non-F.S.G. peanut oil was employed. This oil is stated by Kartha (4) to contain no F.S.G., and this was confirmed by crystallization from acetone. Results are reported in Table I.

These figures show a good series for the melting point but with a decrement of 7° as against 5.8-6° obtained by Kartha with his technique. In another series hardened tallow (I.V. 0.5) was diluted with neatsfoot oil (no F.S.G. by crystallization) and gave a constant decrement of 6.5° for 5 dilutions. It would appear that the drop in melting point is not independent of the nature of the non-F.S.G. used. With our technique the solidifying points are erratic.

In another experiment a sample of tallow was crystallized from acetone (5) and yielded three crops of crystals, amounting to 18% in all and containing F.S.G. equal to 13.0% of the original tallow. As the final crop contained only .3% F.S.G., it was assumed that all the F.S.G. had been separated in the crystals. Portions from the main crop containing 81% of their own weight of F.S.G. were mixed with peanut oil and with cacao butter (both showing no F.S.G. by crystallization from acetone) to give mixtures containing 13.0% of F.S.G. from tallow. Results are given in Table II.

TABLE II

	Original tallow	Crystals 1st crop	F.S.G. in P.N.O.	F.S.G. in C.B.
Melting point..........	117.5°	138°	119.5°	118.5°F.
Solidifying point.....	105.5°	134.5°	107°	105°F.

In theory two dilutions of the crystals should give 20.25% F.S.G. and a melting point of 124° (138—2 x 7). A further dilution would give 10.13% F.S.G. and 117°. Interpolating to 13% F.S.G. gives a melting point of 119°. Kartha (6) has advised that under certain conditions he has also obtained a small increase in melting point with peanut oil.

The same tallow was analyzed by the Bertram procedure and found to contain 55% saturated acids, and on random interesterification it should give 16.6% F.S.G., which should raise the melting point. However it has been found that the interesterified tallow (sodium methylate catalyst) has a melting point of 114°.

Further researches on these lines are proceeding.

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5. *Ibid.*, 49.
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ABSTRACTS . . . . E. S. Lutton, Edito

• Oils and Fats

Ralph W. Planck, Abstractor
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Utilization of cachaza. E. A. Vazquez. *Bol. ofic. asoc. tec. azucar.* (Cuba) 9, 9-23(1950-51); *Sugar Ind. Abstr.* 12, 134 (1950). The cane-juice clarification muds (cachaza) can be extd. with acid to remove sugar, phosphate, and nitrogenous substances. The residue can be further extd. with org. solvents for wax and fats. The acid ext. can be used for the clarification of guarapo (fermented cane juice), and in the manuf. of yeast and alc. The processes are described and considered from the economic standpoint. The concn. of the muds by centrifugal sepn. is considered theoretically. (*C. A.* 47, 11769)

Sesame—research moves ahead. J. A. Martin (So. Carolina Agr. Exp. Station, Clemson, S. C.). *Crops & Soils* 6(2), 10-11 (1953). Yields as high as 1,078 lbs./acre and oil contents as high as 56% indicate that sesame may soon be an important oil seed crop in the South. More disease resistant strains are being bred.

Antioxidants in the home preservation of foods. Flora Hanning, Lyla M. Rice, Jobelle A. Shands, W. Batterman, and R. Bray (Univ. Wisconsin, Madison, Wis.). *J. Home Econ.* 45, 660-62(1953). It is recommended for home treatment of lard that 5% hydrogenated vegetable shortening and a little cream of tartar be added. It is suggested that no antioxidants be added to pork sausage, fish, or chicken prior to freezing.

Surface tension and viscosity in fats which become rancid. Leoncio Romero A. (Univ. Chile, Santiago). *Tesis quim, Univ. Chile* 2, 62-76(1950). Olive (com. edible), cod-liver (light and dark), castor, and linseed oils were observed for 4 months during which they were exposed only to artificial light for several hours. Storage temperature was 12-13.5°. The d. and viscosity (Stokes method) increased. A relation between d. and viscosity was evident only with castor and cod-liver oils. (*C. A.* 47, 7233)

Cottonseed oil by alcohol extraction. Y. K. Raghunatha Rao. *Oils and Oilseeds J.* 4(6), 10-11(1953). Whole cottonseed is crushed between rolls, lint and hulls screened out and the powdered kernel extracted with hot ethanol. Cooling the extract to room temperature causes oil of high quality to separate from the alcohol solution which retains most of the gossypol and other pigments, fatty acids, etc. After stripping, the oil had a Lovibond color of 24Y-3.5R and a fatty acid content of 0.3-0.4%. The meal was superior to hexane extracted meal because of its lower gossypol content. Advantages reported for the alcohol extraction compared with the usual hexane extraction process include need for less equipment, lower costs for solvents and refining, and higher quality of oil and meal.

Whale oil is now produced in factory ships. P. B. Cream. *Canadian Chemical Processing* 37, No. 13, 42(1953). A discussion of production of whale oil with the main emphasis on the overall historical discussion of modern whale oil production.

Ethyl oleate as a solvent for injectable solutions. F. Gialdi and R. Ponci (Univ. Pavia). *Farmaco, Ed. prat.* (Pavia), 8, 123-7(1953). A general discussion. (*C. A.* 47, 6605)

Demargarinization of cottonseed oil. P. D. Kupchinskii. *Masloboino Zhirovaya Prom.* 18(2), 8-11(1953). The removal of the solids from cottonseed oil is not affected by ordinary cooling to crystallization temperature; hence, rapid chilling is advisable. During the crystallization period it is best that a 1° temperature differential be maintained between the oil and the cooling agent. If the gradient is too great the precipitate is gelatinous and unfilterable. The initial crystallization is best done at about 6°; at 1-2° the solid is very difficult to filter. The 2nd crystallization is best done at 2.5-3.5°, the entire process taking 18-24 hrs. The solid removed amounted to 12-23% of the charge and contained some 38% saturated fatty acids. The liquid fractions contain some 20% saturated fatty acids. A flow sheet for the process is given. (*C. A.* 47, 7237)

Glycerol in hair preparations. Robert A. Stetson. *Am. Perfumer Essent. Oil Rev.* 61, 285-8(1953). The role of glycerol as a humectant, vehicle, solvent, bodying agent, emollient, lubricant, softener, and depressant in shampoos, brilliantines, and hair-treating creams is discussed. (*C. A.* 47, 6609)

The determination of total phosphatide in commercial lecithin. H. H. Hutt, H, Weatherall, and T. Culshaw. *The Analyst* **78**, No. 933, 712-716(1953). In a previous publication it has been suggested that the difference between acetone-insoluble matter and petrol-insoluble matter can be made the basis of a means for assessing the phosphatide content of commercial lecithin for works-control purposes. A modified method, which has improved precision, is now described for the determination of acetone-insoluble matter; it is compared experimentally with previously published methods. The ratio of phosphatide to non-phosphatide removed at various stages of washing is examined.

The difference between acetone-insoluble matter determined by the method proposed and petrol-insoluble matter is suggested as giving a suitable measure of phosphatide content.

The spectrophotometric determination of long-chain fatty acids containing ketonic grouups with particular reference to licanic acid. A. Mendolowitz and J. P. Riley. *The Analyst* **78**, No. 933, 704-709(1953). A spectrophotometric procedure, based on the alkaline 2:4-dinitrophenylhydrazone method of Lappin and Clark, is described for the determination of ketonic groups in long-chain compounds. The effect of a number of variables on the final intensity of the color has been investigated. The method has been applied to the determination of licanic acid in the presence of other saturated and unsaturated fatty acids and shows a standard deviation of 0.8%.

Canadian erucic acid oils IX. Thermal polymerization of rapeseed oil. A. Zuckerman, R. P. A. Sims, and N. H. Grace (Division of Applied Biology NRL, Ottawa). *Can. J. Tech.* **32**, No. 1, 10-16(1954). Heating of rapeseed oil in an inert atmosphere at atmospheric pressure resulted in increases of refractive index, viscosity, and molecular weight; and a decrease in iodine value. The presence of peroxides increased the rate of polymerization. Estimation of dibasic dimeric acids by lead salt precipitation was less satisfactory than by distillation of the simple esters of the fatty acid mixture. Erucic acid prepared from heat-treated rapeseed oil did not show evidence of isomerization.

Ultra-violet spectrophotometric estimation of the quality of mineral oil extracted from bread. M. A. Cookson, J. B. M. Coppock, and R. Schnurman. *The Analyst* **78**, No. 933, 695-703 (1953). A method has been devised for determining in bread the degree of refining of a mineral oil that has been absorbed by the dough during bread-making. The method consists basically of sulphating under controlled conditions the unsaponifiable fraction of the total oils extracted from the bread, so that the natural saponifiable matter is destroyed without completely removing the unsaturated hydrocarbon constituents inherent in mineral oils refined to different degrees. The recovered mineral oil is then examined by ultraviolet absorption to determine its quality. A spectrophotometric criterion, based on the absorption intensity of the sulphated oils at 2600 Å, is suggested for the quality of mineral oils that can be regarded as satisfactory for the lubrication plants used for bread production. Some of the properties of naturally occurring unsaponifiable oils of bread are also described.

Biosynthesis of fatty acids by slices and cell-free suspensions of mammary gland. G. Popjak and A. Tietz (The National Institute for Medical Research, Mill Hill, London, England). *The Biochem. J.* **56**, No. 1, 46-54(1954). The biosynthesis of fatty acids from acetate in tissue slices and cell-free suspensions of rat and sheep mammary gland have been studied. In tissue slices, the addition of glucose, pyruvate, and members of the citric acid cycle stimulated fatty acid synthesis from acetate. All the saturated n-fatty acids containing an even number of carbon atoms from 6 to 18 and also oleic acid were synthesized in rat mammary suspensions. The implications of the results are discussed.

The lipase activity of certain cereal products. W. H. Templeton and B. R. Carpenter (British Baking Industries Research Association, Chorleywood, Herts., England). *The Analyst* **78**, No. 933, 726-7(1953). The authors discuss the fact that sometimes off-flavors in finished baked products can be caused by the action of lipase originally present in the flour or cereal product used in their manufacture. Hard and fast conclusions cannot be drawn from the figures shown, but they give an indication of the state of the flour and whether or not it is responsible for the soapy taste in samples of baked goods.

Bleaching of carotene by a lipoxidase-linoleate system. J. A. Blain, J. Hawthorn, and J. P. Todd (Royal Technical College, Glasgow). *J. Sci. Food Agric.* **4**, 580-87(1953). A system for the study of lipoxidase-catalyzed bleaching of carotene in the presence of linoleate is described and consists essentially of a mixture of a phosphate buffer at pH 6.0, a solution of carotene in acetone-alcohol, sodium linoleate in alcohol, and the lipoxidase extract. The effect of temperature, enzyme concentration, substrate concentration, time, and pH on bleaching rates are discussed and illustrated graphically. The effect of linoleate in modifying the state of dispersion of carotene may be the principal factor determining the form of the pH-activity curve. The method may be used to assay soybean lipoxidase, and, with minor modification, to determine lipoxidase activity in wheat products.

Rapid method for the estimation of water-insoluble fatty acids (WIA) in cream and butter. Fred Hillig (Food & Drug Admin.). *J. Assoc. Official Agric. Chemists* **36**, 1077-83(1953). Water-soluble acids are removed by washing with ice water. The fat is dissolved in ether and titrated with sodium ethylate. The determination is completed in about 15 min. for samples 20 g. cream or 10 g. butter. Collaborative determinations showed satisfactory agreement with values obtained by the official method although there was a tendency for the rapid method to give high results in the region of 1,000 mg. WIA per 100 g. fat or above.

Chemical estimation of vitamin E activity in cereal products. I. The tocopherol pattern of wheat-germ oil. P. W. Russell Eggitt and L. D. Ward (Spillers Ltd., Cambridge). *J. Sci. Food Agric.* **4**, 569-79(1953). Details are given for the complete analysis of a cereal product for vitamin E activity in the following steps: (1) extraction with peroxide-free ether; (2) saponification with KOH in EtOH containing pyrogallol and extraction of the unsaponifiable fraction with purified ether; (3) removal of the bulk of the sterols from unsaponifiables by crystallization from MeOH; (4) removal of residual sterols, carotenoids, and other interfering substances by chromatography of a benzene solution on a column of activated Floridin earth; (5) separation of tocopherols by paper chromatography using liquid paraffin B. P. as the stationary and 75% aqueous EtOH as the mobile phase; (6) determination of eluted tocopherols and ''artifacts'' by the Emmerie-Engel method. Analyses of several wheat-germ oils show that the pattern as per cent of total ''tocopherols'' is: origin spot, 12; α-tocopherol, 52; β-tocopherol, 27; fast moving spot, 9. The compound in the fast moving spot does not couple with diazotized *o*-dianisidine, forms a nitroso-compound, and may be 5-methyltocol.

PATENTS

Stabilization of glyceride oils. Arthur W. Schwab, Cyril D. Evans and Patricia M. Cooney (U. S. A., Secy. Agr.). *U. S. 2,661,358.* Glyceride oils are stabilized by the addition of chelidonic or chelidamic acid.

Method of preparing adducts. Joachim Dazzi (Monsanto Chemical Co.). *U. S. 2,661,359.* Adducts are obtained by heating at 150-300°C. a mixture of maleic anhydride, oleic acid, and 0.5-5.0% of an aryl ester of phosphorus or hypophosphorus acid (based on weight of maleic anhydride).

Improved shortening and cake composition. William C. Griffin (Atlas Powder Co.). *U. S. 2,662,015.* The shortening contains 0.5-6% of a polyethylene glycol ester, $R(OCH_2CH_2)_nOR'$, in which R and R' are straight chain C_{12} to C_{18} monocarboxylic groups, e.g. ricinoleic, unsubstituted saturated or monounsaturated acids, and n is 15 to 35.

Process for treating tall oil. Emmett P. Glynn and Burt F. Hofferth (Armour Co.). *U. S. 2,662,849.* Fractional distillation of tall oil yields a first cut of low boiling unsaponifiables and palmitic acid, and a second cut of oleic and linoleic acids. Fractional low temperature crystallization of the second cut yields oleic acid as solid phase.

Separation of geometrical isomers by urea complex formation. Richard A. Foster and Charles G. Laspe (Shell Development Co.). *U. S. 2,662,879.* A mixture of 25 parts elaidic acid and 75 parts oleic acid is contacted at room temperature with 600 parts of methyl alcohol solution saturated with urea at 27°C. The crystalline material which separates contains urea complexes of both acids and is enriched in elaidic acid. The unreacted portion is enriched in oleic acid.

Separation of salts of organic acids. Vaman R. Kokatnur (Helen G. Kokatnur). *U. S. 2,662,880.* Crude wet soaps of high molecular weight hydroaromatic resin acids and unsaturated fatty acids from kraft pulp industry are separated by (1) drying the crude mixture under nonoxidizing conditions by washing with an aliphatic ketone, C_5 or lower; (2) adding abietic acid in amounts approximately equivalent to fatty acids in the soap; (3) warming until solution results and abietic acid displaces fatty acids from the soaps; (4) cooling the solution; (5) separating the precipitated sodium abietate from the ketone solution of fatty acids.

Stabilization of glyceride oils with carboxymethyl mercaptosuccinic acid. Arthur W. Schwab, Patricia M. Cooney and Cyril D. Evans (U. S. A., Secy Agr.). *U. S. 2,662,905.* In refining a glyceride oil, 0.001-0.1% carboxymethyl mercaptosuccinic acid is added during the cooling of the oil after steam deodorization.

Oxidation of fatty acids. Roger L. Logan (The C. P. Hall Co. of Illinois). *U. S. 2,662,908.* Dicarboxylic acids and short chain fatty acids are produced by the oxidation of C_4 to C_{24} fatty acids in the presence of nitric acid of 8-30% concentration. The shorter chain length fatty acids are distilled continuously from the reaction mixture.

Extraction of lower fatty acids. Franklin N. Best (Hercules Powder Co.). *U. S. 2,662,916.* Lower fatty acids are recovered from the weak aqueous solution obtained in the manufacture of cellulose ester by countercurrent extraction with a mixture of 40-76% isopropyl ether and 60-24% of a C_3 to C_5 aliphatic ester or ether having a boiling point below that of the acid to be extracted. The temperature of the extraction is about 35°C. so the cellulosic materials precipitate and may be removed.

Rice bran oil process. George J. Strezynski and Frank E. Lowatsch (The De Laval Separator Co.). *U. S. 2,663,717.* Rice bran oil containg gums and waxes is separated by (1) mixing the crude material with sufficient water to hydrate the gums, heating the mixture to 140°F., agitating, cooling slowly, and centrifuging; and (2) mixing the sludge (which consists of wax, gums, water, and a small amount of oil) with an emulsifying agent, heating to 200°F. and centrifuging. The wax subcomponent contains most of the oil from the sludge, and the gum subcomponent contains the water.

Method for the continuuous alkali refining of vegetable oils. Arthur U. Ayres (The Sharples Corp.). *U. S. 2,663,719.* Oils containing free fatty acids are extracted continuously with aqueous caustic soda of at least 20° Bé in amounts about equivalent to the free fatty acid content. The mixing temperature is 140-160°F. and the time of contact is not over 5 sec. so the soap stock separates in a nonagglomerated state and is immediately removed.

Method for manufacturing polymerized fatty acids. Charles G. Goebel (Emery Industries, Inc.). *U. S. 2,664,429.* A mixture of fatty acids containing polyunsaturated acids is mixed in a continuous stream with 1-5% water and heated to 350-400°C. under sufficient pressure to retain the water in solution and inhibit decarboxylation. The mixture is held at polymerizing temperatures for 20 min. to 1 hr., cooled to 260-360°C., and the pressure is released. Unpolymerized acids are removed from the dimer acids by flash distillation.

Fatty acid treatment. Martin David Reinish and Joseph Patrick Caldarera (Colgate-Palmolive-Peet Co.). *U. S. 2,664,430.* Light colored fatty acids may be obtained from natural fats and oils by hydrolyzing the fat, bubbling air through the crude fatty acids in a surge drum for 1 to 2 hrs. at 240-260°F. so as to oxidize the color-forming bodies and render them nonvolatile, and finally distilling the acids.

Method for stabilizing soybean oil refined by solvent treatment. Herbert J. Passino (The M. W. Kellogg Co.). *U. S. 2,664,431.* By contacting an oil with a solvent having a critical temperature below 450°F. under pressure and in the para-critical range in which the miscibility decreases with increase in temperature, there is obtained an extract phase containing most of the oil and a relatively small raffinate phase containing most of the color bodies. These phases are separated and not more than 1/10 of the raffinate is returned to the extract oil. The oil so obtained is 9/10 decolorized and contains at least a portion of each stabilizing agent present in the raffinate.

Method of stabilizing fats and oils and compositions obtained thereby. Noel H. Kuhrt (Eastman Kodak Co.). *U. S. 2,665,991.* Fatty material in a liquid form is washed with glycine and phosphoric acid in a polar solvent which is immiscible with the fat.

Refining fatty oils. Fred S. Sadler (Sharples Corp.). *U. S. 2,666,074.* Gum-containing oils are mixed with an aqueous solution of a polybasic aliphatic acid (citric, tartaric, maleic, malic, oxalic, itaconic, aconitic, tricarballylic, fumaric, succinic, glutaric, or adipic). The amount and concentration of the aqueous solution are such that the water added is 0.1-0.5% and the acid is 0.01% of the weight of oil and just sufficient to combine chemically with the gums. The treated oil is then refined with an alkaline agent.

Baking composition. Elmer F. Glabe (Food Technology, Inc.). *U. S. 2,666,704.* Baking mix contains 0.01-5.0% by weight of activated dihydroxyphospholipids. The latter consist of phosphatides which have been hydroxylated at the double bonds of the unsaturated fatty acids and activated by mixing with fat and water.

Shortening composition and method of making. Elmer F. Glabe (Food Technology, Inc.). *U. S. 2,666,705.* An edible shortening contains activated dihydroxyphosphatides which have been premixed with 8.5-300% by weight of fatty material and 10-85% water.

Polyethylene glycol esters in fat. Emery I. Valko (E. F. Drew & Co., Inc.). *U. S. 2,666,706.* Edible fat is mixed with 0.05-5.0% of polyethylene glycol esters of the formula $R(OCH_2CH_2)_xOR'$, in which R is a fatty acid of at least 12 carbons, R' is a C_2 to C_4 fatty acid, and $(OCH_2CH_2)_x$ has a molecular weight of 1,000-2,000.

Maintaining stability of vegetable oils undergoing heating. Joseph A. Chenicek (Universal Oil Products Co.). *U. S. 2,666,708.* Vegetable oil is stabilized for roasting, frying, and cooking operations by the addition of 0.001-0.5% *tert*-alkyl-4-alkoxyphenol. Additional quantities are added during cooking to maintain an effective level.

Stabilization of edible oils and fats. Robert H. Rosenwald and Joseph A. Chenicek (Universal Oil Products Co.). *U. S. 2,666,709.* Edible oils and fats are stabilized against rancidity by the addition of a 2-hydroxy-5-*tert*-butoxy-alkylbenzene in which the alkyl group contains no more than 5 carbons.

Lubricating oil composition. John C. Munday and Dilworth T. Rogers (Standard Oil Development Co.). *U. S. 2,666,746.* An additive to depress the pour point is an oil soluble copolymer of C_2-C_{18} fatty acid vinyl ester and dialkyl fumarate in which each alkyl group is C_{10}-C_{18}.

Mineral oil composition containing copolymers of itaconic acid esters and a vinyl ester of a fatty acid. Jeffrey H. Bartlett (Standard Oil Development Co.). *U. S. 2,666,747.* To a lubricating oil is added 0.01-10.0% by weight of a copolymer having a molecular weight of 2,000-20,000 and composed of 270-144 pts. by wt. of C_{10}-C_{18} ester of itaconic acid and 75-30 pts. by wt. of C_2-C_{18} fatty acid vinyl ester.

Treatment of fatty oils. Arthur W. Hixson and Ralph Miller (The Chemical Foundation, Inc.). *U. S. 2,666,773.* Unbodied crude fatty oil is mixed at an elevated temperature with a hydrocarbon such as propane under conditions such that two phases form. The light phase contains 95% of the triglyerides and the heavy phase contains about 5% of the triglycerides and the bulk of color bodies and ash-forming constituents. The phases are separated and purified oil is recovered.

Butter. Bergedorfer Eisenwerk A.-G. (Georg Filter, inventor). *Ger. 812,628,* Sept. 3, 1951. Cream of whole milk of medium fat content is enriched 25-30% to the desired fat content of butter by concentration with exclusion of air. The cream is first introduced into a centrifugal cream separator equipped for cooling, and the cream is concentrated to a fat content of 80% in a 2nd centrifuge. The properties of the butter thus prepared vary with the biological properties of the whole milk used, yielding a butter with either a sweet taste or a tart taste. Admission of CO_2 or air during the 1st centrifugation influences the souring tendencies and consistency of butter by controlled gas formation. (*C. A.* **47**, 6575)

Fatty acid esters of tall oil. Vita Mayer, C. Jacini, and Giovanni Jacini. *Ital. 467,994,* Dec. 28, 1951. Tall oil (100 parts) is mixed with 150 parts MeOH, 10 parts H_2SO_4, and 250 parts C_6H_6 and boiled for 2-6 hrs. Water is added, the upper layer is separated, and solvent, fatty acid esters, and abietic acids are separated by distillation. (*C. A.* **47**, 7242)

Continuuous purification of fatty oils. I. A. Afzelius (to Aktiebolaget Separator). *Swed. 138,985,* Feb. 3, 1953. Fatty oils are continually treated with alkali in 2 stages, and steam is blown in during the 2nd stage. The acid is neutralized in the 1st stage, and the soap formed is removed. (*C. A.* **47**, 7242)

• Biology and Nutrition

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

Studies on the fatty acid oxidizing system of animal tissues. II. Beta-ketoacyl derivatives of coenzyme A. H. Beinert (Univ. of Wisconsin). *J. Biol. Chem.* **205**, 575 (1953). The preparation of acetoacetyl, beta-ketohexanoyl, and beta-ketooctanoyl CoA by enzymatic dehydrogenation of the corresponding betahydroxy derivatives of CoA has been described. Extinction coefficients at various levels of Mg^{++} and pH values have been determined. The compounds were of the same order of stability as other known acyl derivatives of CoA, but were readily susceptible to enzymatic cleavage in the presence of reduced CoA.

The effect of choline on phospholipide synthesis in dog liver slices. N. R. DiLuzio and D. B. Zilversmit (Univ. of Tennessee). *J. Biol. Chem.* **205**, 867(1953). A dog maintained on a high fat, low protein, choline-deficient diet was characterized by a progressive decrease in the concentration of choline-containing phospholipides in the liver and a diminished ability of the liver slice to synthesize these phospholipides. The addition of choline to the medium had no effect on the rate of phospholipide synthesis of the normal slice, or a slice obtained from a dog maintained on the deficient diet but receiving a choline supplement.

The influence of dietary fat and carbohydrate on growth and longevity in rats. C. E. French, R. H. Ingram, J. A. Uram, G. P. Barron, and R. W. Swift (Pennsylvania State College). *J. Nutrition* **51**, 329(1953). Male and female rats receiving a high fat diet grew fully as rapidly as those on a carbohydrate diet, although they consumed 4.8 and 5.7% less total calories, respectively. No seasonal variation in food consumption occurred on any of the diets fed. The life span of male rats ingesting the high fat diet decreased markedly and there was also a less pronounced but significant decrease in the longevity of the females. Increased efficiency of utilization of the diet was correlated with decrease in life span, but increased caloric intake per se was not so associated.

Metabolism of essential fatty acids. Incorporation of acetate into arachidonic acid. J. F. Mead, G. Steinberg, D. R. Howton (Univ. of California School of Medicine). *J. Biol. Chem.* **205**, 683(1953). By the use of carboxyl-labeled acetate it was shown that acetic acid is not incorporated into the linoleic acid of the lipides of weanling rats to an appreciable extent. Arachidonic acid, on the other hand, was derived from acetate and an exogenous C_{18} precursor.

The action of microorganisms on fats. II. Some characteristics of the lipase system of Penicillium roqueforti. H. A. Morris and J. J. Jezeski (Univ. of Minnesota). *J. Dairy Science,* **36**, 1285(1953). The lipolytic activities of preparations obtained from mycelia of *P. roqueforti* and from the medium on which the mold was cultured have been investigated. The effects of temperature, pH, type of substrate, and sodium chloride concentration on lipolytic activity also have been studied.

Unsaturated fatty acids and alloxan diabetes. R. R. Rodriguez, P. Cattaneo, B. A. Houssay, and B. Uno (Instituto de Biologia y Medicina Experimental, Buenos Aires, Argentina). *J. Nutrition* **51**, 441(1953). The influence of different diets fed during a preliminary period of one month on the toxic and diabetogenic action of alloxan was studied in male rats. Following this month-long regime, the animals were injected with alloxan and mortality was observed over a 10-day period. Immediately thereafter a 7-hour fasting glycemia was produced and measured. High fat diets, the fat of which consisted primarily of saturated fatty acids, had a markedly protective action against the toxic and diabetogenic effects of alloxan as compared with a high carbohydrate diet. High fat diets rich in unsaturated fatty acids had an aggravating action.

The conversion of cholesterol and acetate to cholic acid. I. Zabin and W. F. Barker (Univ. of California School of Medicine). *J. Biol. Chem.* **205**, 633(1953). Labeled cholesterol prepared biosynthetically from methyl-labeled acetate was administered to a dog with a bile fistula. The activity found in the carbonyl carbon of the cholic acid isolated from bile proved that cholesterol was converted to cholic acid by removal of no more than 3 carbon atoms, carbons 25, 26, and 27.

The metabolism of fats. David E. Green (Univ. of Wisconsin). *Scientific American* **190**, 32-36(1954). Review of the classical and modern schemes of fatty acid oxidation.

Animal fats: recent researches in the fats research laboratory, D. S. I. R., New Zealand. F. B. Shorland. *J. Sci. Food & Agric.* **4**, 497-503(1953). Review of the effect of dietary fat on depot fat of animals, relationship between species and depot fat composition, effect of dietary fat on the fatty-acid composition of phospholipids, seasonal variations in the fatty-acid composition of butter fat, and some trace constituents of animal fats. Species may be classified into three groups: (a) those unable to synthesize fats from non-fat foods and incorporate exogenous fats into their depots, e.g. fishes; (b) those capable of synthesizing fats and also incorporating exogenous fats into depots, e.g. amphibians, reptiles, and most mammals; (c) those whose depot fats are relatively unaffected by dietary fat, e.g. ruminants. The fatty acid composition of phospholipids shows considerable similarity for all species. The proportions of dietary roughage which serve as "acetate" precursors affect the proportion of lower saturated fatty acids in butter fat and the total fat content of milk. The trace constituents considered include unsaponifiables, lower saturated fatty acids, highly unsaturated fatty acids and branched chain fatty acids in butter fat, pig fat, ox tallow, and mutton tallow.

• Waxes

R. L. Broadhead, Abstractor

Waxes in cosmetic industry. L. Ivanovszky. *Soap, Perfumery & Cosmetics* **26**, 919-22, 918(1953). Discussion concerning function, evaluation, and new type waxes. (*C. A.* **47**, 12768)

Demargarination of peanut oil by crystallization in pure dichloroethane or mixtures of it. C. Paquot and C. Galletaud. *Oleagineaux* **8**, 839-841(1953). Peanut oil can be demargarinated by crystallization from pure dichloroethane or an 80% mixture by weight of dichloroethane with ethanol. A 35-45% mixture of oil in the solvent is cooled to —15°C. for 15 hours and filtered or centrifuged at this temperature. The oil, which now has a lowered cloud point, is recovered by removing the solvent, preferably under slight vacuum.

Inhibiting oxidation of waxes used on wrappers and cartons. R. F. Seubert and E. D. Andrews (Koppers Co. Inc., Pittsburgh, Pa.). *Tappi* **36**, No. 6, 174A-5A(1953). The use of the antioxidant di-tert-butyl-p-cresol (DBPC) as inhibitor of the oxidation of waxes used in the paper industry is discussed. (*C. A.* **47**, 12814)

Infrared analysis for cosmetics. Paul A. Wilks. *Am. Perfumer Essent. Oil Rev.* **62**, 181-4(1953). Use to identify oils, waxes, wetting agents, resins, solvents, and other ingredients of cosmetics is discussed. (*C. A.* **47**, 12768)

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Transfer paper. Chester Davis and Ned A. Thacker (to National Cash Register Co.). *U. S. 2,646,367,* July 21, 1953. A hydrophobic transfer coating applied to a manifold sheet (I) consists of a colorless recording oil (II) contg. a colorless color-reactant (III) in a wax binder (IV). Thus, a mixt. of 55% by wt. of a petroleum lubricating oil of viscosity 200 sec. Saybolt and 45% by wt. of a mixt. of 50% crystal violet lactone and 50% benzoyl leuco methylene blue is added to a mixt. of sugar cane wax 44.4, refined paraffin wax 44.4, and Montan wax 11.2%. I is coated with the thoroughly stirred aggregate by use of 6 lb. of coating per 36 x 48 in. ream and used with an under-sheet sensitized with acid-like inorg. materials (cf. *C. A.* **45**, 5845d). Other II are chlorinated or alkylated biphenyls having equiv. viscosity, hydrogenated terphenyls, diocetyl phthalate, or chlorinated paraffins. IV may be any microcryst. wax m. 170-200°F., a fatty acid amide, a synthetic wax such as hydrogenated castor oil, or a montanic acid ester. (*C. A.* **47**, 12816)

• Detergents

Lenore Petchaft, Abstractor

Synthetic detergents from tallow. Anon. *Chem. Week.* **74**, No. 2, 70, 73, 75(1954). Surplus tallow is now being converted into synthetic detergents by production of Igepon TE-42, and amide type products. In plant operations tallow acids (mainly oleic, palmitic, and stearic) obtained from the fat strippers are converted to acid chlorides, reacted with methyltaurine (2-methylaminoethanesulfonate) and caustic. The reaction product, labeled sodium-N-methyl-N-"tallow" taurate is recovered as a slurry.

The application of cellulosic carboxydextrins in soapmaking. A. P. Antykov. *Zhur. Priklad. Khim.* **26**, 848-53(1953). Carboxydextrins, prepared by successive oxidative, acidic, and alkaline destruction of native cellulose, can be used to replace part of the fat in soapmaking, and leads to 10-30% saving in consumption of the fats with 8-20% saving on alkali. The soaps thus prepared are superior to purely fatty toilet and household soaps. Cellulose (freed of lignin) in the form of paper scrap is steam heated in an autoclave at 100° for 4 hours with agitation; the mass is then treated with 3.5 parts

50-60% H_2SO_4, heated to 100° for 1 hour with stirring, the liquid portion is drained, and the residue is pressure filtered. The precipitate of carboxydextrins is washed and treated with 0.2% NaOH, the solid then being dried at 50-55° and powdered in a ball mill. The yield is 56-75%. The products form Na salts in 0.2% NaOH which have solubility of 0.1-0.6% in H_2O at 15-100°. The products appear to be beneficial in the treatment of skin damage. (*C. A.* 47, 12845)

Evaluation of sea-water laundry detergents. Rubin Bernstein and Harry Sosson (Philadelphia Naval Shipyard, Philadelphia, Penn.). *Soap, Sanit. Chemicals* **29**, No. 12, 42-5, 203, 205(1953); **30**, No. 1, 46-9, 99-100(1954). A study of new detergents and detergent-builder combinations for laundering cottons with seawater was made. Ten detergents including built and unbuilt anionics and non-ionics were tested under standard detergent evaluation techniques, under practical laundering tests, and by cooperative laboratory tests run in 16 industrial laboratories using synthetic sea-water and nine types of commercial standard soiled cloth. A statistical analysis of the results was made. Results showed that different brands of soiled cloths may judge the same detergents for soil removal capability. Standard soiled cloths, in laboratory tests and in practical launderings, for evaluation of soil removal in sea-water, are capable of distinguishing poor from promising materials but do not differentiate between acceptable and superior detergents. Cloths soiled with street dust gave results which correlate to a degree with evaluations of the detergents for their practical washing ability.

Determination of total fat, neutral oil, and fatty acids in soap stocks. M. Fauve and P. Lacoste. *Bull. mens. inform. ITERG* **7**, 421-3(1953). Samples (10-g.) of soapstocks mixed with 100 ml. of 5% HCl are exposed to infrared rays for 2½ hours in a glass dish under mechanical stirring. The liberation of the fatty substances proceeds without hydrolysis or decomposition of the glycerides present. Soap stocks from extracted oils require more time for attack, or the HCl must be replaced by the same quantity of H_2SO_4. (*C. A.* **48**, 388)

A study of the surface tensions of detergents. H. Hendrickx and A. Vleeschauwer. *Proc. 13th Intern. Dairy Congr.* (Hague) **3**, 891-3(1953). The surface tension of a 1% solution of Na_2CO_3, Na_3PO_4, Na_2SiO_3, and NaOH is 71.54, 72.46, 72.46, and 71.24, respectively. The addition of wetting agents greatly improves the washing properties of these compounds. The effect of different concentrations of wetting agents on the surface tension of detergents and distilled H_2O was studied. (*C. A.* **48**, 389)

The action of alkaline detergents on bottle surfaces. N. A. Hurt, R. Wallington and L. H. Myles. *Ind. Chemist.* **29**, 581-4(1953). The scuffing of glass surfaces by caustic soda solutions is prevented or greatly inhibited by silicates and phosphates of sodium, and, as these two compounds possess antiscuffing properties to a marked degree, one or the other of them is an essential constituent of alkaline detergents for bottle washing.

Radiotracer study of sulfate ion adsorption at the air/solution inter-face in solutions of surface-active agents. C. M. Judson, A. A. Lerew, J. K. Dixon and D. J. Salley (American Cyanamid Co., Stamford, Conn.). *J. Phys. Chem.* **57**, 916-23(1953). Radioactive tracer methods have been used to measure the adsorption of sulfate at the air/solution interface in solutions containing sulfate with various cationic, anionic, and non-ionic agents. Measurements of sulfate adsorption with solutions of Aerosol SE Cationic agent indicate that there is a surface hydrolysis which can be explained in terms of competition between sulfate and hydroxyl gegenions. Multilayer adsorption of sulfate, up to an equivalent of about 200 monolayers, was also found in solutions containing sodium sulfate with anionic and non-ionic agents. It appears that when a layer of surface-active agent is present at the surface, electrolyte, which may be present in the solution, tends to accumulate in the region adjacent to the surface in an amount which is proportional to the concentration of the electrolyte. Multilayers of surface-active electrolyte apparently form in the same way as multilayers of any other electrolyte, in spite of the fact that long chain micelles may be involved as well as small ions.

On the determination of critical micelle concentrations by a bubble pressure method. Lawrence M. Kushner and Willard D. Hubbard (National Bureau of Standards, Washington 25, D. C.). *J. Phys. Chem.* **57**, 898-9(1953). Bubble pressure measurements have been made on aqueous solutions of pure and commercial grade sodium dodecyl sulfate. The curves obtained with the commercial material have considerable structure depending on the bubbling rate. The curves for the pure samples are what one might expect on the basis of the surface tension of the solutions. The interpretation of bubble pressure and conductance data for solutions of impure surface active materials is discussed.

Improvements of the dirt suspending power of CMC. K. J. Nieuwenhuis (Proefstation voor de Wasindustrie, Delft, The Netherlands). *J. Polymer Sci.* **12**, 237-52(1954). The salts of carboxymethylcellulose (CMC) are used in large quantities to improve the dirt-suspending power of synthetic detergents and soaps. They exert their specific influence because they are adsorbed by cellulose fibers from their solutions in water. Theoretical considerations are given, showing that: (1) The degree of substitution (DS) should probably be about 0.5. (2) The substitution should be as uniform as possible. (3) The cellulose chains should be neither too short nor too long. The fiber contents, FC, i.e. the percentage of insoluble and partly swollen fibers in 1/20 N NaOH, can be taken as a measure of the uniformity of the substitution. The easiest way to obtain uniformly substituted products is by dispersing cellulose and reagents in a suspending liquid, e.g. an alcohol or a hydrocarbon. FC's smaller than 2 to 4% are obtained. Then the dirt-suspending power was greatest with a DS between 0.48 and 0.53.

Experiment concerning the use of Bogoda's method for making of toilet (soap) base. S. P. Ostrin (Uritskii Soap Factory, Kharkov). *Masloboino-Zhirovaya Prom.* **18**, No. 8, 13-14(1953). In this process the paste in a soap-pan from the preceding boiling operation is grained with caustic alkali, settled for 1.5-2 hours, and the lye underneath the soap (I) is withdrawn and reused for the saponification of soap stock. Fresh fat and sufficient lye are added to I; the mixture is boiled for 4-5 hours and settled. After settling for 8-12 hours, the spent lye is run off and the soap then undergoes settling changes etc. It is claimed that Bogoda's method has the advantage of rapidity and can be used successfully for the preparation of toilet soap base (*C. A.* **48**, 389)

Distillation of fatty acids from soap stock. M. P. Salganskii and A. S. Shvetsov (Gorki Fat Combine). *Masloboino-Zhirovaya Prom.* **18**, No. 8, 24-5(1953). A description with diagrams of a process for recovery of fatty acids from black cottonseed soap stock is presented. (*C. A.* **48**, 389)

Surface chemistry of fluorocarbons and their derivatives. H. J. Scholberg, R. A. Guenther, and R. I. Coon (Minnesota Mining & Manuf. Co., St. Paul, Minn.). *J. Phys. Chem.* **57**, 923-5 (1953). Data are given for the free surface energy of a number of fluorocarbons. These data show that fluorocarbons as a class have lower surface energies than all other compounds. Curves for the lowering of surface tension as a function of concentration are given for a series of completely fluorinated acids. These surface active compounds cause a greater lowering of the surface tension of water than has ever been found before. Fluorocarbon surface active compounds are shown to lower the surface tension of organic substances very materially.

Condensed phosphates and their behavior in synthetic detergents. H. Stupel (Seifenfabrick Hochdorf, Hochdorf, Switzerland). *Soap, Perfumery, Cosmetics* **27**, 65-73(1954). The condensed phosphates are used as builders for synthetic detergents because of three principal methods of action: (1) complex-forming capacity for alkaline earth ion, (2) suspension, dispersion, peptizing and emulsifying properties for pigments and oils, and (3) pH regulation of suds. In addition they exert a synergistic effect on the detergent properties of synthetics. Numerous tests are described using combinations of various phosphates with detergents and combinations of phosphates, soaps and detergents. It was found that dirt suspending agents which are already good are improved in their properties by condensed phosphates, but compounds having a less marked adsorption-preventing action are somewhat impaired. 39 references.

Forty years of soap industry progress. Daniel H. Terry (Bon Ami Co., New York, N. Y.). *Soap, Sanit. Chemicals* **30**, No. 1, 34-7, 95, 97(1954). Developments in the soap industry since 1913 are reviewed.

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Improvements in washing and cleansing agents. Badischer Anilin- & Soda-Fabrick. *Brit. 701,805.* Surface-active substances containing higher molecular weight nitrogenous polymeric material such as polymeric N-vinyl-pyrrolidone, polymeric ethylene imine, or interpolymers of N-vinylpyrrolidone and vinylalkyl benzimidazole, show more rapid foaming, high amount of foam, good foam stability, and have a beneficial effect on the washing of fabrics containing both colored and uncolored parts.