ABSTRACTS . . . . Don Whyte, Editor

• Oils and Fats

R. A. Reiners, Abstractor

Isomers of conjugated fatty acids. I. Alkali-isomerized linoleic acid. P. L. Nichols, Jr., S. F. Herb and R. W. Riemenschneider (Eastern Regional Res. Lab.). *J. Am. Chem. Soc.* **73**, 247(1951). Experimental results and theoretical considerations indicate that alkali-isomerized linoleic acid is composed of 90-95% conjugated dienoic acids, some of which have lower specific extinction coefficients than those of conjugated linoleic acids prepared by known procedures. Theoretical considerations of the double bond shift mechanism are presented which indicate that $\Delta^{9c,11t}$- and $\Delta^{10t,12c}$-linoleic acids would be formed predominantly. $\Delta^{10t,12t}$-Linoleic acid was isolated from alkali isomerized linoleic acid. The shape of the absorption curve and location of the point of maximum absorption of alkali isomerized linoleic acid differs from *trans-trans*-isomers of linoleic acid in much the same manner as *cis-trans*-isomers of other known compounds differ from their *trans-trans*-isomers.

Highly unsaturated acids. IX. Constitution of docosahexaenoic acid, $C_{22}H_{32}O_2$, in bonito oil. X. Isolation of bonitonic acid, $C_{22}H_{34}O_2$, and its constitution. S. Matsuda (Osaka Imperial Univ.). *J. Soc. Chem. Ind. Japan* **45**, Suppl. binding 158-9, 159-61(1942). Docosahexaenoic acid, $C_{22}H_{32}O_2$, from bonito oil was analyzed by ozonolysis and was found to be a 4, 8, 12, 15, 18, 21-docosahexaenoic acid. (*Chem. Abs.* **45**, 546)

Polymerization of oleic acid and its methyl ester in the presence of the molecular compound of boron trifluoride with phosphoric acid. A. V. Topchiev and T. P. Vishnyakova. *Doklady Akad. Nauk S.S.S.R.* **71**, 493-6(1950). Pure oleic acid was polymerized in the presence of compounds of BF_3 with the phosphoric acids. $BF_3 \cdot H_3PO_4$ was the most active catalyst. Polymerizations with $BF_3 \cdot H_3PO_4$ were conducted at 20, 60, and 100° with catalyst amounts varying from 1 to 28% and with 4 hours' reaction time. The maximum degree of polymerization at 20° with 28% catalyst was 71.8%; the bromine no. fell, for 3-20% catalyst from 58.1 to 41.4, and the molecular weight increased from 290 to 455. The corresponding data for 60° (1.5 to 24% $BF_3 \cdot H_3PO_4$) are 56.9 to 34.9 and 308 to 529; for 100° (3-20% catalyst) 42.2 to 29.6, and 430 to 545. With 24% catalyst the acid no. decreased, indicating participation of the carboxyl group. In all cases only dimers (unsaturated) were obtained. Analogous experiments were conducted with methyl oleate. The reaction did not go at 20° but at 60° with a 5-20% catalyst, the bromine no. fell from 51.2 to 40.6 and the molecular weight increased from 323 to 448; for 100° with the same amount of catalyst, the data are 44.8 to 36.7 and 345 to 487 (*Chem. Abs.* **45**, 546)

The reduction of a fatty acid amide under high pressure. IV. S. Ueno, S. Komori and H. Morikawa (Imperial Univ., Osaka). *J. Soc. Chem. Ind. Japan* **45**, Suppl. binding, 214-15(1942). Hydrogenation of $C_{15}H_{31}CONH_2$ over a Zn-Cr-O catalyst at 315-30° and 200 atmospheres yields primarily $(C_{16}H_{33})_2NH$ and small amounts of $C_{16}H_{33}NH_2$ and $C_{16}H_{33}OH$. The yield of diamine increased with increased pressure to 240 atmospheres. At pressures below 190 atmospheres the alcohol was the chief product. The presence of NH_3 (20-30 atmospheres) increased the yield of primary amine, leaving that of diamine unchanged. The best yields of diamine (40%) were obtained with amine prepared from the acid chloride. (*Chem. Abs.* **45**, 547)

Chemical composition of butterfat. R. P. Hansen and F. B. Shorland (Dept. Sci. Ind. Research, Wellington). *J. New Zealand Inst. Chem.* **14**, 142(1950). A fraction of the 18-C acids of butterfat gave liquid methyl esters resistant to oxidation. The acid fraction had the following characteristics: m.p. 8°; $\alpha_D + 0.9$ in chloroform; n^{17} 1.4578; saponification equivalent 287.0; iodine no. 2.4; C 74.82%; H 11.56%. The presence of branched-chain acids is suggested. (*Chem. Abs.* **45**, 779)

Chemical examination of depolymerized castor oil. S. C. Gupta, M. R. Verma, J. S. Aggarwal and S. Siddiqui (Natl. Chem. Lab., Poona). *J. Sci. Ind. Research* (India) **9B**, No. 4, 86-9 (1950). Depolymerization of castor oil gel at 350-70° (Indian Patent 28,563) produces a dark viscous liquid consisting of a mixture of derivatives of mono- and dicarboxylic unsaturated acids. In addition the depolymerized castor-oil gel consists of 7-8% unsaponifiable matter, mainly aldehydes and hydrocarbons. (*Chem. Abs.* **45**, 881)

The constitution of vaccenic acid. S. S. Gupta, T. P. Hilditch, S. Paul and R. K. Shrivastava (Univ., Liverpool). *J. Chem. Soc.* **1950**, 3484. The traces of *trans*-octadecenoic acids present in the body and milk fats of oxen and sheep and termed "vaccenic acid" contain both *trans*-octadec-10-enoic and *trans*-octadec-11-enoic acids.

The component fatty acids and glycerides of groundnut oils. R. V. Crawford and T. P. Hilditch (Univ., Liverpool). *J. Sci. Food Agr.* **1**, 372(1950). The amount of linoleic acid derived from 4 groundnut oils of differing iodine value (86-99) varied from 20-38%; the oleic acid contents correspondingly ranged from 60-39%. The West African oil was more saturated than the East African oils. In oils of high linoleic acid content 90% of the glycerides contain linoleo groups whereas only 50% of the glycerides contain linoleo groups in an oil containing 20% linoleic acid.

Hydrolysis of fats at high temperatures. A. Sturzenegger and H. Sturm (Friedrich Steinfels Akt.-Ges., Zurich, Switzerland). *Ind. Eng. Chem.* **43**, 510(1951). Beef tallow, coconut oil and peanut oil were hydrolyzed in the temperature range 225-280°. No appreciable differences were found. Relationships between the degree of hydrolysis and the amount of water present, and the rate of hydrolysis and temperature were established. The reaction velocity is almost independent of the amount of water used but zinc oxide was found to accelerate the reaction considerably. The reversibility of the process was demonstrated.

Antioxidant effect of soy and cottonseed flours in raw pastry mixes and baked pastry. Andrea Overman (Oregon State College, Corvallis, Oregon). *Food Res.* **16**, 39(1951). Both soy and cottonseed flour were effective in delaying the development of organoleptic rancidity in raw mixes and to a lesser extent in baked pastry. Pastry containing 3% cottonseed flour was satisfactory in flavor and texture but the color was a dull greenish brown.

Extraction of seeds with alcohol. J. Mayolle. *Bull. mens. ITERG.* **4**, 453-5(1950). Mixtures of equal parts of peanut oil and 97% ethanol had cloud points of 96, 92, 91, 80, 76° C. if the acidity of the peanut oil was 1.4, 3.3, 5.1, 11.6, 15.6, respectively. The two phases of the same oils separated by centrifugation at 21° contained, respectively, the following percentages of oil (acidities in parentheses): oily phase: 89.2 (0.8), 88.6 (1.85), 86.5 (2.5), 86 (6.95), 85 (8.4); alcohol phase: 3.7 (21.5), 4.7 (34), 5.85 (41.5), 10.8 (58), 4.5 (63.5). (*Chem. Abs.* **45**, 1360)

Tests on the semi-industrial extraction of oil from the Aleurites Montana from Kivu. R. Wilbaux and A. S. Frankignoulle. *Bull. Agricole du Congo Belge* **41**, 993-1002(1950). The physical and chemical properties of five oils from the *Aleurites* family are described. The method of extraction was shown to have an important effect on the properties of the oil. Pressures of 800-1000 atmospheres are necessary to get satisfactory recovery of the oil. The properties of the industrially obtained oil agrees well with those of the oil from the laboratory. The shell content has an important effect on the ease of recovery of the oil but if part of the shell can be removed, the press capacity can be increased about 20%.

Productivity and oil-plants in the mother country. J. L. Collins. *Oleagineux* **6**, 15-19(1951). The relation of productivity to statistics and agronomy is discussed.

A review of the fatty acid derivatives and their industrial applications. Nathalie Simon. *Oleagineux* **6**, 25-30(1951). A review on the uses of fatty acids in soaps, waxes and lubricants.

Vinyl laurate and other vinyl esters. D. Swern and E. F. Jordan, Jr. *Org. Synthesis* **30**, 106-9(1950). Lauric acid (80 g.) and 206 g. $CH_2{:}CHCO_2CH_3$ containing 1.6 g. $(CH_3COO)_2Hg$ (N atm.), shaken 30 min., treated dropwise with 0.15 ml. 100% H_2SO_4, refluxed 3 hrs., and treated with 0.83 g. $CH_3COONa \cdot 3H_2O$, gives 53-9% $C_{11}H_{23}CO_2CH{:}CH_2$. Yields of other vinyl esters are given. (*Chem. Abs.* **45**, 121)

Seed oil of Nicandra physaloides. F. v. Gizycki and G. Kotitschke (Martin Luther Univ., Halle/Saale, Ger.). *Fette u. Seifen* **52**, 454-5(1950). Seeds of *Nicandra physaloides* yielded 21% of a yellowish green oil with the following characteristics: d^{20} 0.915, n^{20} 1.4733, acid no. 1.77, saponification no. 187.5, iodine no. (Kaufmann) 138.0, thiocyanogen no. 77.45, hydroxyl no. 0, unsaponifiable 0.83%. Constants for the total fatty acids were n^{20} 1.4651, acid no. 200.0, average molecular weight 280.3, iodine no. 142.8. Constants for the solid fatty acids (10.2% of total) were m.p. 54°, iodine no. 0, acid no. 201.4, average molecular weight 278.6; for the liquid fatty acids (89.8% of total) iodine no. 161.1, acid no. 199.6, average molecular weight 281.1. Stigmasterol and sitosterol were identified in the unsaponifiable fraction. (*Chem. Abs.* **45**, 1360)

Reactions of oxygen with fatty material. R. P. A. Sims (National Research Council, Ottawa). *Can. Chem. Proc. Ind.* **35**, 125(1951). A review covering the last 5 years on the mechanism of fat oxidation.

The use of antioxidants in deep fat frying. L. Sair and L. A. Hall (The Griffith Laboratories, Inc., Chicago, Ill.). *Food Tech.* **5**, 69(1951). Temperatures normally used in commercial deep fat frying operations (375° F.) rapidly decompose or volatilize the antioxidants added to the cookers. In order to increase shelf life of deep fat fried products, it has been found necessary to add the antioxidants after the frying operation. The factors underlying the carry-through of an antioxidant in baked goods are dependent on the antioxidant, the fat and the flour.

Tallow being decolorized by liquid-liquid extraction with propane. Anon. *Chem. Processing* **14**(2), 36(1951). A brief description of the process is presented.

Dehydration of castor oil by substituted sulfonic acids as catalysts. K. K. Dole and V. R. Keskar (Fergusson Coll., Poona). *Current Sci.* (India) **19**, 242-3(1950). In place of H_2SO_4, dehydration can be brought about by sulfonic acids and their salts. Found to be good catalysts are benzenesulfonic acid, toluenesulfonic acid, m-sulfobenzoic acid, and K phenol sulfonate. Na salts of p-xylenesulfonic acid, anthraquinone-2,6-sulfonic acid, 1-naphthol-5-sulfonic acid, 1-naphthylamine-2-sulfonic acid are not so effective. (*Chem. Abs.* **45**, 881)

The absorption spectra of fatty oils in the ultraviolet region. K. Kawakami and H. Miyayoshi (Inst. Sci. Research, Manchuria). *J. Agr. Chem. Soc. Japan* **17**, 856-62(1941).; *Bull. Agr. Chem. Soc. Japan* **17**, 102(1941). Chinese tung, perilla, linseed, poppy-seed, sunflower, soybean, kaoliang bran, cottonseed, sesame, almond, kenaf, ochra, castor, olive, and peanut oils showed similar absorption spectra. The maxima were coincident with those of eleostearic acid and of a new fatty acid obtained by Moore from linseed oil by alkali treatment. The absorption was interpreted as due to the conjugated double bonds, because linseed oil, freed from them by treating the oil with maleic anhydride, showed only faint absorption. The cause of absorption was not a single chromophore. These absorptions were not due to conjugated triene because dehydrated ricinoleic acid without conjugated triene showed distinct absorptions. (*Chem. Abs.* **45**, 882)

The estimation of coconut oil in the presence of mineral oils and other vegetable oils. S. N. Iyer (Govt. Anal. Lab., Madras). *J. Sci. Ind. Research* (India) **9B**, No. 4, 93-5(1950). Erroneous results are obtained by the standard procedure for estimating coconut oil in adulterated samples by means of Reichert and Polenske values when the adulterant is a mineral oil, owing to interference with saponification of the coconut oil. To ensure complete saponification sufficient time should be allowed for the alkali to act on the oil mixture (overnight). (*Chem. Abs.* **45**, 882)

Determination of component glycerides of fats. V. V. Mhaskar, N. L. Phalnikar and B. V. Bhide (Sir Parshurambhau Coll., Poona). *J. Univ. Bombay* **18**, Pt. 5, Sect. A, Sci. No. 27, 28-37(1950). A study was made of the method of determining composition of unsaturated glycerides in natural fats by brominating the glycerides and separating the mixtures of bromides so obtained. Pure synthetic triolein, trilinolein, monooleo-2,3-dilinolein, and monolinoleo-2,3-diolein alone and in mixtures were used. The presence of one of the glyceride bromides changes the solubility of the others, so that in mixtures it becomes impossible to separate the bromides by the solvents used, acetone-alcohol (1:1), 90% alcohol, and petroleum ether. This method gives only a rough approximation of the composition of fats. (*Chem. Abs.* **45**, 880)

The Woburn method for the determination of the total iodine number, and its application to the determination of the conjugated unsaturated portion. J. D. von Mikusch (Hamburg-Harburg, Ger.). *Farbe u. Lack* **56**, 341-8, 387-93(1950). The method and its applications are reviewed. 63 references. (*Chem. Abs.* **45**, 881)

Detection of mineral oils in fatty oils. H. Patzsch (Duisburg, Germany). *Pharm. Zentralhalle* **89**, 302-3(1950). The rapid saponification test of Mendritzki is of value only as a preliminary qualitative test. If large amounts of unsaponifiable matter are present, a milky turbidity develops. In this case, it must be determined whether mineral oil or other unsaponifiable matter causes the turbidity. However, even if the solution is clear, it is still possible that white mineral oil is present since small amounts (up to 10%) of unsaponifiable matter are soluble in the soap solution. In such seemingly negative cases, the determination of unsaponifiable matter is a necessity. (*Chem. Abs.* **45**, 881)

Autoxidation. I, II. E. Ibuki. *J. Chem. Soc. Japan* **67**, 104-6 (1950). The effect of various resin soaps on the autoxidation of unsaturated aliphatic acids and the antioxidant action of lecithin were studied. (*Chem. Abs.* **45**, 546)

Collaborative study of a chromatographic method for the volatile fatty acids. L. L. Ramsey and S. M. Hess (Food & Drug Admin., Washington, D. C.). *J. Assoc. Offic. Agr. Chemists* **33**, 848-54(1950). Aqueous solution of the volatile acids were analyzed by 22 analysts in 17 laboratories with a chromatographic method (*A.O.A.C. Methods of Analysis*, 7th ed., 1950). The study shows that the method is sufficiently accurate for studies of decomposition in foods. (*Chem. Abs.* **45**, 491)

Autoxidation of long-chain unsaturated fatty acids. W. Treibs. *Fette u. Seifen* **52**, 549-53(1950). In the autoxidation of the methyl esters of linoleic acid and linolenic acid 2 moles O are absorbed and dialkyl peroxides are formed. Oxidation of oleic acid in alkaline medium yielded sebacic acid and iso-oleic acid; undecylenic acid under the same conditions gave azelaic acid and iso-undecylenic acid. For the autoxidation and drying of long-chain acids with more than one 1,4-unsaturation, it is suggested that a methylene group loses an H, allyl rearrangement takes place and a conjugated system is formed. One mole O adds to 1 double bond to form a peroxide, which stabilizes itself by addition to a double bond of the same or another mole of the acid, a second mole of O saturates the remaining double bond, and the newly formed peroxide rearranges to an α-ketol group. *Chem. Abs.* **45**, 1359)

Determination of free fatty acids in metallic stearates. P. N. Cheremisinoff (M. W. Parsons Imports Co., Brooklyn, N. Y.). *Chemist Analyst* **39**, 88(1950). Finely ground metallic stearates are extracted with neutralized denaturated alcohol at 60° and the extract titrated with sodium hydroxide.

Effect of two heat treatments on rancidity development in unshelled pecans. Josephine McGlamery and Maude P. Hood (Univ. of Georgia, Athens). *Food Res.* **16**, 80(1951). Heating unshelled Stuart pecans to an internal temperature of 80° (10-12 minutes) and cooling rapidly caused an appreciable increase in the shelf life of pecans. Sealing the shells with hot mineral oil immediately after heat treatment increased the shelf life further. The heat treatment was shown to inhibit enzyme activity.

Modern splitting of fats—the Hoffmann method. L. Konstandt. *Seifen-Ole-Fette-Wachse* **76**, 461-4(1950). A review of the production of fatty acids and concentrated glycerol by means of the Hoffmann continuous process without the use of saponification agents or steam. A flow sheet and illustrations of apparatus are included. (*Chem. Abs.* **45**, 1359)

Molecular distillation of sperm blubber oil. S. Ishikawa, Y. Omote and H. Kanno. *J. Chem. Soc. Japan* (Ind. Chem. Sect.) **52**, 21-2(1949). Molecular distillation of sperm blubber oil was carried out with a cyclic still. The principal constituent was distilled at 205°, the quantity being 75% of the total distillate, and it consisted of oleyl oleate and cetyl oleate. (*Chem. Abs.* **45**, 1361)

Shark-liver oil. II. Stability of vitamin A. S. M. Patel and A. Sreenivasan (Univ., Bombay). *J. Sci. Ind. Research* (India) **9B**, No. 4, 99-102(1950). The stability of vitamin A in shark-liver oil was tested at 28° and at 50°. Isobutyl gallate 0.02% and tartaric acid 0.01% formed the best combination of antioxidants tested. Protective action was lessened at higher temperatures. Accelerated decomposition of shark-liver oil and various molecularly distilled fractions by exposure to ultraviolet light showed that the rate of destruction decreased with increasing temperature of distillation up to 220°. The fraction collected above 220° was more unstable than those collected below this temperature. There is a correlation between the iodine value of the saponifiable fraction and the stability of vitamin A; and there is a parallelism between the rate of destruction of vitamin A and the amount of unsaturated acids.

III. Deodorization. *Ibid.* No. 5, 130-2. The odor of shark-liver oil can be reduced by refluxing the oil, dissolved in absolute alcohol or propylene glycol, with skim-milk powder or gum tragacanth. By mixing one part of the oil with 3 parts of groundnut oil with warming, freezing, separating the groundnut oil phase by controlled thawing until 75% is in liquid state, decanting, and cold pressing the oil, solvent vitamin A is extracted quantitatively and the solution obtained is nearly free from fishy odors. Cyclic distillation of the groundnut oil extract has yielded vitamin A concentrates. (*Chem. Abs.* **45**, 882)

Solvent extraction. R. E. Treybal (New York Univ.). *Ind. Eng. Chem.* **43**, 79(1951). Solvent refining of oils and fats and solvent extraction of vegetable oils are mentioned briefly.

Feeding rape residues. II. The content of mustard oil and the possibility of its removal. K. Nehring and W. Schramm (Landw. Versuchsstation, Rostock, Ger.). *Landw. Forsch.* 2, 126-44(1950). In 124 samples of rape seed (*Brassica napus* and *B. rapa*) of different origins an average content of mustard oil of 0.156% was found, which was 0.260% of the fat-free seed. Seventy-one samples of extraction residues showed an average content of 0.320%. Addition of 1% of mustard-seed meal to a mixture of rape-seed meal and water (1:1) decreased the mustard oil by the action of myrosin to less than 0.10%, but bitter substances were formed by the glucosides. The bitter substances and the mustard oil could be removed almost completely by hot extraction. (*Chem. Abs.* **45**, 1360)

Spontaneous heating and ignition in stored palm kernels. I. A survey of occurrences of heating and fire. P. C. Bowes, J. H. Burgoyne, T. P. Hilditch and A. Thomas (Univ. of Liverpool). *J. Sci. Food Agr.* 1, 360(1950). Wet palm kernels stored in jute bags can undergo spontaneous heating due to aerobic fermentation but the maximum temperature possible by this action is 75°. Spontaneous ignition seems to occur, however, and several possible mechanisms are discussed.

PATENTS

Diamine-fatty acid salts. S. A. Ballard and V. E. Haury (Shell Dev. Co., San Francisco, Calif.). *U. S. 2,539,685.* The salt of a fatty acid with a diamine compound is disclosed, the diamine compound being characterized by having its amino nitrogen atoms linked to carbon atoms separated from one another by a third carbon atom.

Solvent saver recovery apparatus. C. F. Dinley (Detrex Corp., Detroit, Mich.). *U. S. 2,539,407.* Apparatus is described for recovering solvents from solids previously treated with solvents.

Fatty acid alkylolamine condensation and products. M. J. Kelley (Nopco Chem. Co., Harrison, N. J.). *U. S. 2,540,678.* A process is disclosed which comprises initially condensing at least two molecules of an alkylolamine with a monobasic acyl radical containing from 6-36 carbon atoms. This product is then condensed with at least one monobasic acyl group having at least 2 carbon atoms.

Ether-esters of dihydroxystearic acid. D. Swern (U. S. A.). *U. S. 2,542,062.* A compound is claimed of the general formula $CH_3(CH_2)_7 - CHOH - CHOR - (CH_2)_7COOR$, wherein R is an alkenyl radical.

High molecular weight carboxylic acids. H. D. Hartough (Socony-Vacuum Oil Company, New York). *U. S. 2,542,772.* The method is described of producing unsaturated aliphatic carboxylic acids having a molecular weight of about 1800 which comprises reacting 100 parts by weight of 20 per cent chlorowax and 156 parts by weight of a mixture of fatty acids containing 37-42 per cent by weight linolenic acid, 35-47 per cent by weight linoleic acid, 6-12 per cent by weight oleic acid, 8-11 per cent palmitic acid and stearic acid in the presence of about 38 parts by weight of anhydrous zinc chloride at 120 to 135° to obtain a reaction mixture, water washing the reaction mixture to remove zinc chloride and dehydrating said washed reaction product.

Extraction apparatus. Raffineries Nord-Ocean. *French 943,064.* Apparatus for extracting fatty substances from animal or vegetable material comprises a closed rotary extractor, a filter, and a still. (*Chem. Abs.* **45**, 1362)

Extraction of olive oil. P. H. Barriere Fils. *French 943,552.* Apparatus is described for removing the stones from olives and for extracting the oil. (*Chem. Abs. 45*, 885)

Deacidizing oils, fats, and waxes. A. Ofner. *Hungarian 135,-577.* Oils, fats, and waxes are treated with organic solvents which dissolve the acids in the oils and do not dissolve the neutral fats. The acids may be transformed to salts, and the material treated with agents which dissolve the formed salts. One kg. bleached and filtered sperm oil with acid no. 6.82 is shaken with 1 l. methanol which contains 6.82 g. KOH. The mixture is poured into a shaking funnel, warmed to 50°, the lower phase separated and distilled in vacuo. The product has an acid no. of 0.13, and ash content of 0.1%. (*Chem. Abs.* **45**, 884)

• Biology and Nutrition

R. A. Reiners, Abstractor

Estimation of peroxides in ghee by the ferric thiocyanate method. P. Devi and S. C. Ray (Indian Dairy Research Inst., Bangalore). *Current Sci.* (India) **19**, 243-4(1950). For the storage study of ghee and extent of oxidative spoilage the ferric thiocyanate method as developed by Hills and Thiel was found to be definitely more sensitive than Lea's iodometric determination. (*Chem. Abs.* **45**, 779)

A simplified purification of lecithin. Mary C. Pangborn (N. Y. State Dept. of Health, Albany). *J. Biol. Chem.* **188**, 471(1951). A method is described for the purification of lecithin from fresh egg yolks.

Studies on supplements for high soybean oil meal rations for early poult growth. H. Patrick (Univ. Tennessee, Knoxville, Tenn.). *Poultry Sci.* **30**, 70(1951). Beltsville Small White turkey poults did not respond to supplement of synthetic vitamin B_{12} but normal growth was reported when the feed was supplemented with fish meal or fish solubles.

Failure of cockerel comb and testis development on sesame meal and its prevention by vitamin B_{12}. F. X. Gassner, A. R. Patton, H. S. Wilgus and L. W. Charkey (Colorado A. and M. College, Fort Collins, Col.). *Proc. Soc. Exp. Bio. Med.* **75**, 630(1950). White Leghorn cockerels fed a ration containing 70% sesame meal developed subnormal combs and testes. This condition was prevented by the addition of vitamin B_{12} to the diet.

Chemical determination of vitamin E. R. A. Dunford (The British Drug Houses (Canada) Ltd., Toronto). *Can. Chem. Process Ind.* **35**, 47(1951). A review of the methods of determination of tocopherols is presented and a new method for the hydrolysis of tocopherol esters in the absence of air is described.

Identification of sterols on filter paper and their separation by paper partition chromatography. J. M. McMahol, R. B. Davis and G. Kalnitsky (State Univ. of Iowa, Iowa City). *Proc. Soc. Exp. Biol. Med.* **75**, 799(1950). Cholesterol, ergosterol, 7-dehydrocholesterol, vitamin D_2 or vitamin D_3 may be identified by placing a drop of solution on filter paper and spraying the spot with a 20% solution of antimony pentachloride in chloroform. These sterols may be separated by paper chromatography using a solution of methanol (80), benzene (10), and Skellysolve B (10). The antimony pentachloride solution may be used to identify the various bands.

The sterols in palm oil. Marie-Therese Mellier. *Oleagineux* **6**, 20-24(1951). The sterol content of the palm oil unsaponifiable is about 0-5 grams/1000 grams of oil. Measurement of the physical properties and spectrophotometric studies indicated that these sterols are mainly sitosterols plus some ergosterol.

The phytosterols of soyabean and the synthesis of hormones and vitamins of steroidal constitution. II. A. Matagrin. *Industr. Agr. Alim.* **60**, 449-458(1950). Reviews methods used for extraction of crude soyasterols from soybean oil or its fractions. The color reactions, methods of separation and uses of the sterols are discussed.

Fat emulsions for oral nutrition. II. Failure of phosphatide, Tween 80, or choline to influence fat absorption. M. Shoshkes, R. P. Geyer and F. J. Stare (Harvard Med. School). *Proc. Soc. Expt. Biol. Med.* **75**, 680(1950). The absorption of orally fed corn oil by the rat was unaffected by the presence of large amounts (20%) of purified soybean phosphatide or Tween 80. The absorption of corn oil by severely choline-deficient rats was normal.

Emulsions of fat for intravenous use. R. B. Geyer (Harvard Univ.). *J. Home Economics* **43**, 113(1951). A fat emulsion containing about 3000 calories per liter can be injected intravenously without ill effect if the fat particles average less than one micron in diameter. Within 3 hours after injection 50% of the fat is metabolized.

The absorption and distribution of labeled fatty acids in the rat. J. G. Coniglio, C. A. Anderson and C. S. Robinson (Vanderbilt Univ., Nashville, Tenn.). *Proc. Soc. Exp. Biol. Med.* **75**, 666(1950). Six rats were fed biosynthesized lipids labeled with C^{14}. Greatest C^{14} activity was found in the liver and mesenteric fat.

Production of a nutritional deficiency in mice fed a low fat diet. D. K. Bosshardt, W. J. Paul, R. H. Barnes and J. W. Huff (Sharp and Dohme, Inc., Glenolden, Penna.). *Proc. Soc. Exp. Biol. Med.* **75**, 722(1950). The addition of 2% succinylsulfathiazole (an intestinal bacteriostatic agent) to low fat (3%) diets caused a growth retardation in mice although adequate quantities of all known accessory growth factors were fed. Normal growth was restored when fat, cottonseed meal or rolled oats were added to the basal diet containing succinylsulfathiazole. Possibly a factor essential for lipid synthesis by the animal is formed by the intestinal flora.

Biosynthesis of labeled fatty acids and cholesterol in experimental diabetes. R. O. Brady and S. Guren (Univ. Penna., Philadelphia). *J. Biol. Chem.* **187**, 589(1950). Although liver slices from normal rats and cats readily convert labeled acetate to long chain fatty acids, the livers of alloxanized rats and pancreatectomized cats are relatively incapable of carrying out this process. Conversion of acetate to cholesterol by livers of alloxanized rats and pancreatectomized cats is apparently unimpared, although this process may be inhibited when the diabetes is sufficiently prolonged and severe. The accumulation of liver fat in diabetic animals may be attributed mainly to increased transport from extrahepatic sources.

Effect of pH on action of fatty acids on microbial growth. D. G. Dervichian and H. Mousset (Inst. Pasteur, Paris). *Ann. inst. Pasteur* **77**, 703-9(1949). Lauric acid bacteriostasis of *Escherichia coli* and other gram-negative bacteria increases to a maximum at pH 7.6, than decreases up to pH 8.3, even though the solubility of lauric acid greatly increases over this range. The bactericidal concentrations of lauric acid required for *Staphylococcus aureous* are very small at pH 6 or less, and rise almost exponentially above pH 7. The bactericidal action for the gram-negative *E. typhi* is the reverse; lauric acid is almost devoid of killing power below pH 7, and becomes very bactericidal as the pH increases to 9. (*Chem. Abs.* **45**, 705)

Inhibition studies of radioactive fatty acid metabolism. R. P. Geyer, Mary Cunningham and Joyce Pendergast (Harvard School of Public Health, Boston, Mass.). *J. Biol. Chem.* **188**, 185(1951). The presence of malonic acid increased the total amount of C^{14} accounted for as $C^{14}O_2$ and $CH_3C^{14}OCH_2C^{14}OOH$ during the metabolism of carboxyl-labeled fatty acids by rat liver slices. Malonic acid caused a reduction in $C^{14}O_2$ and an increase in radioactivity of both the carbonyl and carboxyl groups of acetoacetic acid. The additional acetoacetate formed from hexanoic and octanoic acids had a carbonyl carbon to carboxyl carbon ratio of 1.0 and that formed from pentanoic and heptanoic acids had a ratio of 0.61.

Polyethenoid fatty acid metabolism. III. Arachidonate supplementation. R. T. Holman and T. S. Taylor (Texas A. and M. College, College Station, Texas). *Arch. Biochem.* **29**, 295 (1950). Fat-deficient rats which received an ethyl arachidonate supplement deposited considerable quantities of polyunsaturated fatty acids in the various tissues. The proportion of arachidonate which is deposited in the entire animal is very low. After 8 weeks of supplementation of 30 mg. ethyl arachidonate per day, a maximum of 33% of the ingested polyunsaturated acids was found in the animal.

A study of the use of nordihydroguaiaretic acid in dairy products. IV. Its antioxygenic properties in spray-dried whole milk and ice cream mix with and without added synergists. J. W. Stull, E. O. Herreid and P. H. Tracy (Univ. of Illinois, Urbana). *J. Dairy Sci.* **34**, 80(1951). The addition of N.D.G.A. to spray-dried whole milk and to spray-dried ice cream mix retarded greatly the development of oxidized flavor. Citric acid was an effective synergist.

N.D.G.A. retards development of oxidized flavors in dairy products. Anon. *Food Processing* **12**(2), 16(1951). N.D.G.A. plus citric acid greatly retards the development of oxidized and metallic flavors in frozen cream, ice cream, milk, butter cream candies and similar products.

PATENT

Simultaneous defatting and dehydrating of fatty substances. E. Levin and E. M. Worsham. *U.S. 2,539,544.* Comminuted animal tissue is desiccated by azeotropic distillation with a fat solvent at a temperature below 100°. The dry defatted tissue is then separated from the solvent-fat solution by any convenient means.

• Waxes

E. H. McMullen, Abstractor

Use of synthetic waxes for fruit preservation in Germany. D. Faucheur. *Industr. Agr. Alim.* **60**, 487-489(1950). Crude or refined lignite wax, esterified with ethylene or butylene glycol is emulsified and used to coat fruits.

Studies on lipase from oil seeds. Part I. General studies of the Ricinus lipase from castor seeds. G. V. Nevgi and C. V. Ramakrishnan. *Jour. Indian Chem. Soc.* **27**, 255-259(1950). Lipase can be used to hydrolyze oils. The effect of a number of factors on the stability of the lipase such as the nature and concentration of the buffer is discussed.

Part II. Synthesis of some aliphatic esters by Ricinus lipase from castor seeds. *Ibid.* 260-262. Several aliphatic esters were synthesized using *ricinus* lipase. The larger the alcohol used, the greater was the yield of ester produced.

Part III. Effect of hydroxyl groups in the alcohol on the synthesis of esters by lipase. C. V. Ramakrishnan and G. V. Nevgi. *Jour. Indian Chem. Soc.* **27**, 263(1950). It was found in both the aliphatic and aromatic series that the percentage synthesis of the ester increases as the number of hydroxyl groups in the alcohol increases.

Part IV. Synthesis of some esters by lipase. *Ibid.* 264. The yields of ester from an unsaturated acid are always larger than from a saturated acid. Aromatic alcohols give slightly larger yields of esters than the corresponding aliphatic alcohols. The best yield of esters are obtained by having both alcohol and acid aromatic or both aliphatic rather than mixed.

Part V. Synthesis of some esters by lipase. *Ibid.* 265-267. The larger the molar quantities of alcohol or acid used the greater the yield of ester up to a certain limit (2.5 mols).

Part VI. Hydrolysis of some aliphatic esters by Ricinus lipase. *Ibid.* 331-332. The increase in the number of carbon atoms in the alcohol decreases the percentage hydrolysis from methyl to the amyl ester. The per cent hydrolysis is always greater for the *n*-ester than for the *iso* one.

Part VII. Hydrolysis of some aliphatic esters. *Ibid.* 333. The change in the number of carbon atoms in the acid does not affect the per cent hydrolysis of the esters.

Part VIII. Effect of salts on the synthesis and hydrolysis of some esters by lipase. *Ibid.* 334-336. $CaCl_2$, $BaCl_2$, $MnSO_4$ were found to be the best accelerators for the ester synthesis while $AlCl_3$, Na_2HPO_4, NaCl and $K_2Cr_2O_7$ acted as poisons. KCN and $MnSO_4$ were the best accelerators for the hydrolysis of the esters with $K_2Cr_2O_7$ having the least effect.

Part IX. Comparative study of lipases from different oils. *Ibid.* 337-344. The lipases from castor, safflower, and sesame seeds were isolated and compared. The optimum pH of the lipase is independent of the nature of the buffer and the substrate but the percentage hydrolysis of the oil is higher in an acetate buffer and the activity of the lipase is higher in its own oil. Castor lipase is more active than sesame which is more active than safflower lipase.

PATENTS

Carnauba wax as slip agent for vinylidene chloride-acrylonitrile copolymer films. Paul M. Hauser (E. I. du Pont de Nemours). *U. S. 2,525,671.* The slip characteristics of vinylidene chloride-acrylonitrile copolymer films are improved by the addition of 0.1-3% of an ester wax, such as carnauba and spermaceti waxes, or hydrogenated castor oil. (*Chem. Abs.* **45**, 905)

Waxes from food waste. E. F. Kurth (State of Oregon). *U. S. 2,526,607.* Waxes are synthesized during the hydrolysis of wood. Douglas fir slab-wood is hydrolyzed with dilute H_2SO_4 under pressures of 150 lb./sq. in. and temperatures of 160-185°. The lignin residue I is then extracted with an aliphatic hydrocarbon solvent from which is recovered a light-colored, relatively soft wax resembling beeswax with the following constants: m. 63-64°, acid no. 42-44, saponification no. 73-100, unsaponifiable matter (% by weight) 30-37, and iodine no. 26-28. It was insoluble in cold dilute acid or alkaline solutions. (*Chem. Abs.* **45**, 1346)

Refining of vegetable wax powder. H. F. Johnson and E. S. McLoud (S. C. Johnson & Son, Inc.). *U. S. 2,527,481.* Crude vegetable wax powder which has not been melted in the course of its production is purified by bringing the powder into contact with at least 2.5 parts of water at a temperature not higher than 70°, agitating the wax-water mixture sufficiently to wet the wax, then allowing the mixture to remain quiescent for at least 1.5 and preferably 3 hours until a wax layer is formed on the surface of the water, and recovering the powdered wax from the wax layer. Either of two variations of the method reduced the borra (leafy matter) content of a crude carnauba wax powder, from 15-18 to 4%. The process, which is also applicable to esparto grass and ouricury waxes, gives a product sufficiently light in color to require no treatment with chemical bleaching agents. (*Chem. Abs.* **45**, 1363)

• Drying Oils

Stuart A. Harrison, Abstractor

Dimer acids. D. T. Moore. *Official Digest Federation Paint & Varnish Production Clubs.* **No.** 312, 33(1951). When linoleic acid, or its esters, is subjected to thermal polymerization largely dimer and trimers are formed. It is generally believed that this comes about by an isomerization of the double bonds to the conjugated arrangement followed by a Diels-Alder reaction with another double bond to give a cyclic dimer. A great number of structures are possible but probably no significant difference could be expected to exist between them since they are all cyclic. Early work had shown that the polymerization of linseed fatty acids at 280-290° was accompanied by considerable decarboxylation. Recently it has been shown that if the polymerization is carried out in an autoclave in the presence of steam decarboxylation is virtually absent and the proportion of trimers reduced. The dimers are useful in conjunction with oils to give relatively high viscosity bodied oils in short times. For example, if 70 pts. of soya oil and 30 pts. of a mixture (12 pts. of 95% glycerol plus 100 pts. of dimer acids) were heated to 585°F. a Gardner viscosity of Z-1 was reached in 8½ hours as compared to 14 hours for the oil alone. Other effects of the dimer acid addition to oils are increase in set to-touch time, decrease in wrinkling, and improved through-dry. In alkyds greater flexibility is achieved by inclusion of dimer acids though at the cost of some decrease in hardness.

Possibilities and limitations of tall oil as a raw material for lacquers and paints. J. D. von Mikusch. *Farbe u Lack* **56,** 91(1950). Tall oil contains 30-59% fatty acids, 34-64% rosin acids, and 5-10% unsaponifiable matter. It is brown to black in color and has a penetrating unpleasant odor which persists in the finished product. The high rosin content makes it unsuitable for esterified products and if the rosin acids are removed the remaining fatty acids have insufficient drying power. The fatty acid fractions can be purified by fractionation and further refinement. If these refined fatty acids are used to esterify polyhydric alcohols, such as pentaerythritol, and then are styrenated, useful products are obtained. (*Chem. Abs.* **45,** 878)

Chemical constitution of shellac. A. Wright. *Paint Manuf.,* **19,** 151-55, 212(1949). The chemical composition and properties of the dye, wax, and resin components of lac are considered. (*Brit. Abs.* BII, 609, July, 1950)

Drying oils. T. P. Hilditch. *Official Digest Federation Paint and Varnish Production Clubs.* **No.** 313, 83(1951). Glycerides of a good drying oil consist to the extent of about 90% of molecules which contain at least two and frequently three polyethenoid acyl groups. The relative proportions of eleostearic, linoleic, and linolenic acids can be determined rapidly by spectral means in conjunction with alkaline isomerization. The useful vegetable drying oils can be separated into two classes—linoleic rich and linolenic rich drying oils. Oils of the first class are soya bean oil and the oils from sunflower, safflower, tobacco, and Niger seeds. The most important linolenic rich oils other than linseed are conophor, candlenut, and rubber seed oil. Oils whose drying characteristics are poor can be improved by solvent extraction using solvents which are not completely miscible with the oils. The drying properties of the linolenic rich oils are improved by heat bodying and/or isomerization.

Strength of surface coating films. H. Grinsfelder. *Official Digest Federation Paint & Varnish Production Clubs.* **No.** 312, 42(1951). Factors which are known to severely affect the strength and life of films are sunlight, heat, and oxygen. Not usually considered to be deleterious are changes in humidity but changes from day to day in moisture content may lead to film strength fatigue. The results of testing the initial tensile strength of different types of free films and the tensile loss on aging and exposure are given.

The use of itaconic acid in upgraded oils. E. C. Haines and J. P. Bilello. *Official Digest Federation Paint & Varnish Production Clubs.* **No.** 313, 125(1951). Itaconic acid can be used as high as 20% in the preparation of soya-modified alkyds to give a clear, oil-soluble, comparatively low viscosity resin oil. However, when fumaric alkyd with half the acid content, e.g. 10% fumaric acid, was made considerable discontinuity was found. Since itaconic acid shows a much slower bodying action than either fumaric or maleic acids it can be used in much larger quantities, thereby increasing the amount of unsaturation which in turn exerts its desirable effect. Accordingly this alkyd may be cooked with more oil to form products of superior drying characteristics.

Baking varnishes from mixtures of alkyd resin and abietomaleic resin. K. von Lerberghe, J. Toomans, O. Buisseret, and N. Dubay. *Congr. tech. intern. ind. peintures inds. assoc.* **1,** 561(1947). Varnishes were prepared by mixing an oil-modified alkyd resin in solvent naptha with an abieto-maleic resin. The content of the latter resin was varied from 12.5 to 50% of the total non-volatile portion. Films of the varnishes on glass and steel were baked at 150°. Hardness increased as the maleic modified resin was increased and baking time was increased. Varnishes containing up to 25 per cent of this resin had good distensibility. (*Chem. Abs.* **45,** 1357)

The yellowing of oil paints. G. Salomone. *Ind. Vernice* (Milan) **4,** 142(1950). Films of three fractions of oil of different iodine number obtained by treating raw linseed oil with 90% acetone were air dried for 30 days on glass plates. The degree and rate of yellowing was proportional to the iodine number. Attempts to extract the yellow substance from the dried and powdered films were not successful. It is concluded that yellowing is proportional to the mucilage content. Yellowing is accelerated by white lead, less by zinc white, lithopone, and titanium dioxide. (*Chem. Abs.* **45,** 1355)

PATENTS

Coating compositions. R. A. Barkhuff Jr. *U. S. 2,538,857.* A mixture of thiophene (84), formalin (105), 2-ethyl hexanol (1) and sulfuric acid (4) was reacted at 100-105° and 20-25 p.s.i. for three hours. The product was cooled and neutralized with lime (5) and dehydrated under vacuum. The resulting syrup can be used to modify heat-reactive oils. For example, the syrup prepared as described (1) plus tung oil (1) and bodied linseed oil (1) was heated to 265-271° for one and one-half hours. This gave a modified oil which dried to a hard smooth film in 15 minutes at 150° with drier.

Solvent fractionation of refined glyceride oils. S. E. Freeman. *U. S. 2,539,661.* An oil can be fractionated into two fractions, one relatively saturated and the other relatively unsaturated by counter-current washing of the oil with furfural. By this methd soybean oil having an iodine value of 136.5 can be separated into a raffinate (42.7%) with an iodine value of 110.4 and an extract (57.3%) with an iodine value of 155.0.

Product from copal suitable for lacquers. M. Gloor & E. Willmeroth. *Swiss 266,374.* Copal (1000) is dissolved in linseed fatty acids (100) and heated. Linseed oil (1000) is added and the mixture esterified with glycerol (65). The alkyd-like product is light fast and particularly suitable for tin-can lacquers. (*Chem. Abs.* **45,** 880)

• Detergents

Lenore Petchaft, Abstractor

Physicochemical characterization of wetting agents. E. Bartholme and K. Schafer. *Melliand Textilber* **31,** 487-91(1950). Surface tension measurements alone are not completely satisfactory for expressing speed of wetting of wetting agents, but if it is assumed that the change of surface tension with time is conditioned by the diffusion of wetting agent molecules through the solution to the surface, then measurement of change of surface tension with time after production of a new wetting surface provides a method for determining speed of wetting. Change of surface tension with time is represented graphically for a number of wetting agents. A formula is derived from which it is concluded that there is a relationship between molecular structure and speed of wetting.

Development of metal cleaners with radioisotopic evaluation methods. J. C. Harris and R. E. Kamp (Monsanto Chem. Co., Dayton, O.). *Metal Finishing* **48,** No. 11, 75-8(1950). The radioisotopic tracer method for the determination of soil removal combined with a dilution technique proved suitable for the evaluation of combinations of various surface active agents and alkalies. A relatively nonfoaming composition consisting of 2.5% Sterox CD and 97.5% Na metasilicate performed at least as satisfactorily as the better known lathering composition of 5% alkyl benzene sulfonate and 95% metasilicate composition. Of the various alkali types used (in combination with

Santomerse No. 1) the meta- and orthsilicates proved most effective, a second but lower level of effectiveness was attained by soda ash, trisodium phosphate, and tetrasodium pyrophosphate, while still lower in soil removal were modified soda and caustic soda (*Chem. Abs.* **45**, 884)

X-ray diffraction by solid soaps. A. J. Stosick (Univ. of Southern California, Los Angeles). *J. Chem. Phys.* **18**, 1035-40(1950). Arguments are presented to show that x-ray diagrams obtained by using the powder technique for common soap samples can be interpreted in terms of two kinds of disordering. The first kind, a stacking disorder of micellar layers, makes the layers optically independent for certain diffraction maximum so that continuous diffraction bands arise rather than discrete maxima. A second kind of disorder within a layer in which long-chain ions are randomly oriented with respect to rotation about their long axes causes all but one set of bands to be weak. A consideration of these two disorders permits extensive unification of the results of x-ray diffraction experiments for poorly crystallized soaps. The use of such diffraction patterns for phase studies is subject to severe uncertainties. (*Chem. Abs.* **45**, 439)

Cationic surface-active agents and their applications. C. V. Cardew. *Soap, Perfumery, Cosmetics* **24**, 154-7(1951). Review of properties of cationic agents which result in wide variety of uses for these compounds. Such uses include application as cationic detergents in washing eating utensils, bottles, glassware, dishes, etc.; applications in food and agriculture industries to wash fruit and eggs, dairy sanitation, general sanitary maintenance; in cosmetics as hair rinses, shampoos, toothpastes, antiseptic creams, mouth washes, deodorants, anti-perspirant creams, fixation of hair dyes; textile uses such as textile softeners, and in dyes. Danger of incompatibility with various anionic detergents and inorganic materials is stressed.

High viscosity detergent solutions. H. L. Sanders and E. A. Knaggs (Ninol Laboratories, Chicago, Ill.). *Soap Sanit. Chemicals* **27**, No. 2, 41-3, 129, 131(1951). The theory of viscosity, methods of measurements, and applications to detergent solutions are reviewed. Using the Brookfield viscosimeter, the viscosities of detergent solutions containing nonionic or anionic agents were measured and the viscosities plotted against the concentrations. The formation of sharp viscosity maxima appears to be characteristic of the nonionics, whereas anionic detergents give smooth curves. The viscosities of mixtures of detergents and salts were also determined. The results indicate that products such as liquid cleaners, shampoo concentrates, pine oil jellies and the like can be thickened without the use of gums, if appropriate detergents of the high-viscosity type are selected.

Surface active agents and related chemicals in metal processing. H. A. Strow (MacDermid, Inc., Waterbury, Conn.). *Soap Sanit. Chemicals* **26**, No. 12, 135-9(1950). Review of the use of the various alkali cleaners and synthetic detergents in metal cleaning and plating.

Influence of soaps on gelling characteristics of hevea latices. D. J. McKeand. (Dunlop Rubber Co., Ltd., Birmingham, Eng.). *Ind. Eng. Chem.* **43**, 415-20(1951). From a study of the surface and interfacial tension-pH relationships of fatty acid soaps it was presumed that soap can play a major part in gelation. Addition of a synthetic long-chain anionic or nonionic detergent whose surface tension only changes slightly with pH, inhibits gelling with sodium silicofluoride. On the other hand, small amounts of cationic soaps, e.g. Amine 220, Arquad 2C, Emulsept and Lupomin, which by virtue of the positive charge carried destabilize the rubber-serum system, are found to sensitize the latex to gelling. This is especially marked with latex preserved with sodium pentachlorophenate. The influence of some of these soaps on the mechanical stability of latices has also been investigated. Thus, by treatment of a latex with different types of soaps, it is possible to influence the course of swelling.

Relations between limit concentrations of solutions used for graining soaps and the quantities of hydroxy acids present in the crude fats. Jose A. Bracho (Lab. Chevreul, Paris). *Bull. mens. ITERG.* **4**, 418-24(1950). Tallow containing 0.1% of hydroxy acids was oxidized at 85° with air, to produce samples containing between 0.15% (after 9 hours) and 2.5% (after 32 hours) of hydroxy acids. A very distinct bleaching effect was observed. The samples were saponified with NaOH (theoretical quantity + 1%) and just enough water to yield neat soaps containing 63% of fatty acids. Several 25-g. samples of each soap were salted out in beakers on a water bath at 95° with 25 g. of aqueous solutions of NaCl at different concentrations. In the spent lyes, concentrations of NaCl just sufficient to prevent solution of the soap were 8% and 12.5%, respectively for tallows containing 0.5% and 2.5% of hydroxy acids. A soap prepared from a mixture of equal parts of tallows containing 0.1% and 0.5% of hydroxy acids gave a limit lye containing 9.6% NaCl. Higher concentrations of hydroxy acids in the raw material gave darker-colored soaps. (*Chem. Abs.* **45**, 1361)

CTP (Conti-thermo-press) soap manufacture. A Nichterlein (Berlin-Lichtenrade, Ger.). *Seifen-Ole-Fette-Wachse* **76**, 485-8 (1950). A plant in the Netherlands for the continuous saponification of fats with soda is described and illustrated with diagram and flow sheet. (*Chem. Abs.* **45**, 1359)

Shampoos, I, II. Milton A. Lesser. *Soap Sanit. Chemicals,* **26**, No. 12, 40-3, 143(1950); **27**, No. 1, 38-41, 115, 117, 119 (1951). Extensive survey article on manufacture and formulation of various types of shampoos. The competition between soap and synthetic detergents in shampoo application is reviewed. For the manufacture of liquid soap shampoos the various raw materials including oils, alkalies, additives such as thickening agents, clarifying agents, perfumes and colors are discussed. There are three methods of producing liquid soaps, the use of whole vegetable oils, use of fatty acids in place of oils, and the dilution of a concentrated soft soap. Manufacture of shampoos from synthetic detergents consists of mixing the detergent with the requisite quantity of water, followed by addition of desired additives—a simpler process than the manufacture of shampoos from soap. Disadvantages of synthetics due to excessive drying may be overcome by the use of conditioning agents such as lanolin, or removal of lower alkyl radicals. Types of synthetic shampoos described are cream and paste shampoos, aerosols, jell-type and powdered. 45 references.

Evaluating hair shampoos. Anon. *Soap Sanit. Chemicals* **27**, No. 1, 59-60(1951). A method of evaluating shampoos based on a wool scouring method is described. The amount of grease left in the wool after shampoo scouring is a measure of the relative detergent action of the shampoo. The commercial shampoos and detergents studied varied widely in their ability to clean grease wool. The alkyl sulfates were the most effective, fatty acid soaps were lower in the scale, and cationics gave negative results indicating definite adsorption of cationic ions by wool.

Detergent-sanitizers. W. S. Mueller (Univ. of Massachusetts, Amherst). *J. Milk Food Technol.* **12**, 240-4(1949). Properties of detergent-sanitizers consisting of detergents (phosphates, polyphosphates, Na_2CO_3, borax, nonionic wetting agent) and bactericidal agent (quaternary ammonium compound) are discussed (*Chem. Abs.* **45**, 1361)

PATENTS

Germicidal soaps containing halogenated dihydroxy diphenyl methanes. E. C. Kunz and W. S. Gump (Sindar Corp.) *U. S. 2,535,077.* Preparation of a germicidal soap by adding to soaps, either liquid or solid, a small amount of 2.2'-dihydroxy halogenated diphenyl methane.

Continuous method of manufacturing soap. Purdy Bradford (Swift & Co.). *U. S. 2,539,889.* Method of purifying saponifiable material before saponification by a continuous process of manufacturing soap in which is formed a mixture of a saponifiable material containing objectionable color bodies, a solid adsorbent bleaching agent (fuller's earth), and an inert hydrocarbon, which is a solvent for both the saponifiable material and the soap formed from it, and the material is then converted into glycerine and soap in the presence of an alkaline saponifying reagent.

Improved surface active agents. Sun Chemical Corp. *British 640,924.* Preparation of surface active agents useful as detergents, finishing agents, softeners and wetting agents in the textile and other fields by reacting a high molecular weight unsaturated aliphatic nitrile having at least ten carbon atoms such as oleonitrile with a sulfonating agent such as concentrated sulfuric acid.

Washing powders containing soapless detergents. F. J. Pollok (Imperial Chemical Industries, Ltd.). *British 646,088.* Preparation of washing powders in which the soapless detergents do not tend to separate on storage from the inorganic constituents by mixing an oily liquid (ethylene oxide condensation product) with a water-soluble cellulose ether to form a jelly which is then mixed with inorganic solids and powdered.

Process for the preparation of readily foaming and strongly lathering soap. N. V. Dobbelman. *British 648,722.* Process for the preparation of a toilet soap which foams readily with an abundant lather and is non-irritating to the skin, in which a soap from lower fatty acids is super-fatted by means of a higher fatty acid (stearic acid).