80-95%) from various grades of inedible animal fats and red oils. Since the urea complex of oleic acid forms in good yield at room temperature, low temperatures are not required in the isolation procedure. Yields of oleic acid are equal to or lower than those obtained by conventional low-temperature crystallization procedures, but the preparation of a polyunsaturate-free oleic acid is apparently not possible by urea complex formation alone. The separation of polyunsaturated acids from oleic acid by urea complex formation is more convenient than but not as efficient as by solvent crystallization, but separation of saturated acids from unsaturated acids is less convenient.

Advantages and disadvantages in using urea in the preparation of purified oleic acid are briefly discussed.

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ABSTRACTS . . . . E. S. Lutton, Editor

• Oils and Fats

R. A. Reiners, Abstractor

Steam consumption under different working conditions in oil-deodorization processes. T. K. Ghose and N. C. Chakravartty (Coll. Eng. Technol., Calcutta). *Trans. Indian Inst. Chem. Engrs.* **3**, 21-31(1949-50). Information on deodorization conditions in 9 Indian factories manufacturing Vanaspati [a hydrogenated peanut oil (95%) and sesame oil (5%) mixture] is summarized. 19 references. (*Chem. Abs.* **46**, 6853)

Sesame oil in margarine and in similar fats, additions of coloring matters. S. Anselmi and Adriana Cesari (Inst. super sanita, Rome). *Ann. chim.* (Rome) **41**, 573-86 (1951); *Rend, ist super sanita* (Rome) **14**, 624-38(1951). The colored material in sesame oil was extracted with ethanol, treated with activated C, and evaporated to dryness over a water bath. The oily residue gave a characteristic red color with a furfural-HCl mixture. Fat-soluble dyes either used alone or in mixtures could be easily distinguished from the dye in sesame oil by the HCl test. (*Chem. Abs.* **46**, 6853)

Turbidity due to impurities in edible beechnut oils. H. P. Kaufmann, J. Baltes and L. Grunwald (Univ. Munster/Westf., Ger.). *Fette u. Seifen.* **53**, 531-3(1951). The turbidity was due mainly to the precipitation of myricyl lignocerate and β-sitosterol. The unsaponifiable fraction of beechnut oil may contain isophytosterol. (*Chem. Abs.* **46**, 6852)

Boleko (isano) oil. I. The fat acids of the oil and their separation. H. P. Kaufmann, J. Baltes and H. Herminghaus (Univ. Munster/Westf., Ger.). *Fette u. Seifen* **53**, 537-42(1951). A new, highly unsaturated monohydroxy fat acid, $C_{18}H_{28}O_3$, for which the name isanolic acid is proposed, has been separated from Boleko *(Ongoekoa gore* or *Oklaineana)* oil. Isanolic acid has an acid no. of 190.7, hydroxyl value 191.7, n_D^{50} 1.4924, and iodine no. (Kaufmann) 166.0. Isanolic acid is the chief fat acid in Boleko oil (44%). Since its absorption spectrum closely resembles that of isanic acid, it is assumed that isanolic acid is 8-hydroxyisanic acid. Isanic acid is also present in the oil in appreciable quantity together with a small amount of linolenic acid and saturated acids. (*Chem. Abs.* **46**, 6852)

The analysis of isomerized oils. J. D. v. Mikusch (F. Thorl's Ver. Harburger Oelfabriken, Hamburg-Harburg, Ger.). *Ind. vernice* (Milan) **6**, 15-22(1952). A review with 38 references of the development of oil isomerization and of chemical and physical methods to study it. (*Chem. Abs.* **46**, 6852)

Utilization of by-products and waste products of the fatty-oil industry. I. Recovery of nickel from spent nickel catalyst. G. K. Belekar, J. G. Kane, and H. S. Shahani (Univ. Bombay). *J. Sci. Ind. Research* (India) **11B**, 28-30(1952). Five spent catalyst samples were digested with 10-50% H_2SO_4 and with various H_2SO_4-HNO_3 mixtures of 15-70% and 20-70% proportions. Higher Ni recoveries (93.2 to 98.3%) in the combined mother liquor and washings occurred from mixed acid treatment. 27 references. (*Chem. Abs.* **46**, 6852)

Use of the titers of fatty acids for the analysis of binary and tertiary mixtures. C. Paquot (Centre natl. recherches, Paris). *Bull. mens. ITERG* (Inst. tech. etudes et recherches corps gras) **6**, 174-8(1952). The titers of a series of binary and tertiary mixtures containing lauric, myristic, stearic, oleic, and linoleic acids are given on 11 charts. With these values and the acid nos. it is possible to determine the composition of tertiary mixtures of the saturated acids. The systems containing unsaturated acids, palmitic-stearic-oleic and stearic-oleic-linoleic, are determined by their titer and iodine value. (*Chem. Abs.* **46**, 6852)

Fats. CXXIX. Paper chromatography in the field of fats. 7. Identification and separation of fatty acids. H. P. Kaufmann and J. Budwig (Chem. Landes-Untersuchungsamt Nordrhein-Westfalen, Munster, Ger.). *Fette u. Seifen* **53**, 390-9 (1951). The paper chromatography of propionic, butyric, valeric, caproic, enanthic, caprylic, octenoic, pelargonic, decanoic, undecylenic, stearic, oleic, elaidic, linoleic, and erucic acids was investigated. Basic dyes, particularly Rhodamine B and Nile Blue, give characteristic reactions with these acids, particularly under ultraviolet light. By using No. 214 paper (Fa. Macherey, Nagel & Co.) and treating successively with $PhNHNH_2$, Rodamine B, and aqueous $AgNO_3$, characteristic colors are obtained. N_2H_4, toludine, and quinine react similarly to $PhNHNH_2$.

CXXX. 8. Lipid replacement in the human skin and its measurement by paper chromatography. H. P. Kaufmann, A. Szakall and J. Budwig. *Ibid.* 406-8. The lipids present in the epidermis after defatting consisted mainly of fatty acids, particularly oleic acid. An extract of the skin (not defatted) contained glycerides.

CXXXI. 9. Application to lacquer raw materials. H. P. Kaufmann, J. Budwig and C. W. Schmidt. *Ibid.* 408-12. The boiling of stand oil was investigated. By using 99% methanol as the developer, the free fat acids could be removed from the glycerides; after application of a contrasting dye the fat acid area was dependent on the increase in saponification no. of the oil. During the boiling process, the most unsaturated glycerides vanish slowly, and, parallel to the increase in viscosity of the oil, the amount of polymerized products increases. (*Chem. Abs.* **46**, 6851)

Deterioration of fatty acids in meats during storage. O. S. Privett. *Ann. Rept. Hormel Inst. Minn.* **1950-51**, 11-17. Beef, lamb, and pork stored at 33°F. underwent no significant fatty oxidative deterioration until the meat had become unpalatable because of proteolytic deterioration. However, oxidative changes in the fat, including destruction of essential fatty acids, occurred prior to protein deterioration during storage at 4°F. (*Chem. Abs.* **46**, 6769)

A Stysanus species as a fat producer. M. Blinc (Slovene Acad. Sci. Arts, Ljubljana, Yugoslavia). *Slovenska Akad. Znanosti Umetnosti, Razred Mat., Fiz. Tehn. Vede, Class. III, Ser. A, Rzaprave* II, 43-50(1951). A fungus of the genus *Stysanus* was isolated from a moist chip of spruce wood, and examined microscopically. The mycelium secreted an oil. The effects of different media and of different methods of inoculation were studied. The red and brown strains were separated by culture on sterile rice supplied with Henneberg salts. The best medium was 10% glucose supplied with Henneberg salts. Fat production was faster when mycelium was used as the inoculum. After 25-30 days the mycelium was filtered off, dried, and extracted with ethyl ether. The red strain contained 25.61% fat, the brown strain 34.52% (calculated on dry basis), but the properties (specific gravity, acid value, saponification no., iodine no., *n*) of both oils were the same, and similar to those of olive oil and the oils of seeds. (*Chem. Abs.* **46**, 6702)

Chemical composition and structure of fats in relation to their value for cakemaking. B. M. Craig. *Ann. Rept. Hormel Inst.* **1948-49**, 51-3. Progress on the synthesis of triglycerides for studying the factors associated with shortening in cakemaking is discussed. (*Chem. Abs.* **46**, 7245)

Unsaponifiable lipids of Vernix caseosa. S. Cmelik, N. Petrak-Longhino and F. Mihelic (Central Hyg. Inst., Zagreb, Croatia). *Biochem. Z.* **322**, 355-9(1952). The unsaponifiable substances of vernix caseosa (fatty substance covering the fetus) is remarkably rich in unsaturated hydrocarbons (squalenes) which have been previously found in ovarian dermoid cysts, in female depot fat, and also in sebum. In addition to cholesterol an unsaturated steroid alcohol was isolated (m. 136-7°) which formed crystalline benzoates and acetates. There is also evidence of the presence of higher aliphatic alcohol. One waxlike alcohol was isolated (m. 60-62°) and its acetyl no. was found to be 222. (*Chem. Abs.* **46**, 7196)

Solubilities of saturated fatty acid esters. R. S. Sedgwick, C. W. Hoerr and H. J. Harwood (Armour and Co., Chicago, Ill.). *J. Org. Chem.* **17**, 327-37(1952). The solubilities of the methyl esters of caprylic, lauric, myristic, palmitic and stearic acids have been determined in benzene, cyclohexane, carbon tetrachloride, chloroform, ethyl acetate, butyl acetate, methanol, 95% ethanol, n-butanol, acetone and acetonitrile. The esters in solution do not exhibit the tendency toward intermolecular association that is evidenced by the acids.

Course and mechanism of the autoxidation of fats. O. S. Privett. *Ann. Rept. Hormel Inst. Univ. Minn.* **1950-51**, 6-7. A heat-stable factor capable of catalyzing fat autoxidation is present in pork loin tissue. It can be extracted with 50% ethanol, salt solutions, and weak acid solutions. (*Chem. Abs.* **46**, 7343)

The active principles in Job's tears. I. The fatty oil contained in Job's tears and the pharmacological actions of palmitic acid. Y. Matsushima (Prefectural Hyg. Inst., Kumamoto). *Folia Pharmacol. Japan.* **48**, No. 2, 109-26(1952); *Breviaria*, p. 6. The seed of Job's tears *Coix lacryma jobi* var. *frumentacea* gave 9.77% crude oil by extraction with ether. The oil was left in the cold for several days to give a large amount of crystals which was identified as palmitin. The filtered oil had the constants: *sp. gr.* 0.9182(15°), iodine no. 97.2 and saponification no. 190.2. The chief component of its saturated fatty acid was palmitic acid plus a small amount of myristic acid, and that of its unsaturated fatty acid was a liquid, b_5 235° which was identified as $CH_3(CH_2)_8CH:CH(CH_2)_6COOH$, probably of the cis-form, and was named coixic acid. The crude oil stimulated respiration of frog, mouse, and rabbit, and with larger administration it killed them by respiration paralysis. The residue of the oil extraction had no pharmacological actions. Palmitic acid and its esters had the same actions as the crude oil. (*Chem. Abs.* **46**, 7229)

Ketone rancidity of fats. H. Thaler. *Angew. Chem.* **62**, 40 (1950). Ketone rancidity is of microbiological origin. *Penicillium glaucum*, which has fatty acids of C_{4-14} as its sole source of C, produces ketones by oxidation of the β-C atom. (*Chem. Abs.* **46**, 7343)

Polymerization of oleic acid and its methyl ester in the presence of molecular compounds of boron trifluoride and phosphoric acids. A. V. Topchiev and T. P. Vishnyakova (I. M. Gubkin Petrol. Inst., Moscow). *Zhur. Obshchei Khim.* (J. Gen. Chem.) **21**, 1618-25(1951). Pure oleic acid does not polymerize with 100% H_3PO_4 in 10 hrs. at 100°. The use of ethyl ether-BF_3 complex does not alter the result. However, 5% addition of $H_3PO_4 \cdot BF_3$, $H_4P_2O_7 \cdot 2BF_3$, or $HPO_3 \cdot BF_3$ does cause appreciable polymerization, the first catalyst being somewhat more active. Polymerization of methyl oleate is similarly catalyzed by $H_3PO_4 \cdot BF_3$ and proceeds fairly readily even at 20°, being promoted by increased temperature and amount of catalyst added. The principal product is a dimer having the structure $CH_3(CH_2)_8CH[(CH_2)_7CO_2H]C[(CH_2)_7CO_2H]:CH(CH_2)_7CH_3$. Generally under similar conditions the free oleic acid polymerizes more completely than its methyl ester. (*Chem. Abs.* **46**, 7043)

Chemical and kinetic studies on the autoxidation of fatty acid esters. O. S. Privett and W. O. Lundberg. *Ann. Rept. Hormel Inst. Univ. Minn.* **1950-51**, 7-11. The kinetics of decomposition of mixed methyl linoleate peroxides are characteristic of a pseudounimolecular reaction. The mixed linoleate peroxides were partially separated by liquid-liquid counter-current extraction. Conjugated peroxides concentrated in the nonpolar solvent phase (Skellysolve F); and nonconjugated peroxides concentrated in the aqueous alcohol phase. (Chem. Abs. **46**, 7343)

Proposal for the unification of rancidity constants for fats. H. Schmalfuss (Inst. angew. Ernahrungswiss., Hanover, Ger.). *Fette u. Seifen* **53**, 689-90 (1951). It is proposed that all measures of fat rancidity be expressed uniformly based on 1 g. of fat as follows: (1) peroxide content in terms of the Lea no. (ml. of 0.002 *N* $Na_2S_2O_3$ used); (2) acidity in terms of the acid no. (mg. KOH used); (3) ketone content in terms of methyl nonyl ketone (in γ); free aldehyde content in terms of heptaldehyde (in γ); epihydrinaldehyde content as total epihydrinaldehyde (in γ). (*Chem. Abs.* **46**, 7343)

Composition of natural and synthetic fatty alcohol mixtures. I. Fractional distillation of fatty alcohols. H. Stage (Fa. Dr. Herrmann Stage, Koln-Niehl, Ger.). *Fette u. Seifen* **53**, 677-82 (1951). The fractional distillation of alcohols up to C_{18} is discussed and physical constants are given. Fractionation of sperm oil gave: alcohols less than C_{14} 1, $C_{14}H_{29}OH$ 5-6, $C_{14}H_{27}OH$ 5, $C_{16}H_{33}OH$ 26-27, $C_{16}H_{31}OH$ 10, $C_{16}H_{37}OH$ 7-9, *cis*-$C_{18}H_{35}OH$ 17-19, *trans*-$C_{18}H_{35}OH$ 15-17, and unsaturated C_{20} alcohols 10% by volume. (*Chem. Abs.* **46**, 7343)

The separation temperature of beef fat and aniline. H. Brunink. *Chem. Weekblad* **48**, 97-9(1952). The separation temperature (A), the iodine no. (B) and the acidity (C) of 95% of the samples of beef fat are related according to the equation: $A = -0.48B - 0.43C + 60.5$. Admixtures or rancidity cause considerable deviations from this relation and can be detected. (*Chem. Abs.* **46**, 5865)

Iodine number of fat acid having conjugated double bond by pyridine bromide. T. Tsuchiya, R. Kaneko and A. Tanaka (Tokyo Ind. Research Inst.). *J. Nippon Oil Technol. Soc.* **4**, 30-6 (1951). Iodine no. of punicic acid, m. 44-4.5°, with BrC_6H_4N gives approximate theoretical value by using either 0.1 or 0.2 *N* BrC_5H_4N in 100% excess for 30 minutes. (*Chem. Abs.* **46**, 5865)

Conjugation of a double bond with an aromatic nucleus. XXII. Dienometry of fats with solutions of p-benzoquinone. M. Lora Tamayo and Carmen Estada. *Anales real soc. espan. fis. y quim* (Madrid) **47B**, 815-18(1951). The dienometric method with p-benzoquinone applied to the determination of diene nos. of linseed, cottonseed, China wood, and palm oils gave higher values in most cases than those obtained by the method of Kaufmann with maleic anhydride. The influences of time, temperature, and concentration were studied. (*Chem. Abs.* **46**, 5867)

New apparatus for the solvent extraction of oil seeds. The Bottaro extractor. A. Paleni (Soc. ital. richerche agr. e ind., Corregio E., Italy). *Fette u. Seifen* **53**, 385-9(1951). The apparatus is based on the use of pipes of comparatively small diameter (20 cm.) which contain a spiral; the spirals and the pipes rotate about the same axis. The material to be extracted moves countercurrent to the solvent. (*Chem. Abs.* **46**, 5867)

Utilization of rice oil. IV. J. Kawai and J. Hayakawa. *J. Nippon Oil Technol. Soc.* **4**, 6-10(1951). The methyl esters of rice-oil fat acids were hydrogenated to an iodine no. of 56.8-71.5 and solidifying points of 19.5-10.5°.

V. *Ibid.* 11-16. Data are given on alcoholysis of dewaxed oil and crude rice wax with methanol or ethanol with H_2SO_4 as a catalyst by refluxing and by heating in an autoclave.

VI. *Ibid.* 37-43. Rice wax prepared by precipitating and washing with acetone and then hydrogenating had about the same hardness as that of carnauba wax. (*Chem. Abs.* 46, 5867)

Moisture content and drying of oil seeds. J. C. de Janvry and Th. Francois. *Bull. mens. ITERG* (Inst. tech. etudes et recherches corps gras) 6, 117-20(1952). The methods are reviewed. In all cases where the oven method is not obligatory, the Carl Fischer method is recommended. Values thus obtained are always higher than those with other methods; however, agreement is extremely close. Conductive or dielectric methods were most deceiving. Methods employing infrared rays or another source of heat were rapid (15 to 45 min.) and permitted precision within 1%. Utility and principles of devices for artificial drying of oil seeds are discussed. The temperatures employed vary between 30 and 80°. (*Chem. Abs.* 46, 5867)

Uacu oil. G. P. Pinto (Inst. agron. norte, Belem, Brazil). *Bol. tec. inst. agron. norte* (Belem, Brazil) 21, 31-62(1950). The seeds of *Monopterix uacu* yield by hot-pressing 12%, by extraction with benzine 28.4% of a dark green oil of agreeable odor without appreciable taste. The natives prepare it by boiling with water and ladling off the supernatant layer. It gives a gummy deposit which causes rancidity, but after this is removed the oil keeps well. It has d_4^{25} 0.9079, d_4^{15} 0.9140, melting point 22.7°, freezing point 20.8°, n_D^{25} 1.4656, saponification no. no. 61, thiocyanogen no. 48, Reichert-Meissl no. 0.15, Polenske no. 0.48, acidity as oleic 1.4%, acid value 2.8, ester value 189, unsaponifiable 0.6%. The Heydenreich reaction gives a yellow color with orange striae. Fatty acids from the oil are: caprylic 0.5, capric 0.2, myristic 0.7, palmitic 11.0, stearic 5.3, arachidic 4.6, lignoceric 4.8, oleic 67.8, unsaponifiable 0.6% by weight. The oil can be used for cooking, for the manufacture of vegetable fats, oleic acid, and soaps. (*Chem. Abs.* 46, 5344)

Dehydration of castor oil by potassium phenolsulfonate. K. K. Dole and V. R. Kreskar (Fergusson Coll. Research Lab., Poona, India). *Proc. Oil Technol. Assoc. India* 6, 70-4(1950). The catalyst was effective, producing dehydration in 60-70 minutes, under reduced pressure at 285°. (*Chem. Abs.* 46, 5344)

The seed fat of the okari nut (Terminalia kaernbachii). D. J. Clark, H. H. Hatt and W. J. Troyahn (Commonwealth Sci. Ind. Research Organization, Melbourne). *Australian J. Applied Sci.* 2, 378-84(1951). The okari nut, the fruit of the tree *Terminalia kaernbachii*, has a large kernel (10 g.), forming 4% of the whole undried fruit. The dried kernel yields 65-70% of a fat shown, by fractional distillation of the methyl esters, to consist chiefly of the glycerides of palmitic (37.2%), stearic (7.7%), oleic (34.4%), and linoleic (14.6%) acids. The ultraviolet absorption spectrum showed the presence of 0.3% of the glycerides of conjugated dienoic acids. The fat has d^{25} 0.908, n^{25} 1.4645, $[\alpha]_D^{25}$ —0.05°, color (Lovibond) Y, 1.0:0, 0.3, melting point 32°, setting point 17°, saponification no. 198, iodine no. 61, thiocyanogen no. 48, Reichert-Meissel no. 0.15, Polenske no. 0.3, unsaponifiable 1.7%, titer of fatty acids 40.5°, tetrabromide no. 41%, and thus closely resembles butterfat in physical properties, and mowrah butter most closely. (*Chem. Abs.* 46, 5343)

Fat constants of the body oils of some marine fishes of Bombay. R. S. Patakoot, L. B. Pradhan and N. N. Murti (Rammarain Ruia Coll. Matunga, Bombay). *J. Univ. Bombay* 19, Pt. 3, *Sci.* No. 28, B18-20(1950). Body oils of 12 fishes inhabiting the waters adjacent to India were examined. (*Chem. Abs.* 46, 5343)

Safety in decolorizing fats. Anon. *Soap Sanit. Chemicals* 28, No. 4, 54-5, 173(1952). Safety in the fat refining plants which use propane or liquid petroleum gas in liquid-liquid extraction systems is discussed. (*Chem. Abs.* 46, 5341)

The critical separation temperature of fats from aniline and its application to the control of purity of cacao fat. II. Nut chocolate. F. Th. van Voorst (Keuringadienst waren, Alkmaar, Netherlands). *Chem. Weekblad* 47, 595-6(1951). The critical separation temperature from aniline of chocolate fat from nut-chocolate confections may be affected by the simultaneous extraction of nut fat with the chocolate fat. A graph shows the relation between the critical separation temperature and iodine no. for several oils and fats. (*Chem. Abs.* 46, 5341)

SINITIRO KAWAMURA

Mechanism of the autoxidation of fats. Yoshio Ishii (Univ. Tokyo). *J. Oil Chemists' Soc., Japan* 1, 85-90, 84(1952). A review with 52 references.

The antioxidants for vitamin A in enriched margarine. I. Takajirô Mori, K. Naitô, Y. Ozawa, and H. Kembô (Univ. Tokyo). *J. Japan. Soc. Food Nutrition* 4, 105-9(1951). N. D. G. A. was the most effective, and ascorbic acid stearate followed, when used as a sole antioxidant; alpha tocopherol plus citric acid was the most effective, and alpha tocopherol plus ascorbic acid was the second, when used in mixture. Ascorbic acid, ethyl and butyl gallates were other antioxidants tested. The fats comprising margarine were hardened whale oil 70-72, coconut oil 10-12, and peanut oil 18%. Vitamin A was added at 1000 i.u./g. margarine.

Malodorous constituents of hardened oil. Tsutomu Kuwata and Heijirô Kaneyuki (Univ. Tokyo). *J. Oil Chemists' Soc., Japan*, 1, 71-3(1952). The volatile constituents of hardened whale oil, melting at 38°, were distilled at 4 mm. Hg. The fractions boiling at 100-120, and 120-145° at 4 mm. were most malodorous. They contained aldehydes of C_7-C_{12} and fatty acids of C_5-C_8.

Decolorization of rice-bran oil with filtrol. Shigeru Kinomura (Tokyo Kôgyô Shikenjo). *J. Oil Chemists' Soc., Japan*, 1, 81-4 (1952). Efficiency of decolorization of rice-bran oil was tested by determining the red, yellow, and blue values by the Lovibond colorimeter by the use of "filtrol LX-466," "filtrol special," and "filtrol super" of Filtrol Corp. of U.S.A., and "active white clay N" of Mizusawa Chem. Co. of Japan. Rice-bran oil with low acid value was decolorized best with "filtrol LX-466," while that with high acid value was decolorized most suitably with domestic clay.

Odoriferous substances of whale oil. III. Carbonyl compounds. Keigo Onoe and Tarô Hori (Kyoto Univ.). *J. Chem. Soc. Japan*, Pure Chem. Sect. **73**, 275-8(1952). The 2,4-dinitrophenylhydrazone, derivatives of odoriferous carbonyl compounds, could be separated into three neutral and two acidic hydrazones on a chromatopile. Among them one neutral derivative was $C_{12}H_{14}O_5N_4$, 2,4-dinitrophenylhydrazone of 2-hexenal, judged from the ultraviolet absorption spectrum and the mixed m.p. test with a synthesized sample. Another hydrazone of a neutral CO compound, $C_{14}H_{18}O_7N_4$, might be in the peroxide form. The hydrazone of one acidic compound was $C_{13}H_{16}O_7N_4$. Volatile aldehydes (formaldehyde and propionaldehyde) were identified as hydroxamates on a filter paper chromatogram.

The oxidation reaction in the monolayers of unsaturated fatty acids. Keiichi Eda (Gakushûin Univ., Tokyo). *J. Chem. Soc. Japan*, Pure Chem, Sect. **73**, 260-3(1952). The monomolecular layers of oleic (C_{18} cis), elaidic (C_{18} trans), erucic (C_{22} cis), brassidic (C_{22} trans), selacholeic (C_{24} cis), and selachelaidic (C_{24} trans) on aqueous solution of 0.01 *N* H_2SO_4 plus 0.0025% $KMnO_4$ were measured for their rates of increase in surface area, when surface pressure was kept constant. The oxidation reactions were discussed in the light of the measurements.

Fatty acids. V. Comparison of oxidation velocities of unsaturated fatty acids and their methyl esters. Senjirô Maruta (Yamanashi Univ.). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **55**, 303-4(1952). The oxidation velocity of oleic acid or linseed oil fatty acid was smaller than that of the methyl ester.

Oiliness of lubricating oils. XI. Rectifying effect of palmitic acid multilayers. Toshio Sakurai and Akira Furusawa (Tokyo Inst. Technol.). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **55**, 245-7(1952).

XII. Rectifying effect of didodecyl sebacate multilayers. *Ibid.* 247-9.

XIII. Rectifying effect of the films of saturated fatty acids. Orientation of oil molecules. *Ibid.* 309-11.

XIV. Rectifying effect of films of aliphatic dibasic acid esters. *Ibid.* 487-9.

The fatty oil of Symplocos cratalgoides. Tetsujirô Obara and Mitsuo Kitamura (Tokyo Education Univ.). *J. Agr. Chem. Soc. Japan* 26, 64-8(1952). The seeds of this plant contain 27% fatty oil. The acid clay treatment produced edible oil by removing the bitter taste of the crude oil. The purified oil had d^{25} 0.9172, sp. viscosity 61.70, n^{20} 1.4673, acid value 5.35, sapon. value 195.0, iodine value 104.1, Hehner value 92.5, Reichert-Meissl value 0.46, Polenske value 0.25, unsapon. matter 1.4%. The mixed fatty acids consisted of 12.8% solid and 84.0% liquid acids. The solid acids consisted of about 85% palmitic and a little stearic acids. The liquid acids consisted of about 65% oleic, about 22% linoleic and some linolenic acids.

Molecular distillation of pupa oil. (The nutritive value of silkworm pupa. X.). Tatsuo Koyanagi and Shigeki Kobayashi (Iwate Univ., Morioka). *J. Agr. Chem. Soc. Japan* 26, 109-12 (1952). By the molecular distillation at 10^{-3} to 10^{-4} mm. Hg of pupa oil the free acids could be removed and the peculiar disagreeable odor could be eliminated without noticeable decomposition of the residual oil. Decolorization of the solvent-extracted pupa oil became easier after molecular distillation. Drying of wet pupae in vacuo prevented color development in extracted oil.

Lipoxidase. II. Distribution of lipoxidase in plants and microorganisms. 1. Hiroyasu Fukuba (Univ. Tokyo). *J. Agr. Chem. Soc. Japan* 26, 167-70(1952). Lipoxidase activity could be detected only in the seed of legumes. There was no correlation between the iodine value of seed fats and the lipoxidase activity of various oily seeds. Among microorganisms tested, only *Aspergillus* and *Rhizopus* contained lipoxidase; bacteria and yeasts contained no lipoxidase.

III. The optimum pH of lipoxidase. *Ibid.* 170-2. The colloidal properties (interfacial tension against xylene, and turbidity) of polyoxyethylene linoleate were independent of pH values in contrast to those of Na linoleate. According to the substrates used, the apparent optimum pH of lipoxidase was: Na linoleate, pH 8.9-9.2; methyl lineolate, pH 6.6-7.3; and polyoxyethylene linoleate, pH 6.5-7.0.

IV. The inhibiting action of antioxidants on lipoxidase. Hiroyasu Fukuba. *J. Japan. Soc. Food Nutrition* 4, 199-201(1952). The activities of antioxidants could be compared in only 30 min. at 30°, when the lipoxidase ext. was added in the system. By the use of this new method, N.D.G.A. showed the antioxidant activity (i.e., the inhibitory action on lipoxidase) about 50 times as strong as hydroquinone. Others (pyrogallol, ethyl gallate, 1-naphthol, and maleic acid) were weaker antioxidants in the order just named. Thiourea slightly accelerated the oxidation of the substrate (methyl linoleate).

V. The changes in vitamin contents during the bleaching of bread by lipoxidase. *Ibid.* 201-4. Lipoxidase decolorized carotene with 95% destruction, but destroyed thiamine only 10%, and did not destroy riboflavin at all. By practical baking tests, lipoxidase was a more suitable bleaching agent than "Novadolox" for bread from nonenriched and enriched wheat flour in that the lipoxidase-bleached bread contained more thiamine and riboflavin than the "Novadolox"-bleached bread.

PATENTS

Manufacture of fatty acids. F. E. Lacey and W. M. Leaders (Swift & Co.). *U. S. 2,602,808.* A continuous process for hydrolyzing fats is disclosed in which fats are subjected to hydrolyzing temperatures in the presence of water and of solvents such as pentanes, hexanes, heptanes or petroleum naphtha. The ratio of solvent to fat is such that the resulting mixture is separated into a plurality of phases, one containing solvent and light colored fatty acids and another phase containing solvent and color bodies.

Rapid method of analyzing emulsions and fatty mineral oils. S. Spring and Louise F. Peale. *U. S. 2,606,818.* Process of determining the amount of unsaponifiable substances in emulsions or oils is claimed which consists of adding to the oily matter an alkali to react with the saponifiable material therein, and then adding a sufficient quantity of a high specific gravity polyhydric alcohol to keep the saponified matter in solution and to increase the specific gravity of that solution so that the unsaponifiable oily matter separates from the saponified matter, whereby the separated oily matter layer is rapidly and sharply defined for subsequent measurement.

Catalytic process for preparing amides. P. W. Garbo. *U. S. 2,606,915.* Amides are prepared by reacting urea and a fatty acid containing at least 8 carbon atoms in the presence of a catalyst consisting of an inorganic, oxygen containing compound of an element selected from Groups V and VI and having an atomic number between 15 and 92.

Process of liberating and recovering oil from materials containing starch, proteins, and oil. E. R. Darling and W. E. C. Yelland (Lauhoff Grain Co.). *U. S. 2,606,916.* Process of selectively separating oil from an oil-and-protein-containing comestible material is claimed which comprises suspending the material in an aqueous solution of ammonium hydroxide, ammonium carbonate or ethanolamine in a concentration sufficient to effect the emulsification of the oil in the material without materially affecting the protein, separating the resulting oil-in-water emulsion from the residual insoluble materials of the emulsion, breaking the thus treated emulsion to liberate the oil therefrom, and recovering the latter.

Winterized vegetable oil and process for producing same. A. L. Ayers and C. R. Scott (Phillips Pet. Co.). *U. S. 2,607,695.* A vegetable oil containing from 0.1% to 10% of a stabilizer selected from the group consisting of coconut oil and lanolin is claimed.

Composition useful as an antioxidant for fats and oils. J. E. Magoffin (Eastman Kodak Co.). *U. S. 2,607,745.* A concentrate is claimed which contains 10-60% of at least one alkylated hydroxyphenyl ether dissolved in propylene glycol.

Ibid. U. S. 2,607,746. A propylene glycol concentrate is claimed which contains 3-30% of a gallic acid ester, 10-50% alkylated hydroxyphenyl ether and 3-10% of at least one synergistic acid selected from the group citric acid, orthophosphoric acid, tartaric acid and ascorbic acid.

Process for recovering oil from the solvent cleaning or scouring of raw wool or wool fabric. R. E. Derly. *U. S. 2,607,786.* A process is disclosed for the recovery of oil and solvent from the liquid obtained from scouring wool with a volatile chlorinated hydrocarbon solvent which consists of mixing the so obtained liquid with a substantially anhydrous alkaline liquid of lower specific gravity than the chlorinated solvent to saponify partially the fats in the solvent and to coagulate the dirt. This coagulated matter floats to the top leaving a substantially dirt-free liquid below.

Refining of glyceride oils. B. Clayton. *U. S. 2,607,788.* A process in the alkali refining of a glyceride oil is claimed which comprises mixing the oil with 1.25-2 times the amount of aqueous 10°-20° Bé soda ash solution necessary to neutralize the acidity of the oil, thereafter continuously separating the resulting mixture centrifugally at a temperature of 70-110°F. and under a pressure of 10-50 psig. The separated oil is mixed with NaOH solution and the resultant mixture continuously separated centrifugally to produce a purified oil.

Method of producing amides. E. T. Roe and D. Swern (Sec. Agr.). *U. S. 2,608,562.* A process is claimed comprising reaction of an aliphatic monocarboxylic acid having from 6 to 18 carbon atoms with a compound selected from the group consisting of formamide, acetamide, and acetylurea at a temperature of about from 180° to 250° to produce the amide of the acid.

Lanolin products. W. C. Griffin (Atlas Powder Co.). *U. S. 2,608,563.* A lanolin product is claimed which is soluble in mineral oil, comprising the interraction product of lanolin, a polyoxyethylene ether of a hexitol, and oleic acid.

A process for the separation of higher fatty acid partial esters of polyhydric alcohols from mixture containing the same. H. H. Young and H. C. Black (Swift & Co.). *U. S. 2,608,564.* A process is claimed for the separation of higher fatty acid partial esters of polyhydric alcohols into fractions having substantially uniform chemical and physical properties, which comprises: admixing higher fatty acid esters containing substantial amounts of higher fatty acid partial esters of a polyhydric alcohol with from ½ to 15 parts by volume of an ester of a lower aliphatic alcohol and an aliphatic monocarboxylic acid at a temperature between 70°F. and 200°F. to obtain a complete solution of the said fatty acid esters, then cooling the solution stepwise at small intervals of temperature between about 100° F. and —40°F. and separating the distinct phases formed after each stepwise cooling operation, whereby several higher fatty acid partial esters having substantially uniform chemical and physical properties are obtained.

Process for utilizing prepared oil-bearing material as a filtering agent in solvent extraction by continuous countercurrent flow. M. Bonotto. *U. S. 2,608,565.* A process is disclosed for the solvent extraction of oil-bearing materials consisting of screening a flaked solvent-extractable oil-bearing material to separate as screenings therefrom a quantity of fines, mechanically pressing such fines to produce a product having granular pieces each composed of a compressed and granulated mass of coarser and increased size than the screening and of greater density than the material from which the granulated pieces were derived, and utilizing such compressed and granulated pieces as a filtering material in the extraction of the solvent-extractable oil-bearing material from which such compressed and granulated pieces have been derived.

Process for decolorizing a soybean oil miscella. R. A. Marmor and W. W. Moyer (A. E. Staley Manufacturing Co.). *U. S. 2,608,566.* In the process of refining soybean oil obtained by extracting the oil from soybeans with hexane solvent, the improvement is claimed comprising the sequential steps of contacting the extract with a color adsorbent at a temperature below about 50°, and subsequently removing the solvent from the extract by vacuum distillation at a temperature below about 50°, before any additional refining steps.

Esters of hydroxy fatty acids. W. R. Forsman. *Swed. 132,999.* An unsaturated fatty acid or ester is treated with H_2SO_4 and the sulfated hydroxy fatty acid or ester formed is separated, esterified with an alcohol in the presence of a mineral acid, and the resulting mixture of alkylated hydroxy fatty acid and its sulfate separated. Examples are given of the preparation of an ester starting from oleic acid and ethanol. (*Chem. Abs.* 46, 6668)

• Biology and Nutrition

R. A. Reiners, Abstractor

Changes in the vitamin A content of herring during the process of preserving (or canning). Magdalene Junker. *Arch. Fischereiwiss.* 1, 12-20(1948). Vitamin A was biologically determined by curative growth tests on rats. Preliminary drying did not reduce the vitamin A content as compared with the fresh fish. Preliminary boiling reduced it about 7%. This corresponds approximately to the fat loss during boiling. The finished product which had been sterilized without any preliminary treatment showed a vitamin A loss of only 7% as compared with the fresh fish. The finished product which had been subjected to preliminary boiling before sterilization showed a loss of 12%, while that which had been subjected to preliminary drying showed the highest loss of 33%. This high vitamin loss was probably due to oxidation and rancidification of the oil. (*Chem. Abs.* 46, 6769)

Coloring of edible fats with lactoflavin. W. Schuchardt. *Fette u. Seifen* 53, 689(1951). A mixture of lactoflavin (3 g.) and carotene (1.5 g.) colors a ton of margarine satisfactorily. (*Chem. Abs.* 46, 6769)

The influence of nutrition on the composition of butterfat. E. Brouwer (Physiol. Lab., Landbouwhogeschool, Wageningen, Netherlands). *Chem. Weekblad* 42, 789-91(1951). The seasonal fluctuation in consistency and iodine number of butterfat are closely tied in with unsaturated fatty acid content of the feed. During the grazing season the oleic acid content is in general higher because of the availability of green forage. (*Chem. Abs.* 46, 6768)

Biological decomposition of oleic acid. K. Bernhard and U. Gloor (Univ. Basel, Switz.). *Helv. Chim. Acta* 35, 608-16 (1952). The metabolism of oleic acid fed to dogs and man was studied with deuterium-labeled compounds by the isotope-dilution method. In the oxidation of oleic acid, oleyl alcohol, oleyl acetate, and oleyl benzoate, azelaic acid is not an intermediate. On feeding N-diethyloleamide, small amounts of succinic acid were isolated from the feces. No metabolic products, e.g. glucuronides of N-butyloleamide and of oleanilide could be found in the urine. 9,10-Dihydroxy- and 9,10-diketostearic acids are oxidized to azelaic acid in dogs. (*Chem. Abs.* 46, 6714)

Effect of intermittent fat and protein feeding in simultaneous caloric undernutrition. K. Gernand (Univ. Halle a. d. Saale, Ger.). *Klin. Wochschr.* 30, 199-201(1952). Rats weighing 100 g. were kept at constant weight by feeding the males with 24 g. and the females with 22 g. of a basal diet containing 20% protein, 21% fat, and 59% carbohydrate. A group receiving its fat and protein allowance for each 8-day period within 3 days gained weight and was in better health, provided intermittent fat and protein feeding was started early during caloric undernutrition. If it was started after 3-4 weeks, almost all rats died as did the continuously undernourished rats. (*Chem. Abs.* 46, 7187)

Value of synthetic fats in nutrition. II. A. Scheunert (Inst. Ernahrungsforsch., Potsdam-Rehbrucke, Ger.). *Pharmazie* 6, 652-8(1951). A review with 36 references. (*Chem. Abs.* 46, 7189)

Biology of fats. IV. The essential fat acids. H. P. Kaufmann (Univ. Munster/Westfalen, Ger.). *Fette u. Seifen* 54, 69-73 (1952). A review and discussion of the essential fat acids and of the relation between lipids and cancer. (*Chem. Abs.* 46, 7189)

Sex hormones. II. Synergisms between hormones and other compounds. 1. The existence of androgen activator in the whale testis fat and a statistical method to prove the synergism. Y. Ito, B. Tamaoki and M. Egusa (Univ. Tokyo). *J. Pharm. Soc. Japan* 72, 172-82(1952). The fatty acids from whale testis fat hydrolyzate showed synergistic activity to androgens but the neutral fraction had neither such activity nor androgenic activity when measured by seminal vesicle plus prostate anterior and intramedial lobe weight test. (*Chem. Abs.* 46, 7193)

Chemical assay for tocopherol in animal materials. R. W. Swick and C. A. Bauman (Univ. Wis., Madison). *Anal. Chem.* 24, 758-60(1952). The material to be analyzed is homogenized, saponified, acidified, extracted, and the tocopherols separated from the resultant petroleum ether solution by chromatography. The tocopherol concentration of the eluates is determined by a modified Emmerie-Engel method.

Fat metabolism in human subjects. J. R. Chipault. *Ann. Rept. Hormel Inst. Univ. Minn.* 1950-51, 27-31. Triolein incubated with fresh, human feces was partially hydrogenated. Similar saturation of olive-oil fatty acids incubated with *Escherichia coli* was not obtained. Glycerol added to the feces-triolein substrate, as a possible H donor, repressed the formation of saturated acids during incubation. (*Chem. Abs.* 46, 7193)

Stability of carotene concentrates. H. L. Mitchell, W. G. Schrenk and R. E. Silker (Kansas Agr. Exp. Station, Manhattan). *Ind. Eng. Chem.* 44, 1123-24(1952). The effect of various antioxidants is shown on the stability of carotene added to expelled cottonseed meal, expelled soybean meal and unconverted rice bran.

The influence of ingested mineral oil upon the development of an essential fatty acid deficiency in the rat. E. K. Bacon, S. Lassen, S. M. Greenberg, J. W. Mehl, and H. J. Deuel Jr. (Univ. So. Calif., Los Angeles). *J. Nutrition* 47, 383-98(1952). Mineral oil at levels of 2, 3.5, 5, 7.5 and 10% was added to a low fat diet which under ordinary conditions will result in a fatty acid deficiency and cessation of growth in rats in 11-12 weeks. The two higher levels of mineral oil resulted in growth failure after a shorter period. Fecal excretion of total fatty acids was increased by the presence of mineral oil in the diet. A purely solvent action of mineral oil apparently cannot be accepted, since the deficiency symptoms were prevented by either oral or intraperitoneal linoleate.

Nutritive value of lard as affected by the proportion of fat in the diet. R. Hoagland, G. G. Snider and C. E. Swift (U. S. Dept. Agr., Beltsville, Md.). *J. Nutrition* 47, 399-409(1952). No statistically significant differences were found in the efficiency of utilization of feed energy in rats fed isocaloric diets containing 5.0, 10.98 and 18.27% lard.

Effect of penicillin on the tolerance of turkeys to fat. S. J. Slinger, W. F. Pepper, and D. C. Hill (Ontario Agr. College, Guelph, Canada). *Arch. Biochem. Biophys.* 37, 266-69(1952). The energy requirements of turkeys for maximum growth and feed efficiency was in excess of 820 cal./lb. under the test conditions. The addition of 10% corn oil to the diet, raising the energy content to 900 cal./lb., caused growth reduction. The depressing effect on growth of the high level of fat was considerably relieved by supplementation of the diet with penicillin.

Purification of a toxic substance from defatted soy flour. I. E. Liener and M. J. Pallansch (Univ. Minn., St. Paul). *J. Biol. Chem.* 197, 29-36(1952). The purification of a toxic substance from defatted soy bean flour has been accomplished by fractional precipitation with ammonium sulfate to obtain a material of 95% electrophoretic homogeneity. This fraction is virtually free of anti-tryptic activity and is characterized by marked hemaglutinating action. The possible relationship of this material to the poor nutritive value of raw soybeans is discussed.

Acetate as a precursor of milk constituents in the intact dairy cow. M. Kleiber, A. H. Smith, A. L. Black, Mary A. Brown and B. M. Tolbert (Univ. Calif., Berkeley). *J. Biol. Chem.* 197, 371-79(1952). One % of the C^{14} injected into dairy cows as carboxyl labeled acetate was recovered in lactose, 1% in casein and 9% in milk fat. The corresponding yield after injection of methyl-labeled acetate amounted to 2% for casein, 2% for lactose, and 12% for milk fat.

Vitamin E. H. A. Mattill (State Univ. Iowa, Iowa City). *Nutrition Rev.* 10, 225-6(1952). The poor understanding of the mode in which vitamin E functions is emphasized.

The reproducibility of geometrical correction procedures in the spectrophotometric estimation of vitamin A. H. H. Bagnall and F. G. Stock (City Analyst's Lab., Birmingham). *Analyst* 77, 356-63(1952). Recent assessments of the precision of the geometrical correction procedures for the spectrophotometric estimation of vitamin A are discussed.

• Drying Oils

Stuart A. Harrison, Abstractor

The kinetics of the fatty acid esterification of poly alcohols. W. Rubin. *J. Oil and Colour Chem. Assoc.* 35, 418(1952). The esterification of bisphenolepichlorohydrin condensation polymers (Epons) was studied with a variety of catalysts. Rate constants were calculated at various temperatures for the catalysts. A mechanism for the litharge catalyzed esterification is given.

Chemical engineering in alkyd resin manufacture. S. Yokell. *Paint Varnish Production* 42, No. 8, 23(1952). The advantages and disadvantages of a number of methods of heating alkyd kettles are discussed from the standpoint of flexibility, control, and cost. The selection of suitable alloys for kettle construction is considered. The importance of the relation of agitation to heat transfer is stressed. Methods of fume control are discussed.

Dimerized linoleic acid modified alkyds. K. K. Sarin, S. L. Kapur, and J. S. Aggarival. *J. Sci. Ind. Research* **11B**, 31 (1952). Dimerized linoleic acid, prepared from castor oil, was progressively substituted for phthalic anhydride (up to 50% anhydride replaced) in an alkyd containing 28.5 g. phthalic anhydride; 53.8 g. linseed-oil fatty acids; and 17.7 g. of glycerol. Minimum viscosity for 50% solution in benzene was attained at 15% substitution. This 15% resin had good bodying and film-forming properties. Increase in substitution caused progressive decrease in film drying time and increase in water and alkali resistance. (*Chem. Abs.* **46**, 6850)

Analysis of drying oils by ultraviolet spectrophotography. P. Desnuelle and R. Massoni. *Bull. Mens. ITERG* **6**, 204(1952). Linseed oil can be completely analyzed by the determination of saturated acids by Bertram's method, polyethylenic acids by spectrophotography and oleic acid by difference. In synthetic drying oils neither "natural" linolenic nor isolinoleic acids can be determined spectrally since the thermal treatment during the fabrication of these oils involves important isomerizations. (*Chem. Abs.* **46**, 6847)

Mechanisms of autoxidation and drying processes. W. Treibs. *Fette u. Seifen* **54**, 3(1952). The absorption of oxygen by drying oils takes place at the rate of 1 mole of oxygen per each double bond saturated. The primary products are peroxides not hydroperoxides. The primary oxygen addition takes place in the 1,4 or 1,5 positions. Autoxidation results in an increase in the number of ester groups. It appears that the primary reaction in autoxidation is always the formation of peroxide; only the secondary reactions vary. (*Chem. Abs.* **46**, 7341)

Quicker way to dry coatings. Anon. *Chem. Eng.* **59**, No. 6, 249 (1952). A new technique for the quick drying of films is described. Films of oils and other materials are dried in a few seconds by the reaction with vapors of sulfur dichloride.

Improving tall oil esters. E. C. Ford Jr. and M. D. Brewster. *Paint, Oil Chem. Rev.* **115**, No. 17, 14(1952). The preparation and properties of the tall oil esters of sorbitol and pentaerythritol as well as mixed esters are given. The modification of tall oil esters with maleic anhydride, phenolic resins, and china wood oil are described.

The chemistry of polymerized oils. Part III. Reduction of some organic peroxides with lithium aluminum hydride. M. Matic and D. A. Sutton. *J. Chem. Soc.* (1952) 2679. A number of diperoxides were reduced with lithium aluminum hydride to give the alcohols. This work was done preliminary to the reduction of peroxidized oils.

The processing and utilization of castor oil. C. Griffiths. *Paint Manuf.* **22**, 250(1952). This article reviews the processes employed in the preparation of castor oil and its derivatives, together with their application in the paint industry.

Examination of varnish-making vegetable oils. II. H. W. Chatfield. *Paint Manuf.* **22**, 247(1952). This second part concludes an article describing the desirable properties of varnish making oils. The tests used for determining the character of oils and varnishes are described in a general way.

Thermal polymerization of linseed oil. C. Boelhouwer, A. C. Jol, and H. I. Waterman. *Research* **5**, 336(1952). Linseed stand oils of three different viscosities were analyzed for the proportion of inter- and intramolecular polymerization. In each case the intermolecular polymerization predominated. Intramolecular reaction in the linseed oil glyceride molecules takes place by combination of two fatty acid groups to a dimer containing about two rings per molecule.

SINITIRO KAWAMURA

The vinyl esters of fatty acids. I. Synthesis of the vinyl esters of fatty acids. Teruzô Asahara and Minoru Tomita (Univ. Tokyo). *J. Oil Chemists' Soc. Japan* **1**, 76-9(1952). The best catalyst was Hg acetate plus H_2SO_4; $HgSO_4$ and Hg acetate plus H_3PO_4 followed in effectiveness. Fatty acids with 5-6 moles of vinyl acetate at 20-30° with catalyst gave vinyl esters of saturated fatty acids in the yields of 62-75%, the esters of unsaturated fatty acids could be obtained in lower yields (40%).

II. Polymerization of the vinyl esters of fatty acids. *Ibid.* 79-81. Vinyl esters were polymerized in the presence of 2% benzoyl peroxide at 100°. Vinyl esters of saturated fatty acids polymerized in better yields and in shorter times than those of unsaturated acids. Copolymers with vinyl acetate were produced and viscosities were measured.

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Copolymerization of vinyl monomers with fatty oils, fatty acids, resins and the like. E. C. Haines. *U. S. 2,602,071.* Oils such as tung oil, oiticica oil, etc., are styrenated continuously, styrene being added in increments during the reaction.

Styrenated oil—tall oil vinyl esters coating compositions. P. E. Marling. *U. S. 2,603,611.* The vinyl esters of tall oil fatty acids can be added to a styrenated oil in any proportion to give clear films. The vinyl esters plasticize the film. They differ from an oil in that adding an oil such as soybean oil to the styrenated oil results in cloudy or opaque films.

• Waxes

E. F. Guttenberg, Abstractor

New ointment bases. I. Wool wax alcohols, ointments, and water-in-oil emulsions. Fritz Neuwald. *Arch. Pharm.* **284**, 203-7(1951). A review with several formulations. (*Chem. Abs.* **46**, 5258)

Lanette wax SX; its importance and versatility as a base for modern cosmetics. S. P. Jannaway. *Australasian J. Pharm.* **32**, 1374, 1377-8, 1381-2, 1385(1951). A general review and formulary. (*Chem. Abs.* **46**, 5258)

PATENTS

Treatment of montan wax. Frederick W. Breuer and David T. Zentmyer (to Armstrong Cork Co.). *U. S. 2,586,780.* Montan wax is bleached by heating with H_2SO_4; the emulsion thus produced is treated with a mixture H_2SO_4-CrO_3, or with CrO_3 alone. The bleached wax is first treated with a glycol to partially esterify the monocarboxylic acids and to convert most of the dibasic acids to monoesters and then esterified with a higher polyhydric alcohol containing 3-8 OH groups, i.e. pentaerythritol. The resulting wax shows a hardness about equal to that of carnauba wax and is free from gelled products. (*Chem. Abs.* **46**, 5297)

• Detergents

Lenore Petchaft, Abstractor

Antibacterial action of detergents. J. Voets. *Parasitica.* **6**, 98-106(1950). Detergents are divided into nonionic, anionic possessing acidic characteristics, and cationic or ammoniacal products. A relation exists between the diminution of surface tension and bactericidal efficiency of detergents. Efficiency depends not only on the positive or negative charge, but also on the structure of the quaternary molecule. Acidity plays an important part in toxicity; in general, the inhibitory action of a cationic detergent increases with alkalinity, while that of an anionic detergent increases with acidity. Rise in temperature from 20° to 37° increases activity. Suggestions are made for the types of detergents most suitable for various forms of disinfection. 31 references. (*Chem. Abs.* **46**, 6182)

The synthesis of alkylaryl sulfonates as detergent raw materials. A. v. Segesser and H. Stupel. *Chimia.* **6**, 84-6(1952). A review with 38 references. (*Chem. Abs.* **46**, 6411)

Soap plant insulation. R. Leaver and A. H. Lawrence (Lever Brothers Co., Los Angeles, Calif.). *Soap Sanit. Chemicals* **28**, No. 7, 79, 81, 83, 85(1952). Review of plant and equipment of new Lever Brothers Co. soap plant in Los Angeles, Calif., with special emphasis on insulation of various types of plant equipment.

CMC—an aid to washability. J. G. Jarrell and H. B. Trost (Hercules Powder Co., Wilmington, Del.). *Soap, Sanit. Chemicals* **28**, No. 7, 40-3, 155, No. 8, 50-2, 163(1952). Laboratory data are presented which indicate that cotton sized with CMC has a slight resistance to soiling and a marked ease of washing after soiling. Tests run to determine whether this effect was due to the effectiveness of CMC as a detergent additive showed that the CMC is a much more effective washing aid when incorporated on the cloth before soiling rather than in the detergent. The reasons for this phenomenon have not been definitely determined, but may be due to the fact that cotton impregnated with CMC solution might have a reduced attraction for soil due to the increased negativity imparted by these polar compounds. The extreme ease of washability of CMC-sized fabric has been utilized in commercial and home laundries to allow greatly reduced quantities of soap, bleach, and alkali to be used.

Detergents and septic tanks. James E. Fuller (Univ. of Mass., Amherst, Mass.). *Sewage, Ind. Wastes* **24**, 844-50(1952). The effect of non-germicidal detergents on the biological digestion of sewage was studied under laboratory conditions. Eight household and three industrial detergents were investigated. Observations or tests were made on turbidity, scum and sludge accumulation, settleable solids, total bacteria counts, etc. There was no evidence that household detergents, in concentrations likely to be present in sewage at any time, would be detrimental to the proper functioning of septic tanks. There were indications that the industrial detergents would be somewhat more detrimental.

Germicidal soaps. G. Hopf (Allgem. Krankenhaus, Heidberg i., Hamburg, Germany). *Fette u. Seifen* **54**, 89-91(1952). A review. (*Chem. Abs.* **46**, 6854)

Some aspects of detergency (I). E. G. Curphey. *Chem. Products* **15**, 291-5(1952). The physical balance between anion and cation in a detergent compound, together with the influence of viscosity in solution are dealt with in detail. Calculations and results in graph form show how the Debye-Huckel theory may be applied to commercial cleaning problems.

Solvent-detergents. A. Davidsohn. *Soap, Perfumery, Cosmetics* **25**, 724-8(1952). The purpose of a detergent-solvent combination is to have the solvent present for dissolving grease and similar oily dirt, and to have the detergent present as a penetrating and wetting agent, and as an emulsifying agent to carry off the solvent and to keep dirt in suspension. Practical formulations are given using non-ionic detergents (the easiest formulations to make), secondary alcohol sulfates and alkyl aryl sulfonates. A new process in which preparation of the combination is a manufacturing process and not a mixing process is described. The new compound has possible applications in the laundry industry, in metal degreasing operations, and for decarbonizing compounds.

Milled detergent bar. C. F. Jelinek, R. L. Mayhew and J. A. Yeager (General Aniline & Film Corp., Easton, Pa.). *Soap. Sanit. Chemicals* **28**, No. 8, 42-5, 161(1952). The problems involved in manufacture of synthetic bar detergents are outlined. In order to obtain a bar which would have satisfactory lather, especially in sea water, and would not leave a sticky feeling after use, many experimental formulas using various combinations of different synthetics were tried. Thus, from the standpoint of lather, skin detergency, shaving, cotton detergency, dishwashing, physical characteristics, and ease of manufacture, the following bar formulation was found to be a satisfactory all-purpose bar for use in soft, hard, or sea waters: 47% tallow soap, 20% Sorapon SF con., 20% Nekal A, 10% Aerosol AY, 2% carboxymethylcellulose, and 1% perfume.

The use of alkalies in cleaning processes. I, II. P. G. Clements and T. Kennedy (Joseph Crosfield & Sons, Ltd., Warrington, Eng.). *Ind. Chemist* **28**, 152-7, 301-5(1952). Review of the mechanism, both physical and chemical, of the removal of dirt from a surface and the factors including emulsification, rinsability, effect of hard water on detergent solutions, and bactericidal power of alkaline detergents, affecting the application of alkaline detergents for this purpose. Also reviewed is the effect of alkaline detergents on various materials of construction such as aluminum, copper, copper alloys, glass linings, iron and steel, plastics, rubber, stainless steel, tin, wood, and zinc.

Testing for polyglycol ethers of the Leonil O type in woolen clothes. Hermann Haakh, Dori v. Candie, and Wilhelm Mobus. *Melliand Textilber* **32**, 699-701(1951). Leonil O consists of 1 molecule sperm-oil alcohol and 20-30 molecules ethylene oxide. I was used as wartime substitute for soap. Its presence is shown qualitatively and quantitatively in dilutions as low as 1:100,000, by a red-brown precipitate with a ''tannin'' prepared by condensing resorcinol (I) with glucose (II) in the presence of H_2SO_4. Other similar polyglycol ethers and other polymeric materials may also be precipitated with this reagent and similar ''tannins'' prepared with I and benzaldehyde and glyoxylic acid. Such polyglycol ethers may also be quantitatively shaken out of aqueous solutions with BuOH. (*Chem. Abs.* **46**, 4804)

Improving liquid soap quality. Paul I. Smith. *Am. Perfumer.* **60**, 53(1952). A sequestering agent to be used in improving liquid soaps must be light colored, free from odor and soluble in water; it should be highly surface-active in dilute solutions; it should not precipitate proteins and be non-colloidal; it should exert water softening action even in dilute soap solutions; it should prevent formation of insoluble metallic soaps; it should have a good shelf life and be unaffected by other soap additives; and it should not increase the skin irritant effect of the soap.

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Sulfation of higher alcohols with sulfamic acid. Saburô Komori, Seizaburô Sakakibara, and Kazuo Nambu (Osaka Univ.). *J. Oil Chemists' Soc., Japan* **1**, 73-6(1952). Lauryl, cetyl, and oleyl alcohols with NH_2SO_3H at 125-145° gave $ROSO_3NH_4$. As catalysts urea (best), acetamide, thiourea, pyridine, α-picoline, and dimethylaniline were examined. Specific surface tension and foaming power of these NH_4 salts were measured.

Detergents and human skin. Masao Nonaka (Mitsuwa Chem. Inst.). *J. Oil Chemists' Soc., Japan* **1**, 67-70(1952). A review with 18 references.

Fatty acid amides and their derivatives. III. Properties of aqueous solutions of sodium fatty acid amide-N-methyl sulfonate. Tokuzô Yoshizaki. *J. Chem. Soc. Japan,* Ind. Chem. Sect. **55**, 296-8(1952). Na lauric (I), palmitic (II), and stearic (III) amide-N-methyl sulfonate, synthesized by the method described in Part I [*Ibid.* **54**, 415(1951)] (cf. Japan. Pat. 136,497 and U. S. Pat. 2,313,695), were tested as surface-active agents. II and III were superior to I in surface tension, foaming capacity, and interfacial tension against kerosene, while I was superior to II and III in penetrating power.

IV. Emulsifying and detergent powers of sodium fatty acid amide-N-methyl sulfonate. *Ibid.* 352-4. II and III were superior to I in these properties.

PATENTS

Color stabilized detergent composition. Herbert L. Sanders and William J. Maxcy (General Aniline & Film Corp.). *U. S. 2,601,329.* The darkening or discoloration of polyglycol ether type detergents is prevented even in the presence of alkali metal hydroxide by the addition of a small amount of thiourea.

Process for production of washing powder from a normally oily liquid synthetic soapless detergent. Frederick J. Pollok (Imperial Chemical Industries, Ltd.). *U. S. 2,603,605.* Preparation of non-exuding washing powders containing a mixture of inorganic solids such as Na_2CO_3, $NaHCO_3$, Na_2SO_4, and a jelly formed in an aqueous medium by the addition of a water soluble cellulose ether (Na salt of CMC) to a soapless detergent of the oily liquid type (polyethylene oxide condensation product of an alkyl phenol).

Stabilized aqueous solutions of surface-active sodium secondary alkyl sulfates. Siegfried Leonard Langedijk and Pieter Nicolaas Degens (Shell Development Co.). *U. S. 2,603,606.* A process for stabilizing solutions of higher surface-active secondary sodium alkyl sulfates by the addition of enough inorganic potassium salt to result in a quantity of potassium ions sufficient to prevent crystallization even at low temperatures.

Detergent composition containing diimidazoles. Franz Ackermann and Jules Meyer (Ciba Ltd.). *U. S. 2,604,454.* A detergent composition consists essentially of a water-soluble, synthetic organic, anion-active detergent such as soap or synthetic sulfonated detergent with improved whitening effect in washing due to the addition of a small amount of an asymmetric substitution product of a diimidazole.

Deaeration and drying of water-soluble sulfonated detergent compositions. Earl Davis (Purex Corp.). *U. S. 2,606,156.* A solid detergent of the class consisting of synthetic anionic sulfated and sulfonated water soluble detergents and of increased density is made by subjecting an air-containing fluid aqueous slurry of the detergent to deaeration, without drying, at subatmospheric pressure in one zone, and then drying the deaerated fluid slurry in another independent zone to produce the detergent in solid form.

Detergent compositions. Marchon Products, Ltd., and A. Taylor. *Brit. 674,896.* A detergent composition comprises a sulfated or sulfonated detergent compound which has been neutralized with an organic base, a hydrophilic colloid and a fatty acid alkylolamide.

Synthetic detergents and emulsifiers. J. P. A. Vallernaud. *Fr. 971,322.* Murumuru butter or the acids derived therefrom, alone or mixed with lauric acid, was treated with amines, such as MeEtNH, MePrNH, MeBuNH, $HOCH_2CH_2MeNH$, $HOCH_2CH_2EtNH$, dodecylethylamine, 9-octadecenylethanolamine, or 12-hydroxy-9-octadecenylethanolamine; the products were then sulfonated or phosphated, e.g. with chlorosulfonic acid, P_2O_5, acid chlorides, or concentrated H_2SO_4. Murumuru butter (200 kg.) was treated with 70 kg. of methylmonoethanolamine at 170° for 2 hrs., and the water formed was distilled off. The solid product (100 kg.) was treated with 80 kg. oleum and 10 g. NH_4 vanadate until it was water-soluble; Na_2CO_3 was added until the solution was neutral, giving a white Na salt, which was a good detergent and emulsifier. (*Chem. Abs.* **46**, 7348)