give poor yields, and the use of less urea results in lower purities.

Experimental

Linolenic Acid Concentrate. Linseed oil fatty acids (composition: 47% linolenic acid, 17% linoleic acid, 27% oleic acid, 9% saturated acids) were prepared from linseed oil by the rapid saponification technique (5). To a hot solution of 2,000 g. of urea in 5,000 ml. of methanol, 1,000 g. of linseed oil fatty acids were added with good mixing. Immediate precipitation occurred, and the solution was allowed to stand over-night at room temperature (16–24 hrs.). The complexes were filtered off and discarded. Most of the methanol was evaporated from the filtrate under a stream of nitrogen, and water was then added to dissolve the urea. The oil which separated was washed several times with water and dried by gentle heating under vacuum in a stream of nitrogen. The recovered acids weighed 425 g .; iodine number 241. Distillation from an alembic flask yielded 350 g. of linolenic acid concentrate, b.p. 160–162°/0.1, as a pale-yellow oil; iodine number 253; neutralization equivalent, 280; composition: linolenic acid 84%, linoleic acid 14%, oleic acid 0%, saturated acids 2%. The yield of linolenic acid recovered was 63%.

Ethyl Linolenate Concentrate. Some 2,000 g. of linseed oil fatty acids, 2,000 ml. of absolute ethanol, and 40 g. of naphthalenesulfonic acid were refluxed for 6 hrs. A large quantity of water was added, and the upper layer was washed several times with water and dried. The crude ethyl esters weighed 2,122 g. (97% yield); acid number 10. These were dissolved in a hot solution of 4,240 g. of urea in 10,600 ml. of methanol, and the complexes were separated as described above. From the filtrate 775 g. of esters were obtained; iodine number 210; saponification number 182. (Considerable difficulty was experienced with emulsions in the separation of the oily layer from the water. Petroleum naphtha, hexane fraction, was used to assist the separation.) Distillation yielded 620 g. of ethyl linolenate concentrate, b.p. 134–138°/0.1, iodine number 230; saponification number 183; acid number 14; composition: linolenate 82%, linoleate 12%, oleate 3%, saturated 3%. The yield of recovered linolenate was 54%.

Summary

Linolenic acid and ethyl linolenate concentrates (80–85%) have been obtained from linseed oil fatty acids or ethyl esters in 50–60% yield, based on linolenic recovery, by a single urea complex separation at room temperature.

REFERENCES

1. Knafo, G., Bull. mens. inform. ITERG., *7*, 114–123 (1953).
2. Loury, M., and Heliot, H., Rev. Franc. Corps Gras, *2*, 488–495 (1955).
3. Newey, H. A., Shokal, E. C., Mueller, A. C., Bradley, T. F., and Fetterly, L. C., Ind. Eng. Chem., *42*, 2538–2541 (1950).
4. Schlenk, H., and Holman, R. T., J. Am. Chem. Soc., *72*, 5001–5004 (1950).
5. Swern, Daniel, Knight, H. B., Scanlan, J. T., and Ault, W. C., Oil and Soap, *22*, 302–304 (1945).
6. Swern, Daniel, and Parker, W. E., J. Am. Oil Chemists' Soc., *30*, 5–7 (1953).

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

• Oils and Fats

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Oil from the seed of Hippophaë rhamnoides III. Refining, hydrogenation, and drying tests and the possible use of interfacial tension as a measure of degree of refining. H. P. Kaufmann and A. Vázquez Roncero. *Grasas y aceites(Servilla, Spain)* 7, 21–6(1956). The seed oil of *H. rhamnoides* was found to be a drying oil as expected from its fatty acid content which includes linoleic 35 and linolenic acids 27%. Refined oils have a lower interfacial tension toward distilled water than do the crude oils. The interfacial tension of an oil toward distilled water might be used as a measure of the degree of refining of the oil. (*C. A.* **50**, 10428)

Seed fats of the Euphorbiaceae family. I. Chemical examination of the seed from Trewia nudiflora. S. Sarkar and M. M. Chakrabarty(Bose Inst., Calcutta). *Science and Culture(India)* **21**, 473–4(1956). The mixed fatty acids obtained from the oil extracted from the seeds of *T. nudiflora* contained α-eleostearic acid 39.50, linoleic acid 25.13, and oleic plus saturated acids 35.37%. The oil is similar to tung oil. (*C. A.* **50**, 10427)

Changes in olive oil foots(orujo). J. Gracián Yous, G. Arévalo, F. Albi, and A. Plasencia(Inst. grasas, Serville). *Grasas y aceites(Servilla, Spain)* **6**, 276–83(1955). Moisture and oil content on a dry basis and the iodine value of the oil decreased during 150 days' storage whereas the free fatty acids increased. These changes were due principally to hydrolysis, oxidation, and polymerization. (*C. A.* **50**, 10428)

Analysis and constitution of "oxidized acids." C. Paquot and M. Querolle(Lab. general corps gras C.N.R.S., Paris). *Compt. rend. 27e congr. intern. chim. ind., Brussels* **1954**, 3; *Industrie chim. belge* **20**, Spec. No., 724–6(1955). The acidic products arising from the slow spontaneous autoxidation of oil from olive husks are separated into 4 fractions by fractional precipitation from hot aqueous alcohol or acetone, or by precipitation from ethyl acetate with hexane. These contained: a Diels-Alder dimer of hydroxylinoleic acid; *cis*-9, 10-dihydroxystearic acid; a normal fatty acid fraction entrained during precipitation of the oxidized acids; and a dark viscous residue containing the first two and unidentified carbonyl compounds. (*C. A.* **50**, 10428)

Continuous distillations of synthetic fatty acids. A. Ya. Koldovkin and A. N. Bodan. *Khim. i Tekhnol. Topliva* **6**, 1-8(1956). European and American methods for the purification of natural fatty acids are analyzed with regard to use for separation of the fatty acids obtained by the oxidation of paraffins. (*C. A.* **50**, 16137)

Liquid n-paraffins as raw material for the synthesis of higher fatty acids. V. K. Tsyskovskii, Ts. N. Shcheglova, and E. M. Nebylova(Leningrad Petroleum Inst.). *Khim. i Tekhnol. Topliva* **6**, 9–14(1956). Oxidation of *n*-alkanes (C_{12}–C_{22}) was carried out in all-glass equipment at 130 ± 1° with manganese naphthenate as the catalyst. The concentration of *n*-alkanes in the starting material was found to be the main factor determining the composition and kinds of fatty acids in the product. (*C. A.* **50**, 16138)

The preparation of fatty acids by the direct oxidation of (petroleum) solar oils. St. Anastasiu and T. Wexler. *Rev. chim. (Bucharest)* **6**, 241(1955). In preliminary experiments, the aeration of solar oils (36 hours at 85–100°) in the presence of 1% Mn stearate gave, on decantation and removal of the nonsaponifiable fraction, technical grade fatty acids in 25% yield. (*C. A.* **50**, 16139)

Guiding principles in the production of a catalyzer for hardening fats. J. Górniak. *Przemysl Spożywczy* **10**, 169–71(1956). Detailed description is given of methods for production and regeneration of a catalyst produced from nickel formate. (*C. A.* **50**, 16139)

Spectrophotometric method for determination of pigments in vegetable oils. B. Ya. Sterlin and A. N. Mironova. *Masloboino-Zhirovaya Prom.* 22(4), 10–12(1956). The spectral-transmittance curves (1 mm.) for raw, neutralized, and bleached sunflower, rapeseed, soybean, and cottonseed oils was used in the selection of a refining method to improve their stability during storage. (*C. A.* **50,** 16139)

Adaptation of saline-base methods in fat industry works at Szamotuly. M. Zuromski. *Przemysl Spożywczy* **10,** 203–5 (1956). Presence of a brine underlayer during the neutralization of oil resulted in 1–2% higher yields than those of the conventional refining process. This increase in output of refined oil was achieved by reducing the neutral oil content in soap stocks. (*C. A.* **50,** 16139)

Presence in oily seeds and sprouts of substances that destroy lipide peroxides. P. Dubouloz and J. Laurent(Univ. Marseille, France). *Compt. rend. soc. biol.* **150,** 216(1956). Oil-bearing seeds contain agents which decompose lipide peroxides. The agents remain in the seed cake after the oil is pressed out. Upon germination of flax seed and soybeans these substances become distributed throughout the young sprouts. (*C. A.* **50,** 16139)

Rapid method for determination of stability of fats and oils. O. K. Palladina and K. S. Stepanova. *Masloboino-Zhirovaya Prom.* 22(4), 16–8(1956). Data are tabulated on the relative susceptibility to oxidative deterioration of raw and refined cottonseed, sunflower and peanut oils, raw soybean and refined sesame oils, hydrogenated sunflower, peanut, and whale oil, and beef tallow as determined iodometrically after the exposure of 1 g. sample on a filter paper in a petri dish to ultraviolet light for 5, 10, 15, and 20 minutes. The usefulness of this method for indicating the susceptibility of fat or oil to deterioration is discussed. (*C. A.* **50,** 16139)

Determination of the completeness of (alkali-refined) oil washing. A. G. Styazhkina. *Masloboino-Zhirovaya Prom.* 22(4), 18–20(1956). In this method the color of sample, prepared by boiling 10 g. of oil in 50 ml. of distilled water for 3 minutes and treated with 3 drops of 1% solution of phenolphthalein, is compared with that of a series of permanent standards containing up to 240 γ of rhodamine per 10 ml. and calibrated against soap solutions prepared in a similar way. Advantages of this method over the standard method are that the whole process can be carried out in a comparatively short time and thus used to control washing in the refining procedure. (*C. A.* **50,** 16140)

Component fatty acids of Impatiens balsamina seed fat. S. Sarkar and M. M. Chakrabarty(Bose Inst., Calcutta). *Science and Culture(India)* 21, 616–8(1956). The following fatty acids were found: palmitic 4.7, stearic 5.8, arachidic 2.8, oleic 18.3, linoleic 9.2, linolenic 30.2, and parinaric 29.1%. Low molecular weight, water soluble fatty acids, e.g. acetic acid were not detected. (*C. A.* **50,** 16140)

The influence of the peroxides content on the stability of cool stored lard. A. Domański. *Przemysl Spożywczy* 9, 22–4(1955). Lard could be stored (4°) for four months when its peroxide index(ml. of 0.002 *N* sodium thiosulfate per g. lard) was below 1.5. An index of 1.5–2 permitted 2 months' storage, and lard exhibiting an index over 2 had to be consumed immediately. (*C. A.* **50,** 14995)

Formation of bitter substances in cereals. II. Connection between autoxidation and formation of bitter substance. M. Rothe(Inst. Ernahrungsforsch., Potsdam-Rehbrucke, Ger.). *Fette, Seifen, Anstrichmittel* **56,** 667–70(1954). It is believed that the formation of bitter substances results from the reaction of antioxidant complexes with fat peroxides. Such complexes are formed by transfer of peroxide oxygen to the antioxidant followed by polymerization of the fat to a bitter substance. (*C. A.* **50,** 15980)

Changes of fried oil during cooking. II. Acid value, iodine value, specific gravity, and viscosity. Masae Kotsubo and Fumiko Ueyanagi(Kochi Univ.). *J. Home Econ. (Japan)* **6,** 5–8 (1955). Acid values, viscosity, and specific gravity of soybean, rapeseed, and sesame-seed oils increased on repeating a frying process. Iodine values of sesame-seed oil decreased steadily but those of soybean and rapeseed oils decreased sharply at first followed by a slight increase before further decrease began. A linear relation was found between their iodine values and viscosities. (*C. A.* **50,** 14995)

The treatment of alkali-refined linseed oil with activated fuller's earth. C. W. H. King and G. H. Hutchinson(John M. Hamilton & Co., Ltd., Hull, Engl.). *J. Oil & Colour Chemists' Assoc.* 38, 673–93(1955). (*C. A.* **50,** 15104)

Chemical composition of gokhru seed oil. C. V. N. Rao and P. D. Kebra(Laxminarayan Inst. Technol., Nagpur). *Indian Soap J.* **20,** 103–4(1954). The seed of *Xanthium strumarium* yielded 25.5% kernel. The kernels yielded 33.1% oil which had the following characteristics: *d* 0.9910, *n* 1.4713, saponification value 199.8, iodine value(Wijs) 119.9, iodine value(Woburn) 125.9, diene value 9.27, unsaponifiable matter 0.66%, and solid fatty acid content 10.27%. The oil had the following composition: total saturated acids 11.12, oleic acid 36.66, linoleic and isolinoleic 52.22, and linolenic 0%. (*C. A.* **50,** 15103)

Fatty acids from seed oil of Panax schinseng. Goichi Kurono, Takeshi Sakai and Isoko Aeki(Kanazawa Univ.). *Ann. Rept. Fac. Pharm. Kanazawa Univ.* **5,** 1–4(1955). Powdered seed of *P. schinseng* on extraction with ether and saponification with 10% potassium hydroxide yielded petroselinic acid, oleic acid, and a little petroselaidic acid. Palmitic and linoleic acids were not found. (*C. A.* **50,** 15103)

Polarographic investigations of gossypol. II. Effect of temperature and oxidizing agents on gossypol in model preparations. A. L. Markman and S. N. Kolesov. *Zhur. Priklad. Khim.* **29,** 424–32(1956). The content of gossypol as determined by polarographic method decreased slowly and uniformly with time in refined sunflower oil at 80°. At higher temperatures the decrease was abrupt during the first 0.5 hour and then tended to approach a constant value. This suggested that a reagent in the oil reacts with gossypol. Gossypol itself is stable at 120° (2.5 hours), slowly decomposed at 140° (0.5 hour), and only at 160–180° does it decompose rapidly. The peroxides in sunflower oil are stable at 100°, 40% remain on attaining 120°, and only at 140° is all the free oxygen driven off. In a solution of gossypol in sunflower oil either all of gossypol or all of the peroxide is decomposed, depending on which is in excess. At 120° and below only the presence of peroxides, and to a lesser degree dissolved oxygen from the atmosphere can account for the decomposition of gossypol. (*C. A.* **50,** 15103)

Oils derived from composites. M. Dima, Gh. V. Cotrut, E. Diaconescu, N. Simionescu, and A. Carpov. *Acad. rep. populare Romåne, Filiala Iasi Studii cercetari stiint* **4**(1–4) 273–89 (1953). Oils extracted from composite seeds, e.g., *Xanthium strumarium, X. spinosum,* and especially *X. schinatum* which grow in Southern Rumania were investigated. The oils contain glycerides of palmitic, stearic, oleic, and linoleic acids and are of the semi-drying type. According to test they can be used for food and technical purposes. (*C. A.* **50,** 15103)

Oxidative deterioration of animal fat. M. Necheav(Technol. Inst. Meat and Dairy Ind., Moscow). *Myasnaya Ind. S.S.S.R.* **27**(3), 46–9(1956). Freshly prepared beef, pork, and butter fat samples were air oxidized in closed containers at 60–80°, pressure of 2–2.5 or 50 mm. Hg., and for 1 to 400 hours. The formation of epoxide oxygen starts at 7–8 mg. oxygen per g. of fat; and at this stage the fats become unpalatable. During the oxidation of thin, 2–5 mm., fat layers at 60° and 75° the decrease in unsaturation were equally pronounced in all three kinds of fat. When the thickness of fat was increased to 50 mm., the amount of peroxides formed in pork fat was 2–3 fold greater than that formed in beef and butter fats. The lower stability of pork fat is attributed to its greater unsaturation and presence of a lesser amount of natural antioxidants. (*C. A.* **50,** 15102)

Branched-chain fatty acids. F. B. Shorland(Dept. Sci. Ind. Research, Wellington, N. Z.). *Australian J. Sci.* **19,** 1–6(1956). A review, covering occurrence, physical properties, constitution, synthesis, and biochemistry. (*C. A.* **50,** 15099)

Separation of saturated straight-chain fatty acids. II. Qualitative paper ionophoresis. Olavi Perilä(Finland Inst. Technol., Helsinki). *Acta Chem. Scand.* **9,** 1231–2(1955). The acids from acetic to $CH_3(CH_2)_7COOH$ were separated ionophoretically in aqueous sodium hydroxide solution buffered with boric acid to pH 9.0. Acids from acetic to palmitic were separated with 0.2 *N* sodium hydroxide in glycerol at 90°.

Properties of white and yellow ox fats. E. Barresi(Univ. Messina, Sicily) and U. Gambino. *Atti soc. ital. sci. vet.* **9,** 451–4 (1955). Determinations of acid, peroxide, Reichert-Meissl, Polenske saponification number and refractive indices of the two classes of fats showed no considerable differences. (*C. A.* **50,** 15102)

Investigations on the elaidinization of vegetables oils. The influence of cis-trans isomerism on the solubility of vegetable oils in furfural (furfuryl aldehyde). E. Algelescu and F. Esanu. *Acad. rep. populare Romåne, Bul. stiint., Sect. stiint. teh. si chim.* **4,** 359–77(1952). Sunflower and olive oils were elaidinized with selenium or nitrous acid as catalyst. The elaidinization process did not effect the solubility in furfural, except when addition products of the oils and elaidinization catalysts were present. Catalyst-oil addition products developed with sunflower oil but not with olive oil. It is suggested that determination of solubility in furfural could be used as a control procedure in commercial hydrogenation. It is less tedious and more rapid than the iodine number determination. (*C. A.* **50**, 15102)

Brazil nuts and their possible industrial use. María Jesús Ojeda. *Ch. Bol. quím. peruano* **3**(18–19), 12–14(1955). The kernel of *Bertholletia excelas* was analyzed as moisture 5.20, fat 66.68, protein 17.40, crude fiber 4.35, ash 2.35, calcium 0.0098, iron 0.21, phosphorus 0.193, and alkalies 1.88% with 683.99 cal per gram. A clear-yellow oil with agreeable odor and taste, d_{15} 0.9200 and n_{25} 1.4710 was obtained containing the acids: myristic 0.30, palmitic 15.00, stearic 6.00, oleic 48.00, and linoleic 30.00%. (*C. A.* **50**, 15102)

Improved preparation of 9(10), 10(9)-ketohydroxystearic acids by oxidation of oleic acid with potassium permanganate in neutral solution. J. E. Coleman, C. Ricciuti and D. Swern(Eastern Regional Research Lab.). *J. Am. Chem. Soc.* **78**, 5342–5345(1956). The mild oxidation of oleic acid, as the potassium soap, with dilute aqueous potassium permanganate has been reinvestigated and the marked effect of pH in determining the course of the reaction has been interpreted. When the pH is maintained in the range of 9.0–9.5 by neutralizing the liberated alkali as it is formed, 65–75% conversions to 9(10), 10(19)-ketohydroxystearic acids are obtained. If excess alkali is added before oxidation or is permitted to accumulate (pH 12), yields of ketol are reduced to 0–30% and yields of 9,10-dihydroxystearic acid jump to 60–96%. It has been concluded that the ''neutral'' oxidation of postassium oleate by potassium permanganate was never actually studied by previous investigators. A mechanism based on stepwise (pH controlled) or complete (pH not controlled) hydrolysis of the intermediate cyclic complex between oleic acid and potassium permanganate is proposed to account for this striking reversal of products. Also, with pH control the concentration of the reaction mixture is increased 20-fold over the best values reported in the literature. The oxidation of elaidic, however, is only slightly pH-dependent; this is not understood. Octadecadienoic acids are converted predominantly to polymeric products.

Alcoholysis of wool grease. Takaharu Miyakawa and Hiroshi Noguchi(Osaka Ind. Research Inst., Osaka). *J. Japan Oil Chemists' Soc.* **5**, 145–8(1956). Interesterification of wool grease was examined using methanol or ethanol as solvents and metallic sodium or potassium hydroxide as catalysts. Under suitable conditions 60–70% methanolysis or about 50% ethanolysis could be secured.

Wool grease. Preparation of methyl esters and other derivatives of wool fatty acids. Takahara Miyakawa, Hiroshi Noguchi, and Hideo Nomizu(Osaka Ind. Research Inst., Osaka). *J. Japan Oil Chemists' Soc.* **5**, 145–52(1956). In purification of wool fatty acids and preparation of their derivatives it was found desirable to follow the course through methyl esters. Methylation could be carried out easily by adding mineral acid into the suspension of calcium salts in methanol. The methyl esters reacted nearly quantitatively with ethanolamine, in 85% yield with ammonia, and also smoothly with polyhydric alcohols (polyethylene glycol, pentaerythritol, and sorbitol) in the presence of Zn and ZnO. It was possible to separate hydroxy acids by adsorption of methyl esters on alumina.

Shortenings. II. The shortening quality of shortenings. Kimitoshi Nakazawa, Tetsuo Shimada, and Mitsugu Umezawa (Nihon Yushi Co., Tokyo). *J. Japan Oil Chemists' Soc.* **5**, 89–93(1956). Shortening values were determined on commercial shortenings and margarines by a shortmeter after C. E. Davis (1921) and C. H. Bailey (1934). The shortening quality of commercial shortenings from rape and cottonseed oils was generally superior and that from coconut oil was inferior. The creaming quality had no direct relation with shortening quality. Addition of emulsifiers such as monoglyceride and lecithin also had no effect on shortening quality. Hydrogenation of rape oil increased shortening quality. Moderate selective hydrogenation was best among hydrogenation methods to give good plasticity and shortening quality. Lard was one of the best from the viewpoint of shortening quality.

Examination of fats and fat products. A committee report. Tomotaro Tsuchiya et al. *J. Japan Oil Chemists' Soc.* **5**, 115–26(1956). This is the concluding part of the series. The methods described include: cooling tests, iodine no. (Wijs and Hanus methods), hexabromide no., acetyl no., hydroxyl no., Reichert-Meissl no., Polenske no., and peroxide no.

Fatty oils of aquatic invertebrates. XIII. Fat from horse shoe crab, Tachypleus tridentatus. Yoshiyuki Toyama and Toru Takagi(Nagoya Univ.). *J. Chem. Soc. Japan, Pure Chem. Sect.* **77**, 754–6(1956). Female and male sample gave, respectively, 16.1, 21.5% ether extract, and the acetone-soluble fat showed d_4^{30}—, 0.9011; n_D^{30}—, 1.4653; acid no. 11.3, 7.0; saponification no. 167.2, 173.4; iodine no. 73.9, 98.8; unsaponifiable matter 23.03, 14.88%; sterol in unsaponifiable matter 30.6, 21.4%. The content of unsaturated fatty acids was hexaenoic 1.50, 2.63; pentaenoic 2.73, 7.20; tetraenoic 2.06, 2.79; trienoic 1.73, 0.91; dienoic 1.65, 0.38%, when determined by ultraviolet spectroscopy of isomerized fatty acids. Oleic and palmitic acids were identified as components. This fat contained cholesterol, another 5-sterol, batyl alcohol, and possible selachyl alcohol.

XIV. Fatty oils from one species of holothurioidea, nine species of gastropoda, and two of anthozoa. Yoshiyuki Toyama and Tatsuo Tanaka(Nagoya Univ.). *Ibid.* 756–9(1956). The species examined, ether extract (%), and the characteristics (n_D^{40}, acid no., saponification no., iodine no., unsaponifiable matter, neutralization no., and iodine no. of fatty acids, sterol content [%], m.p. of the sterol, and provitamin D content [%]) of the fatty oils (soluble in acetone), were, respectively, *Stichopus japonicus*, 1.1, 1.4769, 23.5, 152.6, 108.2, 17.04%, 184.1, 108.4, 10.46, 103–6°, 0; *Actinocyclus japonicus*, 5.0, 1.4878, —, 125.7, —, —, —, —, 34.44, 108–111°, 0; *Philine japonica*, 4.4, 1.4802, —, 142.0, —, —, —, 98.7, 29.20, 117–120°, 0; *Turris unedo*, 7.2, 1.4753, 32.7, 159.1, 116.4, 19.76, 194.4, 120.5, 55.92, 126–8°, 0.56; *Asprella sieboldi*, 5.5, 1.4836, 65.6, 133.4, 133.2, 30.33, 183.9, 128.8, 43.63, 135–7°, 0.85; *Fusinus perplexus*, 5.1, 1.4841, 57.9, 143.8, 144.1, 25.12, 186.9, 139.5, 33.53, 122–4°, 2.3; *Chicoreus sinensis*, 5.6, 1.4803, 48.4, 133.3, 142.7, —, 185.5, 136.7, 36.41, 133–6°, 3.4; *Ficus subintermedius*, 5.0, 1.4913, 50.2, 141.2, 126.1, —, 187.0, 116.9, 50.95, 134–6°, 1.1; *Tonna tessellata*, 4.7, 1.4879, 76.4, 129.9, 130.3, —, 183.9, 133.5, 29.25, 120–3°, 0.99; *Apollon perca*, 4.4, 1.4873, 82.9, 142.4, 134.6, 26.80, —, 142.8, 39.94, 127–9°, 2.4; *Pterolides sparmanni*, 9.2, 1.4860, —, 137.5, 168.3, —, 191.8, —, 31.59, 116–18°, 0.17; and *Calliactis japonica*, 3.8, 1.4847, 35.8, 127.4, 166.9, 32.20, 186.3, 179.0, 54.46, 132–4°, 0.07. The sterol of *Actinocyclus japonicus* and *Philline japonica* had an absorption maximum at 277–8 mμ. *Calliactis japonica* contained cholesterol as the principal sterol.

Oxidation of rape seed oil and its fatty acids. 1. Peroxyacid oxidation. Sachiko Oohara and Yuichi Shinozaki(Okayama Univ.). *J. Japan Oil Chemists' Soc.* **5**, 222–6(1956). In peroxyacid oxidation of rape oil, when 100 parts of rape oil were reacted with 200 parts acetic acid and 60 parts 30% hydrogen peroxide at 102–105°, most of the hydroxylation was finished in the initial 15–30 min. and decomposition and other reactions seemed to follow afterwards. The product showed considerably higher viscosity than hitherto prepared hydroxylated oils. The yield of dihydroxybehenic acid was higher from erucic acid than from brassidic acid both by methods of peroxyacid oxidation and potassium permanganate method. Monohydroxybehenic acid (m.p. 91.5°) was prepared from erucic acid.

II. Oxidative decomposition of erucic acid. Sachiko Oohara and Yuichi Shinozaki. *Ibid.* 226–9. Treatment of erucic acid or dihydroxybenhenic acid in acetone with potassium permanganate gave brassylic acid in 80% yield. When dihydroxybehenic acid was decomposed oxidatively with lead tetraacetate, the *cis* form was decomposed a little more rapidly than the *trans* form. Oxidative decomposition of erucic acid with nitric acid gave pelargonic, arachidic, brassylic, and dodecadienoic acids.

Effects of x-irradiation on lipide metabolism. II. Uptake of P^{32} into rat liver phospholipides. E. O. Weinman, S. R. Lerner and C. Entenman(U. S. Naval Radiological Defense Lab., San Francisco, Calif.). *Arch. Biochem. Biophys.* **64**, 164–174(1956). The effect of whole-body x-irradiation on the incorporation of inorganic P^{32} into phospholipides of rat liver and liver cell fractions were studied both *in vitro* and *in vivo*. Liver slices from rats, 24 hr. after exposure to 1000 or 2500 r., incorporated more P^{32} into phospholipides than did slices from unirradiated rats. Increased incorporation also occurred in the various cell fractions studied, namely nuclei, mitochondria, microsomes, and supernatant. No increase in P^{32} incorporation into phospholipides of the liver or liver cell fractions was noted in rats which were injected with inorganic P^{32} 24 hr. after irradiation with 2500 r.

Deterioration of fats and the antioxidants. H. Raeithel(Institut für Lebensmitteltechnologie und Verpackung, Monoco). *Olii-Grassi-Colori* **33**, 259–269(1956). The various sorts of deterioration of fats are described(chemical-physical processes, biological and enzymatic processes, and purely chemical processes).

In a more detailed way the phenomena of atmospheric oxidation are described and means for testing the rancidity of an oil or fat discussed. A discussion about the antioxidants and their mode of action forms the conclusion.

Valorization of acid oils especially cottonseed oil. C. Paquot. *Olii-Grassi-Colori* **33**, 270–274(1956). The acid oils obtained through acidification of soapstocks can be transformed by different treatments into industrial products. Referring to acid cottonseed oil of a deficient quality, the author makes suggestions about various methods of fractionation, purification, and hydrogenation by means of which one may obtain fatty acids such as oleins and neutral liquid or solid oils.

Stearin and olein by fractionation with hexane. Note 1. Repartition of the unsaponifiable matter between the stearic and the oleic fractions. G. B. Martinenghi. *Olearia* **10**, 123–129(1956). The first note of this study described results of tests obtained in fractionating tallow fatty acid with hexane and also with 90% MeOH at temps. −20° to 10°. The product with hexane was a stearic precipitate practically free from unsaponifiable matter and with iodine number less than 1. With MeOH the stearin contained unsaponifiable matter, traces of methyl esters, and had an iodine number of 3 at least. The advantages offered by the new CITIOSOL process with hexane are stressed.

Determination of oil acidity from oilseeds. G. Gigoni. *Olii-Grassi-Colori* **33**, 306–308(1956). To prevent any alteration of the oil before the extraction it is suggested that the oil seeds be ground in the presence of the solvent (petroleum ether) with direct titration of the oil solution. The treatment at 100–105° in order to block the lipases is effected on the unbroken seed.

The separation of fatty acids. Industrial production. A Fichoux. *Rev. franc. corps gras* **3**, 504–517(1956). Fatty acid distillation is discussed with regard to number and size of plates, heating, rectification, etc. with special reference to tall oil.

Ultraviolet spectrophotometric research on seed oils and their mixtures with olive oils. G. D'Arrigo. *Olii-Grassi-Colori* **33**, 299–304(1956). Ultraviolet absorption curves have been determined for pure and refined seed oils, alone or in combination with olive oil obtained by pressure. It was found that unrefined oil can be distinguished by the fact that it intensifies the absorption at 230 and 270 millimicrons.

The preservation of oils. Anti-oxidizing action of ascorbylpalmitate on some vegetable oils. G. Cerutti. *Olearia* **10**, 130–132(1956). Results are given for stability tests made on samples of olive oil, blended seed oils, and groundnut oil, to which ascorbylpalmitate has been added, and stored without any special precautions. The anti-oxidizing qualities of this ester of ascorbic acid are confirmed by the tests listed. After six months of storage there has been no appreciable increase in the peroxide number and the organoleptic qualities remained good. The quantity of ascorbylpalmitate used was 0.02 and 0.04%; the 0.02% is quite sufficient to assure good storage.

Growth problems of the soybean processing industry. I. T. A. Hieronymus(College of Agr., Univ. of Illinois, Urbana). *Soybean Digest* **17**(1), 14–15(1956). Potential markets for soybean meal and oil are reviewed briefly. The greatest possibilities for growth appear to be in livestock feed and oil for export.

The fats and oils outlook, 1956-57 crop year. J. E. Thigpen(Oils & Peanut Div., Commodities Stabilization Service, U.S.D.A.). *Soybean Digest* **17**(1), 19(1956). Statistics are tabulated for U. S. edible fats and oils and protein meal production for the period from 1935 to 1956. The world supply-demand for fats and oils appears to be nearly in balance, but there is some doubt about possibilities for increased consumption of protein meal.

The transfer of surface films through surface channels—geometrical factors. V. K. LaMer and M. Blank(Dept. Chem., Columbia Univ., New York). *J. Colloid Sci.* **11**, 608–16, 688 (1956). Mixtures of certain substances, such as Adol 22, ethyl palmitate and cyclohexyl myristate, spread as monolayers can be separated into their components by a process of transferring the monolayer through channels from a higher to a lower surface pressure. When a mixture is separable, the order of separation depends upon the surface pressures of the individual components. Mathematical expressions are derived for the rate of transfer in terms of the angle of the groove of the channel and the height of the barrier, and are verified for a system comprising brass grooves wetted with water and cyclohexyl myristate monolayers on water.

Non-Newtonian surface viscosity. M. Joly(Serv. Chim.-Phys., Inst. Pasteur, Paris). *J. Colloid Sci.* **11**, 519–31(1956). Data are tabulated for (1) surface viscosities of Newtonian gaseous monolayers of tricaproin, tricaprylin, a C_{20} dicarboxylic acid and ethyl-11-oxystearate; liquid monolayers of oleic and myristic acids, tricaprin, trilaurin, triolein and triricinolein; and mesomorphous monolayers of stearic, palmitic and myristic acids; (2) free energies of activation of flow of many of the same monolayers; and (3) non-Newtonian surface viscosities free energies of activation and relaxation times of monolayers of lauryl, myristyl, cetyl and stearyl alcohols and stearyl amide. A hypothesis is presented to explain these rheological data.

Activity of trypsin-lipid complexes at oil/water interfaces. M. J. Fraser and J. H. Schulman(Dept. Colloid Sci., Univ. Cambridge, England). *J. Colloid Sci.* **11**, 451–70(1956). Adsorption of trypsin at lipid stabilized mineral oil/water interfaces was studied as a function of the nature of the interface. Lipid stabilizers included sulfonates, lauryl phosphate, oleic acid-glyceryl monoleate, bile salts, trimethyl ammonium bromides of *n*-lauryl alcohol and cholesterol, and egg phospholipid. The adsorption of the enzyme, as indicated by changes in activity, was related to the charges and natures of the lipid polar groups at the interface and the protein polar groups. The loss in activity of the enzyme at the interface is thought to result from an unfolding of the molecule which is partially reversible by desorption.

Penetrability of molecular layers. H. Sobotka(Dept. Chem., Mt. Sinai Hospital, New York). *J. Colloid Sci.* **11**, 435–44(1956). The probable structures of built-up layers of stearic and lignoceric acids and their barium salts are deduced from the penetrability of the films to serum albumin, the evaporation rate of isostearic acid films, and the skeletonization of mixed acid-barium salt films by organic solvents and albumin. A mechanistic description of the skeletonization process is proposed.

Recent work on spread monolayers, adsorption and desorption. L. Ter Minassian-Saraga(Lab. Chim. Phys., Faculté des Sciences, Paris). *J. Colloid Sci.* **11**, 398–418(1956). The behavior of oxyhemoglobin films spread on aqueous substrates is reviewed. Surface potential measurements of myristic acid monolayers on hydrochloric acid solution, and the adsorption-desorption behaviors of lauric acid films are summarized. Surface potentials of very dilute films of fatty acids spread on distilled water are negative and tend to a negligible value when the substrate pH decreases. Desorption of lauric and myristic acid films under constant pressure may be diffusion controlled. Theoretical laws are proposed to explain these behaviors.

Monolayers in equilibrium with lenses of oil on water. I. Octadecanol and tetradecanoic acid in white oil. W. M. Sawyer and F. M. Fowkes(Shell Dev. Co., Emeryville, Cal.). *J. Phys. Chem.* **60**, 1235–9(1956). Lenses of white oil containing octadecanol or tetradecanoic acid were placed on a clean water or 0.01 *N* hydrochloric acid substrate. For all concentrations, the final spreading coefficient was negative. Eqilibrium conditions were established between the monolayer of the oil/water interface and that at the air/water interface. The observed difference in film pressures between these monolayers was independent of solute concentration.

The solubility of tristearin in organic solvents. C. W. Hoerr and H. J. Harwood(Research Div., Armour & Co., Chicago, Ill.). *J. Phys. Chem.* **60**, 1265–9(1956). The solubilities of tristearin were determined quantitatively in hexane, benzene, carbon tetrachloride, chloroform, ethyl acetate, acetone, and ordinary unhydrogenated cottonseed oil. Results are presented graphically. Tristearin is more soluble in non-polar than in polar solvents. Three distinct solubility curves were observed corresponding to the three crystalline forms (α, β' and β) which had been established previously by melting point determinations and x-ray measurements. In these solubility studies, no evidence was found for a fourth crystalline form reportedly melting about 70°.

Oil soluble synergistic antioxidant. C. L. Griffith and L. Sair (The Griffith Labs., Inc.). *U. S. 2,768,084.* The desired antioxidant is a mixture of the following two solutions. The first solution is formed by dissolving butylated hydroxyanisole in an edible oil. The second solution is formed by dissolving lecithin in an edible oil and adding an acid such as citric, tartaric or phosphoric, and a gallic acid ester (methyl, ethyl, propyl, butyl, hexyl, or lauryl). In preparing the second solution, the temperature is maintained high enough to dissolve the added ingredients but below the decomposition temperature of lecithin. This solution is then cooled rapidly and combined with the first solution at temperatures below 128°F. The amount of free water in the second solution and the final mixture is not greater than 5%.

Purification of glyceride oils. B. Clayton. *U. S. 2,769,827.* The crude glyceride oil is mixed with 1 to 3.5% of aqueous (1.5 to 29%) ammonia. In a continuous process, the resulting mixture is centrifuged at 140° to 175°F. The aqueous effluent contains the gums which are recovered after dilution of the effluent with 1 to 3 parts by wt. of water.

Purification of glyceride oils by means of ion-exchange resins. M. G. Chasanov, R. Kunin, M. Mattikow, and B. H. Thurman (Refining, Uninc. and Rohm & Haas Co.). *U. S. 2,771,480.* A glyceride oil containing free fatty acids and color-bodies is contacted with a strongly basic anion exchange resin containing quaternary ammonium hydroxide groups. The fatty acids and color-bodies are thereby removed from the oil. The resin may be regenerated by treatment with an aqueous solution of inorganic hypochlorites or hydrogen peroxide which removes the adsorbed color-bodies, and with a solution of caustic alkali to remove the adsorbed fatty acids.

Antioxidant material for use in treating meat. L. A. Hall(The Griffith Co.). *U. S. 2,772,169.* During the curing of meat, there is added to the nitrite salts an effective amount of a mixture containing 1.5 to 7.5 parts by wt. of a gallic ester, 1.5 to 7 parts of ascorbic acid and 12 to 40 parts of phospholipid.

Antioxidant composition. L. A. Hall(The Griffith Co.). *U. S. 2,772,170.* An effective antioxidant composition is a clear solution in an edible oil of a fatty acid monoglyceride citrate, propyl gallate and 0.5 to 2.5% of added water.

Antioxidant concentrate comprising reaction products of mixed glycerides as solvent carriers. R. W. Bentz(Eastman Kodak Co.). *U. S. 2,772,243.* The antioxidant concentrate consists of the reaction product obtained by heating a mixture of 1 to 3 moles of propylene glycol and 1 mole of the mixed glycerides of animal and vegetable fats and oils at a temperature between 100° and 180°, at least one gallic acid ester of a C_1 to C_{12} alcohol, and at least one alkylated hydroxyphenyl ether. The final mixture contains 2 to 30% of gallic acid ester and 3 to 50% of the alkylated hydroxyphenyl ether.

Sterol recovery. F. O. Laquer(K. M. Laquer). *U. S. 2,772,297.* A method for obtaining sitosterol from by-products of oil refining is described. The acidulated foots and still bottom pitches are saponified in alcohol solution. The products are mixed with sufficient quantities of a water-insoluble drying-and-extraction aid to form a thick slurry, which is then dried. The sitosterols are recovered from the dry mixture by extraction with acetone, ethylene dichloride, methyl alcohol, ethyl acetate or their mixtures.

Separation of solid and liquid esters. Henkel & Cie, G. m.b.H. *Brit. 743,166.* Carboxylic acid ester mixtures are separated by treating with aqueous solutions containing surface-active agents. Colloidal substances, electrolytes, and water soluble organic liquids can be added. The separation of ester mixtures, either natural or synthetic, is useful in the winterproofing of edible oils, the separating of hardened fats, and the separation of isomeric phthalic acid esters. (*C. A.* **50**, 15105)

Stabilization of fats and esters of fatty acids. O Heikel. *Czech. 83,473.* Aromatic acids, esters, and lactones of the type $ROOC(CH{=}CH)_xAr(OH)_y(OCH_3)_2$ act in concentrations 0.5–1% as antioxidants. Examples are given in which sinapic, ferulic, and o-coumaric acid were used with different fats and oils. (*C. A.* **50**, 16140)

Acidification of fish-liver oils and fish oils. Jean F. A. Bruzac. *Fr. 998,607.* Fish oils and fish-liver oils, e.g., those used in leather manufacture, have very low acidities, e.g. $\leqslant 1\%$, while an acidity of $>10\%$ is desired. To acidify such oils, they are inoculated with acid-forming bacteria and aerated with oxygen, ozone, or ozonized air under pressure to accelerate acidification and to ensure equal distribution of the bacteria in the oil. (*C. A.* **50**, 15105)

Separating straight-chained fatty acids from fatty acid mixtures containing isocarboxylic acids. E. Katzschmann and K. H. Imhausen(Imhausen & Co., G.m.b.H. and K. H. Imhausen). *Ger. 829,296.* Fatty acid mixtures as they are obtained in the paraffin oxidation, and containing straight-chained fatty acids besides isocarboxylic acids, are converted to the earth alkali, Mg, Al, or heavy metal salts and the resulting salts of isocarboxylic acids are separated from those of straight-chained fatty acids by their greater solubility in water or nonaqueous solvents. (*C. A.* **50**, 10126)

Separation of fatty acids. Ichiro Imai(Nippon Fats and Oils Co.). *Japan. 885('55).* Fat acids (5 kg.) from rice bran oil in 10 kg. ligroine are treated with 7.9 kg. urea containing 6% water and stirred for two hours. The urea additives are filtered and washed with warm water to give 2.66 kg. saturated fat acid with iodine number of 63. The ligroine in the filtrate is removed to give 2.31 kg. unsaturated fat acids with iodine number of 137.4. (*C. A.* **50**, 16140)

FATTY ACID DERIVATIVES

Fatty acids and derivatives in cosmetics. V. K. Babayan(E. F. Drew & Co., Inc., Boonton, N. J.). *J. Soc. Cosmetic Chemists* **7**, 225–33(1956). A review with 31 references. (*C. A.* **50**, 10345)

Preparation of oxides of higher unsaturated fatty acids. G. V. Pigulevskii and I. L. Kuranova. *Zhur. Priklad. Khim.* **28**, 1353–5(1955). Oxides of higher unsaturated fatty acids were prepared by the following simplified procedure without isolation of the free acids. Peach oil(200 g.) saponified, esterified, and distilled to yield 148 g. of metyl esters which was treated in 300 ml. ethyl ether with acetic peroxide in ethyl ether containing 10.5 g. active oxygen, the solution washed after 3 days with 5% sodium carbonate and water, and fractionally distilled to yield 63.1 g. methyl oleate oxide, $b_{0.064}$ 161–3°. Saponification with 0.5 *N* alcoholic potassium hydroxide at room temperature yielded 53% oleic acid oxide, m. 57–8°. Similarly, from 200 g. sunflower oil the yield was 91 g. methyl linoleate dioxide, $b_{0.17}$ 200–3°, which yielded 44 g. of the solid isomer, m. 31–2°; hydrolysis gave 37 g. linoleic acid dioxide, m. 78°. (*C. A.* **50**, 10073)

Polyethylene glycol esters of fatty acids. R. Schneider. *Fette u. Seifen* **58**, 549–53(1956). A review with 120 references. (*C. A.* **50**, 16137)

Urea complexes of fatty substances. IX. Application to the purification of technical monoglycerides. F. Mazuelos Vela and A. Vázquez Roncero(Inst. grassa, Seville). *Grasas y aceites (Sevilla, Spain)* **6**, 230–2(1955). Stearic acid was reacted with glycerol to yield glycerides, 70% of which were precipitated by urea. Partial glycerides were made from olive, oliveseed, grape-seed, and cottonseed oils either by transesterification with glycerol or by reaction of the fatty acids with glycerol. Extraction of the mixed glycerides with methanol eliminated the triglycerides. The remaining partial glycerides were fractionated by precipitation with urea in methanol and the filtrate was similarly refractionated 1–2 times. Each successive fraction recovered from the urea complexes had a higher monoglyceride content and higher iodine value. About half the glycerides could not be precipitated by urea and this fraction had the highest monoglyceride content(about 80%) and highest iodine value indicating that the unsaturated glycerides had ben concentrated in this fraction. (*C. A.* **50**, 10425)

Hydroxyarylstearic acids as oxidation and rust inhibitors in lubricants. H. Gisser, J. Messina, and J. Snead(Pitman-Dunn Lab., Frankford Arsenal, Philadelphia 37, Pa.). *Ind. Eng. Chem.* **48**, 2001–2004(1956). Hydroxyarylstearic acids were prepared by condensation of phenols with oleic acid, using aluminum chloride. The compounds were found to be active as oxidation and rust inhibitors in instrument oil compositions. The most effective compound prepared was hydroxy-phenylstearic acid, which in 2% solution was an effective antioxidant (at 100°) and rust inhibitor in bis(2-ethylhexyl) sebacate and triiso-octyl phosphate.

Preparation of dibasic acids from fatty oils. VI. Oxidation of ricinoleic, caproic, caprylic, butyric, sebacic, and adipic acids with nitric acid under pressure. (Including supplement to Parts IV and V.) Masaru Kobayashi(Osaka Munic. Techn. Research Inst., Osaka). *J. Japan Oil Chemists' Soc.* **5**, 85–9(1956). Oxidation with 15–30% HNO_3 at 135–170° gave dibasic acids in higher yields than atmospheric oxidation. Ricinoleic acid gave azelaic, suberic, pimelic, adipic, glutaric, and succinic acids; caprylic acid gave pimelic, adipic, glutaric, and succinic acids; caproic acid gave adipic, glutaric, and succinic acids; adipic acid gave glutaric and succinic acids; sebacic acid gave pimelic, azelaic, suberic, adipic, glutaric, and succinic acids; all as mixtures. Butyric, adipic, and sebacic acids gave only acetic acid, while ricinoleic, caproic, and caprylic acids gave acetic, propionic, butyric, and valeric acids as monobasic acids. One-dimensional paper chromatography of dibasic aliphatic acids was improved by using sodium 2-(2,4-dinitrophenyl)-azo-1-naphthol-3,6-disulfonate as coloring reagent. Nitrogen-containing oily substances formed in initial stage of the reaction were found to consist of a mixture of amines and amino acids.

The wetting of incomplete monomolecular layers. L. S. Bartell and R. J. Ruch(Dept. Chem., Iowa State College, Ames). *J. Phys. Chem.* **60**, 1231–4(1956). Films were formed on polished platinum or chromium-plated surfaces by adsorption from solutions of *n*-octadecylamine in *n*-hexadecane. Fresh films were found to contain very nearly the same amount of amine as conventional Langmuir-Blodgett monolayers and, in addition, appreciable amounts of solvent. Films containing solvent were no more readily wetted by pure solvent than were dry monolayers. Contact angles of water and hexadecane were not affected by depletion of the monolayers until more than half of the adsorbed molecules had been removed.

The adsorption of alcohols and phenols from non-polar solvents onto alumina. D. J. Crisp (Dept. Colloid Sci., Cambridge and Marine Biol. Station, Univ. College N. Wales, Bangor, Wales). *J. Colloid Sci.* 11, 356–76 (1956). Adsorption isotherms onto alumina are presented graphically for octadecyl alcohol, melissyl alcohol, cetyl alcohol, cholesterol and phenol from solutions in benzene. Maximum adsorption as micromoles per gram of alumina were: octadecyl alcohol, 740; cholesterol, 420; and phenol, 640. When two alcohols or an alcohol and phenol were adsorbed competitively, each adsorbate followed the Langmuir equation independently and the coefficient of adsorption of one could be deduced from that of the other. When one of the competing substances was water, the Langmuir isotherm was not followed. Isosteric or differential heats of adsorption were determined, and also the heats of mixing of octyl alcohol and benzene. In all cases, the heats and free energies of adsorption were independent of the length of the hydrocarbon chain. The free energy and probably also the heat of adsorption in the series, alcohol, phenol and fatty acid, increased as the hydroxyl group became more acidic. The nature of the adsorption process is discussed.

Isocyanate-castor oil metal cement. C. W. Yoho (Stoner-Mudge, Inc.). *U. S. 2,769,826.* A polymeric cement containing approximately equal stoichiometric proportions of isocyanate and castor oil is prepared by mixing the following two prepolymers. The first consists of 5.5 to 11 parts of methylene bis (4-phenyl isocyanate) and 72 parts of castor oil. The second prepolymer contains 10 to 28 parts of methylene bis(4-phenyl isocyanate) and 10 parts of castor oil. The prepolymers are made to have a stable viscosity in the range of 5,000 to 100,000 centipoises at 80°F.

Production of dodecanoyl peroxide. J. Chapman and W. A. Wynne (Imperial Chem. Indus. Ltd.). *U. S. 2,771,492.* Dodecanoyl peroxide is made by reacting dodecanoyl chloride ($C_{11}H_{23}COCl$) with 0.4 to 4 moles of oxygen peroxide and 0.9 to 1.5 moles of a caustic alkali at temperatures between —10 and 5°. The concentration of the peroxide is 20 to 60% by wt., and of the alkali is 10 to 45% by wt. in the case of sodium hydroxide or 14 to 50% of potassium hydroxide.

Fermentable carbohydrate food products. W. J. King (Colgate-Palmolive Co.). *U. S. 2,772,168.* A minor amount of a higher fatty acid amide of an amino carboxylic compound is added to a fermentable carbohydrate food in order to inhibit acid production in the oral cavity.

Stable dental creams containing higher aliphatic acyl amide of aminocarboxylic acid compound. G. M. Salzmann (Colgate-Palmolive Co.). *U. S. 2,772,203.* A dental cream is described containing a saturated amide formed by the reaction of an aliphatic monoamino C_2 to C_6 acid with a C_{12} to C_{16} acyl group.

Dental preparations containing higher aliphatic acyl sarcoside compounds. W. J. King (Colgate-Palmolive Co.). *U. S. 2,772,204.* A dental preparation is described that contains a sarcoside compound such as N-heptadecanoyl or N-stearoyl sarcoside.

Dental floss containing higher aliphatic acyl amide of an aminocarboxylic acid compound. W. J. King (Colgate-Palmolive Co.). *U. S. 2,772,205.* A dental floss is described containing a saturated amide of an aliphatic monoaminocarboxylic C_2 to C_6 acid and an aliphatic C_{12} to C_{16} acyl group.

Process for production of 11-bromo-undecanoic acid. W. Münch, L. Notarbartolo, and L. Spano (Perfogit Soc. per Azioni). *U. S. 2,772,302.* The preparation of 11-bromoundecanoic acid is described by the reaction of undecenoic acid with hydrogen bromide in the presence of a peroxide and in the absence of free oxygen.

α, ω-Dicarboxylic acids. E. G. E. Hawkins (Distillers Co. Ltd.). *Brit. 740,747.* Peroxide compounds prepared by treating alicyclic ketones or alkoxysubstituted cycloalkyl hydroperoxides with water solutions or suspensions of ferrous salts in the presence of acid give dicarboxylic acids or their esters. The treatment of cyclic ketones with hydrogen peroxide may be carried out in the presence or absence of an acid catalyst such as HCl. (*C. A.* 50, 15582)

11-Bromoundecanoic acid. Perfogit Società per Azioni. *Brit. 740,724.* $Br(CH_2)_{10}COOH$ may be prepared by passing HBr into a solution of 11-undecenoic acid in toluene, washing the product, distilling off the unreacted toluene, and crystallizing the residue. In the absence of air with 1–2% organic peroxide such as benzoyl peroxide, 11-bromoundecanoic acid can be obtained at 92% purity. In the presence of air, HBr with 11-undecenoic acid gives 38–79% of 11-bromoundecanoic acid with 5–22% of $CH_3CHBr(CH_2)_8COOH$. (*C. A.* 50, 15577)

• Biology and Nutrition

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

The distribution of cholesterol among the protein fractions of blood serum. L. S. Tarasova and G. V. Troitskiĭ (Crimean Med. Inst., Simferopol). *Ukraïn. Biokhim. Zhur.* 28, 177–81 (1956). Cholesterol was found in all protein fractions in considerable amounts in blood serums of normal humans, in serum of human placenta, rabbit, hog, cattle (bull), dog, and guinea pig. Alpha- and beta-globulins (except those of rabbits) proved especially rich in cholesterol (7 to 10 times as high as in other protein fractions). Results present strong evidence for the existence of a union between proteins and cholesterol. Since rabbits are susceptible to the development of atherosclerosis, the authors suggest that the ability of β-globulin to become cholesterol saturated may be regarded as a factor of importance in the pathogenesis of this disease. (*C. A.* 50, 15817)

Cholesterol metabolism. Meyer Friedman, Sanford O. Byers and Shirley St. George (Mount Zion Hosp., San Francisco, Calif.). *Ann. Rev. Biochem.* 25, 613–40 (1956). A review with 317 references. (*C. A.* 50, 15820)

Incorporation in vitro of free fatty acids into the glycerides of intestinal mucosa. P. Favarger and J. Gerlach (Univ. Geneva, Switz.). *Helv. Physiol. et Pharmacol. Acta* 14, C16–7 (1956). At pH 6 the hydrolysis of the preëxisting glycerides in the mucosa was less rapid than at pH 7 and the incorporation of added radio-active palmitic acid was much more rapid. The optimum for the incorporation reaction was between pH 4 and 5. An increase in total glycerides was sometimes observed: this indicates that the reaction was not entirely one of exchange. The addition of monoölein to the mixture augmented this increase in total glycerides; free glycerol did not. Quinine and atoxyl had some inhibiting action. (*C. A.* 50, 15806)

Nitrogen, phosphorus, potassium and ash content of castor-bean hulls. W. Parkey, J. E. Webster, and D. L. Van Horn. *Oklahoma Eng. Expt. Sta. Publ. Oklahoma Agr. Mech. Coll. Tech. Bull.* No. T-16 (1956). The average analysis of the castor-bean hulls for all varieties and location was: N 1.64, P 0.82, K 3.81, and ash 10.38%. No important variation among varieties was noted for any of the components. The greatest variation within components occurred between years and locations. There were differences between samples of hulls from the irrigated and nonirrigated plots. (*C. A.* 50, 15103)

Sterols of olive oil. I. J. Gracián Tous and J. Martel (Inst. grasas, Seville). *Grasas y aceites (Sevilla, Spain)* 6, 269–75 (1955). Sterols isolated from olive oil by precipitation with digitonin from the free fatty acids or from the unsaponifiable fraction obtained from the oil, or by isolation on an aluminum oxide chromatographic column have the same characteristics. The method involving the use of digitonin was easiest and simplest. (*C. A.* 50, 10428)

A microdetermination of cholesterol in blood. Hiroyuki Koike, Akira Ichiyoshi, and Shigeo Amino (Senshu Hosp., Osaka). *Nisshin Igaku* 43, 380–5 (1956). From 100 to 200 γ of cholesterol in human blood was determined spectrophotometrically, following the method of Kenny (*C. A.* 47, 2242). The ether extract of human blood was dissolved in chloroform, glacial acetic acid and concentrated sulfuric acid were added to the solution, and the intensity of the color at 310 mμ was determined. The recovery was 96%. (*C. A.* 50, 15680)

Paper chromatography of tocopherols. Antaonín Kopecky (Vyzk. ústav oleje a tuky, Ústí n.L., Czech.). *Průmsyl Potravin* 7, 267–9 (1956). A method is described for the qualitative determination of α, γ, δ-tocopherols in soybean oil and pharmaceutical preparations with aqueous methanol on paper impregnated with 20% petroleum oil and silver nitrate as detecting agent. (*C. A.* 50, 15349)

A new method for the determination of α-tocopherol by paper chromatogrphy. J. Guerillot, A. Guerillot-Vinet and L. Delmas (Natl. Agr. Sta., Grignon, France). *Ann. inst. natl. recherche agron., Ser. A, Ann. agron.* 4, 831 (1953). The determination of α-tocopherol by paper chromatography by producing a Turnbull blue stain is described. (*C. A.* 50, 15349)

Food intake and estrogenic hormone effects on serum and tissue cholesterol. Ruth Okey and Marian M. Lyman (Dept. of

Home Ec., Univ. of California, Berkeley). *J. Nutrition* **60**, 65–74(1956). An *ad libitum* and a pair-feeding study are reported for castrated male rats fed 1% cholesterol with 15 and with 30% protein. In each case one castrate group was treated with estradiol benzoate. Food intakes of the hormone-dosed castrates were reduced one-third to one-fourth as compared with *ad libitum* controls, intact and castrate, respectively. However, when undosed castrates were pair-fed to those dosed with hormone, they gained approximately twice as much. The *ad libitum* intact controls showed higher liver cholesterol with the 15% than with the 30% protein diet. Variation in liver cholesterol with protein content of the diet was less in castrates than in controls.

Partial inactivation of lipoprotein lipase by bacterial heparinase E. D. Korn(National Heart Institute, National Inst. of Health, Bethesda, Maryland). *Science* **124**, 489(1956). It is concluded that heparinase is responsible for the inactivation of the lipase and that lipoprotein lipase is, most probably, a mucoprotein which contains a mucopolysaccharide very similar to heparin as an integral part of the molecule.

Influence of diet composition on caloric requirements, water intake and organ weights of rats during restricted food intake. H. Kaunitz, C. A. Slanetz, Ruth Ellen Johnson and J. Guilmain(College of Physicians and Surgeons, Columbia Univ., New York, N. Y.). *J. Nutrition* **60**, 221–228(1956). The influence of high-fat, high-carbohydrate, and high-protein diets on the caloric requirements, water intake, and organ weights of rats kept at constant weight by restricted feeding was studied. The caloric requirements for all diets declined during the first 5 weeks and became constant thereafter. On the high-protein and high-fat diets, the animals were eventually able to maintain their weight with 25% fewer calories than those on the high-carbohydrate diet. The water intake was highest on the high-protein and lowest on the high-fat diet.

Nutritional properties of the molecularly distilled fractions of autoxidized fats. H. Kaunitz, C. A. Slanetz, R. E. Johnson and J. Guilmain(College of Physicians and Surgeons, Columbia University, New York, N. Y.), H. B. Knight, D. H. Saunders and D. Swern. *J. Nutrition* **60**, 237–244(1956). Lard and refined cottonseed oil which had been aerated at 95° for 200 to 300 hours and a sample of hydrogenated vegetable oil which had been used commercially for deep fat frying for 80 hours at 190° were molecularly distilled at 280°. The distillates were used in nutritional experiments. When the distillates were included in purified diets containing either 5 or 30% casein, the resulting growth of most of the weanling male rats fed these diets was only slightly below the matching rats receiving fresh lard. In contrast, distillate added to the nonvolatile polymeric residue from the molecular distillation of autoxidized fats had a protective effect markedly below that of fresh fats.

The value of animal fat in rations for milk production. O. H. Horton, K. A. Kendall, W. B. Nevens, and R. G. Hansen (Dept. of Dairy Science, Univ. of Illinois, Urbana). *J. Dairy Sci.* **39**, 1461–1468(1956). Twenty-six cows were used to determine the effect of feeding concentrates containing different levels of stabilized animal fat upon milk yield, percentage butterfat content of the milk, and composition of the butterfat of the cows during both the barn-feeding and the pasture-feeding periods.

Observations on the incorporation in vivo of palmitic acid-1-C^{14} and oleic acid-1-C^{14} into lecithins. D. J. Hanahan and R. Blomstrand(Dept. of Physiological Chemistry, Univ. of Lund, Lund, Sweden). *J. Biol. Chem.* **222**, 677–684(1956). The incorporation of palmitic acid-1-C^{14} and oleic acid-1-C^{14} into the lecithins of the liver, intestinal tract, and lymph of rats has been investigated. When the saturated fatty acid was used, approximately 10 per cent of the total radioactivity of the lipide fraction was found in the lecithins, while, with the unsaturated acid, less than 1 per cent was located in the lecithins. An active long chain fatty acid dehydrogenase was apparently present in the intestinal tract of these rats.

Radiation induced oxidation of cholesterol. W. F. Dauben and P. H. Payot(Chem. Lab., University of California, Berkeley 4, California). *J. Am. Chem. Soc.* **78**, 5657–5660(1956). When C^{14}-labeled cholesterol is stored in the presence of air, it is oxidized on and about the 5,6-double bond and, in the main, the epimeric 7-hydroxy, and 7-keto and the $5\alpha,6\beta$-dihydroxy derivatives are formed. Such an oxidation reaction required both radiation and oxygen since unlabeled cholesterol in air or C^{14}-labeled cholesterol *in vacuo* are stable.

Studies to determine the nature of the damage to the nutritive value of some vegetable oils from heat treatment. IV. Ethyl esters of heat-polymerized linseed, soybean and sunflower seed oils. E. W. Crampton, R. H. Common, E. T. Pritchard and Florence Farmer(McGill University, Province of Quebec, Canada). *J. Nutrition* **60**, 13–24(1956). The non-adduct-forming fraction (NAFD) of the distillable esters from heated soybean oil was toxic, though to a lesser degree than that from the comparable fraction obtained from linseed oil. The NAFD from heated sunflower seed oil, however, was only slightly injurious to the rats. The adduct-forming fractions from both heated soybean oil and the heated sunflower seed oil were nutritionally harmless. The chief chemical difference between the NAFD fractions from the three heated oils was in respect to their behavior on alkali isomerization. The NAFD from heated linseed oil displayed relatively little increase of its absorbance at 233 $m\mu$, whereas the results for the soybean and sunflower seed oils suggested the presence of high proportions of difficult conjugatable diene unsaturation. These results suggest that the non-adduct-forming fraction of the distillable esters of heated linseed may contain a high proportion of non-conjugatable diene *cis*-isomers, possibly of cyclic structure.

The neo-β isomer of vitamin A and retinene. P. K. Brown and G. Wald(Biological Lab., Harvard Univ., Cambridge, Mass.). *J. Biol. Chem.* **222**, 865–877(1956). The neo-β(11-*cis*) isomer of vitamin A and retinene, the precursor of rhodopsin and iodopsin, is a hindered *cis* polyene, the first such structure to appear in nature. Its preparation and properties are described, particularly properties useful in its identification and measurement in mixtures and tissue extracts: reduction of the retinene to vitamin A with potassium borohydride, isomerization with iodine and light, the antimony chloride reaction, and the synthesis of rhodopson.

The effects of citrate and coenzyme A on fatty acid metabolism. R. O. Brady, A. M. Mamoon, and E. R. Stadtman(National Heart Institute, Dept. of Health, Education, and Welfare, Bethesda, Maryland). *J. Biol. Chem.* **222**, 795–802(1956). Evidence has been presented which suggests that the stimulating effect of citrate upon fatty acid synthesis is due at least in part to the production of TPNH via isocitric dehydrogenase. Fatty acid synthesis is markedly inhibited by free CoASH and, by way of contrast, fatty acid oxidation was stimulated by supplemental CoASH and inhibited by the addition of citrate.

The sterol of Gelidum amausii and Pterocladia tenuis. Shunsuke Ito, Hiroshi Nagashima, and Taro Matsumoto(Nihon Univ., Tokyo). *J. Chem. Soc. Japan, Pure Chem. Sect.* **77**, 1119–21(1956). These algae contained chalinasterol reported by W. Bergmann, H. P. Schedl, and E. M. Low [*J. Org. Chem.* **10**, 570(1945)]. This sterol was found in plant kingdom for the first time.

Corbisterol. Toshitake Tamura, Kazuyoshi Kokuma, and Taro Matsumoto(Nihon Univ., Tokyo). *J. Chem. Soc. Japan, Pure Chem. Sect.* **77**, 987–90(1956). Corbisterol, isolated from *Corbicula leana* and *C. japonica* [T. Matsumoto and Y. Toyama, *J. Chem. Soc. Japan* **64**, 326 (1943)] was identified as 7-dehydrostigmasterol.

Crystalline derivatives of vitamin A. IV. Preparation of vitamin A 2-naphtyl urethane. Toshio Agawa, Takuji Shiomi, and Saburô Komori(Osaka Univ., Osaka). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **59**, 1040–42(1956). Vitamin A 2-naphthylurethane in powder form was obtained in similar yields from natural and synthetic vitamin A. The yield was the better when the material was the purer. It was 71.6% from molecular distillate (2,370,000 I.U./g.) from unsaponifiable matter of cod-liver oil. Crystalline urethane(m.p. 110–11°C.) could be easily prepared from the crude one. 2-Naphthoyl azide could be used as the reagent instead of 2-naphthylisocyanate in preparing the urethane.

Synthesis of long-chain fatty acids from acetate in flax, Linum usitatissimum L. W. P. Gibble and E. B. Kurtz, Jr.(Dept. Botany, U. of Arizona, Tucson, Arizona). *Arch. Biochem. Biophys.* **64**, 1–5(1956). An *in vitro* system was produced in which developing flax fruits utilize acetate-1-C^{14} to synthesize long-chain fatty acids. Upon separation and degradation of the individual fatty acids synthesized *in vitro*, the greatest radioactivity was found in the odd-numbered carbon atoms. These results show that palmitic, stearic, oleic, linoleic, and linolenic acids are each formed in flax by multiple condensation of acetate.

Protein interactions with lecithin and cephalin monolayers. D. D. Eley and D. G. Hedge(Univ. Nottingham, England). *J. Colloid Sci.* **11**, 445–50(1956). Protein-lipid interactions were studied in a surface trough by a modification of the Schulman-Rideal injection technique. All of the lipids were synthetic, namely, distearin, dipalmitoyl cephalin, and distearoyl lecithin. The proteins were bovine plasma albumin and sheep insulin. The behavior of the distearin monolayer was similar to that previously reported for cholesterol and is ascribed to a 1:1 combination of the peptide bond with lipid hydroxyl to form the first layer of adsorbed protein. The absence of ionic character in distearin points to a hydrogen bond mechanism. The first sublayer of albumin under dipalmitoyl cephalin apparently forms by interaction of each molecule of cephalin through the amino and phosphate groups with two peptide linkages by either hydrogen bonding or ion-dipole association. With lecithin, however, the interaction appears to be primarily ionic with each lecithin molecule reacting with four peptide bonds. In all cases, there were indications that a second layer of native protein was adsorbed.

Repository vitamin composition. F. H. Buckwalter (Bristol Labs., Inc.). *U. S. 2,768,112.* Vitamin A is dispersed in an injectable oil containing 0.1 to 10% by wt. of aluminum stearate which will act to maintain slow absorption of the vitamin preparation from the blood stream. The injectable oil is a non-drying, saponifiable oil.

Production of fermentation glycerol. E. M. Frankel and S. L. Goldheim. *U. S. 2,772,206.* Glycerol is formed by fermentation of an aqueous sugar solution with yeast in the presence of sodium bisulfite-sulfite. After the yeast and alcohol have been removed, the glycerol is purified by passage through a cation exchange column. Sulfurous acid is removed as the effluent is concentrated.

Glycerol manufacture. E. M. Frankel and S. L. Goldheim. *U. S. 2,772,207.* Glycerol is formed by fermentation of a sugar solution in the presence of sodium sulfite-bisulfite, and purified by treatment with a polar ion excluding material.

• Drying Oils and Paints

Raymond Paschke, Abstractor

Solubility phenomena in dilute solutions of alkyd resins. E. G. Bobalek, R. L. Savage, and M. C. Schroeder (Case Inst. Technol., Cleveland). *Ind. Eng. Chem.* 48, 1956 (1956). Intrinsic viscosity and light scattering measurements were made on solutions of linseed-glyceryl, soyapentaerythrityl and coconut-glyceryl types of phthalic alkyds. Linear correlations were found between intrinsic viscosity, viscosity of the undiluted alkyd vehicle, acid value, and the stroke cure time. For the nine alkyds studied, a modified Staudinger type of equation correlates the intrinsic viscosity with apparent light-scattering molecular weight, where the empirical constants are dependent on diluting solvents. The viscosity and molecular weight relations provide a sensitive differentiation of the solubility characteristics which influence other paint formulation properties of the alkyd vehicles.

Periodate—permanganate oxidations. V. Oxidation of lipids in media containing organic solvents. E. von Rudloff (Praire Reg. Lab., Saskatoon, Can.). *Can. J. Chem.* 34, 1413 (1956). The periodate-permanganate reaction with methyl oleate and triolein has been studied in media containing a variety of organic solvents. The oxidation proceeded favorably in media containing tertiary butyl alcohol or pyridine and conditions have been found which permit the quantitative analysis of unsaturated lipids.

Use of gaseous solvents in measuring molecular weight by Signer's isothermal distillation method. R. P. A. Sims (Can. Dept. Agriculture, Ottawa). *J. Polymer Sci.* 20, 415 (1956). The use of normally gaseous solvents offers the following advantages: (1) The solvent is dried over P_2O_5 while in the gaseous state, obviating errors that arise from the presence of drying agents in isopiestic tubes. (2) Air and other non-condensable gases are removed, before the tubes are loaded, by repeatedly freezing the solvent and pumping down to a pressure of 10^{-6} mm. Hg. (3) The low vapor pressure of the reference material (Octoil S) permits sealing off the tubes at very low pressures (approx. 10^{-6} mm. Hg). (4) Equilibrium is rapidly attained at 25° if the tubes are rocked while equilibrating. The molecular weight of triolein, after extrapolating the results to infinite dilution, was determined to within ±1%.

Styrene type emulsions. R. C. Agabeg (Monsanto Chemicals, London, Eng.). *Off. Dig.* 28 (381), 890 (1956).

Microscopic studies of heterogeneous polymeric systems. G. C. Claver, Jr. and E. H. Merz (Monsanto Chemical Co., Springfield, Mass.). *Off. Dig.* 28 (381), 858 (1956).

The influence of solvents on pigment dispersion and seeding. F. K. Daniel (Daniel Products Co., New York). *Off. Dig.* 28 (381), 837 (1956).

Water-thinned gloss paints. A. A. Duell (British Paints, Ltd., Newcastle-on-Tyne 2, England). *Off. Dig.* 28 (281), 899 ((1956).

Reaction studies of trimesic acid (benzene-1,3,5-tricarboxylic acid) in polyester formation. R. E. Dunbar and E. C. Hutchins (N. Dak. State College, Fargo). *J. Polymer Sci.* 21, 550 (1956). The methyl ester (m.p. 143°) is used.

Nuclear radiation effects on tung oil. J. Greenfield (Tung Res. Dev. League, Popularville, Miss.). *Amer. Paint J.* 41 (8), 84 (1956). Effects resemble those produced by heat. Elaidinization and polymerization occur. Very rapid production of finished varnishes is predicted.

Polyacrylate emulsions. J. Hand (Scott Bader & Co., Northants., Eng.). *Off. Dig.* 28 (281), 896 (1956).

The use of alkyd emulsions in paint manufacture. R. Hurd (Imp. Chem. Ind., Ltd., Manchester, Eng.). *Off. Dig.* 28 (281), 883 (1956).

Difunctional acids by petroleum hydrocrabon oxidation. C. N. Zellner and F. Lister (Tide Water Associated Oil Co.). *Ind. Eng. Chem.* 48, 1938 (1956). The primary oxidation product obtained in the laboratory as well as in a pilot plant shows promise in such applications as alkyd resins, polyesters, plasticizers, and other uses requiring a difunctional molecule.

Modification of drying oils. III. Reaction of pentaerythritol with D-glucose and synthesis of esters from the products and drying oil fatty acids. Toshio Takeshita (Kagoshima Univ.). *J. Japan Oil Chemists' Soc.* 5, 217–22 (1956). The reactions of pentaerythritol and glucose in the molar ratios of 1:1, 1:2, and 1:3 in the presence of 2, 4, and 6% hydrochloric acid (based on pentaerythritol), respectively, at 100° for 70 min. followed by heating 10 min. at 100° under 10 mm. Hg gave the products with glucose content of 1.9, 4.4, and 6.1%, respectively. They were considered to consist of pentaerythritol mono-, di-, and tri-D-glucoside, respectively, with some non-reacted pentaerythritol. They were esterified with fatty acids of linseed, soybean, or cuttle-fish oil to prepare synthetic drying oils. The esterification was successful with phenol as the solvent at 160–250° under atmospheric pressure. The synthesized drying oils showed higher density, refractive index, and viscosity, and lower ester no. and iodine no. and better drying quality than original oils.

Influence of fatty acid compositions on the properties of alkyd and epoxy resin coatings. Hiroshi Sakurai and Masao Fujiwara (Osaka Univ., Sakai). *J. Chem. Soc. Japan, Ind. Chem. Sect.* 59, 946–50 (1956). For alkyd resin coating linoleic acid was the most suitable. Stearic acid tended to improve the color and color stability but time of drying, hardness, weathering stability, and alkali stability of the resins were undesirable. Oleic acid gave similar results at or over 20% with stearic acid, but it gave comparable results below 20% with linoleic acid. Unsaturated-rich fatty acids of soybean oil obtained by urea adduct method was suitable presumably owing to its high linoleic acid content. Similar results were obtained in fatty acids for epoxy resin coating.

• Detergents

Lenore Petschaft Africk, Abstractor

Surface-active agents for the textile industry with special consideration of the refining of cotton goods. K. Bo. *Tidsskr. Textiltek.* 14, 21–5 (1956). The surface-active agents used in the textile industry, particularly finishing agents for cotton goods, are reviewed. They comprise ordinary soap, anion-active agents, such as sulfonated oils, esters, fatty-acid amides, fatty acid-condensation products, fatty alcohol sulfates, fatty alcohol sulfonate, cation-active products, and nonionic agents. (*C. A.* 50, 10414)

Solvent-detergent combination products. A. Davidsohn. *Scifen-Oele-Fette-Wachse* 82, 461–2, 487–8 (1956). Combinations of solvents with synthetic detergents can clean better than detergents alone when washing heavily soiled clothing, metals, woolens and other textiles. Such combinations should be uniformly clear products, which form either solutions or emulsions in the wash liquor. If solution in the wash liquor is desired, the detergent must act as solubilizer on the solvent which is water insoluble *per se*. Experiments were carried out with tall oil and Teepol, a secondary alkyl sulfate. These experiments showed tall oil to exert a strong synergistic effect upon the wetting speed of the secondary fatty alcohol sulfonate.

Paper chromatography with continuous change in solvent composition. II. Separation of surface-active agents. F. Franks (Brit. Launderers' Assoc. labs., London). *Analyst* **81**, 390–3 (1956). Mixtures of alkylsulfonates and n-alkyl sulfates can be separated with water as the only mobile solvent. The sulfonates migrate while the sulfates remain behind. The chromatography of detergents might be employed successfully in quality control in place of titration and the more tedious methods of analysis. (*C.A.* **50**, 16137)

Determination of the hydrophile-lipophile character of surface-active agents and oils by a water titration. H. L. Greenwald, G. L. Brown and M. N. Fineman(Rohm & Haas Co., Philadelphia, Pa.). *Anal. Chem.* **28**, 1693–7(1956). The titration by water of a dioxane-benzene solution of an oil or a surface active agent to a cloud end point can be used to determine a value related to the hydrophile-lipophile balance character of the oil or surface active agent. Details of such a titration are given and the method is compared with other rating procedures.

The spray drying of synthetic detergents. B. W. Hauschild (Luwa A.G., Zurich, Switzerland). *Soap, Perfumery, Cosmetics* **29**, 1235–40(1956). European adaptation of American spray drying techniques for detergents is described. The following essential elements were discussed: (1) Device for the production of a spray and the transfer of the feed liquid to it. (2) The production of the hot air for drying and its transfer to the drying tower. (3) The drying tower itself. (4) Removal of the finished product from the tower; removal of the exhaust drying air and the recovery of the powder carried away with it. Concurrent and countercurrent methods of operation are also reviewed. Modifications for production of either light duty or heavy duty detergents are pointed out.

Electron-microscopic investigation of frozen-dried solutions of alkylpolyethylene oxides and other scouring agents. M. Kehren and M. Rosch(Textilprufanstalt, M. Gladbach-Theydt, Ger.). *Melliand Textilber.* **37**, 680–5(1956). Freeze-drying was investigated for use in studying micelle formation in solutions of surface-active substances by means of the electron microscope. Various views on micelle formation in scouring solutions, and the earlier observations with the electron microscope are reviewed. Three methods of freeze-drying the solutions for examination are described. (*C. A.* **50**, 14245)

Perborates in detergents. K. Lindner. *Seifen-Oele-Fette-Wachse* **82**, 560–2(1956). Oxygen releasing compounds can be added during spray drying of synthetic detergent slurry without undue loss of oxygen under careful proportioning and with the right type of mechanical mixing equipment. Various methods and patents covering processes of spraying perborates with detergent beads are reviewed.

Autoxidation of aliphatic compounds. C. Paquot(Centre natl. recherche sci., Bellevue, France). *Parfums-cosmet-savons* **122**, 20–7(1956). A discussion of the theories of autoxidation, the mode of action of antioxidants, the selection of antioxidants suitable for use in foodstuffs, and the autoxidation of soaps. (*C. A.* **50**, 11543)

Classifying detergents. E. J. Quinn and J. V. Karabinos(Blockson Chem. Co., Div. Olin-Mathieson Chem. Corp., Joliet, Ill.). *Soap & Chem. Specialties* **32**(11), 39–41(1956). The present study is concerned with a simple foam depression test by which one can quickly differentiate between the various types of detergents and mixtures even in the presence of alkaline builders. Refractive index values are also presented for a number of non-ionic surface-active agents indicating the potential usefulness of this method for the identification of the various hydrophobic groups and extent of ethoxylation present.

Mersols and mersolates. Maria Sorin. *Rev. chim.* (Bucharest) **6**, 78–85(1955). The methods of preparation of mersols (hydrocarbon sulfochlorinated to various degrees) and mersolates (alkylsulfonates with 12–18 C atoms), their physical and chemical properties, and potential uses are reviewed. (*C. A.* **50**, 16140)

Use of synthetic detergents in the manufacture of surface-active tablets. J. P. Sisley. *Rev. franc. corps gras* **3**, 405–424 (1956). This is the first of a two-part discussion with the main emphasis on patent literature. This is of particular interest since this viewpoint is not often found in the general literature.

Use of synthetic detergents in the manufacture of surface-active tablets. J. P. Sisley. *Rev. franc. corps gras* **3**, 483–503 (1956). This article completes the author's discussion of synthetic detergents in the manufacture of surface-active tablets. Of special interest is his discussion of various patents pertaining to this phase of detergents.

Colloidal electrolytes from sulfur olive oil. VIII. The sulfated alcohols. C. Gomez Herrera and F. Ramos Ayerbe. *Grasas y Aceites* **7**, 150–155(1956). Technical grade oleyl alcohol is prepared from sulfur olive oil. Laboratory experiments were made using techniques readily applicable to conditions in Spanish industries. The alcohol sulfates were also studied in which α-alkylsulfates were obtained without attacking the double bond. Laundry tests showed that with cotton textiles the technical grade oleyl sulfate obtained from neutral sulfur olive oil by butanol reduction, shows excellent detergency properties.

Toxicity of detergents. C. Gomez Herrera. *Grasas y Aceites* **7**, 156–161(1956). The recent rapid increase in use of synthetic detergents in Spain makes it advisable to review for general information the possible toxicity of some of these compounds. The various ways by which these compounds may cause harm to the human body are described and related to their chemical composition and then compared with other substances commonly used in laundry and cleaning fields. Means of protection against the toxicity are described.

Foam as a fire exposure protection medium-evaluating effectiveness of wetting and protein agents. J. M. Perri and C. Conway (National Foam System, Inc., West Chester, Pa.). *Ind. Eng. Chem.* **48**, 2021–2023(1956). Tests for insulating abilities of mechanical foams show that alkyl aryl sulfonates are the best wetting agents, protein foams show less deterioration under fire test conditions, and protein foams appear more effective at lower concentrations than those recommended for fire-fighting service.

Rapid determination of long-chain alkyd sulfate adhered to cellulose. Yûzi Takayama(Mitsubishi Rayon Co., Tokyo). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **59**, 856–7(1956). The long chain alkyl sulfate was extracted with hot water and was combined with rosaniline chloride. The complex was dissolved in chloroform-ethyl acetate, and the solution was put to colorimetry (absorption at 530 mμ). Staple fiber cotton was used as the body to which commercial anionic agent was adhered.

Micelle formation of nonionic surface-active agents and solubilization of benzene by their aqueous solutions. Shigetaka Kuroiwa(Shinshû Univ., Ueda). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **59**, 665–7(1956). The amount of solubilized benzene was measured at different concentrations of aqueous solutions of 2 kinds of polyoxyethelene glycol-type nonionic agents [$C_{11}H_{23}COO(CH_2CH_2O)_{30}H$ and $C_{18}H_{35}O(CH_2CH_2O)_9H$]. The special nature of the curve of solubility of benzene *versus* concentration of the agent was considered in terms of the micelle formation of nonionic agents.

Determination of nonionic surface-active agents by iodine-starch coloration. Yûzi Takayama and Naoko Kaneki(Mitsubishi Rayon Co., Tokyo). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **59**, 661–3(1956). This method of determining nonionic agents is based on the principle that amylose combines with polyoxyethylene type nonionic agents and the residual amylose reacts with iodine. Absorption at 372 mμ was preferred to the transmittancy at 590 mμ in the colorimetry. It was important to keep the temperature of the reaction mixture constant. Polyoxyethylene stearate and laurate as well as polyoxyethylene phenol ether and polyoxyethylene alkyl ether could be suitably determined by this method. The coexistence of anionic or cationic agents inhibits this determination.

Determination of anionic and cationic surface-active agents by iodine-starch coloration. *Ibid.* **59**, 663–5(1956). An anionic agent (such as sodium higher alcohol sulfate) broke the combination of nonionic agent (polyoxyethylene stearate) with amylose to set amylose free, which gave iodine-starch coloration. Thus it was possible to determine the anionic detergent by colorimetry of freed amylose (absorption at 610 mμ). The cationic agent (experiments with cetyl pyridinium chloride, quaternary octadecyl β-picoline chloride, and a higher amino-alcohol [$C_{18}H_{37}N(C_2H_4OH)C_2H_4OOCC_{11}H_{23}$] combined with OH of starch, and residual free starch was reacted with iodine. Thus cationic agents were determined by measuring the yellow color of residual iodine (absorption at 372 mμ).

Improvements relating to soap powders. L. V. Cocks and J. P. Parke(Unilever Ltd.). *Brit. 749,857.* A soap powder which reduces the waste of soap used in hard water comprises soaps, sodium or potassium carbonate, disodium or dipotassium orthophosphate, and a water-soluble, non-soapy anionic or nonionic surface-active agent, the carbonate, orthophosphate and surface-active agent being in such a condition that, when the powder is added to water, they dissolve before the soap dissolves.