soil (I), highest dirt removal was in alkaline, lowest in acid medium. With 1.5 and 3% mineral oil dyed red for evaluating as the soil (II), highest removal was in acid medium. In alkaline medium detergents with alkyl C chains of C_8 to C_{18} combined with 3–7 EtO groups show best detergency. C_{12} with 3 EtO groups is the optimum combination for I in alkaline medium. Optimum C chains are C_{12} and C_{14} in alkaline, C_{12} to C_{16} in neutral or acid medium. C_{12} combined with 7 EtO chain shows the optimum in detergency for II. Better removal of II is obtained in acid medium than of I. Tests at different concentration of some of these detergents were also conducted and showed the same results. (*C. A.* 51, 7042)

Improvement of soil removal by alkalies. A. van Nuffel(CENATRA, Lange Leemstraat, Antwerp). *Ind. chim. belge* 22, 27–38(1957). The nature of the alkali has no influence on the soil removal. It is dependent on the pH and ionic concentration. Polyvinyl alcohol and carboxymethylcellulose improve soil removal and inhibit redeposition in distilled and hard water. (*C. A.* 51, 7042)

The soiling characteristics of textile fibers. III. The effect of twist on soil retention. A. S. Weatherburn and C. H. Bayley (National Research Council, Ottawa, Canada). *Textile Research J.* 27, 358–61(1957). The effect of twist on soil retention has been studied for a series of acetate yarns containing 34 filaments of 3.5 den./filament. With increasing twist, soil retention first increased to a maximum, and then decreased to values below that of the untwisted yarn. Microscopic examination of the soiled yarn indicated that at 20 turns/in. visible soil particles had penetrated to the center of the yarn, whereas at 60 turns/inch the soil was located on the exterior surface only.

Method of producing dry detergent compositions. W. J. Diffley. *U. S. 2,791,562.* An aqueous dispersion of a surface active agent is treated chemically to remove liquid water. The chemical treatment comprises adding to and incorporating in such dispersion, two selected reactants capable of reacting with one another and with the liquid water of the dispersion to produce a reaction product containing water of crystallization in amount sufficient to produce a net loss of liquid water in the system. Examples of the reactants are mixtures of borax and sodium hydroxide, borax and sodium carbonate or mixtures of disodium phosphate and sodium hydroxide.

Fatty acid mixtures and soaps derived therefrom. L. A. Stegemeyer (Emery Industries, Inc.). *U. S. 2,792,347.* This invention provides fatty acid compositions which may be employed in soap compositions to achieve the benefits derived from coconut fatty acids without their disadvantages. Thus it has been found that a composition consisting of 15% C_9 pelargonic acid and 85% commercial oleic acid will produce a liquid potash soap of 36% concentration and a viscosity of 82 centipoises, equivalent to a 50% coconut acid-50% oleic acid soap.

Soap composition. R. D. Aylesworth (Emery Industries, Inc.). *U. S. 2,792,348.* It has been found that by incorporating the sodium salts of dibasic acids such as azelaic and sebacic, with the ordinary fatty acid soaps in the process of manufacture of soap, a harder soap from a given fatty acid or fat at a given moisture content will be produced. Also, hard soaps can be produced from low titer fats with a moisture content of from 8 to 10%, which soaps would otherwise have to be dried to a moisture content of from 2 to 4% to avoid stickiness.

Soap cake. B. J. Le Vier and M. Kohn (Lever Brothers Co.). *U. S. 2,792,349.* Soap cakes having shapes for facilitating efficiency in handling, wear and storage comprise convex upper and lower surfaces, one of which is uniformly convexly rounded in one direction only and about an axis parallel to the general plane of the cake, said surface thereby constituting a portion of a cylindrical surface, the other surface of which is uniformly convexly rounded about at least one axis parallel to the general plane of the cake, said axis being substantially at right angles to the axis about which said one surface is rounded.

Soaps. Chimiotechnic (Union Chimique do nord et du Rhone). *Fr. 1,003,450.* Rosin sulfonation products obtained by decarboxylation, subsequent dehydration, and sulfonation of rosin are incorporated into soaps in amounts of 25–100% by weight. (*C. A.* **51**, 6190)

Nitrogen-containing condensation products. O. Albrecht (CIBA Ltd.). *Swiss 314,321.* Polyamines having 2–6 N atoms, such as ethylenediamine or diethylenetriamine, are condensed with aliphatic or cycloaliphatic acids, such as caprylic, lauric, stearic, oleic, or abietic acid, or their acid chlorides or esters to form condensation products which can be used as detergents, or emulsifiers, especially for treating textile fibers. Thus 21.8 parts N-octadecyltrimethylenediamine and 18 parts of stearic acid were heated in N at 155–6° for 6 hrs. A yellowish, waxy mass was obtained which dissolved in hot AcOH and on dilution with hot water gave an opalescent solution. (*C. A.* **51**, 6190)