tion cake had a light color and very low F.F.A. It is also observed from Table II that 95.6% ethanol extraction yielded better quality oil. Because of the presence of large amounts of F.F.A. −25 mesh cake fraction yielded darker oil.

Extraction of peanut cake with ethanol resulted in oil of very good color and very low F.F.A. content (less than 1.0%). As the moisture content of the cakes was low, there was little change in the concentration of the solvent (Table III).

Dried cottonseed meats were extracted with 98.6 and 95.6% ethanol. From Table IV it is contended that the high oil content of the meal was not unexpected since the initial oil content in the meats was quite high (29.66%). However extraction with fresh solvent would reduce the oil content of the meal to the usual levels. The color of the cottonseed oil obtained by 95.6% ethanol was lighter and the F.F.A. content was lower than that of the oil extracted by 98.6% ethanol. Cooked and dried cottonseed meats extraction resulted in higher yields of much lighter oil with lower F.F.A. content even compared to hexane extracted oil. The extraction studies of high F.F.A. content meats illustrated the refining properties and advantages of ethanol as a solvent for oil extraction.

Better quality of oil obtained during extraction with 95.6% ethanol may be attributed to the increased solubility of fatty acids and nonoily substances in ethanol at higher temperatures and lower concentrations.

Rates of Extraction

The difference in the concentration of the strong and lean miscella plotted against time yielded qualitative extraction rates (10). Higher rates of extraction were observed during the extraction of air-dried mowrah cake when compared to oven-dried mowrah cake. The increased extraction rate might result from the dilution of alcohol, which contributes to the increased solubility of nonoily substances. The rates of extraction for 95.6% ethanol were greater than the rate obtained for 98.6% ethanol, independent of the particle-size of the cake being extracted. Decrease in particle-size increased the extraction rates irrespective of the cake nature.

Conclusions

1. Undue dilution of alcohol can be prevented by employing oleaginous materials of moisture content less than 1.0% for ethanol extraction.
2. The residual oil content of the meal depends on the particle size of the cake for a constant period of extraction.
3. Better quality oil in respect to color and F.F.A. is obtained with 95.6% ethanol extraction though the temperature of extraction is higher than the temperature employed with 98.6% ethanol.
4. F.F.A. of the extracted oils is low and within 1.0% for most of the oils, hence a reduction of refining loss. The color of safflower and peanut oils compares with the color of the screw-press oils.
5. In the case of cottonseed meats extraction, the cooking of meats results in a lighter color oil and increases the yield for the same period of extraction. Cottonseed extraction also illustrates the advantages of ethanol as the solvent for oil extraction.

Acknowledgments

The authors wish to thank S. H. Zaheer, director, Regional Research Laboratory, Hyderabad, India, for his keen interest in this project, also to thank G. S. Chowdhry and M. K. Chari of the work-shop section of the Regional Research Laboratory, Hyderabad, India, for their kind help and suggestions during the fabrication of the equipment.

REFERENCES

1. Beckel, A. C., Belter, P. A., U. S. 2,469,147, May 3, 1949.
2. Beckel, A. C., Belter, P. A., and Smith, A. K., J. Am. Oil Chemists' Soc., *25*, 10–11 (1948).
3. Chatterjee, N. G., J. Indian Chem. Soc., Ind. & News Ed. (India), *2*, 171–177 (1939).
4. Chatterjee, N. G., and Saxena, R. S., *ibid.*, *3*, 23–28 (1940).
5. Raghunatha Rao, Y. K., J. Sci. and Ind. Research, India, *12A*, 373–379 (1953).
6. Raghunatha Rao, Y. K., Soap, India, *6*, No. 11, 12–18 (1953).
7. Raghunatha Rao, Y. K., J. Sci. and Ind. Research, India, *11A*, No. 9, 414–415 (1952).
8. Raghunatha Rao, Y. K., and Krishna Murty, R. G., J. Proc. Oil Technologists Assoc. India, *10*, 30–33 (1954, 1955).
9. Raghunatha Rao, Y. K., Bull. Central Food Technol. Research Inst., Mysore, India, *2*, 155–160 (1953).
10. Ramalingam, K., Ph.D. thesis, *1955*, Osmania University, Hyderabad, India.
11. Sato, M., Inaba, T., and Kitagawa, K., J. Soc. Chem. Ind., Japan, *37*, No. 11, 720–721 (1934).
12. Sato, M., and Ito, C., Brit. 336,273, June 10, 1929.
13. Satyan, B. C., Rao, Y. K. R., Bull. Central Food Technol. Research Inst., Mysore, India, *2*, 305–306 (1953).
14. Shoji Igarashi, J. Soc. Chem. Ind., Japan, *49*, 135–138 (1946).
15. Swisher, M. C., and Fiero, G. W., J. Am. Pharm. Asso., *21*, 579–582 (1932).

[Received October 2, 1957]

ABSTRACTS . . . . R. A. REINERS, Editor

ABSTRACTORS: Lenore Petschaft Africk, R. R. Allen, S. S. Chang,
Sini'tiro Kawamura, F. A. Kummerow, and Dorothy M. Rathmann

• Fats and Oils

Formation of Oil and Its Iodine Value in the Developing Linseed. M. N. Hashad (Ain Shams Univ., Egypt), A. K. Ghamrawy, and S. M. El-Sherif. *Ann. Agr. Sci.* (Cairo) 1, 37–66 (1956). Oil accumulations in the Baladi and Hindi varieties of flax seeds were slow and similar (about 0.5% daily) during the first three weeks after flowering. Subsequent rapid rates extended to the thirty-sixth and forty-second day after flowering for Baladi and Hindi, respectively, with resultant oil contents of 34.12 and 41.74%, respectively. Maximum amounts of 37.72 and 43.72% were reached after 48 and 51 days in Baladi and Hindi varieties, a period midway between flowering and ripening. The iodine value increased during the entire period but at a lower rate toward the end, the greatest rate of increase occurring after the oil content was the maximum value which suggests unsaturated acid formation in the late period. The iodine value increased during field ripening after harvesting in Hindi but not in Baladi. The crop was ready for harvesting for optimum fiber production at the maximum oil content stage, but oil quality improvement continued to the fifty-seventh day for Baladi and Hindi. (*C.A.* 52, 18698)

The Occurrence of Rancidity in Salt Herring. R. Marcuse. *Fette, Seifen, Anstrichmittel* 60, 482–7 (1958). The tendency of salt herring to turn rancid during storage can be estimated by determining the oxygen uptake in the presence of oxidation inhibitors. The addition of 0.01–0.02% propyl gallate showed a marked inhibiting effect. (*C.A.* **52**, 18951)

Changes of Fat in Frozen Mackerel During Storage. O. M. Mel'nikova and N. M. Khalina. *Izvest. Tikhookean. Nauch.-Issledovatel. Inst. Ryb. Khoz. i Okeanograf.* **42**, 299–302 (1954); Referat. *Zhur., Khim.* **1956**, Abstr. No. 31180. Hydrolysis and oxidation of fat occur vigorously in mackerel stored at −8 to −10°, but not at −40 to −50°. Heat has very little effect on extent of hydrolysis of glycerides during sterilization, but decomposes unstable peroxides to hydroxy acids and aldehydes. This explains the increase in organoleptic defects during the canning of fat fish. (*C.A.* **52**, 18950)

Edible Fats and Oils. I. The Changes of Various Properties of Edible Oils on Open-air Heating. Bunichi Toi and Shizuyuki Ota. *Kasei-gaku Zasshi* **8**, 197–205 (1957). Physicochemical changes, including ultraviolet absorption spectra, of soybean, rapeseed, and sesame-seed oils are studied.

II. Stability Tests on Commercial Edible Oils at High Temperatures (Heat Stability Tests). *Ibid.* 269–75. (*C.A.* **52**, 18949)

Oxidative Deterioration in Milk. A. de Vleeschauwer, A. van den Baere, and H. Hendrickx. *Mededel Landbouwhogeschool en Opzoekingsstations Staat Gent* **23**(1), 121–36 (1958). The thiobarbituric acid, peroxide, and oxidation-reduction potential tests were used to follow oxidative deterioration. The fresh milk was pasteurized and then stored in the dark at 5°. Pasteurization temperature did not influence test results. Only the peroxide index was able to detect oxidation (by sunlight exposure) sufficient to cause a strong flavor in the milk. Not even the peroxide test could detect small oxidation effects occurring in the dark at 5°. (*C.A.* **52**, 18939)

Action of Trace Metals, Especially Copper, on Fat-Containing Baked Goods. K. Täufel and R. Serzisko. *Ernährungsforschung* **3**, 100–7 (1958). The storage qualities of a baked product consisting of flour:fat:sugar = 3:2:1 was followed, with and without the addition of 10 micrograms of copper per gram of fat (margarine). The baked product at 18–20° in the absence of copper gave an increase in peroxide number from 1.5–42.7 during 21 weeks of storage. In the presence of copper, the peroxide number was 322 at the end of the period. Stored at 35–37°, the peroxide number increased to 38.9 in both the absence and presence of copper. The fatty acids changed very little in all cases except storage at 35–7° in the presence of copper, where fatty acids increased from 0.73–10.35% between the 13th and 20th week. The taste tests did not always parallel the chemical tests, but the former showed earlier deterioration. (*C.A.* **52**, 18935)

Seed Yield and Oil of Linseed as Influenced by Nitrogen and Phosphorus Fertilizer Treatments. A. H. El Damaty and M. T. El Kobbia (Ain Shams Univ., Egypt). *Ann. Agr. Sci.* (Cairo) **1**, 77–82 (1956). Nitrogen fertilizers added 25 days after sowing and just before the first irrigation significantly increased the seed yield, but no significant difference was observed between different forms of nitrogen fertilizers. The addition of superphosphate to any nitrogen fertilizer had no significant effect. The oil content and iodine value were not affected by any fertilizer treatment. (*C.A.* **52**, 18985)

Extraction of Lanolin from Wool Fat with the Aid of Compressed Gas. T. P. Zhuze, G. N. Yushkevich, and I. E. Gekker. *Masloboino-Zhirovaya Prom.* **24**(6), 34–7 (1958). A method is described for the extraction of lanolin from wool grease with the aid of liquefied gases as C_3H_8 and C_3H_6. Approximately 40, 55, and 52% of light-color, good-quality lanolin were extracted from wool grease at, respectively, 105, 90, and 65 atmospheres, and 105°, 100°, and 100°. Higher pressures produced detrimental effect on the quality of lanolin. Stepwise release of pressure is recommended for the recovery of fractions of lanolin for different manufacturing uses. (*C.A.* **52**, 19184)

Ternary Solubility Systems Containing Olive Oil. R. Rigamonti and Amelia Vacirca (Politec., Turin, Italy). *Ann. chim.* (Rome) **48**, 478–90 (1958). Equilibrium in the systems, olive oil-methyl alcohol-acetone, olive oil-methyl alcohol-ethyl acetate, olive oil-methyl alcohol-benzene, and olive oil-glycerol-acetone, are determined both by titrating one component with a mixture of the others to turbidity, and by shaking up a mixture of three components, separating, and analyzing each layer. The linear relations of Hand (*C.A.* **24**, 5203) and Othmer and Tobias (*C.A.* **36**, 4016) are obeyed except for mixtures of olive oil-methyl alcohol with small concentrations of third component. (*C.A.* **52**, 19184)

Oil-Content Determination of Individual Oil Seed Lots from Farmers. J. E. Lindberg, S. Tröeng, and G. Lyttkens. *Sveriges Utsädesfören. Tidskr.* **66**, 281–99 (1956). A new method for the routine determination of oil in oil seed is described. In this method grinding and extraction with ligroine, boiling at 96–100°, is combined in a single apparatus and a new drying cabinet is described. 29 references. (*C.A.* **52**, 19183)

Modern Application of Metal Soaps. Ch. Rosenthal. *Fette, Seifen, Anstrichmittel* **60**, 267 (1958). A lecture. (*C.A.* **52**, 19183)

Steam Distillation of Volatile Fatty Acids. R. O. Weenink (Fats Research Lab., Wellington). *New Zealand J. Sci.* **1**, 18–22 (1958). Data are presented showing the behavior on steam distillation of a mixture of normal saturated fatty acids from C_1 to C_{10}. It is demonstrated that the volatilities of the C_4–C_{10} fatty acids are considerably reduced by the presence of higher molecular weight acids. (*C.A.* **52**, 19183)

The Separation of Fatty Acids. R. T. Holman. *Experientia* **14**, 121–7 (1958) (in English). A lecture; 18 references. (*C.A.* **52**, 19182)

The Action of 2-Chloro-1,3-Butadiene (Chloroprene) on the Oxidation Process of Fats. III. V. G. Mkhitaryan. *Izvest Akad. Nauk Armyan. S.S.R., Khim. Nauk* **11**, 109–18 (1958) (in Russian). The presence of chloroprene in fish oil in the amount 0.2–2.0 ml./60 ml. oil increases the peroxide number and concurrently decreases the iodine number as compared with a control. The presence of copper further accelerates autoxidation. Carotenoids and vitamin A significantly decrease the effect of chloroprene. The chloroprene together with copper may be used to accelerate oxidation and increase viscosity of oils. (*C.A.* **52**, 19182)

Determination of Saturated Acids in Animal Fats. N. S. Drozdov and L. A. Grushetskaya. *Trudy Moskov. Tekhnol. Inst. Myasnoĭ i Molochnoĭ Prom.* **1955**(4), 54–7; Referat. *Zhur., Khim* **1956**, Abstr. No. 34308. The methods of Bertram (*C.A.* **29**, 1145), Thomas and Chei, and Twitchel (cf. *C.A.* **15**, 3617) were compared. In the determination of the content of saturated fatty acids in lard, the Bertram and Thomas and Chei methods give equivalent results, whereas the Twitchell method gives consistently lower values which are probably associated with the fact that in the latter only the high-molecular saturated acids, which yield slightly soluble lead salts, are determined. (*C.A.* **52**, 19181)

Crystallization of Bone Fats with Solvent at Low Temperatures. V. P. Petrovskiĭ and V. N. Komarova. *Trudy Vsesoyuz. Nauch-Issledovatel. Inst. Myasnoĭ Prom.* **1953**, No. 5, 223–31; Referat. *Zhur., Khim.* **1956**, Abstr. No. 41597. Description of new method is given which shortens considerably the time of crystallization and produces fats with different solidification temperatures with high yield of liquid fraction, and high resistance to oxidation. Crystallization with the use of acetone as a solvent produces easily filterable crystals of good structure. A method for production of lubricating oil from bone fat by means of crystallization from acetone is suggested. The relative stability of watch oils with antioxidants was found to increase 1.2–1.5 times upon the presence in fat of 0.1% of lecithin, 5–8 times with 0.1% of tocopherol (vitamin E), 6–10 times with 0.01% of β-naphthol, and 29 times with 0.01% hydroquinone. It is recommended to add to watch oils up to 0.05% of pyrogallol in order to increase their stability 100 times. Addition of 0.05% of hydroquinone increases the stability 25 times. Upon the addition of pyrogallol to oil (50% of bone fat and 50% mineral oil) its color changes from brown to light-yellow as the action of the antioxidant stops. This change serves as indication of decrease in stability of oil during storage. (*C.A.* **52**, 19181)

A Symposium on the Chemistry of Fats and Oils. Introduction. Saburo Komori (Osaka Univ.). *Kagaku* (Kyoto) **11**, 645 (1956).

Chemistry of Fat Constituents. Tsutomu Shimooka (Nagoya Univ.). *Ibid.* 646–50. 21 references.

Plasticizers for the Poly (Vinyl Chloride) Resin from Fats as the Raw Material. Yoshihiro Shigeno (Osaka Univ.). *Ibid.* 650–6. 32 references.

Some Reactions of Fatty Acids. Teruzo Asahara (Univ. Tokyo). *Ibid.* 656–62. A review with 44 references on halogenation, α-sulfonation with sulfur trioxide, condensation of esters at the α-CH_2 group, and synthesis of ketones.

Oxidation of Fats and Oils. Yoshiro Ishii (Nagoya Univ.). *Ibid.* 662–7. 55 references.

Cationic and Amphoteric Surface-Active Agents. Saburo Komori. *Ibid.* 667–71. 25 references.

Anionic and Nonionic Surface-Active Agents. Ryohei Oda (Kyoto Univ.). *Ibid.* 671–5. Reviews. (*C.A.* **52**, 19181)

Chemical Changes Taking Place During Hydrogenation of Fats. A. F. Mabrouk (Univ. Cairo, Giza). *Oil and Soap* (Egypt) **3**, 312 (1956). (*C.A.* **52**, 19181)

Determination of Nickel Content in Hydrogenated Fat by Colorimetric Method. N. Kh. Kameneva and A. G. Koblyanskiĭ. *Trudy Krasnodar. Inst. Pishchevoĭ Prom.* **1955**(11), 39–42; Referat. *Zhur., Khim.* **1956**, Abstr. No. 34318. Ash an aliquot of hydrogenated fat, heat the residue to redness, treat with 6–8 drops of aqua regia, evaporate to dryness, wet with 2–3 drops of 20% hydrochloric acid, dissolve in 3–5 ml. hot water, and transfer to a 50-ml. volumetric flask. Add 1–2 ml. of 20% solution of Rochelle salt, 0.5–1 ml. of 1% alcoholic iodine solution, followed by 10% ammonium hydroxide dropwise until the color disappears, and then 1 ml. of 1% dimethylglyoxime. Shake the flask, make up to volume, and read the color of the solution in 5–10 minutes by means of a FEK-M photocolorimeter. The visual determination of nickel in the presence of less than 5 micrograms of iron per ml. by Dubosque colorimeter according to the same method is possible. A solution containing 0.3–1.2 microgram nickel per ml. should be used. (*C.A.* **52**, 19180)

Composition of the Volatile Matter Involved in the Odor of Hydrogenated Fat. B. N. Tyutyunnikov and L. P. Grechishnikova (Polytech. Inst., Kharkov). *Masloboino-Zhirovaya Prom.* **24**(6), 8–12 (1958). The authors suggest that to avoid the formation of odoriferous substances during the hydrogenation process it is necessary either to remove the low molecular weight triglycerides, especially C_{10}–C_{12}, by selective extraction methods, or to employ a catalyst which does not promote the reactions resulting in the formation of half acetals, and their conversion to aldehydes and alcohols. 14 references. (*C.A.* **52**, 19179)

The Naval-Stores and Tall-Oil Industries. E. O. Barnes and M. L. Taylor (Union Bag-Camp Paper Corp., New York, N. Y.). *Tappi* **41**(8), 16A, 18A, 20A, 22A (1958). A description is given of processes, products, and uses of gum naval stores, wood naval stores, and tall oil. (*C.A.* **52**, 19171)

Transesterification of Glycerides from Cod-Liver and Linseed Oils. Z. Jedliński (Politech., Gdańsk, Poland). *Zeszyty Nauk. Politech. Gdańsk. Chem.* **2**, 9–27 (1957) (German and Russian summaries). The oil from *Gadus morhua* livers crystallized at −2 to −5°, the filtrate kept at 8–10°, filtered, and the filtrate of iodine number 171.5 was mixed in ratios from 1:3 to 3:1 by weight with linseed oil. The mixtures were kept for 2–10 hours at 200° and 1 atmosphere in gaseous carbon dioxide without and with either zinc oxide 0.2–0.3, zinc oxide plus stannous oxide (1:1) mixture 0.3, or stannous oxide 0.25% as catalyst. In all cases oils and varnishes dried within some 20 days, when spread on glass. Sodium ethylate as catalyst caused darkening of oil and produced a glutinous precipitate. Preparation of mixed varnishes containing a drying oil and a partly drying oil was attended by transesterification. (*C.A.* **52**, 19170)

Studies on the Rancidity of Lard. III. A Comparison of Several Tests for Determining the Degree of Rancidity. A. Vargas Romero and R. Gutiérrez González-Quijano (Inst. Grasa y Derivados, Seville). *Grasas y acietes* (Seville, Spain) **9**, 14–17 (1958). Modified Kreis tests show the end of the induction period at 4.5 Lovibond red units for lard on heating in air and 5 red units for lard on heating in oxygen. The rancid odor appeared in six days in lard on heating in air, corresponding to a peroxide value of 7 and to 8 Lovibond red units in the Kreis test. In lard on heating in oxygen the rancid odor appeared in five hours corresponding to a peroxide index of 14 and to 8 red units. In lard on normal storage rancidity was detected in 100 days (peroxide index 15, red units 7). (*C.A.* **52**, 18949)

Determination of Fat in Fish Meal by Refractometry. H. Treiber. *Fette, Seifen, Anstrichmittel* **60**, 488–90 (1958). Fish meal, 1.9 to 2.1 g., is triturated with 3 ml. 1-chloronaphthalene, allowed to stand for 10 minutes, filtered, and index of refraction determined at 20°. The weight of fat (mg.) = E = 3581.4 × 1.6331 − index of refraction)/(index of refraction − 1.4780), and % fat = E × 100/weight of sample. The results agree well with fat determinations by the solvent-extraction method. (*C.A.* **52**, 18951)

Isolation of Sterols from Wastes After Laboratory Refining of Rapeseed Oil. H. Niewiadomske (Politech., Gdańsk, Poland). *Zeszyty Nauk. Politech., Gdańsk Chem.* **No. 2**, 47–58 (1957) (English summary). Separation of sterols from rapeseed oil is discussed. The soapstock contained most of sterols. Sodium soaps prepared from soapstock, when extracted with acetone and the product crystallized from 95% ethyl alcohol, afforded sterols, in 57% yield. (*C.A.* **52**, 19184)

New Technique for Determining the Relative Autoxidation Rates of Fatty Acid Derivatives. A. R. S. Kartha (Maharaja's Coll., Ernakulam). *J. Sci. Ind. Research* (India) **17B**, 135–7 (1958). When fatty acid esters are oxidized under unrestricted supply and availability of oxygen, a maximum rate autoxidation period is reached during which 45–6% of the substrate is destroyed at a constant rate and the rate of decrease of iodine number is constant during this period for a particular substrate. Decrease in iodine number during maximum rate autoxidation period can be used to confirm the values for comparative autoxidation rates reported by other workers. This technique has been applied to the autoxidation of mixtures of methyl linoleate and methyl linolenate and of methyl oleate and methyl linoleate. For the methyl linoleate and methyl linolenate the relative rates of autoxidation in the pre-maximum rate autoxidation period stages are the same as those during the maximum rate autoxidation period, but for methyl oleate and methyl linoleate the rate of autoxidation of the methyl oleate during initial stages of autoxidation including the induction period is very much slower than for the polyethenoid acids. According to the results of the earlier workers the relative autoxidation rates of oleic, linoleic, and linolenic acid methyl esters are approximate in the ratio of 1:12:25. According to the present results the relative autoxidation rates of oleic, linoleic, and linolenic acid methyl esters are in the ratio 1:2:4. (*C.A.* **52**, 19182)

The Unsaturated Fatty Acids of Some Lipides. P. Kajanne (Inst. Technol., Helsinki). *Suomen Kemistilehti* **31B**, 213–14 (1958). The polyunsaturated fatty acids in black currant seeds, butterfat, lard, goat tallow, cow tallow, and the dermal seborrheic secretion of man were spectrophotometrically determined to find a raw material for the preparation of pure oleic acid. The most favorable ratio of other unsaturated acids to oleic acid in the lipides studied was found in goat tallow where the ratio was about 5/100. (*C.A.* **52**, 19182)

The By-products of Cork in the Varnish, Wax, Latex, and Rubber Industries. G. Torricelli. *Ind. vernice* (Milan) **12**, 31–3, 65–8, 137–9 (1958). Cork wax contains 40% nonsaponifiables and 55% cork fatty acids. There are two grades of cork wax, RS (melts at 72–4°) and RSS (melts at 95–100° and up to 118–20°). These waxes resemble carnauba and candelilla wax in many ways, but have superior ability to raise the melting point of paraffins. Thus, 2% RSS raises the melting point of paraffin wax from 50–2° to 72–4°. (*C.A.* **52**, 19124)

Effect of Certain Variables on the Determination of Iodine Values of Waxes by the Hanus Method. Sister Mary Concetta Waller and Jane F. Fussenegger (Ursuline Coll., Louisville, Ky.). *Trans. Kentucky Acad. Sci.* **19**, 6–13 (1958). (*C.A.* **52**, 19185)

Investigations on the Composition of Grass Wax. L. Savidan (Univ. Paris). *Ann. chim.* (Paris) [13], 1, 53–83 (1956). A method is described for the separation and analysis of the constituents of grass wax. These consist of a hydrocarbon, $C_{31}H_{64}$, and a mixture of fatty acid esters, C_{24}–C_{32}, and fatty alcohols, C_{24}–C_{32}. (*C.A.* **52**, 19185)

Some Observations on the Constitution of Wheat Flour Lipids Isolated from Unbleached and Chlorine Dioxide-treated Flours. K. A. Gilles, C. A. Anker, D. H. Wheeler, and J. S. Andrews (General Mills, Inc., Minneapolis). *Cereal Chem.* **35**, 374–379 (1958). Portions of untreated patent flour were treated with levels of chlorine dioxide up to 1.0 g./cwt. The lipids were extracted from the bleached and unbleached flours with pentane and analyzed by spectrophotometric methods. The results showed no decrease in essential fatty acid content by the bleaching treatment.

Advances in the Synthesis of Glycerides of Fatty Acids. L. Hartman (Fats Res. Lab., Dept. of Sci. and Ind. Res., Wellington, New Zealand.) *Chem. Rev.* **58**, 845–867 (1958). A review is given of progress in the chemistry of synthetic glycerides of fatty acids since 1940. 153 references.

Identification of Rapeseed Oil in Olive Oil by Urea Fractionation. U. R. Bhalerao and J. H. Mahon (Canada Dept. of National Health and Welfare, Ottawa). *J. Assoc. Off. Agr. Chemists* **41**, 745–748 (1958). To detect adulteration of olive oil with rapeseed oil, a fractionation of the fatty acids by urea is performed. The mean molecular weight of the fatty acids of olive oil obtained by two urea fractionations was found to be 269.1 to 275.6. Olive oils showing a urea fractionated fatty acid molecular weight over 280 may be considered as adulterated with an oil containing erucic acid glycerides.

Twelve-Month Survey of WIA in Commercial Cream. F. Hillig and W. Weiss (Food and Drug Adm., Dept. of Health, Ed., and Welfare, Washington 25, D. C.). *J. Assoc. Agr. Chemists* **41**, 819–821 (1958). The increase in water insoluble acids (WIA) are a measure of the decomposition of cream. The WIA by the rapid method for 2,825 cans of cream from 85 plants and 13 states were correlated with organoleptic evaluations.

Microdetermination of the Saponification Number. F. A. Lee (Cornell Univ., Geneva, N. Y). *J. Assoc. Off. Agr. Chemists* **41**, 899–900 (1958). Micro saponification numbers are determined on 40 mg. samples in 18 ml. micro-Kjeldahl flasks by the use of 0.5 ml. of 0.5*N* KOH and back titrating with 0.05*N* HCl. The micro results compare with the macro determination.

Indigenous Cottonseed I. Proximate Analysis and Oil Composition of Hyderabad and Bombay Varieties. V. R. Harwalkar, K. T. Achaya, and S. A. Saletore. (Central Labs for Sci. and Ind. Research, Hyderabad-Deccan). *The Oil and Oilseeds J.*, 11(2), 11–16 (1958). Proximate analysis of cottonseeds from Hyderabad and Bombay indicate the existence of two types characterized by high and low seed wts., oil contents and linter contents. Indigenous cottonseeds of American origin were of the high seed wt., oil and linter type and resembled American averages. Fatty acid analysis by methyl ester fractionation indicated the Indian oils were higher in oleic than linoleic acid while American oils of the same I.V. contain more linoleic than oleic acids.

Studies on the Structure of Lactobacillic Acid. II. Position of the Cyclopropane Ring. K. Hofmann, G. J. Marco, and G. A. Jeffrey (Biochemistry and Chemistry Depts., Univ. of Pittsburgh, Pittsburgh, Pennsylvania). *J. Am. Chem. Soc.* **80**, 5717–21 (1958). A micromethod is described for the degradation of long-chain cyclopropane fatty acids. The procedure provides valid information regarding the position of the cyclopropane ring in this class of compounds. The cyclopropane ring of lactobacillic acid was shown to occupy the 11,12-position on the octadecanoic acid chain. X-Ray diffraction methods were used in the identification of the degradation products. Undecanedioic acid was found to be dimorphic, and X-ray diffraction data for both forms are presented. In addition to furnishing information regarding the ring position, the present degradation method provides a means to remove selectively the methylene bridge-carbon from the rest of the carbon chain of cyclopropane fatty acids. The biochemical implications of this finding are discussed.

Hydrogenation and Hydrogenolysis. M. R. Arnold, J. T. Bradbury, W. M. Keely, and F. J. O'Hara (Girdler & Co., Louisville, Kentucky). *Ind. Eng. Chem.* **50**, 1370–79 (1958). Methods for precipitating, reducing, and stabilizing nickel catalysts have been reported. Copper chromite has been used to produce alcohols from pure methyl laurate, as well as from natural products such as beeswax, castor oil, rosin, lanolin, and wool wax. Nickel catalysts have been chosen for selective saturation or isomerization of tung, rapeseed, cottonseed, castor, and sardine oils, as well as pure esters. The effects of catalyst concentration, temperature, pressure, agitation, diffusion, and hydrogen solubility on the rate and selectivity have been studied. Hydrogenation odors have been attributed to volatile aldehydes and acids formed from moisture in the oils or hydrogen, which is also blamed for depressing selectivity.

Catalysts in Sulfation of Castor Oil. S. Rangarajan and N. P. Palaniappan (Annamalai Univ., Annamalainagar, India). *Ind. Eng. Chem.* **50**, 1787–8 (1958). Mercury and other metallic salts are commonly used as catalysts in organic sulfonations. However, use of catalysts in sulfation of fatty oils has not been studied in detail. In this investigation, use of mercury, mercurous sulfate, vanadium pentoxide, copper sulfate, and pyridine as catalysts and their effect on the formation of combined sulfur trioxide in the castor oil-sulfuric acid systems were studied. Mercury and mercurous sulfate give appreciably enhanced rates of reaction.

Determination of Phenolic Hydroxyl by Near-Infrared Spectrophotometry. R. F. Goddu (Hercules Powder Co., Wilmington 99, Del.). *Anal. Chem.* **30**, 2009 (1958). The near-infrared region between 2.7 and 3.0 microns offers a convenient tool for the rapid, selective, and sensitive determination of phenolic hydroxyl compounds. The technique has qualitative and quantitative aspects with accuracy and precision equivalent to those found in other photometric procedures. Particular application is in analysis of phenolic antioxidants.

Gas-Liquid Partition Chromatography. Determination of 2,6-Di-Tert-Butyl-p-Cresol on Antioxidant-Treated Paperboard. E. C. Jennings, Jr., T. D. Curran, and D. G. Edwards (Fibreboard Paper Products Corp., Antioch, Calif.). *Anal. Chem.* **30**, 1946 (1958). The antioxidant, 2,6-di-tert-butyl-*p*-cresol, content of treated paperboard is determined by extraction with cyclohexane-isopropyl alcohol and concentration prior to gas-liquid partition chromatography. Over a concentration range of 14.4 to 144 mg. per square foot recoveries of 100 ± 10% were obtained. Retention time may be used for the identification of antioxidants and masking compounds.

A Chromatographic Technique for the Estimation of Some of the Free Fatty Acids in Lipolyzed Dairy Products. A. R. Kemp and J. H. Hetrick (Dean Milk Co., Rockford Illinois). *J. Dairy Sci.* **41**, 1494-1501 (1958). A simplified Ramsey-Patterson partition chromatographic method is described for use on short-chain fatty acids (butyric through capric) normally found in dairy products. Procedures are described for preparing samples for analysis on a prepared column. The accuracy of the method is illustrated by a chromatogram of a known mixture of synthetic acids and by an analysis of saponified butteroil, in comparison with analyses of other investigators. An indication of the precision is given by five analyses of the same sample. Typical chromatograms are tabulated and explained.

Paper Chromatography of Saturated and Unsaturated Fatty Acids. P. E. Ballance and W. Mary Crombie (Dept. Botany, Univ. Southampton. *Biochem. J.* **69**, 632–40 (1958). Several reversed-phase paper chromatographic systems for separation of fatty acids are described. The relationship between structure and R_F was determined for over 40 pure fatty acids. For saturated and unsaturated C_{12} to C_{22} acids, best results were obtained with a paraffin/aqueous acetic acid system. A castor oil/aqueous acetic acid system seemed to give best separation of acids containing more than one hydroxyl group. Amounts of 1 to 70 μg. in each spot and total quantities of up to 140 μg. of mixed fatty acids can be estimated by use of a copper-dithiooxamide color developing reagent. Full analysis of 5 mg. of natural fatty acid is possible by comparing the chromatograms of (1) the original mixture, (2) the mixture after hydrogenation, and (3) the mixture after oxidation with alkaline permanganate. Application to synthetic mixtures of linolenic, linoleic, oleic and saturated acids, and to the acids from *Trichoderma viride* are shown. The procedure is not applicable to the analysis of highly complex mixtures, such as fish oil, or for mixtures containing appreciable amounts of short-chain acids, such as palm-kernel oil.

Fatty Acid Composition of Food Fats. M. G. Hardinge and Hulda Crooks (Dept. Pharmacology, School of Medicine, College of Medical Evangelists, Loma Linda, Calif.). *J. Am. Dietet. Assoc.*, **34**, 1065–71 (1958). Data are tabulated for the caloric value, protein, fat, carbohydrate and cholesterol contents, and the fatty acid distribution in cereals and bread products, dairy products, dairy food substitutes, desserts and sweets, fats, oils and oily foods, legumes, meat and poultry, nuts, oily fruits and seeds, prepared plant proteins.

Progress in Research on Soybeans. A. K. Smith (Northern Utilization Research & Dev. Div., U. S. Dept. Agr., Peoria, Ill.). *Soybean Digest* 18(12), 14–17 (1958). The relationship of peroxides, trace metals and tocopherols to soybean oil stability is reviewed briefly. Recent research has failed to confirm that an antithiamin factor occurs in soybean. The use of U. S. soybeans in Japan is discussed.

Wool Wax. VIII. The Composition of the Unsaponifiable Material. D. H. S. Horn (Natl. Chem. Research Lab., S. African Council for Sci. & Indus. Research, Pretoria, S. Africa). *J. Sci. Food Agr.* **9**, 632–8 (1958). Samples of freshly secreted and of autoxidized wool waxes were fractionated by chromatographic adsorption on alumina and by treatment with urea. The unsaponifiable material from fresh wax contained: *iso*-cholesterol (the lanosterol-dihydrolanosterol mixture), 44.2%; cholesterol, 32.5; urea-separated aliphatic alcohols, 14.7; aliphatic diols, 3.2; and hydrocarbons, 0.9. Autoxidized wax contained in addition a resinous complex of autoxidized products derived chiefly from the unsaturated unsaponifiable constituents. The possible mechanism of the autoxidation is discussed.

Gas-Liquid Chromatography of Highly Unsaturated Fatty Acid Methyl Esters. W. Stoffel, W. Insull, Jr., and E. H. Ahrens, Jr. (The Rockefeller Inst., N. Y. City). *Proc. Soc. Exptl. Biol. Med.* **99**, 238–41 (1958). Proof is presented that methyl esters of highly unsaturated long-chain fatty acids are not significantly altered in chemical structure during gas-liquid chromatography with the stationary phase Apeizon M at 197°. Relative retention volumes of C_{16}, C_{18}, C_{20} and C_{22} polyenoic acids are listed for 2 stationary phases, non-polar Apeizon M and polar Reoplex 400. A system for rapid total analysis of complex fatty acid mixtures on a submilligram scale is described.

Solvent Extraction of Soybeans. F. L. McDonald (Planters Mfg. Co., Clarksdale, Miss.). *Soybean Digest* 19(1), 16 (1958). The process for solvent extraction of soybean oil is described briefly.

Molecular Interaction in Mixed Monolayers of Fatty Acids. K. Durham (Research Dept., Unilever Ltd., Port Sunlight, Cheshire). *J. Applied Chem.* **8**, 724–8 (1958). Force-area isotherms and partial molar areas are reported for mixed monolayers of arachidic acid and α-ethyl-stearic acid on *M*/400

$CaCl_2$ solution. Results indicate molecular interaction between the acids, and indicate that the mixed films are more condensed than an ideal mixture of the two constituents. This condensation may be ascribed to strong van der Waals' forces between the hydrocarbon chains of the fatty acids.

Carbonyl Compounds as a Criterion of Flavor Deterioration in Edible Fats. N. W. Berry and A. A. McKerrigan (J. Bibby & Sons, Ltd., Liverpool, 3). *J. Sci. Food Agr.* **9**, 693–701 (1958). Methods for estimating total carbonyl contents of oils and shortenings are described. Measurements on peanut, cottonseed and soybean oils at different stages of processing indicate that short-chain, volatile oxidation products are chiefly responsible for oxidative off-flavors. Non-volatile carbonyls may act as precursors of volatile compounds, decomposing when the fat is further heated or stored, and may reduce the protective effects of added antioxidants. Addition of antioxidants to oils and shortenings increases the organoleptic shelf-life at 50°. There is a parallel slower rate of increase in the total carbonyl value and the volatile carbonyl index. The method is applicable to testing the effectiveness of antioxidants in biscuit fats.

Method of Preparing Dispersions of Vegetal Phosphatide Fractions. P. L. Julian and H. T. Iveson (The Glidden Co.). *U. S. 2,849,318.* Separate, homogeneous, stable dispersions of the alcohol-soluble and alcohol-insoluble fractions of vegetal phosphatides are prepared by successively extracting the phosphatides with a lower alcohol, dispersing the resulting fractions in appropriate carriers, such as high boiling solvents or glyceride oils, and finally heating the dispersions to remove the alcohol.

Solvent Extraction of Oils from Vegetable Matter. T. Andrews (Rose, Downs & Thompson Ltd.). *U. S. 2,850,511.* In a solvent extraction process, finely ground vegetable material is suspended in a solvent. The slurry is filtered. The filter cake is reextracted in the same fashion.

Hydrogenation Process and Product. H. P. Kaufmann. *U. S. 2,852,541.* A process is described for the preparation of a hydrogenated vegetable oil containing less than 2% iso-acids and all of the carotenes present in the natural oil. A solution of crude oil is obtained by the extraction of vegetable material with a solvent. The resulting solution is treated with hydrogen at a temperature below 100° in the presence of a hydrogenation catalyst.

Process for Shortening Manufacture. R. J. McGowan and B. F. Teasdale (Canada Packers, Ltd.). *U. S. 2,853,390.* In a continuous process for the manufacture of an all-fat plastic shortening, a feed stream of melted fat is blended with a recycle stream of fat containing finely-divided mechanically strong crystals so that the temperature of the feed stream is reduced below the seeding point. The mixture is cooled rapidly. The resultant supercooled liquid is subjected to crystallization and mechanical working until crystallization is completed. A portion of the product is recycled. The remainder is tempered to the desired consistency.

Aqueous Fat Emulsion. R. R. Degwitz (Merck & Co., Inc.). *U. S. 2,853,419.* A process is described for the preparation of an aqueous fat emulsion which is stable to autoclaving and adapted for intravenous injection. A vegetable oil and lecithin are emulsified with water in the presence of a readily volatile organic liquid which is a solvent for the lipids and consists of a mixture of water-miscible and water-immiscible organic solvents. Finally, the organic liquid is removed from the emulsion.

Apparatus for Frying Potatoes, Fish, and the Like. H. E. Pack (Frying Systems, Inc.). *U. S. 2,853,937.* A continuous conveyor for carrying foods through heated fat is described.

Fat-Soluble Vitamin Composition. A. Rosenberg. *U. S. 2,855,306.* A high melting fat and at least one fat-soluble vitamin are mixed with 0.2 to 15% of crude hot well oil.

Deep Fat Frying Potatoes. W. E. Buechele and J. W. Adacusky (Brock & Co., Inc.). *U. S. 2,855,308.* Sliced potatoes are immersed in fat at 350 to 380°F. for 15 to 30 seconds, immediately withdrawn and fried in fat at 250 to 300°F. for 2 to 5 min.

Method of Producing Shortening. A. H. Steffen (Swift & Co.). *U. S. 2,855,310.* The starting material for preparing a shortening is a mixture of tallow and at least one other fat such that the mixture contains at least 25% tallow by wt., less than 15 mole percent of C_{16} and C_{18} trisaturated glycerides and 30 to 50 mole percent partially saturated glycerides. The mixture is melted, mixed with an interesterification catalyst and heated to cause rearrangement of the fatty acids in the glyceride molecules. To this modified product is added sufficient saturated triglyceride flakes to increase the C_{16} and C_{18} trisaturated glycerides content to 15 mole percent. The resultant shortening substantially increases pound cake volume.

Triglyceride Compositions. DeW. Nelson (Swift & Co.). *U. S. 2,855,311.* At least two triglyceride compositions, having a stable beta crystal structure, are mixed. The mixture has an acyl content of at least 95% C_{16} and C_{18} fatty acids of which 73 to 80% are C_{18} and 20 to 27% are C_{16} acids. The mixture is heated to at least 50° in the presence of an alkaline catalyst so that random redistribution of the acyl radicals will occur.

Proccessing of Phosphatides. D. J. Hennessy and E. E. Kupstas (American Lecithin Co., Inc.). *U. S. 2,855,416.* Crude soy phosphatides containing about ⅓ soybean oil are mixed with a small quantity of an aqueous solution of a peracid (performic, peracetic, perpropionic or perlactic). The mixture is heated. Additional water is added and the hydrated phosphatide fraction is separated from the acetone-soluble soybean oil.

Stabilization of Fatty Materials. J. A. Chenicek (Universal Oil Products Co.). *U. S. 2,856,293.* A food product of animal origin is stabilized against rancidity by the addition of an N, N′-dialkyl-*p*-phenylene diamine.

Manufacture of Edible Dough Products. J. F. Naylor (T. & T. Vicars Ltd. and W. & R. Jacob & Co., Ltd.). *U. S. 2,856,870.* In the manufacture of edible dough products, a liquefied fat is sprayed continuously onto a moving surface and covered with flour to form a homogeneous layer. This is cooled and scraped off so as to fall onto the upper surface of a moving sheet of dough.

Double Soak Filtration-Extraction of Vegetable Oil-Bearing Materials. E. L. D'Aquin, H. L. E. Vix, A. V. Graci, Jr., E. A. Gastrock and J. J. Spadaro (Secy. Agr., U. S. A.). *U. S. 2,857,411.* A process for the filtration-extraction of vegetable oil with solvent is described.

Process for Obtaining Fluid Lanolin. W. R. Noble and J. T. Scanlan (Secy. Agr., U. S. A.). *U. S. 2,857,412.* Crude lanolin is reacted with urea in methanol. After complex formation is completed, the mixture is slurried in ether and filtered. The ether solution is washed with mineral acid and water. Fluid lanolin is recovered by evaporation of the ether.

Process of Preparing Vitamin Oils in Particle Form. H. M. Espoy (Barnett Labs., Inc.). *U. S. 2,858,215.* An apparently dry powder is prepared by mixing an oily vitamin-containing liquid with a finely powdered synthetic calcium silicate gel.

Rearranged Base Stock Triglyceride Products and Process of Making Same. W. M. Cochran, M. L. Ott, and C. W. Lantz (The Glidden Co.). *U. S. 2,859,119.* The iodine value of a non-lauric oil is brought into the range of 37.5 to 82 units. A mixture of 60 to 90% by wt. of this oil and a lauric oil is liquefied and catalytically rearranged to a product having a Wiley melting point between 85° and 110°F.

Flavor-Stable Rearranged Fats from Domestic Oils. W. M. Cochran, C. W. Lantz, and M. L. Ott (The Glidden Co.). *U.S. 2,859,120.* An unsaturated fat which normally turns rancid and reverts is partially hydrogenated to a stability against reversion at least equal to that of 94° hydrogenated cottonseed oil. This hydrogenated fat is mixed with a normally non-reverting, non-rancidifying fat. The mixture is liquefied and catalytically rearranged at temperatures below 250°F.

Deep Fat Cooking Apparatus. C. E. Sech, Jr. (Wise Potato Chip Co.). *U.S. 2,861, 514.* A jacketed kettle for potato chip frying is described.

Apparatus for Continuous Production of Butter. A Mäsek and Z. Malik (VSCHP). *U.S. 2,861,784.*

Non-Selective Hydrogenation of Fats and Oils. D. R. Merker (Swift & Co.). *U.S. 2,862,941.* A process is described for the non-selective hydrogenation of an unsaturated oil in the presence of moisture and a small amount of mineral acid or an aliphatic hydroxy acid.

Purification of Fatty Acids. D. H. Wheeler (General Mills, Inc.). *U.S. 2,862,943.* Fatty acids of improved color are obtained by distillation in the presence of boric acid.

Treatment of Fatty Acids. W. Hagge, F. Povenz, and M. Quaedvlieg (Farbenfabriken Bayer A.-G.). *Ger. 922,431.* Substantially colorless fatty acids are converted to aqueous dispersions by the addition of dispersing agents and treatment with small amounts of chlorine. The precipitated fatty acid is tasteless after water washing. *C.A.* 52, 19188)

Fatty Acid Mixtures. K. H. Imhausen and E. Keunecke (Imhausen & Co. G.m.b.H. and K. H. Imhausen). *Ger. 950,367.* The crude product from paraffin oxidation was divided into two or more fractions of different molecular weight. The fractions subsequently were saponified and separated from the unsaponified residue. The soaps thus obtained were treated thermally and then converted into the free fatty acids by known methods. (*C.A.* **52**, 19188)

Continuous Esterification of Low-Molecular Fatty Acids. V. Vasilescu. *Ger.* (East) *10,348.* Low-molecular fatty acids in aqueous solution are easily transformed into esters by means of weak anion exchangers. Thus a solution of 20% fatty acids, acid number 246, was homogeneously mixed with 150% of the stoichiometric amount of butyl alcohol and introduced into a battery of contact vessels filled with an anion exchanger and heated to 90–130°. After passing through the sixth vessel, the acid number had decreased to 1–2 while the saponification number had increased to 360. The mixture separated into two layers, the oily one containing the esters. The aqueous layer still has an acid number of 50 and could be recycled. (*C.A.* **52**, 19188)

Lubricants from Vegetable Material. Compagnie française de raffinage. *Fr. 55,811.* Addition to *Fr. 972,891* (*C.A.* **46**, 10605g). The products obtained as in the main patent are hydrogenated, treated with sulfur or thionyl chloride in the presence of aluminum chloride, sulfonated or made to react with hydroxyamines to prepare compounds said to be useful as antioxidants, antiseptics, fungicides, insecticides, detergents, and emulsifiers. (*C.A.* **52**, 19110)

Waxes. Établissements Tiscco and M. Procofieff. *Fr. 1,020,823.* Hard waxes are obtained by condensing high-molecular organic acids with amino alcohols. The acids are derived from natural waxes, but the new waxes have chemical and physical properties different from those of the natural waxes. (*C.A.* **52**, 17762)

FATTY ACID DERIVATIVES

Keto Fatty Acids Derived from Castor Oil. I. Unsaturated Acids. J. Nichols and E. Schipper (Research Dept. of Ethicon, Inc., Somerville, New Jersey). *J. Am. Chem. Soc.* **80**, 5705–10 (1958). The chromic acid and Oppenauer oxidation of ricinoleic and ricinelaidic acid to unsaturated keto acids has been investigated. The structure of the chromic acid oxidation product of 12-oxo-*cis*-9 or 12-oxo-*trans*-9-octadecenoic acid has been elucidated and the compound shown to be 9,12-dioxo-*trans*-10-octadecenoic acid.

Keto Fatty Acids Derived from Castor Oil. II. Epoxy and Hydroxy Acids. J. Nichols and E. Schipper (Research Dept. of Ethicon, Inc., Somerville, New Jersey). *J. Am. Chem. Soc.* **80**, 5711–13 (1958). A number of epoxy and hydroxy keto acids were prepared by oxidation of 12-oxo-*cis*-9-octadecenoic acid, 12-oxo-*trans*-9-octadecenoic acid, 12-oxo-*trans*-10-octadecenoic acid and 9,12-dioxo-10-octadecenoic acid.

Keto Fatty Acids Derived from Castor Oil. III. Acid Derivatives. E. Schipper and J. Nichols (Research Dept. of Ethicon, Inc., Somerville, New Jersey). *J. Am. Chem. Soc.* **80**, 5714–17 (1958). Amides and esters of C_{18}-keto fatty acids and several unsaturated C_{18}-acids were prepared by the mixed carbonic-carboxylic anhydride method. An extension of this procedure provided a novel route to the synthesis of long chain acid anhydrides.

Fatty-Acid Amides. III. Paper Chromatography of Fatty-Acid Amides. H. P. Kaufmann and K. J. Skiba (Inst Fettforschung, Münster, Ger.). *Fette, Seifen, Anstrichmittel* **60**, 261–3 (1958). The separation of fatty-acid amides, C_{10}–C_{18}, is carried out by paper chromatography. R_f values for the following acid amides are given: capric 0.80, lauric 0.66, myristic 0.53, palmitic 0.29, stearic 0.15, oleic 0.31, elaidic 0.24, linoleic 0.44, linolenic 0.62. Mixtures of palmitic and oleic and of myristic and linoleic could not be separated. (*C.A.* **52**, 19183)

Fatty-Acid Amides. II. Use and Analytical Determination. Mercury Compounds of the Fatty-Acid Amides. H. P. Kaufmann and K. J. Skiba (Deut. Inst. Fettforschung, Münster/Westf., Ger.). *Fette, Seifen, Anstrichmittel* **59**, 498–502 (1957). The use of fatty-acid amides as intermediates for further reactions, as well as both qualitative and quantitative methods of analysis for the amides are reviewed. The chemistry of mercury compound, $(R.CONH)_2Hg$, is summarized. 50 references. (*C.A.* **52**, 19183)

Adduct. J. Dazzi (Monsanto Chemical Co.). *U.S. 2,862,012.* An olefinic non-conjugated glyceride oil is condensed with an alkyl fumarate.

Glucoside Esters as Suspending Agents in Vinyl Halide Polymerization Process. R. O. L. Lynn, Jr., and H. W. Mohrman (Monsanto Chemical Co.). *U.S. 2,862,913.* In a process for suspension polymerization of a vinyl halide in the presence of a maleic-vinylidene interpolymer, the auxiliary suspending agent is a fatty acid diester of an alkyl glucoside.

Process for the Production of Omega-Amino Acids. H. Otsuki and H. Funahashi. *U.S. 2,862, 940.* Unsaturated fatty acids are reacted with ozone. The ozonide is decomposed by steam distillation. The resultant acid aldehyde is reacted with ammonia. The product is reduced with hydrogen in the presence of Raney nickel so as to form the omega-amino acid.

Alcohols. Friedrich Marten and Otto Roelen (Ruhrchemie A.-G.). *Ger. 947,706.* C_{13}–C_{18}-Olefins were treated with water gas at 135°/150 atmospheres in the presence of a cobalt catalyst and the resulting C_{14}–C_{18}-aldehydes oxidized to give the corresponding fatty acid mixture. A C_6-olefin was treated with water gas under the same conditions and the resulting aldehyde reduced with hydrogen in the presence of the same catalyst at 185°/159 atmospheres to give the corresponding C_7-alcohol. (*C.A.* **52**, 18214)

• Biology and Nutrition

Lipides in the Cerebrospinal Fluid. II. Determination of Total Lipides. W. W. Tourtellotte, A. J. Vander, B. A. Skrentny, and R. N. De Jong (Univ. of Michigan, Ann Arbor). *J. Lab. Clin. Med.* **52**, 481–90 (1958); cf. *Univ. of Mich. Med. Bull.* **24**, 66–96 (1958). An ultramicro total lipide procedure is presented which is capable of determining 2 micrograms of lipides in cerebrospinal fluid. It is based on oxidation of an extract by a dichromate-sulfuric acid reagent and the colorimetric determination of potassium dichromate which has been reduced.

III. Determination of Total Phospholipides. W. W. Tourtellotte, F. M. Parker, and R. N. De Jong. *Ibid.* 491–5. An analytical method is presented which is capable of determining 0.02 microgram of phospholipides in cerebrospinal fluid. It is based on coprecipitation of proteins and lipides and colorimetric determination of phosphorus on lipide extracted from the protein. (*C.A.* **52**, 18616)

A Simplified Method for Determination of Cholesterol Esters in Serum. Takeichi Matsuda (Kyoto Univ.). *Kokumin Eisei* **25**, 199–200 (1956). Free cholesterol in serum is previously removed by converting into the digitonide and the esterified cholesterol is determined then by the usual Liebermann-Burchard reaction. (*C.A.* **52**, 18609)

The Amount of β-Lipoproteins as a Function of Age. M. Burstein and J. Samaille. *Sang, Le* **29**, 312–18 (1958). Determination of β-lipoproteins in 437 males and 281 females between the ages of 18 and 62 years revealed an increase in the β-lipoprotein with age. The young female has a smaller amount of β-lipoproteins up to 35 years, afterwards the differences decrease. (*C.A.* **52**, 18728)

Composition of Milk Triglycerides as Influenced by Fat and Carbohydrate Intakes of the Ration. M. I. Kniga, A. Babak, and G. Khmelik (Zootech. Inst. Kharkov). *Molochnaya Prom.* **19**(7), 32–2 (1958). It was concluded that the changes in Reichert-Meissl number, unsaturated fatty acid content of the fat, and the quality of butter produced are largely determined by the availability of readily fermentable carbohydrates, the fat content of the feed, and the ratio of the Reichert-Meissl number to the unsaturated fatty acid content. It is further stated that the milk fat for the manufacture of high-quality butter can be obtained through feeding of 100–120 g. of sugar per kg. of milk and 60–70 g. of fat per 100 g. of fat produced. (*C.A.* **52**, 18714)

Evolution of Lipides and Lipoproteins in Serums of Normal Dogs, After a Greasy Meal. J. Groulade, A. Lemarchands, and B. Paramelle (Lab. phys. école nat. méd., Grenoble, France). *Bull. soc. chim. biol.* **39**, 873–82 (1957). During the fat digestion period in dogs there is from the second to fourth hour an increase in slightly mobile or immobile fractions in electrophoresis of serum lipoproteins. This increase corresponds to that of the chylomicrons. Around the eighth or tenth hour, a return to the previous condition is observed. Fast fractions vary in a reverse sense to slow fractions. It may be a case of the transfer of α-lipoproteins to the gamma zone during the blood stage of fat assimilation. This would be an example of participation of the constant element in the transfer of the variable elements and would provide support for the theory now being advocated by Oncley as to the part of lipoproteins in fat transfer. 21 references. (*C.A.* **52**, 18716)

The Effect on Serum Cholesterol of Diets Containing Different Fats. H. Malmbros and G. Wigand (Univ. Lund, Swed.). *Lancet* **273**, 1–7 (1957). The effect on serum cholesterol of diets containing various fats was studied on normal subjects. Corn oil and safflower-seed oil had a marked depressing effect on serum cholesterol, rape oil a moderate effect, olive oil a slight effect, and coconut oil no effect. Of the animal fats, milk fat was found to have an enhancing effect. Whale oil depressed the level, but it is not used except in the hydrogenated form, when it loses its effect on cholesterol. (*C.A.* 52, 18718)

Diet and Coronary Thrombosis. Hypothesis and Fact. J. Yudkin (Univ. London). *Lancet* 273, 155–62 (1957). A review of the relation of diet to coronary deaths. No single or major dietary cause of coronary thrombosis was found. (*C.A.* 52, 18718)

Effect of Dietary Triglycerides on Recalcification Time of Plasma. K. J. Kingsbury and K. M. Morgan. *Lancet* 273, 212–14 (1957). Feeding arachis oil to normal subjects resulted in lipemia, increased phospholipide and shortening of plasma recalcification time. A mixture of C-8 to C-10 fatty acid glycerides resulted in no lipemia, but increase in phospholipide and shortening of recalcification time. Tobacco-seed oil caused marked lipemia, short recalcification time, but little increase in phospholipide. (*C.A.* 52, 18718)

Prediction of Serum-Cholesterol Responses of Man to Changes in Fats in the Diet. A. Keys, J. T. Anderson, and F. Grande (Univ. of Minnesota, Minneapolis). *Lancet* 273, 959–66 (1957). Fats included in the diets were butter fat, hydrogenated coconut oil, olive oil, cottonseed oil, corn oil, sunflower-seed oil, safflower oil, fish oil, and the mixed food fats of ordinary American diets. Statistical analyses of the serum-cholesterol levels were made at the end of each dietary period. The results offered no support for the suggestion that a deficiency of essential fatty acids produced the high serum cholesterol levels characteristic of luxurious diets. (*C.A.* 52, 18718)

Influence of the Variation of the Fat Content of the Diet on Chick Growth. F. Rappini (Univ. Bologna, Italy). *Atti soc. ital. sci. vet.* 11, 492–5 (1957). The optimal commercial stabilized fat addition to diet (corn, soybean and rice meals, peanut fat-free cake, fish and meat meal, salt-vitamin diet) for best chick growth was found to be 2%. (*C.A.* 52, 18719)

Serum-Cholesterol Studies in Finland. A. Keys, M. J. Karvonen, and F. Findanza (Inst. Occupational Health, Helsinki). *Lancet* 1958-II, 175–8. Total cholesterol and that in in the α- and β-lipoprotein fractions were measured in 869 healthy men in the city of Helsinki and in two rural areas. Total cholesterol was higher than that observed elsewhere, and this excess was accounted for by β-lipoprotein cholesterol. Farmers' wives resembled the men in rural areas in total cholesterol but had higher levels of α-lipoprotein cholesterol. Smokers had higher cholesterol levels. Higher levels of total cholesterol were observed in men in East Finland than West Finland, and this was accounted for by β-lipoprotein cholesterol. (*C.A.* 52, 18756)

Toxicity of Fish Oil. Noboru Matsuo (Seikei Univ., Tokyo). *Kagaku no Ryôiki* 11, 970–9 (1957). A review with 43 references. (*C.A.* 52, 19184)

The Isolation of Oil-Soluble Coal Tar Colors from Foods. Evelyn Mark and G. G. McKeown (Food and Drug Lab., Dept. of Natl. Health and Welfare, Ottawa, Canada). *J. Assoc. Off. Agr. Chemists* 41, 817–818 (1958). Oil soluble coal tar colors are separated from the oil phase by solvent partition with N,N-dimethyl formamide and petroleum ether. The colors are recovered unchanged from the formamide while 99.8% of oil is removed in the petroleum ether phase.

Essential Fatty Acid Deficiency. II. In Adult Rats. E. Aaes-Jørgensen, E. E. Leppik, H. W. Hayes and R. T. Holman (Dept. of Physiological Chemistry, Univ. of Minnesota, Austin). *J. Nutrition* 66, 245–259 (1958). Adult male rats were fed a low-fat (1%) EFA-free diet for 29 weeks. During this phase of the experiment, groups were supplemented with 1% of cholesterol or 0.5% of cholic acid or both. In the second phase (29th through 52nd week), all groups except low-fat controls were fed a diet containing 20% of hydrogenated coconut oil without the previous supplements. Dermal symptoms of EFA deficiency developed very slowly in rats fed the low-fat, EFA-free diet, reaching a maximum at 35 weeks, followed by spontaneous curing. Supplementation with cholesterol or cholic acid or both had little effect upon the severity of the dermal symptoms or upon growth. At the end of the 52nd week, sudanophilia of the serum was visible in frozen sections of hearts from rats which had been fed 20% hydrogenated coconut oil during the second phase of the experiment (23rd week).

Effect of Dietary Level of Raw Soybean Oil Meal on the Growth of Weanling Rats. R. Borchers (Dept. of Biochemistry and Nutrition, Univ. of Nebraska, Lincoln). *J. Nutrition* 66, 229–235 (1958). Data are presented comparing the rate of gain of weanling rats fed various levels of raw or autoclaved soybean oil meal with and without supplementary methionine and penicillin plus streptomycin. Raw soybean oil meal at the 40% level supplemented with either methionine or antibiotics supported the same rate of gain as autoclaved soybean oil meal. The results disprove the hypothesis that raw soybeans contain a ''toxic'' factor whose effect is enhanced by higher levels of raw soybean intake.

The Effect of Penicillin, Aureomycin, Streptomycin and Vitamin B_{12} on the Liver Reserves of Vitamin A Esters of the Rat. H. R. Cama and D. A. Malik (Dept. of Biochemistry, Indian Inst. of Science, Bangalore). *J. Nutrition* 66, 129–133 (1958). Supplementation of groundnut protein in paired-feeding tests with penicillin at 0.02%, aureomycin at 0.03%, streptomycin at 0.02% level of the diet and vitamin B_{12} at 45 μg./kg. of diet significantly reduced the liver reserves of vitamin A esters in the rat when vitamin A was included in the diet.

The Role of Vitamin A in the Occurrence of Goiter on the Island of Krk, Yugoslavia. Agnes Horvat and H. Maver (Div. of Nutrition, Central Inst. of Hygiene, Zagreb, Yugoslavia). *J. Nutrition* 66, 189–203 (1958). The small quantity of vitamin A in the diet of the population induced the authors to investigate the influence of vitamin A on the occurrence of goiter. For this purpose an experiment was carried out at a school on the island of Krk. Children 7 to 10 years of age were given 3,000 I.U. of vitamin A daily for three months, and it was established that goiter in this group had decreased by 44%, whereas no change was noticed in a control group.

Effects of Supplementary Methionine and Choline on Tissue Lipides and on the Vascular Structure of Cholesterol-Fed Growing Rats. G. T. Passananti, N. B. Guerrant and R. Q. Thompson (Dept. of Agricultural and Biological Chemistry, Pennsylvania State Univ., University Park, Pennsylvania). *J. Nutrition* 66, 55–74 (1958). The influence of choline deficiency, methionine deficiency and a combination of these deficiencies on lipide metabolism and on the development of atherosclerosis in the growing rat has been investigated. Mild aortic changes were produced in male rats by feeding diets high in cholesterol, adequate in choline, and deficient in sulfur-containing amino acids. The various serum lipide fractions were greatly increased in those rats consuming the choline-rich diets.

The Influence of Dietary Fat Upon the Niacin Requirement of the Mouse. W. N. Pearson, J. S. Valenzuela, and J. van Eys (Depts. of Biochemistry and Medicine, Vanderbilt Univ. School of Medicine, Nashville, Tennessee). *J. Nutrition* 66, 277–90 (1958). The albino Swiss mouse requires a source of dietary niacin for growth when fed a 9% casein diet. This requirement may be partially spared by the addition of a small amount of fat (2 to 5%) to the diet, but the addition of 9% of cottonseed oil was deleterious and capable of reversion by 2.0 mg. per cent of niacin.

Hemolysis and Reagent Purity as Factors Causing Erratic Results in the Estimation of Vitamin A and Carotene in Serum by the Bessey-Lowry Method. Margaret Utley, Eileen Brodovsky and W. N. Pearson (Depts. of Biochemistry and Medicine, Vanderbilt Univ. School of Medicine, Nashville, Tennessee). *J. Nutrition* 66, 205–15 (1958). Hemolysis causes a false increase in serum vitamin A values when the micromethod of Bessey and Lowry is used. An especially purified and freshly prepared kerosene-xylene mixture minimizes the false increase in vitamin A caused by hemolysis and avoids errors in the carotene measurements. Only freshly purified and mixed kerosene-xylene should be used in the Bessey-Lowry procedure for determining serum carotene and vitamin A. Serum samples showing evidence of more than a trace of hemolysis should be discarded.

Effect of Dietary Level of Fat and Type of Carbohydrate on Growth and Food Intake. A. Yoshida, A. E. Harper and C. A. Elvehjem (Dept. of Biochemistry, Univ. of Wisconsin, Madison). *J. Nutrition* 66, 217–28 (1958). The caloric intake and the rate of gain of rats fed for 2 weeks on diets containing 35 mg. of protein per calorie increased when part of the dietary sucrose was replaced by fat, but there were no significant differences among the values for gain per calorie with different dietary fats.

Separation and Composition of the Phospholipids of Ox Heart. G. M. Gray and Marjorie G. Macfarlane (Lister Institute of Preventive Medicine, London, S.W. 1). *Biochem. J.* 70, 409–25 (1958). Phospholipids equivalent to about 560 mg. of phosphorus/kg. were extracted from ox heart with chloroform-methanol mixtures and fractionated on Mallinkrodt silicic acid columns. Cardiolipin, cephalin, lysocephalin, sphingomyelin and plasmalogens were separated. The lysocephalin may have arisen from decomposition of cephalin plasmalogen on the silicic acid in the presence of neutral fat. Extraction of heart with acetone and then methanol yielded choline phosphatides, cardiolipin, and inositide, but only a portion of the cephalin. A method for partition chromatography of phospholipids with organic solvents and secondary cellulose acetate as support is described. Data on the hydrolysis and composition of cardiolipin are reported. Glycerophosphoinositide was isolated in crystalline form from the inositide-rich fractions. This inositide contained equimolar proportions of saturated and unsaturated fatty acids.

THE STRUCTURE OF THE PLASMALOGENS OF OX HEART. G. M. Gray (Lister Institute of Preventive Medicine, London, S.W. 1). *Biochem J.* **70**, 425–33 (1958). Hydrolysis of phospholipids from ox heart yielded a lysolecithin and a lysocephalin. These were identified as the α-acyl isomers. The aldehydes isolated from the choline plasmalogen were mainly saturated, the major component being palmitaldehyde. The fatty acids in choline and ethanolamine plasmalogens were chiefly (95%) unsaturated acids. The probable composition of these acids is discussed in terms of results of alkali isomerization data.

MYCOLOGICAL FORMATION OF FAT. VI. SYNTHESIS OF FAT BY *Aspergillus nidulans, Penicillium javanicum* AND *Penicillium spinulosum* IN SHAKEN CULTURE. J. M. Garrido, A. M. Gad and T. K. Walker (Dept. Biochem., Manchester College of Science and Technology, Manchester). *J. Sci. Food Agr.* **9**, 728–32 (1958). The effects of NaH_2PO_4, $MgSO_4$, and K_2SO_4 on fat production by these organisms were determined. Glucose or sucrose was used as the substrate. Under optimum conditions, with glucose as substrate, *A. nidulans* produced 14 g. fat/100 g. sugar consumed; *P. javanicum* and *P. spinulosum* yielded 7.9 and 11.8 g., respectively.

CHOLESTEROL ESTERASE ACTIVITY OF RAT LYMPH. G. V. Vahouny and C. R. Treadwell (Dept. Biochem., Geo. Washington School of Medicine, Washington, D. C.). *Proc. Soc. Exptl. Biol. Med.* **99**, 293–5 (1958). Rat thoracic duct lymph was found to possess no synthetic or hydrolytic cholesterol esterase activity.

EFFECTS OF RESERPINE ON CHOLESTEROL LEVELS IN CHOLESTEROL-FED RABBITS. C. Somoza (Dept. Pathol., Univ. Illinois College of Medicine, Chicago). *Proc. Soc. Exptl. Biol. Med.* **99**, 347–50 (1958). Rabbits given injections of reserpine and fed a high cholesterol diet showed significantly lower mean serum total cholesterol levels and less lipid deposition in aorta, liver, spleen and adrenals than non-treated animals on the same diet. Reserpine added to the stock diet had no effect on lipid levels.

LIVER CHOLESTEROL MOBILIZATION IN MICE AS EFFECTED BY DIETARY β-SITOSTEROL AND CHOLIC ACID. W. T. Beher and W. L. Anthony (Edsel B. Ford Institute for Medical Research. Henry Ford Hospital, Detroit, Mich.). *Proc. Soc. Exptl. Biol. Med.* **99**, 356–8 (1958). Effects of cholic acid and sitosterol feeding were determined in weanling mice. Cholic acid prevented mobilization of liver cholesterol deposits. Although β-sitosterol did not increase the rate of mobilization of accumulated liver cholesterol, sitosterol did counteract the action of cholic acid.

ABSORPTION AND DISTRIBUTION OF CHOLESTEROL-4-C^{14} IN THE RAT. B. Borgström, B. Lindhe and Paulina Wlodawer (Dept. Physiol. Chem., Univ. Lund, Sweden). *Proc. Soc. Exptl. Biol. Med.* **99**, 365–8 (1958). When fed to rats in a well-balanced test meal, a trace dose of cholesterol-4-C^{14} was rapidly (50 to 70%) absorbed. The newly absorbed cholesterol is held in the cells of the small intestinal mucosa (the half life in these cells being approximately 12 hr.). From the intestinal wall the cholesterol enters the chyle in which the peak specific activity is reached about 9 hr. after feeding. Cholesterol is selectively taken up from the thoracic duct lymph by the liver, and is later mixed with cholesterol in blood and tissues. Blood cholesterol activity reaches a peak about 16 hr. after feeding.

SERUM LIPIDS IN HYPERCHOLESTEROLEMIC RABBITS. J. C. Forbes and O. M. Petterson (Dept. Biochem., Medical College of Virginia, Richmond). *Proc. Soc. Exptl. Biol. Med.* **99**, 368–71 (1958). Intravenous injections of the surface active agent Triton WR-1339 into rabbits caused a marked increase in serum neutral fat, cholesterol and phospholipids. Most of these lipids were in the fraction which rose to the surface when the serum was subjected to high-speed centrifugation. However, similar administration of Triton to hypercholesterolemic rabbits increased the amount of cholesterol remaining in the subnatant fraction after high-speed centrifugation of the serum.

DIETARY SAPONIN AND PLASMA CHOLESTEROL IN THE CHICKEN. P. Griminger and H. Fisher (Dept. Poultry Sci., Rutgers Univ., New Brunswick, N. J.). *Proc. Soc. Exptl. Biol. Med.* **99**, 424–6 (1958). A study with growing chicks and adult roosters indicated that dietary saponin will depress plasma cholesterol levels previously elevated by feeding low protein diets in the presence and absence of dietary cholesterol. It is suggested that complexing of saponin with cholesterol secreted into the intestinal lumen makes less cholesterol available for reabsorption from the intestinal tract.

SILICIC ACID CHROMATOGRAPHY OF LIPIDS OF WHOLE HUMAN BLOOD. J. J. Wren and H. K. Mitchell (Kerckhof Labs. of Biol., California Institute of Technology, Pasadena). *Proc. Soc. Exptl. Biol. Med.* **99**, 431–5 (1958). A procedure for the chromatography of blood lipids is described. Results are reported for samples obtained from a normal male donor and a xanthomatous patient.

EFFECT OF Δ-4-CHOLESTENONE ON CHOLESTEROL AND PHOSPHOLIPID METABOLISM IN THE CHICK. R. E. Ranney (Div. Biol. Research, G. D. Searle & Co., Chicago, Ill.). *Proc. Soc. Exptl. Biol. Med.* **99**, 462–6 (1958). Incorporation of acetate-1-C^{14} and P^{32} labeled phosphate into the cholesterol and phospholipids of plasma, liver, and aorta of chicks treated with Δ-4-cholestenone was measured. The response of the chick differed from that of the rat in that there was an increased incorporation of the labels into the lipids of liver and plasma. A significant decrease in aortic cholesterol content and specific activity was noted.

LIPID CHANGES PRODUCED BY CHRONIC HYPERCHOLESTEROLEMIA IN NYLON AND ORLON REPLACEMENTS OF CANINE THORACIC AORTA. G. L. Jordan, Jr., M. E. DeBakey and Bela Halpert (Baylor Univ. College of Med., Houston, Texas). *Proc. Soc. Exptl. Biol. Med.* **99**, 484-7 (1958). Atheromatous changes developed on the intimal surface of nylon and orlon thoracic-aortic vascular replacements in 2 of 6 dogs with induced chronic hypercholesterolemia. In both animals high serum cholesterol concentrations were maintained for over one year before the changes became evident.

DIETARY METHOD FOR INDUCTION OF ATHEROSCLEROSIS, CORONARY OCCLUSION AND MYOCARDIAL INFARCTS IN RATS. G. F. Wilgram (Banting & Best Dept. of Med. Research, Univ. Toronto, Canada). *Proc. Soc. Exptl. Biol. Med.* **99**, 496–9 (1958). Rats were given a basal diet containing dried egg yolk powder 35%, whole wheat flour 10, soy bean flour 10, sucrose 10, bran 6, lard 25, salt mixture 2, and vitamin mixtures 2. This was supplemented with cholesterol, thiouracil, sodium cholate and viosterol. In male rats, this treatment induced a state of hyperlipemia and produced vascular injury. Incidence of coronary lesions (as %) was: lipomatous coronary changes 88, atheromatous coronary changes 81, atherosclerotic coronary changes 63, coronary occlusion 33, cardiac infarcts 14.

WATER DISPERSIBLE CAROTENOID COMPOSITION. J. C. Bauernfeind and R. H. Bunnell (Hoffmann-La Roche Inc.). *U.S. 2,861,891.* Sufficient carotenoid is dissolved in a warm edible oil(which is normally liquid at room temperature) to form a solution that would be supersaturated at room temperature. To the warm solution is added an aqueous colloid solution. The resultant emulsion is cooled so as to form dry, water dispersible particles.

STABILIZED VITAMIN D COMPOSITION. M. A. Cannalonga (Hoffmann-La Roche Inc.). *U.S. 2,862,852.* A dry vitamin D composition is prepared from vitamin D_2, butylated hydroxyanisole, 2,6-di-*tert*-4-methylphenol and ethylenediamine tetraacetic acid.

• Paints and Drying Oils

COPOLYMERIZATION OF CYCLOPENTADIENE WITH VEGETABLE OILS. G. L. Yukhnovskiĭ, N. V. Prilutskaya, and A. V. Chernobaĭ. *Zhur. Priklad. Khim.* **31**, 1091–1100 (1958). Copolymers of cyclopentadiene and vegetable oils obtained at 260–320° gave brittle films. The results of Antykov (*C.A.* **50**, 3776g) could not be duplicated. Copolymerization in the presence of stannic chloride with sunflower, castor, or tung oils gave quickly drying, wrinkled, and brittle films; satisfactory films were obtained by copolymerization with linseed oil (*C.A.* **52**, 19170)

POLYOLS IN ALKYD RESINS. *Paint and Varnish Production* **48** (11), 43–73 (1958). A series of articles discussing the various polyols used in the preparation of alkyd resins. *Glycerine,* N. P. Barr; *Pentaerythritol,* C. L. P. Vaughan; *Sorbitol,* J. P. Burns; *Methyl Glucoside,* J. P. Gibbons; *TME and TMP,* W. M. Kraft; *Glycols and Hexanetriol,* V. H. Boden and T. J. Hall; *Resinous Polyols,* Staff.

EPOXY ESTERS OF DEHYDRATED CASTOR OIL FATTY ACIDS. H. W. Chatfield. *Paint, Oil and Colour J.* **134**, 573–575 (1958). Epoxy esters of 50% oil length were prepared from equal parts of dehydrated castor fatty acids, one high and one low, in conjugated double bonds, and epoxy resins. The two esters were prepared with equal ease but it was found the higher conjugated acids produced esters with paler color, better drying rate, and air dried coatings with less tendency to blister.

The Wetting and Dispersing Action of Liquids on Powders. *Paint Technology* 22, 353–356 (1958). E. W. J. Mardles (Royal Aircraft Estab. Technical College). A criterion of the degree of wetting action of a liquid for a solid, such as a paint pigment, is given by the rheological properties of its dispersions of the finely divided solid. Good wetting action is accompanied by low relative viscosity and low rate of settling. Poor wetting is indicated by high viscosity and yield value, thixotrophy and rheological phenomena.

Resin Derived from Polyhydric Alcohol, Fatty Oil, Benzene Tribasic Acid and Diaminodurene. B. A. Bolton and R. E. Van Strien (Standard Oil Co.). *U.S. 2,860,113.* A polydric alcohol and a vegetable oil, fish oil, or long chain fatty acids are reacted in an inert atmosphere in the presence of an alcoholysis catalyst at 300° to 500°F. until the desired methanol compatibility is reached. Only one hydroxyl group in the polyol remains unreacted. This esterified product is reacted with an acid (trimesic, hemimellitic, trimellitic) at 400° to 500°F. until a homogeneous solution is obtained. Finally tetramethyldiaminobenzene is added and heating is continued until the desired viscosity and acid number are reached.

Oil-modified Amine Type Alkyd Resin Providing Thixotropic Properties to Hydrocarbon Solutions. B. A. Bolton and R. E. Van Strien (Standard Oil Co.). *U.S. 2,860,114.* See U.S. 2,860,113. The preferred reactants are glycerol, soya fatty acids, trimellitic acid and ethylene diamine.

Low Temperature Preparation of Alkyd Resins from Long Chain Fatty Acids. J. S. Heckles (Armstrong Cork Co.). *U.S. 2,861,047.* A fatty acid-pentaerythritol diester is prepared by the reaction at 150° to 250° of 4 equivalents of pentaerythritol with 1.3 to 2.2 equivalents of a long chain fatty acid obtained from a drying oil, semidrying oil, nondrying oils or mixtures thereof. The diester is reacted at 220° to 260° with 0.5 to 1.5 equivalents of isophthalic acid and then with 0.3 to 2.5 equivalents of the long chain fatty acid.

Thixotropic Coating Compositions. H. J. Wright, D. R. McGuire and P. F. Westfall (Cook Paint & Varnish Co.). *U.S. 2,861,048.* A thixotropic product is prepared from a polyamide and a paint vehicle such as alkyd resins, drying oils and resin acid esters. The polyamide has a molecular weight below 1500 and is prepared from polyene fat acids, an alkylene polyamine having at least two primary amino groups and a long chain monomer fatty acid having at least six carbon atoms.

Modified Alkyd Resins. E. C. Chapin (Monsanto Chemical Co.). *U.S. 2,862,898.* A drying oil modified alkyd resin is reacted with a styrene derivative and an unsaturated nitrile.

• Detergents

Electrical Forces Affecting Soil and Substrate in the Detergency Process-Zeta Potential. J. C. Harris (Monsanto Chem. Co., Dayton, Ohio). *Textile Research J.* 28, 912–28 (1958). Electrokinetic forces are of considerable importance in the mechanism of soil removal and redeposition. One electrokinetic measurement is that of the difference in potential between the immovable layer attached to the surface of a solid phase (soil or substrate) and the movable part of the diffuse layer in the body of the detergent liquid, and is termed zeta potential. Correlations have been obtained which indicate that, in a detergent system, it is desirable that the zeta potential of soil particles and substrate become nearly equal to reduce attractive forces tending to cause them to adhere. The effect of surfactants and electrolytes upon the zeta potential of soils and substrates has been collated, permitting an estimate of the areas in need of further elucidation. Cited are available correlations between zeta potential and suspension values, critical micelle concentration, and detergency values.

25th Anniversary of Household Detergents. "Dreft" Led the Way. Anon. *Soap. Chem. Specialties.* 34(9), 47–50, 121 (1958). Review of the developments of synthetic detergents in this country as shown by the history of "Dreft." Growth of the Anionics. O. M. Morgan and L. C. Wizemann (Allied Chem. Corp., New York). *Ibid.* 51–3. Statistics on and future of anionic detergents. Nonionics. J. W. McCutcheon (John W. McCutcheon, Inc., New York). *Ibid.* 54–5, 111. Statistics on growth of nonionics are listed and it is suggested that largest field of future growth will be in synthetic toilet bars and heavy duty liquid detergents. Amphoteric Surfactants. J. S. Mannheimer (Miranol Chem. Co., Irvington, N. J.). *Ibid.* 56–8, 206. The future is bright for these newer detergents containing both anionic and cationic groups and properties. Versatile Cationic Surfactants. C. C. Campbell (Rohm & Haas Co., Philadelphia, Pa.). *Ibid.* 59–60. The many applications of cationics are described.

The Effect of the Composition of Fat Raw Material on the Structure and Properties of Toilet Soaps. Z. I. Kenigsberg. *Vseoyuz. Nauch-Issledovatol. Inst. Zhirov.* **1954**(15), 190–201; Referat *Zhur.Khim.* **1956**. Abstr. No. 41510. The quality of soap prepared from hydrogenated fat increases with the decrease of isoacids which promote the accumulation of a wax phase in soap. Additions of coconut oil (7%) improve the quality of soaps. The relation between the structure of soaps and their fat content was established by x-ray examination. (*C.A.* 52, 19187)

Symposium—The Commercial Surfactants. Polyethanoxy Esters and Ethers. B. Milling (Marchon Products, Ltd., Whitehaven, Engl.). *Am. Perfumer Aromat.* 72(4), 39–42 (1958). These nonionic esters and ethers prepared by reacting hydrophobic acids with ethylene oxide are described. Structure and Properties of Surfactants. G. M. Gantz (General Aniline & Film Corp., New York). *Ibid.* 43–8, 50–2. Extensive review article on classification, preparation and properties of the various syndets. Block Polymer Surfactants. W. B. Stanton (Wyandotte Chemicals Corp., Wyandotte, Mich). *Ibid.* 54, 56, 58. A review of preparation and properties of the block-polymer surfactants, formed by the sequential addition of propylene oxide and ethylene oxide onto a nucleus such as propylene glycol or ethylene diamine. Ampholytic Detergents. D. L. Andersen (General Mills, Minneapolis, Minn.). *Ibid.* 59–60. The versatility of the ampholytes (detergents containing both hydrophobic and hydrophilic groups) is pointed out. Alkylbenzene Sulfonates in Cosmetic Formulations. J. C. Harris (Monsanto Chem. Co., Dayton, Ohio). *Ibid.* 62–4. Sulfated Oils. J. Levy (Nopco Chem. Co., Harrison, New Jersey). *Ibid.* 67–8. Cycloimidium Amphoterics. H. S. Mannheimer (Miranol Chem. Co., Irvington, N. J.). *Ibid.* 69–70, 72. Polyhydric Alcohol Esters for Cosmetic Use. S. I. Kreps and J. Starkman (Van-Dyk & Co., Belleville, N. J.). *Ibid.* 73–5. Alkylolamides in Cosmetics. W. J. Lennon and I. M. Rosenbaum (Geigy Chem. Corp., Ardsley, N. Y.). *Ibid.* 76, 78–80. Nonionic Surfactants Based on Alkylphenols and Alkylmercaptans. R. L. Mayhew and J. M. Cloney (General Aniline & Film Corp., New York, N. Y.). *Ibid.* 83–4, 86, 88. The Development and Use of Straight Chain Alkyl Sulfates. E. Goette and G. Meinhard (Deutsche Hydrierwerke G.m.b.H., Düsseldorf, Ger.). *Ibid.* 90–4. Cationics in Cosmetics. P. L. DuBrow (Armour & Co., Chicago, Ill.). *Ibid.* 95–100.

Dilute Solutions of Amphipathic Ions. I. Conductivity of Strong Salts and Dimerization. II. Transference of Lauryl Sulfate in Sodium Lauryl Sulfate. III. Conductivity of Weak Salts. IV. Some General Effects of Dimerization. P. Mukerjee, K. J. Mysels, and C. I. Dulin (Univ. of Southern Calif., Los Angeles, Calif.). *J. Phys. Chem.* 62, 1390–1408 (1958). Various lines of evidence based on new experimental data for several of the lauryl (dodecyl) sulfate ions (LS^-) were used to show that in dilute solutions it dimerizes reversibly to form $LS_2^=$ ions and also that with quaternary ammonium salts it forms, reversibly again, ion pairs such as $(\text{n-propyl})_4NLS$. Both of the reactions were explained in terms of the reduction of interfacial energy as hydrocarbon parts of two ions amalgamate. The last part of the paper discusses how these ideas are applied to some already known facts from previous measurements to show that dimerization is a rather general phenomenon in solutions of amphipathic ions and that it helps to correlate a number of previously unexplained observations.

Utilization of Alkylaryls from Different Petroleum Fractions in the Manufacture of Synthetic Washing and Cleansing Agents. A. Yu. Rabinovich and E. S. Skripchenko. *Masloboino-Zhirovaya Prom.* 24(6), 26–9 (1958). Tabulated data concerns the following properties of Sulfacids no. 2, 3, and 4, and of DS-RAS (Soviet detergents—refined alkylaryl sulfonate): concentration, pH, surface tension, foamability, emulsifying, wetting and washing properties and the yellowing of cotton fabrics. (*C.A.* 52, 19187)

Sucrose Esters as Surface-Active Agents. C. A. Rhodes. *Chem. Prods.* 21, 320–3 (1958). The development and present and potential applications of sucrose-ester surface-active agents are discussed. The properties of several of these esters are presented in tabular form. (*C.A.* 52, 19185)

Manufacturing of Toilet Soap from the Fat Split by Noncatalytic Method. M. N. Zaliopo and I. I. Sharov. *Masloboino-Zhirovaya Prom.* 24(6), 17–19 (1958). Data are reported for the color and some of the physical-chemical properties of the original fat, fatty acids (I) and their soaps (II) manufactured by the use of nonsplit fats and fats split by noncatalytic methods. The color of I and II was not affected by the manufacturing procedures and was found to be about the same as that of the original fat. (*C.A.* 52, 19186)

Method of Producing Synthetic Detergent Cakes. C. F. J. Dupuy. *U.S. 2,858,569.* Synthetic detergent cakes containing a high proportion of a water-insoluble wax to improve the slushing properties of the bar without suppressing the foam are prepared in a specially designed mold without application of pressure.

Heavy Duty Liquid Detergent Composition. F. E. Carroll (Lever Brothers Co.). *U.S. 2,859,182.* It has been found that when both an alkali metal aryl sulfonate and at least one alkylolamide were used together in a heavy duty liquid detergent composition containing a potassium alkylaryl sulfonate and tetrapotassium pyrophosphate or pentapotassium tripolyphosphate in an aqueous medium, that heavy duty liquid detergent compositions could be obtained that were homogeneous and stable at room temperatures.

Synthetic Non-ionic Detergents from 2,2-bis(4-hydroxyphenyl)Propane. J. E. Woodbridge and V. J. Keenan (Atlantic Refining Co.). *U.S. 2,859,250.* It has been found that if ethylene oxide is reacted with a bis(4-hydroxy-phenyl) alkane in the presence of an alkaline catalyst at elevated temperature between 210° and 270°, novel detergents possessing unexpectedly high detergency properties are obtained.

Controlled Sudsing Heavy Duty Liquid Detergent. V. Lamberti and A. O. Gray, Jr. (Lever Brothers Co.). *U.S. 2,860,107.* A controlled sudsing heavy duty liquid detergent composition which has phase stability on storage and suds stability in usage consists of an aqueous suspension of from about 2 to 3% of potassium dodecylbenzene sulfate, from about 3.5 to 5% of sodium tallow methyl taurate, 2 to 3% of an alkali metal xylene sulfonate, about 1% of coconut oil fatty acids, about 1% of the condensation product of one mole of lauric monoethanolamide with one mole of ethylene oxide, about 1% of triethanolamine, 0.3% of CMC and from about 22.5 to 25% of tetrapotassium pyrophosphate.

Detergent Compositions. Thomas Hedley & Co., Ltd. *Brit. 791,704.* A description is given of a liquid dishwashing composititon with improved sudsing, mildness to hands, and stable against clouding, precipitation of solids, and gelling at temperatures as low as 50°F. A typical composition contains the NH$_4$ salt of a sulfated polyethoxy derivative of a middle-cut coconut fatty alcohol containing 3 moles of ethylene oxide 36, coconut monoethanolamide 8.6, EtOH 19.5, H$_2$O 35.9 parts by weight. Maximum detergency and mildness are obtained when the polyethoxy derivative contains 2–4 moles of ethylene oxide, and these properties fall off as the polyethoxy content is lessened or increased. (*C.A.* 52, 19190)

Polyoxyalkylene Surface Active Compounds. Wyandotte Chemicals Corp. *Brit. 800,159.* Polyoxyalkylene compounds having good surface active properties can be prepared in which the hydrophobic element is a random copolymer of oxypropylene and oxyethylene groups having an oxygen/carbon atom ratio that is greater than 0.33 and less than 0.40 by condensing a mixture of propylene oxide and ethylene oxide with an organic compound containing two to six reactive hydrogen atoms.

Soaps. Chemische Fabrik Grunau Akt.-Ges. *Ger. 922,432.* Mild soaps, substantially unaffected by water hardness, are made by adding to soaps, manufactured in usual manner, water-soluble protein compounds, slightly decomposed protein-cleavage products, of the neutralized condensation products of proteins, or their decomposition products, with fatty acids or higher-molecular sulfonic or sulfinic acids, and higher-molecular polyphosphates. A slightly alkaline reaction of these additions is preferably maintained. Thus, to 92 parts by weight soap chips are added 2 parts of an approximate 50% fatty acid-protein condensation product and 5 parts of an approximate 65% paste of condensed Na phosphates which have been adjusted to pH 8.2. The components are thoroughly mixed on a kneading machine and colorants, fillers, and perfumes are added. (*C.A.* 52, 19190)

Detergents. B. Raecke (Henkel and Cie). *Ger. 945,945.* Alkaline washing agents essentially free of soap, and containing synthetic raw materials for detergents stable to hard water, also contain complex Al compounds which are soluble in the wash liquor. For example, 300 parts crystalline Al$_2$(SO$_4$)$_3$ was dissolved in 750 parts H$_2$O. A solution of 300 parts Seignette salt in 750 parts water was added and the mixture brought to a pH of 7–7.5 with a solution of NaOH. The resulting solution was treated with hot air (95–100°) to give a white, water-soluble product containing Al. A detergent suitable for sensitive hands is produced from 10 parts of this product by blending with an alkylbenzene-sulfonate 13, a paraffin sulfonate 5, NaOH 30, and Na$_4$P$_2$O$_7$ 12 parts. (*C.A.* 52, 19192)