4. In general, an increase in the percentage of methanol in the irrigating solvent resulted in an increase in the R_f value of a given phospholipide.

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Letter to Editor

July 2, 1956

I have read with interest the paper on "Determination of Soaps by Ion Exchange Resin" by J. W. Jenkins, published in the May 1956 (p. 225) issue of your esteemed journal. The method developed is no doubt interesting and is apt to be adopted for routine analysis in soap factories in the near future.

In this connection I draw your attention to a paper on the same subject published by me and my student in January 1955 (p. 187) issue of the *Indian Soap Journal*, which maintains an exchange relationship with your journal.

B. K. MUKHERJI
Honorary Editor
Indian Soap Journal
Calcutta, India

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

• Oils and Fats

S. S. Chang, Abstractor
Sin'itiro Kawamura, Abstractor
Dorothy M. Rathmann, Abstractor

Chemistry of the phosphatides. E. Baer(Univ. Toronto). *Ann. Rev. Biochem.* **24**, 135–56(1955). A review of three years' work. (*C. A.* **50**, 6538)

The coconut-like flavor defect of milk fat. I. Isolation of the flavor compound from butter oil and its identification as δ-decalactone. P. G. Keeney and S. Patton(Dept. of Dairy Sci., Penn. Agr. Exp. Station, Univ. Park). *J. Dairy Sci.* **39**, 1104–1113(1956). The coconut-like off-flavor compound, which develops in butter oil during storage or when butter oil has been heated, was isolated and identified as δ-decalactone(lactone of 5-hydroxy decanoic acid). Infrared spectroscopy and paper chromatography were used in establishing flavor compound's coidentity with δ-decalactone. Paper chromatographic methods are presented whereby a homologous series of gamma lactones from nonalactone to dodecalactone can be resolved. Evidence that a similar series of delta lactones can be separated in a like manner was obtained.

The coconut-like flavor defect of milk fat. II. Demonstration of δ-decalactone in dried cream, dry whole milk, and evaporated milk. *Ibid.* **39**, 1114–1119(1956). Coconut-like flavor extracts were obtained from dried cream, dry whole milk and evaporated milk. The presence of δ-decalactone in these flavor extracts was established by paper chromatography, and the characteristic coconut-like flavor defect of these products is attributed to this lactone.

Modification of the refractive index method for the detection of foreign fats in dairy products. V. R. Bhalerao and F. A. Kummerow(Dept. of Food Tech., Univ. of Ill., Urbana, Ill.). *J. Dairy Sci.* **39**, 947–955(1956). A method based on the glyceride structure of butterfat was worked out to detect adulteration of the butterfat by a foreign fat at a 10% level. The suspected sample of butterfat was separated into alcohol-soluble and insoluble triglycerides at 20° in order to increase concentration of the adulterant in one of these fractions. The refractive index of the alcohol-soluble fraction of butterfat was found to vary from 1.4538 to 1.4541, whereas that of the insoluble fraction was found to vary from 1.4539 to 1.4544. The increase in the refractive index of the alcohol-insoluble fraction indicated the presence of vegetable or animal fat. This fraction was further fractionated from acetone at 0°. The acetone-soluble fraction was iodinated with Wijs solution, and refractive index of the iodinated fraction was determined. The refractive index of the iodinated fraction of butterfat was found to vary from 1.4713 to 1.4732. The addition of 10% of foreign fat other than coconut oil increased the refractive index significantly, enabling the detection with a fair degree of accuracy.

The methods of examination of fats and fat products. Committee reports. Tomotaro Tsuchiya *et al.* *J. Japan Oil Chemists' Soc.* **5**, 47–56(1956). This is the concluding report for chemical tests including acid no., neutralization no., saponification no., ester no., thiocyanogen no., determination of conjugated unsaturated fatty acids (spectroscopic method), determination of unsaponifiable matter, determination of solid fatty acids, and ether-insoluble chloriodide.

Separation and determination of fatty acids. XVIII. Paper chromatography of fatty acids as their acetol ester derivatives. Yoshiyuki Inoue, Osamu Hirayama, and Manjiro Noda(Saikyô Univ., Kyoto). *J. Japan Oil Chemists' Soc.* **5**, 16–18(1956). Acetol esters, $RCOOCH_2COCH_3$, were synthesized from 10 saturated fatty acids from acetic to arachidic by reacting with monobromoacetone. They were converted to their 2,4-dinitrophenylhydrazones and thiosemicarbazones, which were chromatographed on paper by the inverse phase method and the R_f values were determined. The solvents used included methanol-decalin (8:1), methanol-ethyl acetate-decaline (40:3:7), methanol-acetic acid-decalin (50:2:7), and 90% ethanol-acetic acid-decalin (30:5:3). This method is applicable for the separation of mixed fatty acids.

Segregation of soybean fatty acids by urea complex with particular reference to the concentration of urea solution. Hiroshi Sakurai and Masao Fujiwara(Osaka Univ., Sakai). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **59**, 33–6(1956). The optimum temperatures of the segregation of soybean fatty acids by urea complex were in the range 10–25°. The optimum concentration of urea solution was found to be at relative saturation degree of 0.9423, i.e. 43.3% at 10°, 49.0% at 20°, and 51.6% at 25°.

Fatty oils of aquatic invertebrates. X. Fatty oils of Stichopus japonicus, Astriclypeus manni, Clypeaster japonicus, and Gorgonocephalus caryi. Yoshiyuki Toyama and Toru Takagi(Nagoya Univ.). *J. Chem. Soc. Japan, Pure Chem. Sect.* **77**, 102–5 (1956). *S. japonicus*, *A. manni*, *C. japonicus*, and *G. caryi* contained, respectively, 2.5, 1.1, 1.7, 2.3% ether extract, and the oils had, respectively, n_D^{20} 1.4686, 1.4776, 1.4758, 1.4702 (at 30°); acid no. 95.2, 41.9, 28.5, 96.0; saponification no. 149.3, 157.1, 164.6, 146.9; iodine no. 106.2, 158.6, 190.3, 91.6; unsaponifiable matter 16.97, 18.97, 14.75, 29.58%; solid fatty acids 27.91, —, 17.30, —%; sterol content of the unsaponifiable matter 7.45, 64.7, —, 62.4% highly unsaturated acid contents (%), dienoic 3.6, —, —, 1.0, —; trienoic 5.3, —, —, 0.9, —; tetraenoic 7.7, —, 17.2, —; pentaenoic 7.5, —, 34.3, —; hexaenoic 5.7, —, 6.5, —; their sterols were chiefly Δ^7-sterol, cholesterol, cholesterol, and Δ^5-sterol, respectively. *S. japonicus* seemed to contain batyl alcohol and selachyl alcohol.

XI. Fatty acids and unsaponifiable matter of the oil of sea-anemone. Y. Toyama and T. Takagi. *Ibid.* 105–8(1956). Air-dried *Anthopleura japonica* mixed with lesser amounts of *A. stella* and *A. pacifica* gave 6.1% oil, d_D^{20} 0.9199, n_D^{20} 1.4810, acid no. 56.1, saponification no. 117.8, iodine no. 162.0, unsaponifiable matter 34.01%. The glyceride fatty acids consisted of saturated acids of C_{14} 1.5, C_{16} 10.9, and C_{18} and higher 3.7%, and unsaturated acids of C_{16} (—H, 2.7) 11.5, C_{18} (—H, 3.5) 22.6, C_{20} (—H, 6.5) 28.9, C_{22} (—H, 8.4) 20.7%. The unsaponifiable matter consisted of Δ^5-sterols (β-sitosterol identified), cetyl alcohol, and an unsaturated alcohol of oleyl alcohol series.

XII. Fatty oils of Buccinum perryi, Tegula argyrostoma sublaevis, and Mytilus edulis with particular reference to their sterol components. Y. Toyama and Tatsuo Tanaka. *Ibid.* 636–9(1956). Air-dried *B. perryi, T. argyrostoma s.*, and *M. edulis* contained 4.6, 5.8, 8.3% of fatty oil, respectively, which showed d. 0.9525(50°), 0.9269(40°), 0.9538(25°); n_D 1.4858 (50°), 1.4762(40°), 1.4825(25°); acid no. 32.6, 66.3, 60.0; saponification no. 142.7, 173.9, 188.0; iodine no. 134.6, 119.6, 143.5; and unsaponifiable matter 26.88, 15.67, 10.40%. The sterol contained was for the 3 shellfishes, respectively, cholesterol; cholesterol; and poliferasterol, chrynasterol, and β-sitosterol. *M. edulis* contained batyl, chymyl, and selachyl alcohols.

Solvent segregation of vegetable oils. G. K. Joshi, D. Rebello and S. M. Shah(Dept. Chem. Technology, Univ. Bombay). *J. Applied Chem.* **6**, 205–11(1956). The fractionations of linseed oil by treatments with furfural or mixtures of furfural and hexane at 15°, 24.5° and 35° are described. Maximum separation of the unsaturated fraction was achieved at the lower temperatures and higher percentages of hexane. This fraction was obtained in a yield of about 16% and had an iodine value of 209. The design of multi-stage countercurrent extraction columns is discussed in terms of equilibrium curves.

Binary freezing point diagrams for 2-aminopyridine with saturated and unsaturated long chain fatty acids. R. R. Mod and E. L. Skau(S. Regional Research Lab., New Orleans, La.) *J. Phys. Chem.* **60**, 963–5(1956). Binary freezing point data are presented for mixtures of 2-aminopyridine with lauric, myristic, palmitic, stearic, oleic, elaidic, and α- and β-eleostearic acids. The binary diagrams prove the existence of two congruently melting crystalline molecular compounds in each case. In the saturated systems, these had acid to 2-amino-pyridine ratios of 1:1 and 2:1. If the deviation from ideal freezing point depression can be attributed to molecular compound formation alone, the data show that the degree of dissociation of the acid amine compound in the molten state varies with chain length and degree of unsaturation. Dissociation decreases with increasing chain length of the saturated acids. In the C_{18} series, dissociation increases with unsaturation.

The crystallization of cocoa butter and alternative fats. II. Palm kernel stearins and their mixtures with cocoa butter and butter fat. E. H. Steiner(British Food Mfging. Indus. Research Assoc., Leatherhead, Surrey). *J. Sci. Food Agr.* **7**, 425–36(1956). Analytical data and thermal characteristics of 8 samples of commercial palm kernel stearins are reported. Data on the phase compositions and crystallization rates of various blends of these stearins with butter fat and cocoa butter in binary and ternary mixtures are shown graphically. If the percentage of the liquid phase is the criterion of plastic properties, these stearins exhibit a hardness similar to cocoa butter at room temperature or below, but they soften more when warmed. The crystallization of the stearins commenced at a higher temperature with less supercooling than did cocoa butter. The onset of crystallization was retarded slightly by butter fat and considerably by admixture with cocoa butter. When evaluated as an alternative for cocoa butter in plain chocolate, the mixtures of stearin and cocoa butter would probably be very soft and liable to mark easily. A milk chocolate containing equal parts of stearin and cocoa butter would at best resemble a chocolate made with cocoa butter and about 30% milk fat. Products containing palm kernel stearin alone should be tempered at a higher temperature and for a shorter time than those containing an equivalent amount of cocoa butter. Blends of stearin and cocoa butter should be tempered at lower temperatures and for longer times than are usual for cocoa butter alone. If milk fat is also present, the temperature should be lowered still further.

Low temperature heat capacity of palmitic acid and methyl palmitate. H. E. Wirth, J. W. Droege and J. H. Wood(Cryogenic Lab. and Dept. Chem., Ohio State Univ., Columbus). *J. Phys. Chem.* **60**, 917–19(1956). The purification of methyl palmitate and palmitic acid are described. Heat capacity measurements were made in the temperature range of 14° to 300°K. Thermodynamic functions were calculated and show that the entropies at 298.16°K were 118.33 ± 0.35 for methyl palmitate and 108.12 ± 0.22 cal. (mole degree)$^{-1}$ for palmitic acid.

South African pilchard oil. 5. The isolation and structure of an eicosapentaenoic acid from South African pilchard oil. J. M. Whitcutt and D. A. Sutton(Nat. Chem. Res. Lab. S. African Council for Scientific and Ind. Res., Pretoria, South Africa). *Biochem. J.*, **63**, 469–475(1956). The isolation of an eicosapentaenoic acid from South African pilchard oil(*Sardina ocellata* Jenyns) is now reported. It is believed to be *cis*-eicosapenta-5:8:11:14:17-enoic acid and has been isolated by the techniques of lithium salt-acetone segregation, urea-complex fractionation, molecular distillation and reversed-phase partition chromatography. Some of the properties of this acid have been determined. The position of the double bond nearest to the carboxyl group has been unambiguously determined by using an Arndt-Eistert synthesis in combination with a method of ozonolytic degradation. This procedure is probably of wide application. The degree of purity of the acid has been critically considered.

Rancidity inhibition of refined olive oil by treatment with citric acid. H. Steinkamp. *Grasas y Aceites* **7**, 89–93(1956). The stability of an olive oil deodorized in the presence of citric acid under conditions given in U. S. Patent 2,486,424, is studied. A synergist effect for the citric acid is proved in which the citric acid strengthens the inhibiting effect on rancidity of the substances produced during the deodorization. Also tested was a propyl gallate-citric combination.

The lipids of fish. 8. The triglycerides and cholesterol esters of haddock flesh. J. A. Lovern(Dept. Scientific & Industrial Research, Torry Research Station, Aberdeen). *Biochem. J.* **63**, 373–380(1956). An extract of haddock flesh was prepared which contained essentially all of the triglycerides and cholesterol esters, but none of the acidic lipids or phospholipids. Other components were free cholesterol, waxes, aliphatic alcohols and hydrocarbons. Upon separation chromatographically the fatty acids of the cholesterol esters were of an unusually high average unsaturation, owing to the high content of C_{20} and C_{22} unsaturated acids, and, to a less extent, to a rather low content of saturated acids. The fatty acids of the triglycerides showed considerable resemblance to those of haddock depot fat and, alone among the flesh lipids, contained a major proportion of hexadecenoic acid. Each class of lipid appears to have a characteristic fatty acid composition.

Recent work in the field of fatty substances. M. Loncin. *Rev. franc. corps gras.* **3**, 255–266(1956). This article is a discussion of research from the laboratory of "Food Industries" of the C.E.R.I.A.(Bruxelles). The author briefly discusses the background and reasons for the establishment of this research organization and gives 27 references of work reported by various people from their laboratory. Of special value is a discussion of various work now in progress at their research institute.

Paper chromatography with continuous change in solvent composition. Part I. Separation of fatty acids. F. Franks(South East Essex Tech. College, Dagenham, Essex). *Analyst* **81**, 384 (1956). A method and apparatus described permit paper partition chromatography to be carried out with a solvent whose composition changes continuously in an exponential manner. The method is preferred to more conventional procedures, because closely similar compounds such as members of a homologous series can be separated on a short paper strip, thus avoiding diffusiveness of zones. The method has been applied to the separation of mixtures of long chain fatty acids obtained from acetone extracts of laundered articles.

Part II. Separation of surface-active agents. *Ibid.* 390–393 (1956). The method and apparatus described in Part I are used to separate mixtures of surface-active agents and commercial detergents. Procedures are described for the resolution of anionic and cationic compositions. It has not been possible to identify the resolved components of commercial detergents, since pure reference compounds are not readily available.

Rilsan, its properties and uses. R. Desalme. *Rev. franc. corps gras.* **3**, 266–272(1956). Rilsan is a polymer produced from castor oil through treatment with methanol to produce methyl ricinoleate. The methyl ricinoleate upon undergoing a cracking process produces methyl undecylenate which on hydrolysis and amination produces 11-amino-undecanoic acid monomer. Upon polycondensation the polymer "rilsan" is formed. The author describes the procedure used, physical and chemical properties, and gives some of the possible uses.

Theoretical aspects in the manufacture of monoglycerides. M.

Demarcq. *Rev. franc. corps gras.* 3, 336–351(1956). Monoglyceride yields obtainable by glycerolysis of triglycerides or partial esterification of fatty acids are compared and the influence of catalysts, quantity of reagents, temperature, etc. are discussed. The results of Feuge and Baily (*C. A.* 40, 6273) with their theoretical discussions are said to be fortuitous, probably owing to too small quantities of glycerol in their reaction masses. In 12 analogous tests only 23.2–61.5% of monoglycerides could be obtained from 100–200 g. of glycerol for 100 g. of stearic acid at 110–225°, reaction times of 1.18–7 hrs., and varying quantities of $SnCl_2$, H_2SO_4, NaOH, or camphosulfonic acid as catalysts. Two tests with dioxane as solvent produced, respectively, 33.7 and 39.4% of monoglyceride. The best yields were with pyridine as the solvent, but tertiary BuOH as solvent gave only slightly inferior yields in 12 tests with peanut oil, linseed oil, hydrogenated tallow, and others, with different Na alcoholates as catalysts. Practically equal yields could be produced by employing diacetone alcohol as a solvent.

Chromatographic determination of oxidized fatty acids in oils. M. Burnet and P. Desnuelle(Fac. sci., Marseille). *Rev. franc. corps gras.* 3, 325–333(1956). Determination of oxidized acids (all products produced by autoxidation) by the I.U.P.A.C. (International Union of Pure and Applied Chemistry) methods, based on the insolubility of oxidized acids in petroleum ether, gives low results. Sunflower-oil acids oxidized at 35° with oxygen under ultraviolet irradiation until Lea nos. were, resp., 12.5, 123, 286, and 533, analyzed only 0.20 0.22, 0.28, and 0.70% of insoluble substances. A titrimetric and gravimetric method are proposed, based on the use of chromatographic columns filled with rubber swelled by ligroin and elution with aqueous acetone. Antoxidized acids came off at same time as lauric acid. Polymerized oxidized fats of the Diels-Alder type were eluted with products from autoxidation. Tallow, bonefat, ''sulfur'' olive oil, rapeseed oil with, respectively, 0.06, 0.45, 14.4 and 0.3% of oxidized acids, determined by the I.U.P.A.C. method, gave 0.9, 2.2, 26.2 and 2.1% gravimetrically and 1.0, 2.7, 26.3, and 1.8% by titration after chromatographic separation.

Rancidity of olive oil and lard and methods for their detection. J. M. R. de la Barbolla y Alcala. *Grasas y Aceites* 7, 94–106 (1956). The author defines the terms rancidity and stability of fats and then discusses the problems of oxidative spoilage of olive oils and lard. Methods are discussed for the detection of rancidity. Four graphs, three tables and 38 references give the information obtained in this research.

Oil refining with adsorbing materials. A. Paleni. *Olii-Minerali-Grassi e Saponi-Colori Vernici* 33, 229–233(1956). The author mentions the phenomena which occur during the oil treatment with adsorbing earths(Floridin and Porocel types). Factors which limit the adsorbants' action and their regeneration are discussed.

The volatile acids of mutton fat. A. G. McInnes, R. P. Hansen, and A. S. Jessop(Fats Res. Lab., Dept. Sci. and Ind. Res., Wellington, New Zealand). *Biochem. J.* 63, 702–704(1956). By means of gas-liquid chromatography all the *normal* fatty acids, both odd and even, from C_1 to C_{10} have been shown to occur in the external carcass fat of sheep. Two *iso* acids, *iso*butyric and *iso*valeric, and an *anteiso* acid, α-methylbutyric, as well as formic acid, have for the first time been shown to be components of an animal depot fat.

The present status of oil preparation in Sicily. M. Jacona and M. Pitanza. *Olearia* 10, 46–49(1956). The authors report on the data brought together by the Regional Experimental Center for the Oil, Fat and Soap Industry(Catania), on the oil-mills in some Sicilian provinces. The data show the need of bringing Sicilian oil-mills up to date. The more serious deficiencies are in the washing and storage of the olives, the centrifugal treatment of the new oils, and the sanitary conditions of the working premises. The report proposes that a special control-committee be set up to watch over the technical and sanitary conditions of the oil-mills now working; its powers could later on be extended to the opening of the new plants.

New experimental methods and technological innovations for olive oils. P. Giovanni Gargoglio(Director dell'Istituto di Industrie Agrarie dell' Universita di Firenze). *Olii-Minerali-Grassi e Saponi-Colori e Vernici* 33, 181-203(1956). The author reviews the technological innovations that were suggested during the past 3 years; then discusses the various research problems being investigated by the Agricultural Industries Institute of Florence Univ. and the Oil & Wine Analytical Center at the Ministry of Agriculture & Forestry. Much of this research is directed toward the study of the most suitable means for the preservation of olive oil; for more information concerning metal impurities; and for a better understanding of the nutritional values of olive oil. In a discussion of Italian olive oil classification he concludes by stating that the official methods used are not as modern and complete as they could be.

World supplies of ground nuts and ground-nut oil. A. Ferrara. *Olearia* 10, 83–90(1956). After some introductory remarks on the importance of ground-nut oil among the fluid edible vegetable oils, the author draws a panoramic picture of world supplies of ground-nuts, referring to the origin, the spread and the characteristic features of peanuts. He then examines the production, uses and the trade in peanuts and peanut oil. He closes by describing the situation during the period 1950–54, and the changes that have occurred as compared to the prewar years.

Extraction of olive oil by means of electrophoresis. S. Castorina. *Olearia* 10, 79-82(1956). The process of separation of the oil from kneaded olive pulp with the help of electrophoresis is described. In a note which the author plans to publish later he will give the data for the yield obtained in a semi-industrial pilot plant; it is expected that the solid residue remaining after the treatment will contain only 0.5% oil.

The continuous deodorizer "deorapid" for oils. L. Baroni. *Olii-Minerali-Grassi e Saponi-Colori e Vernici* 33, 223–226 (1956). The continuous deodorizer for oils ''deorapid'' is based upon the following assumptions: the rapid passage of oil in the apparatus in a relatively thin layer; highest possible vacuum economically attainable; distribution of direct stream as uniformly and intimately as possible; the highest possible temperature with no damage to the oil. The author describes in detail the performance of the equipment. He then makes a comparison with results from discontinuous deodorization, pointing out the major advantages of the continuous system.

Contributions to the study of marine products. XL. Waxes and triglycerides of sea anemomes. W. Bergmann, St. M. Creighton, and W. M. Stokes(Sterling Chem. Lab. and Bingham Oceanographic Lab., Yale Univ.). *J. Organic Chem.* 21, 721–728(1956). Certain lipid fractions from three sea anemones have been investigated. The warm-water anemone *Condylactis gigantea* has been shown to contain substantial quantities of solid lipids. These were found to consist of a mixture of myristyl myristate and myristyl palmitate and symmetrical palmityldimyristin. Two cold-water anemones, *Bolocera tuediae* and *Actinostola collosa*, have been shown to contain substantial quantities of liquid lipids. These were found to consist mainly of esters of unsaturated alcohols and acids of the order C_{20} and C_{22} and triglycerides of acids of the same order. Two new alcohols, 11-eicosenol and 11-docosenol, have been isolated. Cholesterol has been shown to be the principal sterol of the cold-water anemones.

Progress in soybean research. L. L. McKinney(Northern Utilization Research Branch, Agr. Research Service, U. S. Dept. Agr., Peoria, Ill.). *Soybean Digest* 16(11), 66, 68, 70–2(1956). Recent research on soybeans at the N.U.R.B. is described briefly under the following headings: Norelac (polyamide resin), determination of urease activity in meal, hemagglutinating protein in raw meal, flash desolventizer, market potential survey, and vinyl ethers of fatty alcohols.

Fats and oils under Public Law 480. G. O. Fraser(Foreign Agr. Service). *Soybean Digest* 16(11), 34, 36–7(1956). The effect of P. L. 480 on the export sales of edible oils and oilseeds is reviewed briefly.

Solvent processing of soybeans—controlling the product. J. L. Tennent. *Soybean Digest* 16(10), 20, 22 (1956). The primary operations in the solvent extraction of soybeans are described briefly with particular emphasis on the nature of processing variables which affect the qualities of the oil and meal.

Process for recovering valuable products from gums or soapstock. B. Clayton. *U. S. 2,758,122.* Wet gums, which have been isolated during the refining of crude glyceride oils, are held at temperatures under 100° and at pressures sufficient to prevent the evaporation of water until the phosphatides have been split. The hydrolyzate is then separated into fatty and aqueous phases.

Fractionation of lanolin oil. C. J. Sunde(Malmstrom Chemical Corp.). *U. S. 2,758,125.* A liquid lanolin fraction which is miscible in all proportions with mineral oil is separated from wool grease by the following procedure. Wool grease, containing not over 1% by wt. of water, is mixed with 2 to 5 parts of a solvent mixture containing at least 20% by wt. of a C_{5-9} hydrocarbon and at least 40% by wt. of an open chain ketone. The mixture is heated until clear and is then cooled at a rate of less than 15°F./hr. until all components of the wool grease have precipitated except the liquid lanolin fraction. The latter is separated and has a cloud point below 70°F.

Baking grease. F. F. Hansen. U. S. *2,758,923.* A baking grease is prepared from a vegetable oil which has been heat-bodied at a temperature 25° to 35°F. below its flash point for 3 to 6 hrs., and has an acid content of less than 2.6%, a color less than 12 Gardner standard, and a viscosity between 1.3 and 2.0 stokes at 77°F.

Processing of milk products. J. P. Jensen. *U. S. 2,758,925.* During the manufacture of cheese, butter, dried milk or condensed milk, there is incorporated a significant amount of a composition of glycerol and an acid or base in which the amount of glycerol is in excess of that of the acid or base.

Antioxidant composition. L. A. Hall(The Griffith Labs., Inc.). *U. S. 2,758,931.* A fatty glyceride citrate and propyl gallate are dissolved in monoglycerides containing sufficient glycerin to improve the clarity and inhibit the sedimentation of the solution.

Stabilization of fats and oils with —COR derivatives of 1,2,4-trihydroxybenzene and preparation of related compounds. A. Bell, M. B. Knowles and C. E. Tholstrup(Eastman Kodak Co.). *U. S. 2,759,828.* Fats and oils are stabilized by the addition of 0.001 to 0.1% by wt. of a nuclearly substituted -COR derivative of 1,2,4-trihydroxybenbene in which the R group is hydrogen, a C_{1-20} alkyl radical, a C_{1-10} alkenyl radical, a C_{6-10} aryl radical, or a furyl radical.

Stabilization of fats and oils. K. F. Mattil and R. J. Sims (Swift & Co.). *U. S. 2,759,829.* A means for inhibiting discoloration caused by polyphenolic fat antioxidants in triglyceride shortenings consists in first dissolving the antioxidant (gallic acid or alkyl esters of gallic acid) and an acidic stabilizer in a molten monoglyceride, and then incorporating this solution into the shortening.

Process for deodorization of glyceride oils. B. H. Thurman (Kraft Foods Co.). *U. S. 2,759,883.* A process and apparatus are described for the steam deodorization of glycerides at reduced pressures.

Method of recovering glycerine from fermentation products. J. Zender(Glycerine Corp. of America). *U. S. 2,759,889.* Glycerine is recovered from fermentation slops by dialysis through a semipermeable membrane into an alcohol which is only partially miscible with water.

Rice wax extraction. J. Pominiski, H. L. E. Vix and P. H. Eaves(Secy. Agr., U. S. A.). *U. S. 2,759,956.* Rice bran wax is obtained by heating the bran with 14 to 35% by wt. of water for 15 to 70 min. at 170° to 235°F., adjusting the moisture content of the resultant mixture to 8 to 30%, and finally extracting with hexane at 145° to 150°F. The wax-containing miscella is cooled at a rate of 2° to 4°/min. until an immiscible wax-rich phase has formed. This is separated by centrifuging and is washed repeatedly with hexane.

Refining of glyceride oils. B. H. Thurman(B. Clayton; Refining, Uninc.). *U. S. 2,759,957.* A dehydrated mixture of oil and soda ash is treated with an aqueous rehydrating medium and is then centrifugally separated into oil and soapstock. The soapstock is acidulated with sulfuric acid and the fatty phase is removed. At least a portion of the aqueous phase is treated in an electrolytic cell so that an alkaline solution of sodium sulfate is obtained for use as the aqueous rehydrating medium in the first stage of this process.

Apparatus for purifying edible oils. C. P. Mies, Jr. *U. S. 2,760,645.* A portable apparatus is described for filtering an oil as it is being withdrawn from a container.

Antifoam composition. S. E. Kulakow, now by change of name S. E. Kent (Hodag Chemical Co.). *U. S. 2,762,780.* The antifoam composition is a mixture of sugar cane oil and a sufficient quantity of an oil-soluble emulsifier to enhance the defoaming properties of the oil.

Continuous process of hydrogenation. W. F. Bollens(Swift and Co.). *U. S. 2,762,819.* A continuous method for the hydrogenation of fats comprises passing the fat through a hydrogenation zone and circulating hydrogen through this zone in such a manner as to agitate the oil and to cause hydrogenation in the presence of a catalyst which is metered into the system in proportion to the flow of hydrogen.

Process for simultaneously extracting oil and protein from oleaginous material. N. Sugarman(Georgia Tech. Research Inst.). *U. S. 2,762,820.* The fatty material is ground to a slurry in an aqueous alkaline solution at a pH such that optimum solubility of the protein is obtained. After the pH of the mixture has been lowered without precipitation of the protein, the mixture is heated to 25° to 80°, and separated into a concentrated oil emulsion, a protein solution, and residual solids. The protein is precipitated from its solution by the addition of acid. The oil emulsion is broken by a change in pH and mechanical treatment so that the oil is separated.

Process of producing modified lard. F. A. Norris and K. F. Mattil(Swift and Co.). *U. S. 2,763,555.* A process is described for treating lard to modify permanently its crystallization properties and to improve its appearance and keeping qualities. The lard is heated to a temperature between 120° and 260° for 0.5 to 6 hrs. in the presence of gas under pressure and a small amount of an interesterification catalyst. The process modifies the crystallization properties without causing a significant degree of interesterification.

Lard. R. J. Vander Wal, L. A. Van Akkeren, and R. J. Buswell(Swift and Co.). *U. S. 2,763,556.* A shortening product is made by blending natural lard and rearranged lard. The latter is produced by heating lard in the presence of a metal alcoholate at a temperature between the melting point of lard and 150°.

2,2′-Methylene-bis-tert. butylhydroquinone and stabilization of fats and oils therewith. DeW. S. Young and H. C. McCulley (Eastman Kodak Co.). *U. S. 2,763,672.* Fats and oils are stabilized by the addition of 0.001 to 1.0% by wt. of 2.2′ methylene-bis-*tert.* butylhydroquinone.

Concentration of fatty acids in aqueous solutions and their recovery by azeotropic distillation. W. S. Nathan and T. A. Rayne(British Petroleum Co. Ltd.). *Brit. 735,867.* Fatty acids in aqueous solution are recovered in an anhydrous state by a continuous azeotropic distillation. The aqueous fatty acid is fed into the side of a column along with a recycled aqueous aliphatic ketone of 4–7 carbon atoms per molecule. Dry fatty acid passes out the bottom of the column. Ketone and water pass overhead along with a hydrocarbon boiling 0–10° below the b.p. of the ketone. The condensed distillate forms a hydrocarbon-ketone layer which is recycled to the column head, and a water-ketone layer, which is steam distilled to form an aqueous waste and an aqueous ketone overhead. (*C. A.* **50**, 8235)

Purification of edible oils. Élisabeth Siebel-Rupp. *Fr. 991,878.* Toxic and other impurities are removed from edible oils, e.g. castor oil, linseed oil, colza oil, or cottonseed oil, by decomposition, chemical reaction, or adsorption by passing the crude oils over filter columns, consisting of active coal, aluminum oxide, or permutites. Mixing the oils with adsorbant-active alkali or alkaline earth oxides and subsequently filtering is also effective. Preferably, the oils are dissolved before purification in appropriate solvents. (*C. A.* 50, 9650)

Separation of esters of different degrees of unsaturation from fats and oils. Mitsuo Nakamura, *et al. Japan 8287.* A mixture of sodium methoxide (20 g. sodium and 500 ml. methyl alcohol), 400 g. urea, and 1 kg. soybean oil with an iodine number of 137 is let stand for 3 hours at room temperature. The precipitate is filtered, decomposed with hot water, and washed with hot water to give 200 g. methyl ester with an iodine number of 60. The methanol and glycerine in the filtrate are removed and the residue washed with water to give 800 g. methyl ester with an iodine number of 156. (*C. A.* **50**, 8235)

Hydrogenation of fatty acids with recycling of used catalyst. Seiichi Ueno. *Japan 8431.* A waste nickel-copper catalyst is separated from hydrogenated oil and let stand 3 weeks with rice oil fatty acids to give green copper and nickel soaps. They are placed in an autoclave with water and hydrogenated at 100–230° with an initial hydrogen pressure of 70 atmosphere. The required amount of hydrogen is absorbed in 2 hours to give a white hydrogenated fatty acid. A dark-colored catalyst is separated from the fatty acid. (*C. A.* **50**, 9765)

FATTY ACID DERIVATIVES

Toxic fluorine compounds. IX. ω-Fluorocarboxylic esters and acids. F. L. M. Pattison, S. B. D. Hunt, and J. B. Stothers (Dept. of Chem., Univ. of Western Ontario, Canada). *J. Organic Chem.* 21, 883–886(1956). Members of the series of ω-fluorocarboxylic esters and acids were synthesized, and their properties were determined. Toxicological results were found to be consistent with previously reported observations.

Toxic fluorine compounds. X. ω-Fluorocarboxylic acid chlorides, amides, and anilides. F. L. M. Pattison, R. R. Fraser, G. J. O. Neill, and J. F. K. Wilshire(Dept. of Chem., Univ. of Western Ontario, Canada). *J. Organic Chem.* 21, 887–889 (1956). Members of the series of ω-fluorocarboxylic acid chlorides, anhydrides, amides, and anilides were prepared and their physical constants were determined. Most of the members were used as intermediates for other work, and the solid derivatives served as a means of characterization.

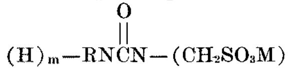
Phosphorus derivatives of fatty acids. I. Preparation and properties of diethyl acylphosphonates. B. Ackerman, T. A. Jordan, C. R. Eddy and D. Swern (Eastern Regional Research Lab., and the Fatty Acid Division of the Association of American Soap and Glycerine Producers, Inc.). *J. Am. Chem. Soc.* **78**, 4444–4447 (1956). Diethyl acylphosphonates have been prepared by the reaction of acyl chlorides with triethyl phosphite. These were derived from the even-numbered C_4-C_{18} saturated fatty acids and oleic acid. Boiling point, density and refractive index were determined for each compound. The diethyl acylphosphonates are unstable to moisture, the rate of hydrolysis decreasing with increase in size of acyl chain and phosphorus ester groups.

Synthesis of some thiol esters of long-chain fatty acids. G. S. Sasin, R. Sasin and N. Capron (Chem. Dept. Drexel Ins. of Technology, Philadelphia 4, Penn.). *J. Organic Chemistry* 21, 852–853 (1956). Thirty-one previously unreported aliphatic and aromatic thiol esters of lauric, myristic, palmitic and stearic acids were synthesized by the action of mercaptans or thiophenols on acid chlorides by a simplified procedure.

Vinyl epoxystearate: preparation, polymerization and properties of polymers and copolymers. L. S. Silbert, Z. B. Jacobs, W. E. Palm, L. P. Witnauer, W. S. Port, and D. Swern (Eastern Regional Research Lab., Philadelphia 18, Pa.). *J. Polymer Sci.* 21, 161–73 (1956). Vinyl epoxystearate was synthesized by the reaction of vinyl oleate with perbenzoic or peracetic acid. An investigation of the kinetics of this reaction showed that epoxidation of the ethylenic double bond proceeded at 220 times the rate of the vinyl bond. The mechanism of the reaction is discussed. Polyvinyl epoxystearate was prepared by conventional methods and found to have low intrinsic and specific viscosities. The mechanical and thermal properties of copolymers of vinyl chloride and vinyl epoxystearate were compared with those of compositions of polyvinyl chloride and butyl epoxystearate. The presence of vinyl epoxystearate permitted the use of lower milling temperatures for the copolymer than were effective with the butyl epoxystearate compositions, but the opposite effect was observed on the temperature coefficient of the torsional modulus. In heat and light stability studies, butyl epoxystearate (or other external epoxy plasticizers) was found to give greater resistance to degradation than did vinyl epoxystearate.

Pyridine derivatives. F. Y. Wiselogle, K. A. Losee, and J. Bernstein (Olin Mathieson Chemical Corp.). *U. S. 2,758,116.* The derivative which is claimed is the mixed anhydride of 1-hydroxy-2-pyridinethione and a fatty acid.

Sulfomethyl fatty ureas. J. G. Erickson (General Mills, Inc.). *U. S. 2,758,133.* Procedures are described for the preparation of compounds having the general formula



$$(H)_m\text{—}RN\overset{\overset{\large O}{\|}}{C}N\text{—}(CH_2SO_3M)_n$$

wherein R is a straight chain $C_{8\text{-}22}$ hydrocarbon group linked to the N atom at the terminal carbon atom, M is an alkali metal or ammonium ion, m is 0–2, n is 1–3, and m+n is 3.

Preparation of guanidino type compounds. B. Vassel and Rose M. Kwapich (International Minerals & Chemical Corp.). *U. S. 2,759,017.* Guanidino type compounds are prepared by reaction of an alkali metal salt of guanidine with an α-halo fatty acid at 0° to 60° in the presence of an alkali metal hydroxide.

Direct esterification of glycosides with fatty acids. J. P. Gibbons (Corn Products Refining Co.). *U. S. 2,759,922.* A process is described for the production of fatty acid esters of glycosides such as methyl glucoside, ethyl glycoside, β-ethoxyethyl-β-D-glucoside, allyl glucoside, methyl galactoside and methyl arabinoside. The glycoside and free $C_{8\text{-}20}$ fatty acids are heated at temperatures in the range 160° to 300° until the desired degree of esterification is attained.

Catalytic esterification of glucosides with fatty acids. J. P. Gibbons (Corn Products Refining Co.). *U. S. 2,759,923.* A glucoside such as methyl glucoside or alkyl glucoside is esterified by reaction with a $C_{8\text{-}22}$ fatty acid at temperatures between 160° and 300° in the presence of an alkaline catalyst such as an alkali metal hydroxide, alkaline earth oxide, alkali salt of a weak acid, or an alkaline earth salt of a weak acid.

Addition of organic acids to the double bond of unsaturated fatty compounds. H. B. Knight, R. E. Koos, and D. Swern (Secy. Agr., U. S. A.). *U. S. 2,759,953.* A catalytic amount of perchloric acid is used to enhance the reaction of an olefinic fatty compound with an anhydrous aliphatic monocarboxylic acid (having no more than 2 carbons in the molecule) at temperatures between 70° and the boiling point of the reaction mixture.

Refining crude fatty acid monoglycerides. R. Miller (The Chemical Foundation, Inc.). *U. S. 2,759,954.* Unesterified glycerol, diglycerides and triglycerides are removed from crude monoglycerides by extraction with at least 10 parts by wt. of a liquefied hydrocarbon at temperatures between 65° and the critical temperature of the solvent.

Process for the esterification of higher fatty acids. F. F. A. Braconier and R. Arnould (Soc. Belge de l'Azote et des Prod. Chim. du Marly). *U. S. 2,759,955.* A continuous noncatalytic process is described for the esterification of aliphatic monocarboxylic acids containing more than 6 carbon atoms with an aliphatic $C_{1\text{-}6}$ alcohol.

Continuous esterification process. W. E. Cash and W. H. Gell (The Distillers Co. Ltd.). *U. S. 2,759,967.* A process and apparatus are described for the production of a non-volatile ester by passage of the alcohol, esterification catalyst and carboxylic acid, anhydride or ester through at least three consecutive heated reaction zones countercurrently to a vaporized entrainer.

Sealing composition and a process for making it. F. J. Castner (Johns-Manville Corp.). *U. S. 2,760,877.* A sealing composition having a high yield strength is prepared by mixing 25 to 75% by wt. of an inert filler and a product formed by heating castor oil with at least 0.2% (by wt. of oil) of a stiffener such as a saturated or unsaturated dicarboxylic acid or anhydride containing up to 12 carbon atoms and no elements besides carbon, hydrogen and oxygen.

Reaction product of polyoxyethylene derivative of a fatty acid partial ester of hexitol anhydride and citric acid. L. A. Hall (The Griffith Labs., Inc.). *U. S. 2,761,784.* The method of preparing this product for use in an antioxidant mixture is described.

• Biology and Nutrition

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

The metabolism of short-chain fatty acids in the sheep. 4. The pathway of propionate metabolism in rumen epithelial tissue. R. J. Pennington and T. M. Sutherland (Rowett Res. Inst., Bucksburn, Aberdeenshire). *Biochem. J.* 63, 618–628 (1956). When [*carboxy*-C^{14}] propionic acid was metabolized by sheep-rumen epithelial tissue, the greater part of the isotope appeared in CO_2. Most or all of the remainder was found in the carboxyl group of the lactate formed; the specific activity of the lactate was much less than that of the propionate. When propionate was metabolized, CO_2 was fixed into lactate. Relatively little CO_2 was fixed when pyruvate or fumerate was metabolized. Propionate suppressed ketone-body formation from pyruvate and lowered the total amount of pyruvate metabolized.

Synthetic work in the phospholipid field. T. Malkin, R. L. Baylis, T. H. Bevan, D. J. Webley (Dept. Organic Chem., The Univ., Bristol, England). *Olii-Minerali-Grassi e Saponi-Colori e Vernici* 33, 226–228 (1956). The fundamental method for the phospholipid synthesis, suitable for the phosphatidil-ethanolamine synthesis, presents some inconveniences: (1) the starting material (1,2-diglyceride) is difficult to prepare and shows migrations of the acid groups, with formation of 1,3-isomeric diglycerides, and (2) the first reaction passage, with dichlor-phosphoric ester, may produce phosphoric triesters which are removed only with difficulty. A new synthesis is shown which avoids these difficulties and allows good results in the case of the phosphatidil-ethanolamine and also, with suitable modifications, of the plasmalogene.

The phospholipase B of liver. R. M. C. Dawson (Biochem. Dept., Inst. of Animal Physiol., Babraham, Cambridgeshire). *Biochem. J.* 64, 192–196 (1956). The presence of an active phospholipase B has been demonstrated in glycerinated extracts of acetone-dried rat and sheep liver, with lysolecithin as a substrate. The liver extracts can also break down lysophosphatidylethanolamine when this is added in a soluble form. Maximal hydrolysis of lysolecithin was obtained at pH 6.2 and a substrate concentration between 2 and $3.5 \times 10^{-3}M$. The enzyme is resistant to most enzyme inhibitors. However, Hg, Cu, and Zn ions are inhibitory, as is saturation of the incubation medium with ether. Lysolecithin breakdown has also been observed to occur with extracts from acetone-dried rat kidney, brain, heart, spleen, and whole blood, but not with skeletal muscle. Phospholipase B is also present in sheep kidney and thyroid.

Vitamin A_2 in Indian fresh-water fish-liver oils. S. Balasundaram, H. R. Cama, P. R. Sundaresan, and T. N. R. Varma (Dept. Biochem., Indian Inst. Sci., Bangalore). *Biochem. J.* **64**, 150–154(1956). Spectrophotometric determinations of vitamins A_1 and A_2 on some Indian fresh-water fish-liver oils have been carried out. Some species of fresh-water fishes show very high amounts of vitamin A_2 in their liver oils. Chromatographic investigations indicate that most of the vitamin A_2 is present in the ester form and a small amount of vitamin A_2 alcohol is also present. Vitamin A_1 whenever present, is in the alcohol form only. The occurrence of small amounts of β-carotene and lutein(?) in liver oils of fresh-water fishes is of interest.

Composition of fatty acids from certain fractions of blood lipoproteins. G. A. Gillies, F. T. Lindgren, and J. Cason(Donner Lab., Division of Medical Physics, and Chem. Lab., Univ. of Calif.). *J. Am. Chem. Soc.* **78**, 4103–4106(1956). The fatty acids from fractions S_f0–20 and S_f20–400 of the blood lipoproteins have been analyzed. Data on the mixed acids were combined with information obtained by chromatography on charcoal to yield an approximate composition for each lot of acids. Two significant differences in composition were noted: (a) more than 20% of C_{16} monounsaturated acid (palmitoleic) is present in Fraction S_f20–400, whereas this acid is either absent from Fraction S_f0–20 or is present at very low concentration; (b) poly-unsaturated acids are essentially absent from Fraction S_f20–400, whereas Fraction S_f0–20 contains about 1% tetra-unsaturated acid (arachidonic) and 18% di-unsaturated acid (linoleic).

The sterol and carbohydrate constituents of the walnut. L. Jurd(Western Utilization Research Branch, Ag. Research Service, U. S. Dept. of Ag.). *J. Organic Chem.* **21**, 759–760(1956). The sterol and carbohydrate constituents of the walnut have been isolated and identified as β-sitosterol, β-sitosteryl-D-glucoside, and sucrose.

Determination of partition coefficients of carotenoids as a tool in pigment analysis. F. J. Petracek and L. Zechmeister(Gates and Crellin Lab., Calif. Institute of Tech., Pasadena, Calif.). *Anal. Chem.* **28**, 1484–1485(1956). The partition of a carotenoid between two immiscible solvents such as hexane and 95% methanol is a characteristic that is determined by the presence or absence of certain functional groups. A photometric method for the estimation of partition coefficients is described to facilitate the identification of carotenoid pigments. Its combination with some other methods is briefly discussed.

The metabolism of vitamin E. II. Purification and characterization of urinary metabolites of α-tocopherol. E. J. Simon, Anne Eisengart, Lila Sundheim, and A. T. Milhorat(Dept. of Psychiatry and Medicine, Cornell Univ.). *J. Biol. Chem.* **221**, 807–817(1956). Two metabolites of α-tocopherol, largely in conjugated form, were found in the urines of humans ingesting large quantities of vitamin E. After hydrolytic removal of the conjugating groups, the metabolites were purified and characterized. Chemical, spectroscopic, and analytical evidence is presented for the formation of their chemical structures as 2-(3-hydroxy-3-methyl-5-carboxypentyl)-3,5,6-trimethylbenzoquinone and its γ-lactone. A crystalline derivative of the lactone was prepared. A hypothetical pathway for the biological formation of the metabolites is discussed.

Biochemistry of the sphingolipides. IX. Configuration of cerebrosides. H. E. Carter and Y. Fujino(Division of Biochem., Noyes Lab. of Chem., Univ. of Illinois, Urbana). *J. Biol. Chem.* **221**, 879–884(1956). An improved procedure has been developed for the preparation of psychosine from phrenosine. Dihydropsychosine (obtained by reduction of psychosine) on hydrolysis with ethanolic hydrochloric acid gives an excellent yield of *erythro*-dihydrosphingosine. No *threo* isomer could be detected in the hydrolysis product. These data establish that the sphingosine moiety of phrenosine has the *erythro* configuration.

A simple modified method for the determination of vitamin A in sterile milk. Lalitha Kadaba and E. O. Herreid(Dept. of Food Tech., Ill. Ag. Experiment Station, Urbana). *J. Dairy Sci.* **39**, 1247–1250(1956). Activated glycerol dichlorohydrin was used as the color-developing reagent instead of antimony trichloride. Saponification and extraction of unsaponifiable procedure was omitted since the fat was used directly after dilution. The time required is less than the method for extracting the unsaponifiable fraction.

Effect of addition of inedible tallow to a calf starter fed to Holstein calves. D. Johnson, Jr., K. L. Dolge, J. E. Rousseau, Jr., R. Teichman, and H. D. Eaton(Animal Ind. Dept., Storrs Ag. Experiment Station, Conn.), G. Beall and L. A. Moore. *J. Dairy Sci.* **39**, 1268–1279(1956). Twenty-four male Holstein calves were fed limited whole milk to 35 days of age, a maximum of 4 lb. per day of calf starter containing 0.0, 2.5, 5.0, and 10.0% inedible stabilized tallow, and *ad libitum* alfalfa pellets to 92 days of age. The calves fed starters containing tallow consumed more calculated total digestible nutrients, which resulted in 5 to 6% greater increases in growth. The pounds of dry matter required per pound of live weight increase were less in the calves fed starters containing tallow, and total digestible nutrient utilization was not appreciably affected. Fecal calcium increased with the inclusion of tallow in the ration of calves. The results of this study indicate that inedible stabilized tallow could be used in calf starters.

The biological utilization of the palmitic acid esters of pantothenic acid. T. Sakuragi and F. A. Kummerow(Dept. of Food Technology, Univ. of Illinois, Urbana). *J. Nutrition* **59**, 327–336(1956). The biological utilization of fat-soluble derivatives of pantothenic acid, ethyl dipalmitoxypantothenate and ethyl 2′-mono-palmitoxypantothenate was compared with that of calcium pantothenate in rats. The over-all activity of the palmitic acid esters was equal to that of the water-soluble form as a supplement for pantothenic acid; this was proved by feeding experiments under various conditions. When a large single dose of the preparation was administered to the rats, the excretion of the pantothenic acid into the urine was markedly increased by esterifying the vitamin with one or two moles of palmitic acid. The biological utilization of the pantothenic acid moiety when present as an ester appeared to be slower than that of the free vitamin. The liver of pantothenate-deficient rats, however, contained a normal pantothenate level within two hours after the administration of ethyl dipalmitoxypantothenate. The activity of pantothenyl tripalmitate was found to be equal to that of free pantothenol.

The biological value of oils and fats. IV. The rate of intestinal absorption. H. J. Thomasson(Unilever Research Lab., Zwijndrecht, The Netherlands). *J. Nutrition* **59**, 343–352(1956). The rates of absorption of 18 natural oils and fats of vegetable and animal origin have been studied. The fat recovered three to 11 hours after the administration of 400 mg. per 100 cm^2 of body surface appeared to be distributed over stomach, small and large intestine with a certain constancy, averaging 73, 22.5, and 5% respectively. The percentage of fat in the small intestine, seems to be independent of the absorption time and consequently of the amount of fat in the tract; that in the stomach showed a tendency to decrease while that in the large intestine increased when absorption time was extended.

A study of the effects of growth hormone on fatty acid metabolism in vitro. A. Allen, Grace Medes, and S. Weinhouse(Dept. of Chem., Temple Univ., Philadelphia, Penn.). *J. Biol. Chem.* **221**, 333–345(1956). The effect of the growth hormone on the conversion of C^{14}-labeled fatty acids to carbon dioxide or to acetoacetate was studied in rat tissue slices or homogenates under various conditions. Under no condition were these conversions accelerated by anterior pituitary growth hormone, added *in vitro*, or injected prior to sacrifice of the animals. Liver slices from rats injected with growth hormone a few hours prior to sacrifice exhibited a somewhat lower incorporation of C^{14}-labeled acetate into fatty acids and an increased incorporation into cholesterol. These effects, however, were neither marked nor consistent.

Antioxidant wrapper for foods. J. C. Pullman and R. B. Porter, Jr.(American Cyanamid Co.). *U. S. 2,758,032.* A protective packaging material for triglyceride-containing materials subject to oxidative deterioration consists of rosin-sized paper carrying 0.01 to 1% by wt. of a 2,2′-methylene bis(4,6-dialkylphenol) antioxidant on the surface to be placed in contact with the fatty material.

Stabilized vitamin preparations. R. D. Wakely(Peter Hand Brewing Co.). *U. S. 2,758,923.* Vitamins D_2 and D_3 are stabilized by reaction with a bile acid having hydroxyl groups at positions 3 and 12.

Stabilized vitamin preparations. R. D. Wakely(Peter Hand Brewing Co.). *U. S. 2,758,924.* Vitamin A or derivatives thereof are stabilized by reaction with desoxycholic or apocholic acid.

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• Drying Oils and Paints

Raymond Paschke, Abstractor

The use of aniline-formaldehyde resins as curing agents for epoxide resins. R. R. Bishop(Imperial Chemical Ind. Ltd., Slough, Bucks, Eng.). *J. Appl. Chem.* **6**, 256(1956). Low molecular weight aniline-formaldehyde resins have been used as curing agents for liquid epoxide resins. With respect to heat distortion temperature and solvent resistance, aniline-formaldehyde resins are superior to aliphatic polyamines, but are equivalent to *m*-phenylenediamine in performance although used in a larger proportion and are more convenient to handle.

The Dutch paint industry. Anon. *Paintindia* **6**(4), 23(1956).

Science for the Coatings Technologist. Part V: Red Pigments. E. S. Beck. *Org. Finishing* **17**, 9(1956).

Electrolytic reduction of phthalic acid. P. C. Condit(Calif. Res. Corp., Richmond). *Ind. Eng. Chem.* **48**, 1252(1956). Phthalic acid can be reduced electrolytically in the cell to cyclohexadiene dicarboxylic acids, which are interesting intermediates for polymeric products. The continuous cell also shows promise in the reduction of organic compounds other than phthalic acid.

Epoxy esters of dehydrated castor oil fatty acids. Part I. H. W. Chatfield. *Paint, Oil Colour J.* **130**(3019), 416(1956). Stoving properties and water, acid, alkali, paraffin oil, and butter resistance are discussed.

Part II. Webbing and frosting of epoxy esters. *Ibid.*(3020), 465(1956). Some reduction of webbing and frosting susceptibility may be expected by using more highly bodied D.C.O. epoxy esters. Under adverse conditions of drying addition of driers or more drier may be helpful. Some control is also possible by the addition of phenolic resins of oil reactive type. When D.C.O. epoxy esters are used with amino resins, the presence of predominating amounts of the latter appear to have a beneficial dilution effect upon the epoxy ester and products are obtained which have less tendency to web and frost. Blends containing a large proportion of epoxy ester are prone to web and frost and in this respect it seems that urea resins may be more likely to encourage these defects than the melamine resins.

The plasticisation of polystyrene emulsion paints. J. I. Evans (Monsanto Chemicals, Fulmer, Bucks, England). *Oil Colour Chemists Assoc. J.* **39**, 553(1956).

Synthetic organic pigments. E. Evensen(Resinous Chemicals Ltd., Eng.). *Paint Manuf.* **26**, 284(1956). This paper classifies the organic pigments into lakes, toners, pigment dyestuffs and metallic co-ordination compounds and on this basis outlines their general properties.

Organic polyisocyanates—Their use in the surface-coatings industry. H. A. Hampton and R. Hurd(Imperial Chemical Industries Ltd., Manchester 9, England). *Oil Colour Chemists' Assoc. J.* **39**, 609(1956). This review covers manufacture, reactions, hazards, and uses. Isocyanate-cured resins have already established their use in the surface-coatings industry in a number of widely differing applications, despite the limited pot life, the toxic hazards of some and the poor colour-retention of most of the polyisocyanates presently available. There is every hope that polyisocyanates of good colour-retention and much reduced or negligible toxicity will be made available in the not too distant future.

Vapor barriers—theory and practice. P. C. Herzog(Glidden Co.). *Paint Ind. Mag.* **71**(8), 8(1956).

Basic concepts of alkyd resins. H. N. Lieberman(Resin Res. Labs., Inc.). *Paint. Ind. Mag.* **71**(8), 16(1956). A review. No references.

Effect of substituents on the autoxidation of some oleic acid derivatives. P. R. Malkan and A. R. S. Kartha. *J. Sci. Ind. Res.* **14B**, 673(1955). The rates of autoxidation of oleic acid, oleyl alcohol, triolein and ethyl oleate are compared by incubating samples at 96° and determining the peroxide value at intervals. The results show that the nature of the substituents in the chain has great influence on the variation of peroxide values during autoxidation. Whereas with oleic acid the maximum peroxide value is reached in ~16 hr. and remains unchanged for the next 160 hr., in the cases of oleyl alcohol, triolein and ethyl oleate maximum peroxide values are obtained in ~70 to 80 hr., and these remain constant for ~6–10 hr. and then start decreasing. Results also show that the rates of destruction of substances undergoing autoxidation are high at the beginning and tend to become very much lower after some time even though substantial quantities of the original substances are still present.

Formulating industrial finishes. 1. The advantages and disadvantages of amino resins. C. H. Morris(P. I. P. Chemicals Ltd., Eng.). *Paint Manuf.* **26**, 279(1956).

The alcoholysis of fatty oils. F. Mort(Taubmans Industries Ltd., St. Peter's, New South Wales). *Oil Colour Chemists' Assoc. J.* **39**, 253(1956). Tolerance tests based on the titration of monoglycerides with methanol fail to give consistent results, are insensitive in the range of monoglyceride concentrations of greatest interest to alkyd-resin manufacturers and are influenced by components other than monoglycerides. The stages of formation of a typical alcoholysis reaction can be clearly followed by electrical conductivity methods. Monoglyceride formation rates are particularly sensitive to temperature and the presence of catalysts.

Paint research in Germany. R. N. Mukherjea. *Paintindia* **6**(4), 26(1956).

Paint application and drying. J. J. Stordy and W. G. J. Appleton(Stordy Eng. Co., Goldthorn Hill, Eng.). *Oil Colour Chemists' Assoc. J.* **39**, 565(1956). This review covers dipping, spraying, flow coating, and storing methods.

Analysis of styrenated methyl linoleate. S. S. Tiong and H. I. Waterman(Technical Univ., Delft, The Netherlands). *J. Appl. Chem.* **6**, 197(1956). The reaction of methyl linoleate with gaseous styrene at 280° and the analysis of the reaction product is described. It is shown that the main product is an addition compound of one mole of styrene and one mole of methyl linoleate. Ring analysis and chemical degradations provided evidence that this product is formed by a Diels-Alder mechanism. No high molecular-weight polystyrene could be found in the reaction product.

Formulating with isophthalic alkyds. H. L. Wampner(Reichhold Chemicals, Inc.). *Off. Dig.* **28**(379), 663(1956). Alkyd resins containing isophthalic acid are compared with similar phthalic anhydride resins. In general, there is an improvement in drying, flexibility, hardness, color and gloss retention, and alkali resistance. The extent of such improvement is in line with the extent of the dibasic acid content. Isophthalic alkyds have been prepared with less than 10% and more than 50% of the dibasic acid.

The formulation of alkyd resins. N. M. Wiederhorn(A. D. Little, Inc., Cambridge, Mass). *Am. Paint J.* **41**(2), 106(1956). A review. No references.

Process of making wrinkle varnishes. J. S. Aggarwal and P. G. Sharma(Council of Scientific and Industrial Research, New Delhi, India). *U. S. 2,749,247.* This patent covers the process which consists substantially in mixing from about 1.5 to 2 parts by weight of a wrinkling oil, whose fatty acid components contain conjugated double bonds and selected from a class consisting of kamala oil, tung oil, oiticica oil, *Trichosanthes anguina* seed oil and *Momordica charantia* seed oil, with about 1 part by weight of estergum, heating the mixture in the absence of a catalyst at a temperature ranging from about 175° to 280° until a drop of the cooled mixture gives a thread of from about 6 to 10 inches, thinning the resulting varnish base with an organic solvent having a boiling point of from about 40° to 125° and adding a surface drier.

Organophilic titania powders containing a polymerizable ethylenic monomer bound to fractured surfaces thereof and their preparation. R. E. Benson(E. I. du Pont and Co.). *U. S. 2,749,248.*

Method for making a dry paint mixture (from clay). N. G. Cadegans(Beloit, Wis.). *U. S. 2,749,249.*

Cellulose acetate sorbate and compositions thereof. W. B. Hewson(Hercules Powder Co.). *U. S. 2,749,319.* This patent covers a method of insolubilizing cellulose acetate sorbate having a sorboyl D. S. within the range of 0.02 to about 0.35 and a total D. S. in the range of 2.2 to 3.0. The method comprises heating cellulose acetate sorbate at a temperature above 50° C. and below its decomposition point with a dienophile having at least two centers of unsaturation, each capable of undergoing the Diels-Alder reaction.

Short oil styrenated alkyd and method. H. Spellberg(Sherwin-Williams Co., Cleveland). *U. S. 2,749,320.* This patent covers a process for the manufacture of a clear homogeneous polymer comprising a non-conjugated non-bodied, unoxidized oil-aromatic vinyl modified alkyd.

Resinous coating. K. J. Lissaut(Petrolite Corp., Wilmington, Del.). *U. S. 2,749,322.* This patent covers a method of producing a solution of a polyfuran resin comprising diluting a mixture of furfural and furfuryl alcohol with from about 15% to 25% by weight of a ketonic solvent, polymerizing the ingredients in the presence of a proton donor catalyst while holding the mixture between about 55°C. and 90°C. until the mixture approaches incipient gelation, and then quenching the reaction by the addition of from about 60% to 120% by weight of additional ketonic solvent based on the weight of the furfural and furfuryl alcohol.

Synthetic linear polyamides obtained by the base catalyzed

polymerization of unsaturated amides. D. S. Breslow (Hercules Powder Co.). *U. S. 2,749,331.* This patent covers the process of preparing a synthetic linear polyamide which comprises contacting under substantially anhydrous conditions an amide, containing as its only olefinic unsaturation an ethylene double bond in the alpha position to the amide carbonyl radical and also containing active hydrogen, at least one of which is attached to the amido nitrogen, with a strongly basic catalyst selected from the group consisting of alkali metals, alkali metal hydroxides, quaternary ammonium hydroxides, alkali metal alkoxides, alkali metal amides, alkali metal hydrides, and alkali metal aralkyls, the basic catalyst being the sole polymerization catalyst present and the amide being the sole polymerizable material present.

Solution of resin in blown oil treated with Friedel-crafts catalyst to produce varnish. M. W. Kiebler, Jr. and E. B. Euchner (The Glidden Co.). *U. S. 2,750,298.*

Peroxides of long-chain olefinic compounds. D. Swern, J. E. Coleman and H. B. Knight (U. S. Dept. Agr.). *U. S. 2,750,362.* Unsaturated material is autoxidized to about a 30% peroxide content using a metal catalyst. Urea is used to remove some unchanged material and increase the peroxide content to over 50%.

• Detergents

Lenore Petschaft Africk, Abstractor

Analysis of mixtures of surface-active quaternary ammonium compounds and polyethylene oxide type of non-ionic surface-active agents. A. Barber, C. C. T. Chinnick, and P. A. Lincoln. *Analyst* **81**, 18–25 (1956). The presence of a nonionic surface-active agent interferes in the observation of the end point in the bromophenol blue method of determining quaternary ammonium compounds. This interference can be overcome by making a blank titration with no nonionic present, and using the blue ethylene dichloride layer of this as a match for the titration of the sample containing some nonionic; the NaCl content should be 1.25–2.5 g. The method of Oliver and Preston for polyethylene-oxide nonionics is improved by substituting phosphotungstic acid for phosphomolybdic. Quaternary ammonium compounds interfere in this modification, but they can be removed by means of ion-exchange resins. (*C. A.* **50**, 12510)

Properties of lauryl ether sulfates. G. Braude, R. R. Egan, M. Warren and L. Galitzin (American Alcolac Corp., Baltimore, Md.). *Soap Chemical Specialties* 32(8) 45–50, 77 (1956). The properties of sodium lauryl ether sulfates depend to a large degree on the length of the hydrophilic ether chain. Viscosities of aqueous solutions decrease with increasing ether chain length. They are very dependent on the sodium chloride and unsulfated ether alcohol content, as well as on the concentration and temperature. Cloud points decrease with increasing ether chain length. Foaming heights reach a maximum at an ether chain length of about 2 to 4. More than 4 moles of ethylene oxide adversely effects foaming properties. Solutions of this material remain clear in hard and distilled water. Solutions of lauryl ether sulfate have good heat stability characteristics. Dilute solutions of sodium lauryl ether sulfate show surface tension and interfacial tension characteristics which are more similar to those of ethylene oxide alcohol condensates than sodium lauryl sulfate. Dilute solutions of sodium lauryl ether sulfate show excellent wetting characteristics in both hard and distilled water.

Surface activity and detergents. I. J. Moreno Calvo (Patonato Juan de la Cierva invest. tec., Madrid). *Rev. cienc. apl.* (Madrid) **10**, 111–23 (1956). Fundamental aspects of washing and the removal of soil from textile material is reviewed. Surface phenomena and physical and electrocolloidal constitution of detergents are considered. (*C. A.* **50**, 12510)

Practical method of evaluating hair shampoos. W. G. Fredell and R. R. Read (Lambert-Hudnut, New York). *Soap Chemical Specialties* 32(8), 40–2 (1956). A standardized method of evaluating lathering properties of shampoos is described. The method is essentially a titration of a standardized soiled head of hair with 0.25 gm. portions of shampoo to an end-point of a permanent lather. That is, a lather that remains for about a minute. Variation in the use amounts are due to type and volume of detergent.

An etiologic appraisal of hand dermatitis. I. The role of soap and detergents as sensitizers. J. J. Jambor and R. R. Suskind (Univ. of Cincinnati, O.). *J. Invest. Dermatol.* **24**, 379–85 (1955). In 57 cases of hand dermatitis none could be shown to be attributable to a suspected soap or detergents. Patch tests with all available personnel, occupational, household, and hobby contactants (including soap) showed that contact dermatitis resulted from diverse causes.

II. The role of soaps and detergents as primary irritants. J. J. Jambor. *Ibid.* 387–96. Immersion of the hands for 30 minutes at 105°F. in solutions of soaps or detergents did not produce evidence of persistent irritation. The simultaneous effect of mechanical irritation was not investigated. (*C. A.* **50**, 12510)

Lauric acid-diethanolamine condensation products. H. Kroll and W. J. Lennon (Geigy Chem. Corp., New York). *Drug & Cosmetic Ind.* **79**, 186–7, 272–7 (1956). The reaction of lauric acid with diethanolamine in the presence of excess diethanolamine results initially in the formation of N,N-bis-(2-hydroxyethyl) lauramide. This compound is responsible for most of the surface active properties of the alkylolamides. Under the conditions of the reaction, the amide undergoes thermal rearrangement to the lauroyl ester of diethanolamine which in turn undergoes further conversion to the dilauroyl ester-amide of diethanolamine. Products obtained by the Kritchevsky process contain about 50 per cent of dihydroxyethyl lauramide. Mention is made of new manufacturing techniques which produce high purity condensates containing 90 per cent or more dihydroxyethyl lauramide. An analytical procedure suitable for determining the major components of amide condensates obtained by both techniques is outlined with typical compositions tabulated. A brief discussion as to the relative merits of each type amide condensate performance-wise in typical cosmetic preparations is also presented.

Germicides based on surface-active agents—their nature and mechanism of action. C. D. Moore and R. B. Hardwick (Glover Chemicals Ltd.). *Manuf. Chemist* **27**, 305–9 (1956). The nature of, and relationship between, the materials used in the preparation of germicides containing surface-active agents are discussed. The various combinations of materials used include phenolic-anionic, quaternary ammonium-non-ionic, phenolic-quaternary ammonium compounds, iodine-non-ionic, and iodine-quaternary ammonium compounds. Methods of applications are given.

Rancidification of the white soap prepared by bleaching the soap paste. F. Muscari-Tomajoli. *Olii minerali, grassi e saponi, color e vernici* **33**, 57–61 (1956). Decolorized soap rancidifies easier than the nondecolorized soap. The bleaching process with Na persulfate (without subsequent recooking), the presence of traces of Cu, and the action of the light facilitate the rancidity. Treatment of the soap with dithionites induces resistance against the rancidity. (*C. A.* **50**, 11689)

Development of a detergent test. W. B. Smith and A. Taylor (Marchon Products, Ltd., Whitehaven, Cumberland, Engl.). *J. Soc. Cosmetic Chemists* **7**, 413–17 (1956). A procedure for testing detergents for dishwashing is described and the magnitude of the uncontrollable variables were assessed. The controllable variables such as amount of soil, volume of wash liquir and temperature were then studied. And finally the study was extended to different soils, different waters and different detergents.

Dielectric constant of hydrous sodium palmitate. H. E. Wirth and W. W. Wellman (Ohio State Univ., Columbus, O.). *J. Phys. Chem.* **60**, 919–20 (1956). The dielectric constant of hydrous B- and o-sodium palmitate is practically constant for water contents between 0 and 3%. Above 3% water the dielectric constant increases rapidly with increasing water content, and becomes frequency dependent. This increase in dielectric constant is far greater than would be expected from a simple mixture, and is attributed to presence of mobile sodium ions in the water which is weakly adsorbed by the soap.

Composition and means for producing and supplying detergent lather. J. G. Spitzer. *Brit. 748,411.* A lather, such as a shaving, shampooing, or washing lather is formed as the composition is released from its container and applied directly to the skin. The composition consists of a water solution of a suitable soap or like detergent, and a highly volatile organic liquid used as a propellant.

New results regarding the adsorption of cellulose glycollate by textile fibers from colloidal solutions. H. Stupel. *Kolloid-Z.*, **145**, 140–1 (1956). Experiments, carried out by using fluorescent microscopy and Acridine Orange as indicator, showed that, under conditions of the washing process, cellulose glycollate is adsorbed on the dirt. Under acid conditions cellulose glycollate is adsorbed on the textile fibers; this adsorption mechanism differs essentially from that taking place during the washing process. The adsorption in acid medium also takes place in the presence of surface-active agents, pigments, silicates, and metal oxides.