hydrogen bonding between adjacent urea molecules that wind around the long-chain molecule, giving rise to specific crystal structures (21).

On the basis of the above structure for the complex the nonreactivity of lauric acid and unoxidized linoleic acid can be explained as resulting from the lack of hydroperoxy and keto groups in these lipides. It is possible that other forces besides hydrogen bonding are also involved because, on the basis of the above postulate, the linoleic acid polymer containing the largest number of hydroperoxy, hydroxy, and carbonyl groups must complex to the greatest extent with the protein, which however was not the case.

Summary

Complexes have been formed between egg albumin and oxidized linoleic acid. Little or no complex formation could be obtained with unoxidized linoleic acid, oleic acid, or lauric acid. The amount of complexed linoleic acid could not be increased to more than 8.0% in spite of a long reaction time. The number of reactive groups (amino, sulfhydryl, and hydroxyl) in the protein of the complexes and in the original protein were found to be the same. The data seemed to indicate that a covalent linkage did not exist between the reactive groups of the protein and the lipide in complexes of this type. Strongly bound adsorption complexes were formed between alumina and oxidized lipides by a simple mixing technique. A possible structure on the basis of a large number of hydrogen bonds has been proposed for the lipide-protein and the lipide-alumina complexes and has been discussed in detail.

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ABSTRACTS . . . R. A. REINERS, Editor

ABSTRACTORS: Lenore Petschaft Africk, S. S. Chang, Sini'tiro Kawamura, F. A. Kummerow, Joseph McLaughlin Jr., and Dorothy M. Rathmann

• Oils and Fats

Function and valuation of fats, oils, and emulsifiers in bakery and food production. S. Young. *3rd Intern. Bread Congr. Hamburg* **1955**, 285–92. The activity of distilled monoglyceride in baked cakes would be expected to be proportional to its monoester content or about 2.2 times more active than the reaction mixture. The distilled monoesters in an experimental cake were considerably more active than was predicted. This greater activity was primarily due to the absence of the diester. (*C. A.* **51**, 15032)

Stabilization of edible fats by spices. II. A new antioxidant from betel leaf. S. C. Sethi and J. S. Aggarwal (Natl. Chem. Lab. India, Poona, India). *J. Sci. Ind. Res.(India)* **15B**, 34–6 (1956). Hydroxychavicol (4-allylpyrocatechol) isolated from betal leaf has been shown to exert an antioxidant effect on refined peanut oil and refined lard. Ascorbic acid from red chillies was synergistic to their natural antioxidants; capsaicin and isoeugenol also showed an antioxidant effect on peanut oil. (*C. A.* **51**, 15031)

The role of lipides in baking. N. Fisher, Margaret L. Ritchie and J. B. M. Coppock (Baking Inds. Res. Sta., Chorleywood, Eng.). *Chem. & Ind.(London)* **1957**, 765–6. New data confirm the existence of lipide-protein complexes in flour. Lipide still in combination with protein is extracted with cold carbon tetrachloride from untreated, unbleached 72% extraction flour. The protein moiety varies according to the moisture content of the flour and of the extracting solvent. Acid hydrolysis of the extracted product shows the presence of proline, whereas flour dried and extracted in a desiccator with anhydrous carbon tetrachloride gives no proline reaction. The sterol fraction crystallizes from a hot 97% acetone extract of the acetone insoluble fraction of flour oil on cooling. Sitosterol palmitate is isolated by alcohol crystallization of the product. A countercurrent distribution study of the acetone insoluble fraction was done with a 24-tube apparatus. Analyses of hydrolyzates show that all fractions contain polypeptide or protein, glycerol, and P and N. (*C. A.* **51**, 15027)

The effects of surface-active agents on baking technology. E. Maes. *3rd Intern. Bread Congr. Hamburg* **1955**, 255–8. Review, 80 references. (*C. A.* **51**, 15023)

Rapid determination of cholesterol in foods. H. R. Marangoni. *Arch. farm. y bioquím Tucumán* **7**, 237–52(1955). Cholesterol is determined colorimetrically by the color produced on heating it with acetic anhydride and sulfuric acid. Methods are given for the analysis of ice cream, cookies, butter and other foodstuffs. (*C. A.* **51**, 15024)

Replacement of glycerol with xylitol in preparation of rosin acids esters. G. A. Fridman. *Gidroliz. i Lesokhim. Prom.* **10** (4), 11–14(1957). Rosin acids were esterified with xylitol under various conditions. As the amount of xylitol was increased from 19 to 28% of the weight of rosin acids, the esterification time was shortened by more than half. The optimum amount of xylitol was found to be 25%; and the optimum temperature was between 280° and 290°. Above 300° thermal decomposition occurred. The addition of 0.1% of CaO and 0.15% of calcium hydroxide shortened the reaction time from 15 to 10 hours. The reaction rate was accelerated and the product was brighter when the esterification was carried out in a carbon dioxide atmosphere. (*C. A.* **51**, 15154)

Sunflower as oilseeds and fodder crop in West Bengal. H. C. Choudhuri and H. T. Banerjee (State Agr. Res. Inst. Govt. W. Bengal, Calcutta). *Sci. and Culture(Calcutta)* 21(11), 675–7 (1956). Sunflower *(Heliathus annuus)* seeds of the Giant Russian, West Bengal (as a control), Sunrise inbred advance female parent and Sunrise varieties were grown. The semimatured stems and leaves were analyzed for moisture, protein, fat, soluble carbohydrate, fiber and ash. The plants of the Giant Russian variety were best for grain and fodder yields but lower than the plants of the West Bengal variety in oil yields. The average yields reported from western countries were considerably higher than those under test. (*C. A.* **51**, 15152)

Extraction of oleic acid from peanut oil-oleic acid solutions. Gopala Venkataraman and G. S. Laddha (Univ. Madras). *Trans. Indian Inst. Chem. Engrs.* **8**, 42–5 (1055–56). Ternary mutual solubility and phase distribution data are reported for the system peanut oil, oleic acid, methyl alcohol at 30° with 90, 95, and 100% methyl alcohol as solvents. The area of heterogeneity increases with water concentration with a decrease in the selectivity of oleic acid extraction. (*C. A.* **51**, 15151)

A new method for determining cholesterol. J. Mangin and M. Mangin (Lab. biol. med. J. Mangin, Longway, France). *Bull. soc. pharm. Nancy* **No. 32**, 7–9 (1957). In a 16x160 mm. test tube place approximately 5 g. of plaster of Paris and 10 ml. chloroform without agitating. After the entrained air has escaped, add 0.5 ml. of serum. Insert a cork, and shake for 10 seconds to put all the plaster in suspension, then agitate on a shaking apparatus for 15 minutes to limit the growth of crystals of calcium sulfate and improve the contact of the chloroform with the serum. After the crystals of calcium sulfate have settled, rotate the tube to bring the chloroform to the surface. With a 2-ml. pipet, thrust a plug of absorbent cotton down to the surface of the crystals of calcium sulfate and draw off 2 ml. of the solution. Cholesterol is determined in the 2 ml. of chloroform by the Liebermann method. (*C. A.* **51**, 14881)

The preparation of methyl esters of fatty acids by methanolysis in presence of urea. R. Rigamonti and Amelia Vacirca (Politecnico, Turin, Italy). *Ann. chim. (Rome)* **47**, 549–56 (1957). The alkali-catalyzed methanolysis of olive oil to methyl esters and glycerol is favored by addition of urea, which forms an insoluble complex with methyl esters, and by use of a solvent. Best results are obtained by using 1 part of olive oil, to 1 part of methyl alcohol, 8 parts of acetone and 5 parts of urea. Under these proportions, 92% of methyl esters containing 3.1% monoglyceride, 0.7% total glycerol were obtained after one hour using 1% sodium hydroxide as catalyst. (*C. A.* **51**, 15151)

Seed fat from Caesalpinia digyna. D. K. Gupta and B. T. R. Iyenger (Univ. Coll. Technol., Calcutta). *Sci. and Culture (Calcutta)* **21**, 682–3 (1956). The seed contains 27.4% oil (dry basis on kernel). Oil analysis: saponification equivalent, 288.7; iodine number, 97.8 (Wijs); unsaponifiable matter 0.5% and n_D^{40} 1.4679. The mixed fatty acids showed: linoleic acid 36.65, linolenic acid 8.25, oleic acid 33.46, and saturated acid 27.64%. (*C. A.* **51**, 15150)

Chemistry of esterification and the transesterification with fatty substances. D. Jacqmain. *Rev. fermentations inds. et aliment* **12**, 76–96 (1957). A review with 154 references. (*C. A.* **51**, 15148)

Estimation of saturated acids in mixed fatty acids of natural fats. R. G. W. Spickett, E. F. J. Thorpe and J. B. Ward (Colonial Prods. Lab., London). *Chem. & Ind.* **1957**, 734. A simplified chemical method for the estimation of saturated fatty acids in natural fats is to chromatograph the potassium permanganate oxidized product of the methyl esters. When methyl myristate, palmitate, and stearate, previously freed from unsaturated compounds, were subjected to this procedure 99.3–99.6% of the starting materials were recovered from the column. The recovery of methyl laurate was 97.1%. (*C. A.* **51**, 15150)

The rancidity of fats. The Swift stability test as a method of research. The effect of some antioxidants. J. Perédi. *Élelmezési Ipar* **8**, 104–11 (1954). *Hung, Tech. Abstr.* **7**(1), 24 (1955). The determination of the peroxide number in tracing the process of the development of rancidity has proved adequate for the Swift stability test. Relations between the organoleptic rancidity and the peroxide number can be established for lard and for sunflower-seed oil as well as for the mixture of both. It was established that the storage time during which lard does not develop rancidity could be increased tenfold by the addition of 0.01% gallic acid derivatives. (*C. A.* **51**, 15149)

Use of pancreatic lipase for the study of the structure of naturally occurring fats. P. Savary, J. Flanzy and P. Desnuelle (Fac. sci. Marseille, France). *Biochim. et Biophys. Acta.* **24**, 414–23 (1957). Pancreatic lipase, because of its specificity in the hydrolysis of triglycerides, was used to study the structure of naturally occurring mixed glycerides. In all cases examined, the distribution of the fatty acid radical between positions 1 and 3 on the one hand and position 2 on the other was not random. Except, in the case of the lard, unsaturated fatty acid residues predominated in the 2 position. In the case of the diunsaturated-monosaturated glycerides asymmetry predominated, and in the disaturated-monounsaturated glycerides, the symmetric isomer predominated. All the 2 positions appeared to be occupied by unsaturated chains in cocoa butter. The situation was found to be exactly the reverse in hog depot fat, regardless of body site or state of fattening of the animal. Palmitic and stearic acid generally were in the same positions, except in hog fat, where the former was more often in position 2 than the latter. The distribution of oleic and linoleic acids in hog fat was structurally the same. (*C. A.* **51**, 15148)

Sperm whale oil. IV. Purification of wax by lipase. Hisashi Fujii and Hirokichi Matsumoto (Res. Lab. Nippo Marine Prods. Co., Odawara). *Nippon Suisan Kabushikikaisha Hokoku* **No. 8**, 19–23 (1957). The wax separated from glycerides in sperm whale oil by molecular distillation contained a small amount of glycerides, and hence was further purified through hydrolyses with lipase from castor seeds. Hydrolysis of glyceride without hydrolysis of wax was confirmed by washing with water at pH 4.4; this would decompose remaining glycerides. (*C. A.* **51**, 15152)

V. Separation of wax and glyceride by the combination of molecular and high-vacuum distillations and their fatty acid compositions. Hisashi Fujii, Shunichi Okura and Mitsuo Nagata. *Ibid.* 24–34. The head and blubber oils of sperm whale were refined with acid clay and then fractionated with a molecular still into 2 fractions and the residue, and further, in a Claisen flask under 10^{-3} mm. Hg into 3 wax and 1 glyceride fractions.

VI. Properties of Antarctic sperm whale oil. Shunichi Okura and Tomiyo Nishimura. *Ibid.*, 75–6. The antarctic sperm whale oil showed higher acid value than did Japanese coastal sperm whale oil. The iodine number and saponification number varied relatively little between years. The head and blubber oils differed in iodine number and saponification number but not the unsaponifiable matter.

VII. Quality and properties of Japanese coastal sperm whale oil. Shunichi Okura and Mikio Mori. *Ibid.* 77–84. The Japanese coastal sperm whale oil showed initial lower acid value which later improved gradually to the level of antarctic sperm whale oil. The iodine number, saponification number, and saponifiable matter of the head and body oils did not differ much initially, but later were distinguishable.

VIII. Oil content of Antarctic sperm whale blubbers. Shinichi Okura and Yoshihiko Taguchi. *Ibid.* 85–7. The oil contents of antarctic sperm whale blubbers cut from 3 dorsal and 1 ventral sites were tabulated. The ventral blubber contained slightly more oil on the average than did the dorsal blubbers.

IX. Properties of blubber oil of sperm whales caught in the adjacent waters of Japan. Shunichi Okura and Kenji Goto. *Ibid.* 88–90.

X. Unsaponifiable matter contents for (Japanese Coastal) sperm whale oils obtained from various sites of an individual whale. Shunichi Okura and Timiyo Nishimura. *Ibid.* 91–3.

XI. Composition of commercial sperm whale alcohols. Shunichi Okura, Mikio Mori and Osamu Hiroi. *Ibid.* 95–139. Hilditch's method of calculating the fatty acid composition of sperm whale oil as a 4-component system from its direct distillation without previous separating into the solid and liquid fractions was applied to the analysis of various fractionated commercial sperm whale alcohols (head, body, wintered liquid, 9-octadecenyl, hexadecyl, and octadecyl alcohols). (*C. A.* **51**, 15152)

Kinetics of Diels-Alder reactions of eleostearic acids with maleic anhydride and substituted maleic anhydrides. W. G. Bickford, Joan S. Hoffman, Dorothy C. Heinzelman and Sara P. Fore (Southern Regional Research Lab., USDA). *J. Organic Chem.* **22**, 1080–1083 (1957). The kinetics of the Diels-Alder reactions of *alpha-* and *beta*-eleostearic acids with chloromaleic, methylmaleic, and maleic anhydrides have been investigated. The reactions of chloromaleic anhydride and maleic anhydride with the eleostearic acids conformed to second order kinetics, but those of methylmaleic anhydride particularly with *alpha*-eleostearic acid, were not strictly second order. The specific rate constants for the Diels-Alder reactions of *beta*-eleostearic acid were found to be of greater magnitude than those for *alpha*-eleostearic acid, and the reactions of the former were found to be less temperature-dependent than the reactions of the latter. Energies of activation for the systems in which *beta*-eleostearic acid was a reactant were markedly lower than those for systems containing *alpha*-eleostearic acid.

Continuous pressure filtration pilot plant. Application to vegetable oils. D. C. Bergstedt, D. A. Dahlstrom (Eimco Corp., Palatine, Ill.) and V. D. Harms (Corn Products Refining Co., Argo, Ill.). *Ind. Eng. Chem.* **49**, 1863–70 (1957). The advantages of a continuous, closed process for filtration of edible corn oil stimulated a testing program for evaluating methods of continuous filtration. The key to this process is proper equipment design. Pilot plant equipment was constructed with sufficient versatility to explore the various promising methods. The results indicated that a precoated filter drum with continual advance of the scraper was best. Significant data were obtained to relate the physical variables in oil filtration and thus permit optimum design. Certain concepts of precoat filtration, commonly applied to aqueous slurries, were found altered by the results of this work.

Ozonization and decomposition of oleic acid and its methyl ester in glacial acetic acid. Gaku Izumi(Nagoya Ind. Expt. Sta.). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **59**, 1129–31(1956). Methyl oleate in glacial acetic acid was reacted with ozonized oxygen and the product was decomposed by boiling under atmospheric pressure. The decomposition of extensively ozonized ester at higher hydrogen pressure gave the product with higher carbonyl no. and iodine no. than that under atmospheric pressure. It was discovered that alcohols could be produced by pressure ozonolysis with Cu chromite catalyst. The product of decomposition changed remarkably at initial and later stages of ozonolysis under atmospheric pressure. Reaction mechanism was discussed by considering the reaction with hydroperoxide as well as that with ethylene and carbonyl. Infrared spectroscopy was applied to examine the decomposition products.

Stability of edible soybean oil at high temperatures. I. Foaming tendency of frying oil. Bun'ichi Toi and Kiyoharu Ooue (Ajinomoto Co., Yokohama). *J. Japan Oil Chemists' Soc.* **6**, 87–92(1957). The change in characteristics of soybean oil during heating showed slow oxidation and polymerization. The foaming was vigorous after an induction period. Ultraviolet spectroscopy showed that the conjugated diene and triene increased remarkably during the induction period of foaming and the conjugated diene increased less remarkably and the conjugated triene decreased after foaming began vigorously. Iron had greater influence on the foaming tendency of heated soybean oil. The alkali refining, bleaching earth treatment, deodorization, and molecular distillation had scarcely any effect on the heat stability of the oil. The decrease in unsaturation by hydrogenation increased the heat stability to some extent.

The properties of some vegetable oils. Seiichi Ueno and Kenji Matsushima(Kinki Univ., Fuse, Osaka). *J. Japan Oil Chemists' Soc.* **6**, 20–3(1957). The seed of *Stauntonia hexaphylla* contained 28.7% oil on dry basis; this seed oil had d_4^{15} 0.9358, n_D^{33} 1.4685, acid no. 0.9, saponification no. 263.6, iodine no. 99.5, Reichert-Meissl no. 58.3, acetyl no. 3.2; contained more than 0.3% water-soluble fatty acids together with palmitic, stearic, and unsaturated acids with 1, 2, and 3 double bonds. The seed of *Aralia chenesis* with 21.4% moisture contained 29.6% oil, d_4^{15} 0.9222, n_D^{20} 1.4716, saponification no. 192.5, iodine no. 101.8, acid no. 3.7, unsaponifiable matter 1.2%. This oil contained 39.2% solid acdis, consisting largely of C_{18} acid and containing little C_{16} and acids higher than C_{18}, and 60.8% liquid acids, consisting mainly of C_{18} and some higher acids with 1, 2, and 3 double bonds. The seed of *Kraunhia floribunda* contained 8.8% oil n_D^{20} 1.4673, saponification no. 196.7, iodine no. 114.7. The seed coat of *Acorus calamus* var. *angustatus* contained very viscous dark oil, saponification no. 172.8, iodine no. 136.1, unsaponifiable matter 38.0%. The seed oil from *Syringa amurensis* var. *japonica* showed d_4^{15} 0.9225, n_D^{20} 1.4782, acid no. 7.6, sapon. no. 180.3, iodine no. 18.2, unsaponifiable matter 3.6%. The seed of *Hibiscus manihot* contained 14% oil, n_D^{20} 1.4534, acid no. 4.9, saponification no. 201.3, iodine no. 91.7, unsaponifiable matter 7.9%. The seed-hull oils from 4 imported cottonseed samples had saponification numbers (195.4–197.2) higher than the seed oil (188.0–189.5) and iodine no. (78.9–85.8) lower than seed oil (104.4–108.4). Ultraviolet absorption spectra were given for seed oils from *S. hexaphylla, K. floribunda, A. calamus* var. (seed coat), and *H. manihot.*

The course of hydrogenation of sardine oil. Maromi Takeda and Yoshiyuki Toyama(Nagoya Univ.). *J. Japan Oil Chemists' Soc.,* **6**, 10–13(1957). Sardine oil was hydrogenated in the presence of 2% Ni catalyst at 180° up to 8 hrs. Eight samples of progressive hydrogenation degrees were examined for saturated acids, ether-insoluble bromides, hexane-insoluble bromides, ultraviolet and infrared absorption spectra, and ultraviolet spectrum of alkali-isomerized fatty acids. Saturated acids increased slowly initially and increased prominently from the time when ether-insoluble bromides disappeared. Tetraenoic, pentaenoic, and hexaenoic acids never accumulated in the whole course of hydrogenation; dienoic acids accumulated in the initial stage of hydrogenation; trienoic acid also accumulated slightly in the initial stage; monoenoic acid accumulated gradually according to the progress of hydrogenation up to a maximum at iodine numbers of 89–78, and then decreased. Conjugated dienoic and trienoic acids accumulated initially, but disappeared when hydrogenation proceeded considerably.

The composition of fatty acids and glycerides of corn oil and its winterization filter cake. Maromi Takeda, Hideko Takai, Futara Ono, and Yoshiyuki Toyama(Nagoya Univ.). *J. Japan Oil Chemists' Soc.* **6**, 13–17(1957). Oils were expressed from yellow dent corn of the U.S.A. and from white dent corn of South Africa. The oil from yellow dent corn, its winterization residual oil, the oil from white dent corn, and its winterization residual oil showed the following contents of saturated, oleic, and linoleic acids: 11.4, 31.8, 56.9; 15.0, 31.5, 53.6; 15.4, 36.3, 48.4; 23.4, 31.5, 45.1%. They showed the following mol. composition of trisaturated, disaturated monounsaturated, monosaturated diunsaturated, and triunsaturated glycerides, resp.: 0, 4.6, 28.4, 67.0; 0, 7.0, 32.8, 60.2; 0, 7.0, 33.9, 59.1; 0, 17.4, 39.1, 43.5 mol. %. Small amounts of crystalline solids were isolated from winterization residual oils.

Utilization of sperm whale oil. III. Fatty acid compositions of glyceride fraction and wax fraction, separated from sperm whale oil by the urea adduct method. Shoichiro Watanabe and Yoshiro Abe. *J. Japan Oil Chemists' Soc.* **5**, 349–51(1956). Repeated urea-adduct fractionation of sperm oil produced glyceride fraction containing 70% glyceride and wax fractionation nearly free from glyceride. Glyceride fraction contained 26% solid fatty acids of total solid acids and 46% liquid acids of total liquid acids, while wax fraction contained 41% solid and 13% liquid acids. Methylation of mixed fatty acids and fractional distillation showed that glyceride fraction contained 24.5% saturated acids (C_{12} 3.4, C_{14} 1.1, C_{16} 15.3, C_{18} 4.7%) and 75.4% unsaturated acids [C_{12} (—2H) 2.2, C_{14} (—2H) 1.4, C_{16} (—2H) 16.3, C_{18} (—2H) 31.5, C_{20} (—2.2H) 19.3, C_{22} (—2.2H) 4.7%]; and wax fraction contained 74.3% saturated acids (C_{10} 1.4, C_{12} 18.0, C_{14} 36.2, C_{16} 8.6, C_{18} 10.0, C_{20} 0.1%) and 24.6% unsaturated acids [C_{10} (—2H) 0.2, C_{12} (—2H) 1.7, C_{14} (—2H) 4.0, C_{16} (—2H) 8.2, C_{18} (—2H) 9.8, C_{20} (—2H) 0.7%].

Effects of mannitol, lecithin, and some amines as antioxidants for several oils. Tadaaki Bitoo, Tokumitsu Ishikawa, and Zyoobu Oohara(Nagoya Inst. Technol.). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **59**, 1443–4(1956). The active oxygen method was used to compare the antioxidant activity of mannitol, lecithin, and $La(OH)_3$ with citric acid and ascorbic acid as synergists, and diaminophenol, phenyl-α-naphthylamine, aldol-α-naphthylamine, and ethyl protocatechuate for linseed, hempseed, tung, soybean, sesame, corn, rapeseed, camellia, olive, silkworm-pupa, whale and cuttle-fish oils. The activities were not the same for different oils. $La(OH)_3$ alone was not a powerful antioxidant, but showed remarkable increase in the activity with synergists.

Corbisterol, the structure and separation from pullets. Taro Matsumoto and Toshitake Tamura(Nihon Univ., Tokyo). *J. Chem. Soc. Japan, Pure Chem. Sect.* **77**, 1596–7(1956). Corbisterol was separated from pullets *(Venerupis semidecussata).* It was $\Delta^{5,7,22}$-stigmastatrienol from the result of ozonolysis of its acetate. This was presumed to be a provitamin D.

The unsaponifiable matter of the fat of silk-worm feces. Toshitake Tamura, Isao Niiya, and Taro Matsumoto(Nihon Univ., Tokyo). *J. Chem. Soc. Japan, Pure Chem. Sect.* **77**, 1424–5 (1956). This unsaponifiable matter consisted of ergosterol, β-sitosterol, and tetracosanol.

The oil of a fish, hatahata (Artoscopus japonicus). Kazuo Matsumoto and Takao Honjoo(Ibaraki Univ., Hitachi). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **59**, 1087(1956). This oil showed d_4^{20} 0.9253, n_D^{20} 1.4795, acid no. 2.2, saponification no. 186.1, iodine no. 162.0, Reichert-Meissl no. 0.79, and unsaponifiable matter content 1.33%. It consisted of 18.9% solid acids (including palmitic acid) and 81.1% liquid acids (including highly unsaturated fatty acids of neutralization no. 180.3 and iodine no. 329.4).

The unsaponifiable matter of the lipide of alfalfa leaves. Choichiro Hirai, Ken Nagasawa, and Taro Matsumoto(Nihon Univ., Tokyo). *J. Chem. Soc. Japan, Pure Chem. Sect.* **77**, 1247–8(1956). This unsaponifiable matter consisted of α- and δ-spinasterol together with hentriacontane ($C_{31}H_{64}$), octacosanol ($C_{28}H_{58}O$), and triacontanol ($C_{30}H_{62}O$).

South African pilchard oil. 6. The isolation and structure of a docosahexaenoic acid from South African pilchard oil. J. M. Whitcutt(South African Council for Scientific and Ind. Res., Pretoria, South Africa). *Biochem. J.* **67**, 60–64(1957). Docosahexaenoic acid has been isolated from South African pilchard oil. Some of its properties have been determined and its degree of purity is discussed. Evidence is presented that the main component is the 4:7:10:13:16:19-hexaene. The structure previously assigned to docosahexaenoic acids of marine origin are discussed.

Studies on the addition of fats of other origin to olive oil. I. Tests on "sterols." M. Vitagliano and A. D'Ambrosio (Instituto di Agrarie, Univ. of Napoli). *Olearia* 11, 169–184 (1957). The first part of the research deals with the application of U. V. chromatography and spectrophotometric techniques for revealing the presence of "sterols" as a method for recognizing the adulteration of olive oil by other oils. These experiments did not give satisfactory results. It is however possible to recognize the presence up to 5% of groundnut, cotton and soya oils, up to 2% of the oils of cruciferae plants, and up to 4% of animal oils, by the determination of the melting point of the acetates of previously isolated sterols.

Hydrolysis of triglycerides and distillation of fatty acids. M. Naudet. *Rev. franc. corps gras* 4, 433–442 (1957). The factors involved in distillation of fatty acids from triglycerides are very well discussed in this article. The 11 figures give considerable data on interrelationships of the factors such as catalyst used, temperature, pressure, amount of water, amount of glycerol, type of fatty acids produced from the triglycerides, and the theory involved to explain results obtained.

Equipment for splitting fats and for the distillation of fatty acids. P. Marecaux. *Rev. franc. corps gras* 4, 359–65 (1957). The author discusses automatic heating control of the Colgate-Emery splitting column and control of continuous as well as fractional distillation apparatus.

Presentation of the results of the determinations of acid numbers and saponification values in the series of fat samples. M. Mangeney (Comp. franc. matieres colorantes, St. Denis). *Rev. franc. corps gras* 4, 301–308 (1957). Results from the conference held in Dec., 1956, at the symposium of functional analysis in Paris are presented.

Refining peanut oils by urea. II. Oils of low and medium acidity. M. Loury and G. Lechartier (Iterg, Paris). *Rev. franc. corps gras* 4, 372–383 (1957). Oils with 2–10% free fatty acids are effectively deacidified if the hydration of the urea complex previously recommended is increased. With the urea quantities amounting to 10 times that of the free fatty acids and 5 hrs. stirring, the acidity of the oil was reduced from 5 to 0.19–0.24%. When the acidity is less than 1%, little if any action is obtained unless a mixture of some of the urea complex of fatty acids (obtained from oils of 2–10% free fatty acids) is added, in which case the acidity can be reduced to 0.2%.

Practical aspects of the splitting of fats and the distillation of fatty acids. J. R. Garrigue. *Rev. franc. corps gras* 4, 365–371 (1957). The author discusses the choice of raw materials and preliminary treatment before splitting; also the secondary reactions taking place during distillation and the final treatment of the distilled fatty acids. A simplified procedure for the determination of splitting degree is given.

Research on soluble volatile acids of cow butter. A Corrao (Instituto di Industrie Agrarie, Univ. Palermo). *Olii Minerali-Grassi E Saponi-Colori E Vernici* 34, 365–369 (1957). An investigation was made by use of paper chromatography of cow butter's soluble volatile acids obtained by the Reichert-Meissl-Wollny technique as modified by Leffmann, Bean and Polenske. In the distillate containing the cow butter, soluble volatile acids are present in extremely small amounts together with butyric, caproic and caprylic acids and also some acetic and formic acids. The author reported that contrary to chromatograms published in the literature by others that propionic acid was not found to be present.

Low temperature direct esterification of highly acid oils by an aryl-acryl-sulfonate catalyst. F. Wittka, F. Franceschi, and F. Muscari Tomajoli. *Olii Minerali-Grassi E Saponi-Colori E Vernici* 34, 328–329 (1957). The results are reported on a pilot plant study of direct esterification of acid oils by operating at low temperature and using as an esterification catalyst an aryl-acryl-sulfonate reactant.

Influence of rancidity on the keeping qualities of canned soups. A. Rutkowski. *Olii Minerali-Grassi E Saponi-Colori E Vernici* 34, 333–336 (1957). A study has been made on the influence of fat autoxidation and hydrolysis on the stability of canned soups, with the following results: (1) during storage the peroxides and fatty acid content increases considerably. No relation was identified between the increase of free fatty acids and the detriment in eating qualities; (2) acidity of the aqueous extract and its pH do not show any change during the alteration process of the preserved products; (3) antioxidant addition influences favorably the keeping qualities of soups; such influence is much smaller than that observed in the case of pure fats; (4) the additions made in the preparation of canned soups exert an accelerating or retarding influence on the oxidation processes; good antioxidants have proved to be the protein hydrolyzates (fluid or in paste form), whereas dry pulse show a pro-oxidant influence.

Composition of acid palm oils. P. Desnuelle, P. Savary and J. Flanzy (Fac. sci., Marseille, France). *Rev. franc. corps gras* 4, 203–5 (1957). Products of the hydrolysis by the natural liposes contained in raw palm oil are studied. The free fatty acids (7.0 to 75.4%) were absorbed from ligroin solution on a column of Amberlite IR A-400. Fractionation of the unabsorbed material on a column of silicated kieselguhr impregnated with cyclohexane indicated 1.2 to 12.3% monoglycerides and 3.9 to 31.9% diglycerides. Monoglycerides were highest in samples containing 48.8% free fatty acids, and diglycerides were highest in samples containing 32.8% free acids. (*C. A.* 51, 10094)

The industrial processes of refining and their influences on the modifications of the oils and the compounds accompanying. J. Baltes (Harburger Oelwerke, Hamburg, Ger.). *Rev. franc. corps gras* 4, 245–51 (1957). The admixtures accompanying natural glycerides are reviewed. Selected examples containing various quantities of heavy metals, tocopherols, and conjugated fatty acids are used to demonstrate that by a judicious choice of refining apparatus and methods one can eliminate unwanted natural constituents, conserve the desirable and prevent modification of the structure of the compounds wanted. (*C. A.* 51, 11740)

Electrical conductivity of carnauba wax when different electrodes are used. C. S. Bhatnagar and D. R. Bhawalkar (Univ. Saugar). *Proc. Natl. Acad. Sci. India, Sect.* A25, Pt. 1, 20-4 (1956). The variation of conductivity of carnauba wax with temperature between 70° and 95° was studied with electrodes of Sn, Ni, and Cu. Conductivity increased slowly up to 80° and then rose sharply up to 83°. This range of 80–83° is the temperature of transition from solid to liquid for the wax. Conductivity differed with each electrode, and was smallest in the solid state with Sn. This effect parallels the fact that Sn electrode produces the best electret with carnauba wax. (*C. A.* 51, 10147)

Physical properties of monolayers adsorbed at the solid air interface. II. Mechanical durability of aliphatic polar compounds and effect of hydrogenation. O. Levine and W. A. Zisman (Georgetown Univ. and U. S. Naval Research Lab., Washington, D. C.). *J. Phys. Chem.* 61, 1188–96 (1957). Compounds were adsorbed as condensed monolayers at glass/air interface. Mechanical durabilities were measured by a multiple-traverse technique. Coefficients of friction vs. number of traverses are shown graphically for layers of fatty amines and their salts, fatty acids, halogenated fatty acids and amines. Data are discussed in terms of the probable nature of the films.

An investigation of sugar-cane cuticular wax. D. H. S. Horn and M. Matic (Natl. Chem. Research Lab., S. African Council for Sci. and Indus. Research, Pretoria, S. Africa). *J. Sci. Food Agr.* 8, 571–7 (1957). Sugar cane cuticular wax was saponified. The unsaponifiable fraction was acetylated, subjected to molecular distillation and chromatography. The acidic fraction contained some triene-unsaturated fatty acids. The unsaponifiable contained a large proportion of high molecular weight material (mol. wt. 800–1200) which appeared to be a mixture of α,β-unsaturated ketones, alcohols and saturated ketones but contained no hydrocarbons. The lower molecular weight unsaponifiables yielded small amounts of C_{27} to C_{31} hydrocarbons, aliphatic alcohols of which *n*-octacosanol was identified as the major component, and some unidentified ketones. Some of these products were probably artifacts formed during heating and saponification of the wax.

The storage of groundnuts under tropical conditions. 1. The effect of prolonged storage on undecorticated and decorticated groundnuts. J. C. Duerden and J. R. Cutler (W. African Stored Products Research Unit, Kano, Nigeria). *J. Sci. Food Agr.* 8, 600–4 (1957). Insect damage and changes in the qualities of groundnuts were determined during storage for 16 months in sacks in a warehouse in Nigeria. Little difference was found between unshelled, hand-shelled, and "pestle-and-mortar" shelled nuts in loss of weight and formation of powder as the result of insect attack but there was a large difference in the build-up of free fatty acids. Free fatty acid contents were as high as 14% in some types of broken shelled nuts as compared to less than 1% in unshelled nuts.

Stabilization of organic compounds. R. B. Thompson and T. Symon (Universal Oil Products Co.). *U. S. 2,810,651.* Fatty material is stabilized against deterioration by the addition of a phenolic inhibitor.

Production of glycerine. K. B. Cofer(Shell Development Co.). *U. S. 2,810,768.* A process for the synthesis of glycerine is described which depends on the hydrolysis of a 1-halo-2,3-epoxypropane with an aqueous solution of a carbonate.

White sauce base. J. N. Lesparre, M. B. Medlock, Jr. and C. E. Morris(Armour & Co.). *U. S. 2,811,452.* A soft paste is prepared from white wheat flour, powdered skim milk, 25 to 50% oleo oil and oleo stock, and monosodium glutamate. The paste is dispersible in water to form a white sauce.

Machine for cooking edible articles in deep fat. C. A. Chironis. *U. S. 2,811,914.* A machine is described for frying doughnuts or similar dough products.

Treatment of lecithin. C. L. Rasmussen(Rodney Hunt Machine Co.). *U. S. 2,812,019.* An apparatus and method are described for dehydrating lecithin in the form of a thin turbulent film at a pressure of 20 to 200 mm. Hg abs. and temperatures over 200°F.

Treatment of cream. G. A. Dummett(The A. P. V. Co. Ltd.). *U. S. 2,812,253.* A method for the steam deodorization of cream is described.

Method and apparatus for continuously cooking potato chips and similar comestibles. H. L. Smith, Jr.(H. W. Lay Co., Inc.). *U. S. 2,812,254.* A fryer for potato chips is described that permits continuous withdrawal and reheating of a portion of the oil so that the chips may be dewatered and brought to the most efficient cooking temperature in the minimum amount of time.

Coatings for simplifying frost removal from refrigerated surfaces. R. H. Goms(Whirlpool-Seeger Corp.). *U. S. 2,812,264.* Adhesion of frost to refrigerated surfaces is reduced by a coating of a vegetable oil containing 2 to 10% of aluminum stearate and 5 to 15% propylene glycol.

Therapeutic solvent vehicle. C. F. Geschickter and M. I. Rubin (Geschickter Fund for Medical Research, Inc.). *U. S. 2,812,283.* A solvent vehicle for therapeutics is prepared from vegetable oil and the dioctyl ester of cis-Δ-4-tetrahydrophthalic acid.

Hydrogenation of structurally modified acids and the resultant products. R. M. Peters(Emery Industries, Inc.). *U. S. 2,812,342.* Unsaturated C_{18} fatty acids are polymerized by heating. The product is distilled in order to separate unpolymerized acids from the polymerized residue. The distilled unpolymerized acids are then hydrogenated under pressure so that the product has an iodine value between 3 and 10. The hydrogenated product is dissolved in a solvent and the mixture is chilled to precipitate the solid saturated acids. The precipitate is removed by filtration. Evaporation of the solvent then yields liquid saturated C_{18} acids having an iodine value of 3 to 10, and a titre below 15°.

Method of making refined fatty acids from soap stocks. R. P. Cox and R. M. Brice(Archer-Daniels-Midland Co.). *U. S. 2,812,343.* Light colored fatty acids are produced by treating acidulated, washed, autoclaved and dried soapstock with 1 to 5% of concentrated phosphoric and/or sulfuric acids at 32°. Clear oil is removed from the sludge which settles out, and is washed to remove water-soluble products of the acidulation. The fatty acids are purified further by distillation.

Polychloroprene-palm oil packing composition. G. P. Leistensnider(Johns-Manville Corp). *U. S. 2,813,084.* A flexible molded composition packing is prepared from a filler material and the reaction product resulting from the *in situ* heat vulcanization of polychloroprene elastomer and palm oil.

Process of treating cacao seeds. W. J. Hale(Verdurin Co.). *U. S. 2,813,795.* An improved cocoa, chocolate and cocoa-butter are obtained from dried cacao seeds which have been impregnated with a solution of non-toxic oxygen-carrying porphyrin and roasted at temperatures below 200°. By this treatment a substantial portion of nitrogen substances other than theobromine are destroyed and the degree of unsaturation of the fats is markedly decreased.

Defoamer for reactors. N. N. Popov and K. I. Tsirkov. *U.S.S.R. 105,933.* A defoamer for apparatus used e.g. in the oxidation of oil by air or the production of drying oils, is in the form of a diffuser installed on the axis of a mixer or on the axes of the paddles inside the apparatus. (*C. A.* 51, 14338)

FATTY ACID DERIVATIVES

Mechanism of the preparation of amides and nitriles from higher fatty acids and ammonia. II. Decomposition properties of ammonium soaps of fatty acids. Hisahiro Kita, Shunzo Oozuka, and Goro Sugahara(Kaoo Soap Co., Wakayama). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **59**, 1047–50(1956). Experiments with ammonium stearate showed that the solvent (ethanol, ethyl ether, or benzene) had no influence on the formation of neutral and acidic salts, that the ammonium soap was considerably stable in the atmosphere at room temperature, and that the ammonium soap began decomposing at 50° and it was decomposed totally over 70° into fatty acid and ammonia without the formation of corresponding amide.

Reactions of higher fatty amines with ethylene oxide. Seizaburo Sakakibara, Akira Fujiwara, and Saburo Komori(Osaka Univ.). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **59**, 1149–54 (1956). Experiments with lauryl and stearyl amines showed that the reaction with ethylene oxide progressed in higher rate with higher temperature in the range of 110–230° and that the order of the effect of the catalyst on the reaction rate was $Na_2CO_3 < K_2CO_3 < NaOH < KOH < Na$. The reaction stopped when 2 moles of ethylene oxide reacted with the amine, in the absence of the catalyst. The reaction product with 2 moles of ethylene oxide, N, N-di-(β-hydroxyethyl)-alkylamines, could be separated in nearly pure form. The reaction products with 1 and 3 moles of ethylene oxide were also separated. The amine and tertiary amine could be determined even in the presence of inorganic alkali by titrating with perchloric acid in acetic acid solution by use of a newly devised apparatus for high-frequency wave titration.

Preparation of highly unsaturated long-chain alkyl vinyl ethers and their application to coating materials. Saburo Komori, Shigeo Miyamori, and Chikaaki Sakai(Osaka Univ.). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **59**, 1134–7(1956). Polyunsaturated alcohols were prepared in high yields from linseed, soybean, and cottonseed oils by Na reduction. Reaction with acetylene at atmospheric pressure produced the corresponding polyunsaturated alkyl vinyl ethers. The liquid polymerizates from them gave beautiful crystalline films on drying at room temperature. This film was low in hardness, but superior in drying, moisture-proofing, acid- and alkali-resistance.

Properties of long-chain alkyl vinyl ethers and their block polymerization. Saburo Komori, Ei Shinsugi, Takaaki Sasaki, and Hiroshi Simaoka(Osaka Univ.). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **59**, 1132–4(1956). The vinyl ether monomers synthesized showed the following properties (m.p., b.p., n_D, and d_4, respectively): lauryl, —, 117–120/4 mm. Hg, 1,4382/20°, 0.8165/20°; myristyl, 4.9–5.6, 138–140/4, 1.4437/20, 0.8215/20; cetyl, 17.2–17.6, 162/4, 1.4468/20, 0.8248/20; stearyl, 29.4–30.2, 152–153/0.1, 1.4413/10, 0.8138/40; arachidyl, 38.9–29.1, 172–173/0.1, 1.4420/40, 0.8048/60; behenyl, 46.3–46.4, 190–192/0.5, 1.4401/50, 0.8055/60. Long-chain alkyl vinyl ethers showed low heat of polymerization. $SnCl_4$ was effective as the catalyst for polymerization. The mol. wt. of the block polymerizate was 2000–5000. The contamination of the ether monomer with higher alcohol had no influence up to 10%.

Aryl fatty acids. I. Addition of methylnaphthalene to oleic acid. Akira Misonou and Yoshihiro Ozawa(Univ. Tokyo). *J. Japan Oil Chemists' Soc.* **6**, 27–31(1957). The reactivity of methylnaphthalene was compared with naphthalene in the addition with ethyl oleate in the presence of Japanese acid clay. The methylnaphthalene used had 98% purity, and consisted of 34% 1-methyl and 66% 2-methyl compound by infrared absorption spectrum. The decrease in iodine no. of the reaction mixture was slightly lower in the case of methylnaphthalene than in the case of naphthalene, but the yield of the main reaction product, methylnaphthylstearic acid and its ester, was higher than that of naphthylstearic acid and its ester, since the high-boiling by-products were formed in smaller amounts. The by-products consisted of naphthalenedistearic acid together with oleic acid dimer and dinaphthylstearic acid, judged from neutralization no. in the case of naphthalene. There seemed to be no difference between the reactivities of the 2 isomers of methylnaphthalene. The conditions of the reaction examined were 1 mole of ethyl oleate and 1 or 2 moles naphthalene of methylnaphthalene at 210° for 2 hrs. or at 180° for 4 hrs. The yield of the main reaction product decreased considerably at lower temperature and at lower ratio of aromatic compound used.

II. Preparation of isoamylnaphthylstearate and its properties as instrument lubricant. Akira Misonou. *Ibid.* 160–4(1957). The addition of naphthalene with free oleic acid was compared with that with ethyl oleate. Isoamyl naphthylstearate was prepared by esterifying naphthylstearic acid with isoamyl alcohol or by distilling the isoamyl esters of the reaction mixture; the latter gave higher yield, about 85 wt. % of the oleic acid. This compound as well as ethyl naphthylstearate gave excellent properties as the lubricating oil for precise instruments.

The water-proofing and softening properties of textiles treated with N-methylolalkylamide, N-(alkylamidomethyl)-pyridinium chloride, and N-alkoxymethylpyridinium chloride. Tokuzo Yoshizaki(Ippôsha Oil Industries, Ltd., Osaka). *J. Japan Oil Chemists' Soc.* **6**, 23–7(1957). *N*-methylolalkylamine (I), prepared from fatty acid amide of hydrogenated rice oil, *N*-(alkylamidomethyl)-pyridinium chloride (II), prepared from the same acid amide, and *N*-alkoxymethylpyridinium chloride (III), prepared from commercial stearyl alcohol, were compared. The water-proofing activity was greater with I and II than with III. Also the softening activity was superior with I and II. 31 references.

Antistatic and rewetting treatment of textile material. E. I. Welles and S. M. Edelstein(Dexter Chemical Corp.). *U. S. 2,809,159.* An antistatic and rewetting composition for application to textiles is prepared from an ethoxylated hydroxy tertiary amine containing a C_8 to C_{24} unsubstituted alkyl group directly attached to the amine nitrogen and a water soluble, non-volatile polyhydric alcohol.

Production of high molecular weight alcohols from fatty acid esters. G. R. Wilson and Marguerite S. Baylerian(Ethyl Corp.). *U. S. 2,809,206.* A solution of crude esters of C_8 to C_{40} fatty acids in a hydrocarbon, ether or alcohol is heated with a mineral acid and a monohydric alcohol until esterification of all free fatty acids in the crude ester has been completed. The finished esters are then reduced to the corresponding alcohols by an alkali metal-reducing alcohol process.

Lubricant compositions containing oleic acid esters of aryloxy alcohols. R. J. Neely and A. G. Rocchini(Gulf Research & Development Co.). *U. S. 2,809,936.* A lubricant composition having an improved viscosity index is obtained by the addition of 1-phenoxy-2-propyl oleate to mineral oil.

In situ epoxidation of fatty acids. F. P. Greenspan and R. J. Gall(Food Machinery & Chemical Corp.). *U. S. 2,810,732.* An unsaturated higher fatty acid mixture containing oleic acid is dissolved in a hydrocarbon solvent and epoxidized at temperatures between 50 and 100° by reaction with 0.25 to 1 mole of acetic acid, 1 mole of aqueous hydrogen peroxide and 0.5 to 5% (by wt. of acetic acid) of sulfuric acid.

Peracid epoxidation of fatty acid esters. F. P. Greenspan(Food Machinery & Chemical Corp.). *U. S. 2,810,733.* Unsaturated glyceride oils are epoxidized by heating with 1 to 1.3 moles of peracid for each mole of ethylenic unsaturation plus 1 to 1.3 moles of peracid for each mole of esterified polyunsaturated acid.

Method of producing secondary aliphatic amines. S. H. Shapiro (Armour & Co.). *U. S. 2,811,556.* Secondary amines are prepared by the reduction of nitriles in the presence of a copper-chromium oxide hydrogenation catalyst.

Method of decarboxylating higher fatty acids over magnesium catalysts. R. Chesrown, R. E. Newby and R. P. Arthur (Armour & Co.). *U. S. 2,811,559.* Formation of soaps during the decarboxylation of higher fatty acids can be prevented by preheating separately to temperatures over 340° the magnesium catalyst and the C_8 to C_{22} fatty acids.

Method for preparing fatty esters of non-reducing oligosaccharides in the presence of sulfoxides. W. F. Huber and N. B. Tucker(The Procter & Gamble Co.). *U. S. 2,812,324.* Esters are prepared by the reaction of a non-reducing oligosaccharide with a fatty acid ester in the presence of an interesterification catalyst and a sulfoxide at temperatures between 50° and 150°.

Preparation of cyanohydrins. E. M. Beavers and E. F. Riener (Rohm & Haas Co.). *U. S. 2,812,338.* Cyanohydrins are prepared by the reaction of an alkali metal cyanide with epoxy C_{16} to C_{22} saturated acids, nitriles or esters.

Graft polymer-fortified bitumin additives. M. L. Kalinowski and L. T. Crews(Standard Oil Co.). *U. S. 2,812,339.* An additive suitable for use in bitumin is prepared by mixing at least one alkylene polyamine, "Ebony Fat" and an ethylene oxide-propylene oxide graft polymer. The "Ebony Fat" is the propane insoluble residue obtained from the solvent extraction of crude fats, oils and fatty acids.

Method of preparing acetoacetic acid ester of castor oil. A. R. Bader(Pittsburgh Plate Glass Co.). *U. S. 2,812,340.* The desired acetoacetic acid ester is prepared by the reaction of diketene with castor oil.

Hydrochlorination process. Elizabeth L. Fareri and J. P. Pellegrini, Jr.(Gulf Research & Development Co.). *U. S. 2,812,-341.* Unsaturated aliphatic acids or alcohols are reacted with anhydrous hydrogen chloride in the presence of a Friedel-Crafts type catalyst.

Antioxidant containing fatty monoglyceride citrate. L. A. Hall (The Griffith Labs., Inc.). *U. S. 2,813,032.* An antioxidant is described which is a solution of fatty monoglyceride citrate in an edible oil containing butylated hydroxyanisole and/or propyl gallate.

Amide condensation products. J. D. Zech(Atlas Powder Co.). *U. S. 2,813,091.* The desired product is obtained by heating together equivalent amounts of a secondary hexityl amine, formaldehyde and a monocarboxylic fatty acid amide in the presence of a mutual solvent.

Method of making azelaic acid. C. G. Goebel, A. C. Brown, H. F. Oehlschlaeger and R. P. Rolfes(Emery Industries, Inc.). *U. S. 2,813,113.* Azelaic acid is produced by the ozonolysis of C_{10} to C_{24} unsaturated fatty acids, esters, nitriles, amides or soaps.

Method of preparing epoxidized oils. A. W. Wahlroos(Archer-Daniels-Midland Co.). *U. S. 2,813,878.* Long-chain unsaturated aliphatic acids, esters, and amides may be epoxidized by heating with a catalytic amount of sulfuric acid, 0.5 mole of acetic acid for each mole of unsaturation and about one mole of hydrogen peroxide. Water and water soluble products are removed from the reaction mixture by gravity separation and are used for treating additional quantities of the unsaturated compound without restoring the peroxide content to its original proportion relative to the acetic acid.

Process for making fatty peracids. D. Swern and W. E. Parker (Secy. Agr., U.S.A.). *U. S. 2,813,885.* Peracids of C_2 to C_{18} saturated fatty acids or methyl esters are prepared by reaction with at least a molar equivalent of concentrated sulfuric acid and 30 to 65% hydrogen peroxide at temperatures below 40°.

Process for preparing organic peracids. H. Krimm(Farbenfabriken Bayer Akt.). *U. S. 2,813,896.* Organic peracids (for example, diperadipic acid) are prepared at temperatures between —50° and +50° by the reaction of aqueous hydrogen peroxide and sulfuric acid with monocarboxylic and dicarboxylic aliphatic, cycloaliphatic and aromatic acids or their acid anhydrides.

• Biology and Nutrition

Nutritive value of whale oil. VII. Nutritive values of glyceride and wax(purified with castor seed lipase) separated from the head and blubber oils by molecular distillation. Hisashi Fujii and Shunichi Okura(Nippon Marine Products Co., Odawara). *Nippon Suisan Kabushikikaisha Kenkyusho Hokoku* **No. 8**, 35–8(1957). White rat groups fed on sperm whale head and blubber oils and waxes separated from each, but not the glycerides, suffered from seborrhea. Those fed on the waxes and original blubber oil all succumbed (butter-fed animals all survived), but 1 fed on the original head oil and 2 each fed on the glycerides and baleen whale oil survived. The glyceride-fed rats showed a similar increase in weight as the butter-fed rats. The blubber oil was slightly more toxic than the head oil.

VIII. Nutritive values of wax and glyceride separated from sperm whale oil by the combination of molecular and high vacuum distillations. *Ibid.* 39–43. The groups fed on the head and blubber oils and their waxes, but not their glycerides, suffered from seborrhea. Therefore, the wax is the pathogen. Addition of small amount of ethyl linoleate to the head oil increased the body weight markedly but additions to the blubber oil did not produce such a marked increase. The glyceride was digested as easily as butter and was equally nutritious as that from baleen whale oil. (*C. A.* **51**, 15032)

Nutrition studies with normal and branch-chain fatty acid amides. G. Weitzel, H. Schön and H. Kalbe(Max-Planck Inst. Göttingen, Ger.). *Z. physiol. Chem.* **295**, 173–87(1953). The methyl acid amides produce stronger diaciduria than the straight chain compounds. The observed diaciduria was greater than that observed when fatty acid glycerides or ethyl esters were added to the diet. The experiments were carried out with dogs. (*C. A.* **51**, 12255)

The site of fat absorption in the rat. G. N. Chandler and J. A. Benson. *Gastroenterologia* **85**, 160–8(1956). The capacity was determined of various levels of the small intestine of the rat to absorb neutral fat after feeding of I^{131}-labeled olive oil through a stomach tube. The third quarter of the intestine was found to be the main site of olive oil absorption. This localization is not dependent on the duration of the period of absorption. The anatomical proximity of the stomach is not the determining factor. (*C. A.* **51**, 12270)

Studies on the glycerides during the clearing reaction. L. A. Carlson and L. B. Wadström (King Gustaf V Res. Inst., Stockholm). *Clin. Chim. Acta* 2, 9–15 (1957). The composition of neutral fats was studied during the clearing reaction (the effect of heparin on alimentary lipemia). The results indicated that the clearing reaction is a simple hydrolysis of triglycerides to partial glycerides, fatty acids and glycerol, similar to the action of pancreatic lipase on fat emulsions. (*C. A.* **51**, **12291**)

The quantitative effects of cholesterol, cholic acid and type of fat on serum cholesterol and vascular sudanophilia in the rat. D. M. Hegsted, S. B. Andrus, A. Gotsis and O. W. Portman (Harvard School of Public Health and Harvard Med. School, Boston, Mass.). *J. Nutrition* **63**, 273–288 (1957). Marked differences in the effect of various oils on the serum cholesterol levels of rats fed diets containing cholic acid and cholesterol are readily measured with considerable accuracy. In general, the effects of the oils tested tend to be similar to their reported effects upon serum cholesterol levels in human beings, suggesting that the active factors in the two species may be similar. The rat assay may thus be a useful, rapid, and relatively accurate method for determining the effects of the various constituents of fats upon serum cholesterol levels.

The effect of fluoride administration on fluoride deposition in tissues and on serum cholesterol in the rat. W. Buttner and J. C. Muhler (Indiana University, Bloomington). *J. Nutrition* **63**, 263–272 (1957). The effect of fluoride administration in the rat on serum cholesterol level was studied. Doses of 0.5, 1.0, or 2.0 mg. of fluoride daily by stomach tube over an experimental time of 4 to 8 weeks did not result in an increase of serum cholesterol. A level of 30 p.p.m. of fluoride provided in the drinking water over a period of 4 months similarly did not increase the normal serum cholesterol level of rats.

Nutritive value and safety of hydrogenated vegetable fats as evaluated by long-term feeding experiments with rats. Roslyn B. Alfin-Slater, A. F. Wells, Lilla Aftergood, and H. J. Deuel, Jr. (Dept. of Biochem. and Nutrition, Univ. of Southern Calif., Los Angeles). *J. Nutrition* **63**, 241–261 (1957). The performances of rats of generations 26 through 46 as judged by gain in weight, tibia length, reproduction, lactation, longevity and carcass analyses have shown that the hydrogenated fats are of full nutritional value. It is concluded that selectively hydrogenated vegetable oils, such as are employed in margarine manufacture, containing positional and stereoisomers of the unsaturated fatty acids, are fully digestible, harmless, and of full nutritional value as determined by long-term studies conducted with rats. In all the multigeneration and longevity studies, herein reported, no deleterious effects were observed as a result of the ingestion of the small amounts of saturated fatty acids present in the hydrogenated fats.

Discovery of cholesterol in some red algae. Kyosuke Tsuda, Saburo Akagi and Yukichi Kishida (Institute of Applied Microbiology, University of Tokyo, and Takamine Research Laboratory, Sankyo Company, Tokyo, Japan). *Science* **126**, 927 (1957). There have been some reports on the isolation of algal sterols, including fucosterol, sitosterols, chalinasterol, and sargasterol, but there has been no report on the isolation of cholesterol from the vegetable kingdom. This report describes discovery of cholesterol in some red sea weeds. (Rhodophyceae).

Effect of insulin on clearance of emulsified fat from the blood in depancreatized dogs. W. R. Waddell and R. P. Geyer (Dept. Nutrition, Harvard Sch. Public Health, Boston). *Proc. Soc. Exptl. Biol. & Med.* **96**, 251–255 (1957). Emulsified fat infused into pancreatized dogs is cleared from the blood at a normal rate if the animal is receiving insulin whereas without insulin the injected fat is cleared slowly. It thus appears that the clearance of fat from the blood is dependent upon normal carbohydrate utilization. Serum cholesterol levels rise following infusion of fat in diabetic animals deprived of insulin. Serum cholesterol concentration falls following infusion of fat into pancreatectomized animals receiving insulin. Observations of fat metabolism in which the fat is administered intravenously give data comparable to those obtained folowing oral administration of fat and the mechanisms of clearance seem identical by the two methods.

Comparison of total cholesterol levels in blood serum with lipid concentrations in human coronary arteries (a second interim report). J. C. Paterson and J. B. D. Derrick (Univ. of Western Ontario, London, Canada). *Can. J. Biochem. & Physiol.* **35**, 869–880 (1957). This report, which is concerned with only one facet of the serum lipid/atherosclerosis problem, gives the results of a comparison of the levels of total serum cholesterol, determined serially during life in 88 patients, with the concentrations of total lipid extracted from large segments of the coronary arteries of the same patients after death and autopsy. No significant relationships have been encountered in individuals between 60 and 89 years of age whether the comparisons were made of the entire series of cases or on cases in the same age group at the time of death. Terminal loss of wt. from wasting disease processes had no significant relationship to the concentration of lipid in the coronary arteries of the entire series of cases or of cases in the same age group.

$C^{14}O_2$ excretion after the intravenous administration of albumin-bound palmitate-1-C^{14} to intact rats. C. McCalla, H. S. Gates, Jr. and R. S. Gordon, Jr. (NIH, Bethesda, Md.). *Arch. Biochem. Biophys.* **71**, 346–351 (1957). Sodium palmitate-1-C^{14} was administered intravenously to rats in the form of the serum albumin-bound complex ion. Expired air collection indicated a rapid and efficient conversion of the substrate to CO_2 in fasting rats, whereas rats fed carbohydrate before the isotope was administered excreted only minimal amounts of label in the same period.

Synthesis of lipids in the livers of rats treated with pituitary growth hormone. A. L. Greenbaum and R. F. Glascock (Dept. Biochem., Univ. College, London). *Biochem. J.* **67**, 360–365 (1957). The effect of administration of pituitary growth hormone on the rates of incorporation of labelled carbon from pyruvate and acetate into carbon dioxide, fatty acids, phospholipids and cholesterol by rat-liver slices has been investigated. There was no difference in the rate of production of carbon dioxide from any of these substrates in normal or treated rats. Growth hormone reduced the rate of incorporation of labelled carbon from carboxy C^{14} acetate into both fatty acids and phospholipids. The rate of incorporation of labelled carbon into cholesterol appeared to be stimulated by growth hormone.

Methods for comparing effects of various fats on fibrinolysis. R. F. Foster and W. A. Thomas (Washington Univ. Sch. of Med., St. Louis). *Proc. Soc. Exptl. Biol. & Med.* **96**, 24–29 (1957). Two new methods have been utilized to compare the biologic effect of 3 dietary fats. In one method using rabbits and studying the effect of single meals of butter, corn oil, coconut oil and water on fibrinolytic activity of blood (drawn 3 hrs. after feeding and measured by a technic utilizing streptokinase to activate profibrinolysin) *in vitro* under controlled conditions. Lysin time was significantly prolonged with butter as compared to corn oil, coconut oil or water. In another method the effects of butter, corn oil, coconut oil and saline added *in vitro* on fibrinolytic activity of clotted human plasma was measured with streptokinase to activate profibrinolysin under controlled conditions. Under these conditions butter markedly prolonged lysis time as compared to corn oil and coconut oil.

Influence of a dietary supplement of erucic acid and other fatty acids on fertility in the rat. Sterility caused by erucic acid. K. K. Carroll and R. L. Noble (Univ. of Western Ontario, London, Canada). *Can. J. Biochem. & Physiol.* **35**, 1093–1105 (1957). Male rats were raised on a diet of powdered Masters' Meal with a supplement of 10% or more by wt. of erucic acid. The animals suffered a progressive reduction in spermatogensis and bcame completely sterile after about 5 months, despite their normal rate of growth and their apparently excellent state of health. Subsequent experiments indicate that similar effects can be produced in adult rats although less readily. The impairment of spermatogenesis appears to be a specific effect of the erucic acid in the diet. The suggestion is offered that erucic acid may interfere with reproduction by interfering with the metabolism of the essential fatty acids.

Surface active agents and cellular metabolism. I. The effect of cationic detergents on the production of acid and of carbon dioxide by baker's yeast. W. McD. Armstrong (Dept. Physiol., Univ. College, Dublin, Ireland). *Arch. Biochem. & Biophys.* **71**, 137–147 (1957). The production of acid and of CO_2 by unbuffered suspensions of fermenting baker's yeast is strongly inhibited by cationic detergents. Under the same experimental conditions, anionic detergents and related compounds are either slightly or not at all inhibitory. A similar difference has been observed in the ability of cationic and anionic detergents, respectively, to release phosphorus-containing compounds from yeast cells. The cytolytic action of cationic detergents on yeast can be correlated with their effects on the metabolism of the cells. It is suggested that the action of cationic detergents on yeast cells involves their interaction in the first instance with anionic groups in the cell surface.

Influence of dietary choline and protein on the level of phospholipid in the serum of the rat. B. Rosenfeld and Jessie M. Lang (Univ. Toronto, Toronto, Can.). *Can. J. Biochem. &*

Physiol. **35**, 845-52(1957). Albino rats weighing 180–200 g. were fed diets containing 5, 9, and 19% protein. The influence of these diets, both with and without additional choline, on the level of serum phospholipid was measured. It was found that in the presence of dietary choline, an increase of the protein content of the diet caused an elevation of the level of phospholipid in the serum. Measurements of the effect of the interval after feeding showed a significant decrease of serum phospholipid 16 hrs. after the removal of the choline-containing food. In choline deficiency no such effect was found. Measurement of the influence of duration of choline deficiency on the level of phospholipid in serum revealed an immediate fall to a lower level at the onset of the deficiency. This change was complete before a significant rise of the level of total liver lipids was apparent.

The effect of sheep-rumen contents on unsaturated fatty acids. F. B. Shorland, R. O. Weenink, A. T. Johns, and I. R. C. McDonald(Fats Res. Lab., Wellington, New Zealand). *Biochem. J.* **67**, 328–333(1957). The incubation of oleic, linoleic or linolenic acid with rumen contents of sheep in a carbon dioxide atmosphere at 37° resulted in the production of stearic acid as well as *trans* and positional isomers of the unsaturated acids. These results further support the view that many of the peculiarities of ruminant fats arise from the hydrogenation of the dietary unsaturated acids, particularly linolenic acid.

Blood lipids. 1. Plasma lipids of the lactating cow: chromatography on silicic acid. G. A. Garton and W. R. H. Duncan (Rowett Res. Inst., Bucksburn, Aberdeenshire). *Biochem. J.* **67**, 340–345(1957). Lipids, prepared by ethanol-ether extraction of the plasma of lactating cows, were extracted with light petroleum. The lipids soluble in light petroleum were subjected to chromatography on silicic acid columns. Fractions were obtained which consisted essentially of sterol esters (the main component of the extracts), of triglycerides and of free sterols; other smaller fractions consisted of unidentified lipids and of phospholipids which were accompanied by non-lipid material.

Blood lipids. 2. Plasma lipids of the lactating cow: fatty acid composition of the sterol esters and triglycerides. A. K. Lough and G. A. Garton(Rowlett Res. Inst., Bucksburn, Aberdeenshire). *Biochem. J.* **67**, 345–351(1957). The reversed-phase partition chromatographic method has been extended to the semi-micro, quantitative analysis of the fatty acids of the sterol esters and triglycerides from the plasma of pasture-fed lactating cows. The sterol-ester fatty acids were characterized by their high content of polyunsaturated components (linoleic, linolenic and arachidonic acids), whereas the triglycerides resembled depot fat in the nature of the component fatty acids, though the proportion of oleic acid was considerably lower in the plasma glycerides than in depot fat. The fatty acid composition of the two classes of plasma lipid is discussed in relation to that of dietary lipids and milk glycerides. It is suggested that dietary polyunsaturated fatty acids which escape hydrogenation in the rumen may be preferentially esterified with cholesterol during, or subsequent to, their absorption from the alimentary tract.

Some biochemical aspects of the food characteristics of fatty substances. P. Desnuelle. *Rev. franc. corps gras* **4**, 427–433 (1957). This article discusses fatty substances from the viewpoint of their digestion, reabsorption, transport, and the problem of the essential fatty acids. The utilization of fatty substances is considered as an energy source in the animal body.

Saturated fatty acids as bacterial antimetabolites. M. N. Camien and M. S. Dunn(Univ. of Calif., Los Angeles). *Arch. Biochem. and Biophys.* **70**, 327–345(1957). Inhibitory effects of saturated fatty acids of from 7 to 24 carbons in length on nine species of lactic acid bacteria have been investigated. The inhibitions due to the acids of from approximately 12 to 20 carbons in length have been shown to be the result of a potent antimetabolite effect, readily reversible by any of the six unsaturated fatty acids (oleic, linoleic, ricinoleic, vaccenic, licanic, and erucic acids) and the one cyclopropane acid (lactobacillic acid) tested. The inhibition due to saturated fatty acids of longer chain length (22 to 24 carbons) nearly equal those of the most active saturated acids in the 12- to 20-carbon range, but the mechanism of these inhibitions has not been investigated. The short-chain fatty acids (12 and fewer carbons) are relatively feeble inhibitors and appear to act primarily according to the physicochemical hypotheses which have been proposed by earlier investigators. A scheme of metabolic pathways suggested by the present findings and correlating the latter with earlier data concerning bacterial lipide metabolism is proposed.

Rumen volatile acids of normal, ketotic and fasted cows. R. E. Brown and J. C. Shaw(Dairy Dept., Univ. of Maryland, College Park). *J. Dairy Sci.* **40**, 667–671(1957). There were no significant differences in the amount of volatile acids in the rumen of ketotic cows ''off feed'' and healthy cows fasted from 18 to 24 hours. Both groups had lower total rumen acids, containing more acetic, and less propionic acid, than healthy cows on normal ration.

The fats of life and soybean oil. J. B. Brown(Institute of Nutrition and Food Technology, Ohio State Univ.). *Soybean Digest* **18**(1), 6–10(1957). The nutritive value of fats and oils is reviewed briefly, with emphasis on the importance of the essential fatty acids. The possible relationship of dietary fat and cholesterol to cardiovascular disease is discussed. The writer points out the circumstantial nature of the evidence but concludes that data are sufficient to justify some lowering of the fat intake and the use of fats rich in essential fatty acids. The possible implications of this conclusion on the markets for soybean oil and hydrogenated oils is discussed in terms of the destruction of linoleic acid by the hydrogenation process.

Lipids and the problem of atherosclerosis: a survey. R. A. Morton(Dept. Biochem., The Univ. Liverpool). *J. Sci. Food Agr.* **8**, 445–57(1957). Review with 102 references. The terminology and nature of cardiovascular disease are defined. The epidemiological aspects and the effects of changing dietary patterns are reviewed. The author discusses in some detail the possible relationship of atherosclerosis to cholesterol metabolism, plasma lipoproteins and lipases, and elastase activity. The effects of both the nature and the quantity of dietary fats on serum cholesterol levels and experimental atherosclerosis are reviewed. It is concluded that, given more research, a rational preventive approach to atherosclerosis may emerge before long, that a significant reduction in fat intake is probably desirable for most men and for older women in this country, and that the food industry should immediately explore how best to use animal and vegetable fats separately or together.

• Drying Oils and Paints

Behavior of paint systems under ultraviolet radiation. M. Kronstein(College of Engineering, New York Univ.). *Paint and Varnish Production* **47**, 25(1957). This study included solution coatings, water emulsion coatings, and modified water emulsion coatings. Based on the behavior of the systems under study the paints were divided into three groups: (A) Paints based on film formers used in a state of solution; (B) paints based on film formers used in a state of water emulsion; (C) modifications of the vehicles used in ''B'' with alkyl resin solutions. Nine tables and seven figures sum up the information obtained.

Effect of the anion on the drying properties of oils catalyzed with cobalt salts. A. Doadrio and R. Montequi. *Grasas y Aceites* **8**, 76–77(1957). Several tests of drying and measures of properties of the films obtained were made. The product employed was linseed oil catalyzed with cobalt salt of naphthenic and octoic acids, with or without organic reagents giving complexes with Co. The cation concentration in all experiments was 0.03% referred to oil, and the organic reagent was added in molar proportion twice that of Co. The α-nitroso-β-naphthol, dimethylglyoxime, oxine, and complexes were used as reagents. The results showed that the catalytic effect of the cation decreased more and more when the complex formation is stronger and almost disappears in the case of α-nitroso-β-naphthol. The effect of ortho-phenanthroline was also studied. No important influence could be determined in the case of Co.

The influence of salts and acids on the metal-soap-catalyzed drying of lithographic varnishes and inks. R. R. Coupe(Patra). *Paint Technol.* **21**, 311–12(1957). The inhibition of drying by salts and acids is ascribed to inactivation of the driers.

The role of peroxide catalysts in coating compositions. C. E. H. Bawn(Liverpool Univ.). *Paint Technol.* **21**, 308–9(1957). The nature of the action of hydroperoxides in drying oils and copolymerization of vinyl monomers with polyesters is outlined.

Process for producing porous plastics from unsaturated fats and oils and their derivatives. A. Solbakken. *U. S. 2,810,654.* An ester of an unsaturated fatty acid is mixed with small amounts of either water or a lower aliphatic alcohol, and a carbonate, bicarbonate or bisulfite. The mixture is agitated vigorously after the addition of sulfur monochloride until the ester is vulcanized and generation of gas *in situ* has transformed the mixture into a porous mass.

Polyamide suspensoids forming continuous films. H. Wittcoff and W. A. Jordan(General Mills, Inc.). *U. S. 2,811,459.* A stable aqueous suspensoid capable of forming continuous tacky films is described. The principal ingredient is a polyamide derived from polymeric fatty acids and an aliphatic polyamine. The polyamide has a melting point within the range of 25° to 95° and a molecular weight between 1,000 and 10,000.

Mixed suspensoids of epoxy resins and polyamide resins. H. Wittcoff and M. M. Renfrew(General Mills, Inc.). *U. S. 2,811,495.* An aqueous dispersion is prepared from an epoxy resin and a polyamide reaction product of polymeric fatty acids with an aliphatic polyamine. The dispersion is stabilized by an intrinsic dispersing agent formed by the reaction of the terminal amine groups of the polyamide with a water soluble carboxylic acid.

Method of manufacturing paint. K. Culemeyer(Willy Spangenberg & Co.). *U. S. 2,812,337.* A paint base is prepared by the reaction of pure tall oil fatty acids with a polyhydric alcohol, and then with a polyisocyanate.

Heat bodying polydiolefinic drying oils with dicyclopentadiene. A. D. Green(Esso Research & Engineering Co.). *U. S. 2,812,371.* A synthetic conjugated diolefinic drying oil is improved by heating with cyclodiolefin at temperatures between 200° and 300°.

Alkyd resin comprising tall oil and pentaerythritol. J. A. Parker and E. J. Pieper(Armstrong Cork Co.). *U. S. 2,813,841.* A modified alkyd resin is prepared from a mixture of tall oil, dimerized glyceride oil fatty acids and polyhydroxy alcohol containing at least one ether linkage. Reaction is continued until the acid number is between 140 and 160. Pentaerythritol is added and the reaction is continued to produce an alkyd having an acid number of 15 to 25. This product is then reacted with an enedioic dicarboxylic acid.

• Detergents

A new family of amphoteric surfactants: fatty amino acid derivatives. D. L. Andersen and A. J. Freeman(General Mills, Inc., Minneapolis, Minn.). *J. Soc. Cosmetic Chemists* 8, 277–82 (1957). A new family of amphoteric surface active agents based on the condensation of a fatty primary amine and methyl acrylate have been made available commercially in both monoadduct and diadduct forms in a variety of fatty chain lengths. Their flexibility as to chemical structure and their amphoteric polyfunctionality combine to provide an extremely versatile family of products offering promise in a wide variety of applications. These fatty amino acid derivatives are particularly adapted to cosmetic formulations, offering controlled surface active properties, compatibility with a wide range of products, mildness and polyfunctionality.

Fatty acid soaps in specialty cleaners. W. J. Beach(Sugar Beet Products Co., Saginaw, Mich.). *Soap & Chem. Specialties* 33(10), 52–4, 105, 107(1957). The use of fatty acids in soaps is increasing due to technical advances in hydrolysis of oils to yield pure acids, savings in time in soap making due to faster and more complete reactions, and greater range of end products possible. Formulations are given for use of these fatty acid soaps in such specialty products as liquid soaps, rug and upholstery cleaners, powdered hand soaps, waterless hand cleaners, paste and cream soaps, leather cleaners and various synthetic products.

Addition of surface-active agents in electrolytic copper refining. N. B. Pleteneva and T. V. Globa. *Tsvetnye Metal.* 30(4), 32–7 (1957). Many surface-active substances produce good deposits when new, but after long use in a bath their concentration might become excessive or the electrolyte becomes contaminated by the products of their decomposition. In selection of new agents, attention should be paid to their possible decomposition products. (*C. A.* 51, 12702)

The surface of the cotton fiber. III. Effects of modification on soil resistance. Blanche R. Porter, C. L. Peacock, V. W. Tripp and Mary L. Rollins(Southern Regional Research Lab., New Orleans, La.). *Textile Research J.* 27, 833–45(1957). Experiments designed to complement microscopical studies and to attempt a practical evaluation of the effectiveness of various agents which impart resistance to dry soil are reported. Various methods of applying soil to fabric were evaluated, as was the effectiveness of a number of soid retardants. Results were interpreted from reflectance data and from radioactive tracer studies. It was shown that soil takeup is directly related to specific surface. It was found that grey cotton is slightly more resistant to soil than bleached cotton, and that increased smoothness of fiber did not necessarily impart soil resistance to cotton fabrics. The most successful types of antisoiling agents for dry soils appear to be colloidal particulate applications such as silica or alumina, and additive finishes which lower surface energy of the fiber.

Modern trends in detergency and sterilization. J. C. L. Resuggan(Brit. Hydrol. Corp., Merton, Eng.). *J. Soc. Dairy Technol.* 10, 84–6(1957). R. reviews anionic, nonionic, and cationic surface-active agents, Ca and Mg. sequestrants, organic acids, and oxidizing agents for detergency, and NaOCl, chloramine-T, and chlorinated Na_3PO_4 for sterilizing value in the creamery. The Ca-sequestering capacity of the Na salts varies as follows: gluconate in 3% NaOH 325, ethylenediaminetetraacetate 201, hexametaphosphate 74, tetraphosphate 57, tripolyphosphate 36, gluconate below pH 11.0 25, and pyrophosphate 7 mg. $CaCO_3$ per g. (*C. A.* 51, 15974)

Inhibition of foaming. VIII. Changes in electrical conductivity of colloidal electrolyte solutions on addition of non-ionic foam stabilizers and foam inhibitors. S. Ross and T. H. Bramfitt (Rensselaer Polytechnic Institute, Troy, N. Y.). *J. Phys. Chem.* 61, 1261–5(1957). The effects of non-ionic foam stabilizers and foam inhibitors on the structure of the micelles produced spontaneously in solutions of colloidal electrolytes has been investigated by means of electrical conductivity measurements. At concentrations above the c.m.c. foam stabilizers reduce specific conductance and foam inhibitors increase specific conductance. These facts are interpreted as resulting from increased micellization caused by foam stabilizers, and reduced micellization caused by foam inhibitors. The solubilization of foam inhibitors and the antifoaming action occur simultaneously, and both phenomena reach their optimum at the same concentration of additive. An extended ''surface semi-micelle'' is postulated as co-existing with the micelles in bulk; like them capable of solubilizing additives; unlike them, surface-active; and responsible by the cohesion of its structure for the relative stabilities of foams.

The adsorption of cations by anionic foams. C. Walling, E. E. Ruff, and J. L. Thornton, Jr.(Lever Brothers Co., Edgewater, N. J.). *J. Phys. Chem.* 61, 486–9(1957). A study of the relative adsorption of Ca^{++} and Na^{+} by N-palmitoyl methyl taurine foams indicated a strong preferential adsorption of Ca^{++} by the anionic surface layer. Quantitative interpretation of the phenomenon was complicated by a competitive preferential adsorption of Ca^{++} by micelles in the solution being foamed. Similar preferential adsorption of a number of other cations by anionic foams was demonstrated. Multivalent ions were, in general, the most strongly held. (*C. A.* 51, 11808)

Purification and surface tension properties of alkyl sodium sulfosuccinates. E. F. Williams, N. T. Woodberry and J. K. Dixon(Am. Cyanamid Co., Stamford, Conn.). *J. Colloid Sci.* 12, 452–9(1957). Methods of purifying a series of dialkyl sodium sulfosuccinates by crystallization and slurry adsorption are described. These procedures are useful for purification of relatively large quantities. The relationship of critical micelle concentration to chain length of the alkyl group is described. A consideration of the nature of the surface tension-concentration curve near the critical concentration indicates that micelle formation and surface hydrolysis occur below the critical micelle concentration.

Stability and resistance against acid, alkali, and hard water of sodium fatty amide N-methylsulfonates. Tokuzo Yoshizaki (Ipposha Oil Inds., Osaka). *J. Japan Oil Chemists' Soc.* 6, 83–7(1957). The properties were compared among Na lauramide N-methylsulfonate, Na oleylamide N-methylsulfonate, Na lauramaide N-methyl-N-ethylsulfonate, Na oleylamide N-methyl-N-ethylsulfonate, Na lauryl alcohol sulfate, and Na oleyl alcohol sulfate. The former 4 were superior in all respects to the latter 2.

Paper chromatography of nonionic surfactants. I. R_f and H.L.B. values of nonionic surfactants of polyoxyethylene series. Toshio Nakagawa and Isami Nakata(Shionogi Seiyaku Co., Amagasaki). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **59**, 1154–6 (1956). The most suitable solvent system was *n*-butanol-pyridine-water (5:2:5 by vol.). Development was made at 0°. The developing reagent was a modified Dragendorff reagent, consisting of 1 vol. of the mixture of 0.85 g. $Bi(OH)_2NO_3$, 100 cc. acetic acid, and 40 cc. H_2O, 1 vol. of the mixture of 8 g. KI and 20 cc. H_2O, 4 vol. of acetic acid, and 10 vol. of H_2O. Commercial nonionic surfactants mainly of the Atlas Powder Co. were examined. It was found that there was an inverse correlation between the R_f and H.L.B. values. The only exception was Tween 61.