Table I but is 14% higher in linoleic acid. The presence of 1% of apparent epoxy acid in the present sample of *M. bicornis* is based only on HBr absorption and is not conclusive.

The compositions of the two *Euphorbia* oils are similar to each other and to the composition of several *Euphorbia* oils reported earlier (2, 5). The *E. marginata* oil reported here differs significantly however from the literature report of 45% linolenic acid and 45% linoleic acid. This discrepancy may be resolved, or the variability of the species may be revealed more clearly as additional samples are analyzed in the screening program.

Oils of the eight *Labiatae* in this study are similar in composition to other *Labiatae* oils with high iodine values. Only two of these oils are reported by Hilditch (5), and the composition of the present samples are distinctly different. The earlier sample of *Ocimum basilicum* was reported to have 21% linolenic acid and 60% linoleic acid in contrast to 50% "linolenic" and 22% "linoleic" acid found in the present sample. Similarly the previous report shows *Perilla frutescens (P. ocymoides)* oil to contain 63 to 70% linolenic acid and from 0 to 16% linoleic acid whereas the present sample contains only 55% "linolenic" acid and 11% "linoleic" acid. Regardless of the discrepancy, which may result from differences in the sources of samples, the composition of the eight *Labiatae* oils are sufficiently similar to suggest that they would all serve in applications where perilla oil has been used in the past; several of them are probably superior to perilla oil of average composition.

The minor amounts of apparent epoxy acid and of conjugated unsaturation in *Thymus vulgaris* oil have no value and for most applications probably would not be detrimental. The absence of saturated acids from the oil of *Monarda fistulosa* may perhaps indicate the presence of some component which responds abnormally to either the iodine value procedure or the alkali isomerization in the determination of polyunsaturated acids, or it may result from the chance accumulation of errors in the procedures. Complete absence of saturated acids would be most unusual, but such a result is often within the accepted precision of the method. The 4% of material in this same oil moving more slowly than the C_{18} acids has not been identified but might be arachidic acid, which has been reported in several oils of the *Labiatae* (2, 5).

The tests of drying time and film hardness, while not precise, support the generality that oils with higher iodine values dry more rapidly and produce harder films. The oil from *Nepeta mussini* is anomalous in that it dries more rapidly than three oils of higher iodine value but produces a softer film than five oils of comparable or lower iodine value. This behavior may indicate greater or lesser amounts of trace constituents which affect the rate or extent of oxidation and polymerization in the drying film.

In general, the analyses reported in Table I suggest that all these oils should be equal or superior to linseed oil as drying oils. They should receive serious consideration if any can be produced more economically, if any are especially adapted to areas of the country which require an alternative crop, if they are sufficiently good to permit performance equal to linseed after dilution with a cheaper oil, or if over-all demand for drying oils should increase sufficiently to justify production of additional ones.

Extensive study of any of the species reported in this paper may reveal that the sample tested is not typical but may be better or worse than the average. Until proved otherwise, it must be assumed in a screening program that the sample analyzed is sufficiently representative to serve as a guide to further study of oils for specific uses.

Acknowledgments

The authors wish to acknowledge the contribution of L. H. Mason, who provided gas chromatographic data on two of the oils, to H. M. Teeter, who provided advice on the drying tests, and to E. H. Melvin for infrared examination of the oils.

REFERENCES

1. Earle, F. R., Melvin, E. H., Mason, L. H., Van Etten, C. H., Wolff, I. A., and Jones, Quentin, J. Am. Oil Chemists' Soc., *36*, 304–307 (1959).
2. Eckey, E. W., "Vegetable Fats and Oils," New York, Reinhold Publishing Corporation, 1954.
3. Fernald, M. L., "Gray's Manual of Botany," 8th ed., New York, American Book Company, 1950.
4. Gardner, H. A., and Sward, G. G., "Physical and Chemical Examination of Paints, Varnishes, Lacquers, and Colors," 10th ed., Henry A. Gardner Laboratory Inc., Bethesda, Md., 1946.
5. Hilditch, T. P., "The Chemical Constitution of Natural Fats," New York, John Wiley and Sons Inc., 1956.
6. Hopper, T. H., and Nesbitt, L. L., Oil and Soap, *14*, 34–36 (1937).
7. Lathrop, C. A., Ind. Eng. Chem., *24*, 826–827 (1932).
8. Majors, K. R., and Milner, R. T., Oil and Soap, *16*, 228–231 (1939).
9. deMello, L. M., and Castro, D. R., Agron. Lusitana, *18*, 61–73 (1956).
10. Zeleny, L., and Coleman, D. A., U. S. Dept. Agr. Tech. Bull. 554 (1937).

[Received September 21, 1959]

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

ABSTRACTORS: Lenore Petschaft Africk, R. R. Allen, S. S. Chang,
Sini'tiro Kawamura, F. A. Kummerow, Louise R. Morrow, and E. G. Perkins

• Fats and Oils

ESTIMATION OF CATALYST ACTIVITY FOR HYDROGENATION OF FATS. I. Kaganowicz. *Prace Inst. i Lab. Badawczych Przemyslu Spozywczego* 8(4), 33–44 (1958). A nickel catalyst was prepared by heating nickel formate in rapeseed oil at 245 ± 4° for 2 hours. When this catalyst was used in the hydrogenation of rapeseed oil, the rate of change of the iodine number of rapeseed oil was proportional to the catalyst activity. The activity of the catalyst was determined by means of the formula $A = (I_i - I_f) \times 88.25/at$, where I_i and I_f are the iodine numbers of the oil before and after hydrogenation, a is the amount of catalyst in weight % based on the oil, t is time in minutes, and 88.25 is the number of ml. of hydrogen corresponding to an iodine number unit. (*C. A.* **53**, 19410)

THE APPLICATION OF ION-EXCHANGE RESINS TO THE PURIFICATION OF FATS. A. Ollero Gómez and A. Soto Cartaya (Univ. Seville). *Grasa y aceites* (Seville, Spain) **9**, 296–301 (1958). Ion-exchange resins may be used for neutralization of fats, removal of trace elements, and analysis of trace elements. The removal of certain trace elements (iron, copper, and zinc) prevents oxidation of natural antioxidants in the oil. (*C. A.* **53**, 19409)

Characterization of the Carbon Acids Used in the Fat and Soap Industries by Chromic Acid Oxidation. M. Jurecek and P. Kozak (Chem.-Tech. Hochschule, Pardubice, Czech.). *Z. anal. Chem.* **167**, 32–8 (1959). The ratio of the Kuhn-Roth number to the acid number of the sample is greater than 1 for naphthenic acids and less than 1 for fatty acids and rosin acids. On steam distillation of CrO_3-oxidized sample, the distillate from fatty acids is cloudy; from the other 2 it is clear. (*C. A.* **53**, 19409)

Synthesis of Fatty Acids. S. C. Bhattacharyya, K. K. Chakravarty, and Virendra Kumar (Natl. Chem. Lab., Poona, India). *Chem & Ind.* **1959**, 1352. A method for synthesis of long-chain fatty acids containing more than 11 carbon atoms is described.

Identification of Some Flavor Compounds from Stored Instant Nonfat Dry Milk. R. Bassette (Univ. of Maryland, College Park). *Univ. Microfilms* (Ann Arbor, Mich.), *L. C. Card* No. **Mic 59-1888**, 91 pp.; *Dissertation Abstr.* **20**, 267–8 (1959). (*C. A.* **53**, 18321)

Rice-Bran Oil. S. I. El Hinnawy (A'in Shams Univ., Cairo). *A'in Shams Univ. Fac. Agr., Bull.* No. 1, 36 pp. (1958). 2-Propanol is the most suitable solvent for rice bran oil extraction. The oil content of the rice bran varies with the variety grown and climatic conditions, as do the properties of the oils. (*C. A.* **53**, 18514)

Dielectric Water Determination in Oil Palm Products. K. F. Heinisch and R. A. Partini Maun-Alibazah. *Ber. Algem. Procfst. A.V.R.O.S.* No. **20**, 10 pp. (1958). The moisture content of palm kernels and pulp is quickly determined with reasonable accuracy with the aid of the dielectric constant. The results of dielectric determinations of palm oil moisture content are unreliable because of the strong effect of the free fatty acid present, and the high dispersion of the dielectric constant with change in temperature. (*C. A.* **53**, 19415)

Comparative Water Determinations in Palm Oil. K. F. Heinisch and R. A. Partini Maun-Alibazah. *Ber. Algem. Procfst. A.V.R.O.S.* No. **10**, 10 pp. (1957). A comparative study of methods of determining moisture content shows that the iodometric determination method of Fischer is the most accurate. (*C. A.* **53**, 19415)

Use of Antioxidants for Edible Oils, Fats, and Food Containing Fats. F. D. Tollenaar (Sci. Dept. FAO, Bangkok, Siam). *Tłuszcze i Srodki Pioarce* **2**, 273–85 (1958). Maximum amounts of propyl or dodecyl gallate, 2- and 3-*tert*-butyl-4-methoxyphenol, or butylated hydroxytoluene used as antioxidants are: for lard propyl gallate 0.005–0.01, 2- and 3-*tert*-butyl-4-methoxyphenol 0.01 or butylated hydroxytoluene 0.01 (together not more than 0.01), for margarine propyl gallate 0.005, dodecyl gallate 0.01, 2- and 3-*tert*-butyl-4-methoxyphenol 0.01 (together not more than 0.015), for powdered milk dodecyl gallate 0.01, for baked goods dodecyl gallate 0.02, 2- and 3-*tert*-butyl-4-methoxyphenol 0.02, or butylated hydroxytoluene 0.02% (together not more than 0.05%). (*C. A.* **53**, 18324)

Properties of Frying Fat Related to Fat Absorption in Doughnut Frying. S. Stern and H. Roth (DCA Food Inds., Inc., New York, N. Y.). *Cereal Sci. Today* **4**, 176–9 (1959). Changes in free-fat acidity (FFA), iodine number, viscosity, and specific gravity of fresh fat subjected to a normal frying schedule were compared with the accompanying changes in fat absorption. Fat absorption is correlated with FFA, specific gravity, and viscosity, and varies inversely with iodine number. Fat will not change with respect to fat absorption with high enough fat turnover in a properly designed fryer. (*C. A.* **53**, 18324)

Variation of Milk-Fat Physical-Chemical Constants. A. Purėnas and E. Grinienė. *Kauno Politech. Inst. Darbai* **7**, 33–9 (1957). (Russian summary). Butter produced in summer decomposes sooner than winter butter and that produced in winter has shortcomings in its consistency. Month of lactation has a great influence upon milk fat acidity and the amount of low molecular weight fatty acids. Difference in fatty acid constants in milk cows in their 1–8-month period of lactation was nonsignificant. (*C. A.* **53**, 18322)

Fatty Oils of Aquatic Invertebrates. XIX. Nonconjugated Sterols and Other Unsaponifiable Components in the Fatty Oil from Tonna luteostoma. Tatsuo Tanaka and Yoshiyuki Toyama. *Mem. Fac. Eng., Nagoya Univ.* **10, 77–83** (1958). The nonconjugated sterol components of both the flesh and viscera oils from *Tonna luteostoma* consist mainly of monoethenoid sterols, among which cholesterol and clionasterol (γ-sitosterol) were identified. For the flesh oil, cholesterol is present in larger amounts than clionasterol, whereas for the viscera oil the reverse is true. Of the unsaponifiable components, other than sterol, batyl alcohol was separated as the main solid component. In the liquid components selachyl alcohol was found among others. (*C. A.* **53**, 18515)

Research on Synthetic Olive Oil. II. Isomerization of Oleic Acid by Esterification. M. Staub and R. Widmer. *Mitt. Gebiete Lebensm. u. Hyg.* **50**, 77–82 (1958). Synthetic olive oils contain at least 50% more solid fatty acids which were identified as isoöleic acids. Their determination affords a means of detecting synthetic olive oils. (*C. A.* **53**, 18514)

Estimation of Vegetable Oil Neutralization Efficiency. K. Danowski (Inst. Przemyłu Tłuszczowego, Warsaw). *Tłuszcze i Srodki Piroace* **2**, 238–92 (1958). Analytical procedures for determining glyceride (oil) losses in alkaline refining are discussed. (*C. A.* **53**, 18514)

New Method of Determination of Gossypol in Oils. A. L. Markman and Yu. P. Zalesov. *Uzbek. Khim. Zhur., Akad. Nauk Uzbek. S. S. R.* **1958**, No. 6, 91–3. Gossypol is extracted from oil by aqueous potassium hydroxide and determined gravimetrically by precipitation as gossypol or volumetrically with Fehling solution. (*C. A.* **53**, 18513)

Influence of Antioxidants in Fats. B. Akkerman (S. M. Kirov Higher Military School, Leningrad). *Izvest. Vysshikh Ucheb. Zavedenii, Pishchevaya Tekhnol.* **1959**, No. 2, 51–6. Addition of 0.5 g. of ascorbic acid and 1 g. of yellow flavon preparation per kilogram of fat or butter produced the most stable product. Both water-soluble and fat-soluble (tocopherol, etc.) antioxidants were most effective when added to the melted product directly before molding. (*C. A.* **53**, 19208)

Refining of Washed Cottonseed Oil for Use in Vanaspati. C. R. Das and Sushil Kumar. *Papers Symposium Cottonseed and By-products, Hyderabad, India* **1958**, Sect. IV, 30–4. The possibilities of extension in cottonseed oil crushing and the precautions to be taken prior to refining to produce a good quality oil for use in Vanaspati production are discussed. Currently available washed cottonseed oil may be refined by either the dry or wet methods. Both methods were tried on a plant scale. The wet, or dilute lye method, was more effective. The processes of bleaching and hydrogenation (low temperature 250°F.) are fully described. (*C. A.* **53**, 19207)

Spectrophotometric Determination of Polyunsaturated Fatty Acids in Butter. S. Mattsson and P. Swartling (State Dairy Research Sta., Alnarp, Swed.). *Milk Dairy Research* (Alnarp) *Rept.* **55**, 8 pp. (1958). By using 21% potassium hydroxide as isomerization agent, higher absorption values of butter triglycerides were found than with 7–10% potassium hydroxide, especially at 268, 316, and 346 mμ corresponding to trienoic, tetraenoic, and pentaenoic acids. With the weak alkali method, the latter are included in the tetraenoic fraction. Phospholipides, containing approximately 0.7% pentaenoic acids, should be analyzed by the strong alkali method. Only semiqualitative results can be obtained, owing to the yet incomplete characterization of higher unsaturated acids in phospholipides. (*C. A.* **53**, 19202)

Isolation and Identification of the High-Molecular-Weight Saturated Fatty Acids of Butterfat. R. P. Hansen, F. B. Shorland, and N. June Cooke (Dept. Sci. and Ind. Research, Wellington, N. Z.). *J. Dairy Research* **26**, 190–5 (1959). Butterfat has been shown to contain the normal odd-numbered saturated acid *n*-nonadecanoic acid (C_{19}), *n*-heneicosanoic acid (C_{21}), and *n*-tricosanoic acids (C_{23}). The presence of the normal even-numbered acids *n*-octadecanoic acid (C_{18}), *n*-docosanoic acid (C_{22}), *n*-tetracosanoic acid (C_{24}), and *n*-hexacosanoic acid (C_{26}) is conclusively established. *n*-Eicosanoic acid (C_{20}) formerly assumed to be present in butterfat has been isolated and identified by its physical and chemical properties. (*C. A.* **53**, 19202)

Lentil Lipoxidase. J. A. Blain, J. J. Doherty and J. P. Todd (Dept. of Biochem., School of Pharmacy, Royal Coll. of Sci. and Tech., Glasgow, C. 1). *Chem. & Ind.* **1959**, 1216–17. The range of activities of lipoxidase from lentil was found to overlap that from soya beans.

Synthesis of Linoleic, γ-Linolenic, Arachidonic, and Docosa-4:7:10:13:16-Pentaenoic Acids. J. M. Osbond and J. C. Wickens (Research Dept., Roche Products Limited, Welwyn Garden City, Herts). *Chem. & Ind.* **1959**, 1288. A flexible method has been developed for the synthesis of "Skipped" polyenoic acids and is exemplified by the preparation of linoleic, γ-linolenic, arachidonic, and docosa-4:7:10:13:16-pentaenoic acids.

Synthesis of 2:3-Distearoyl-Glyceryl 2-myo-Inosityl Phosphate. J. H. Davies and T. Malkin (Dept. of Org. Chem., The Univ., Bristol). *Chem. & Ind.* **1959**, 1155–56. The synthesis is described of 1-glyceryl 2-*myo*-inosityl phosphate by an interchange reaction between glycerol 1-iodide 2;3-distearate and silver 2-(1:3:4:5:6-pentacetyl) *myo*-inosityl phenyl phosphate, followed by the removal of protecting group.

Configuration and Properties of Erucic and Brassidic Acids and Their Esters. N. V. Bulatova. *Pratsi Odes'k. Derzhav. Univ. im. I. I. Mechnikova, Prirodnichi Nauki* **148**(3), 145-50 (1958). The rates of hydrogenation and oxidation for erucic acid and its derivatives were higher than for brassidic acid and its esters. Saponification rates at 25° and 40° of esters of brassidic acid were higher. (*C. A.* **53**, 18852)

Ultraviolet Spectrographic Characteristics of Italian Olive Oils, with Special Reference to Those Mixed with Refined or Extraneous Oils. R. Mattei and G. Volpi (Univ. Florence). *Olearia* **13**, 55–61 (1959). The specific coefficients K_{232} and K_{270} can be used to distinguish virgin olive oils, A and B refined oils, and to detect small percentages of refined oils in virgin oils. It will not detect adulteration of esterified oils with animal oleins, nor distinguish an oil refined by alkali or esterification. (*C. A.* **53**, 19414)

Hydrogenation of Cottonseed Oil. A. L. Markman and A. A. Abdurakhimov. *Uzbek. Khim. Zhur., Akad. Nauk Uzbek. S. S. R.* **1958**, No. 4, 45–51. Hydrogenation tests run on cottonseed oil over nickel-copper catalysts show that increasing the activity or amount of catalyst or increasing the temperature, decreases the selectivity of the process. Increase of hydrogen flow increases both reactivity and selectivity of the process. (*C. A.* **53**, 19414)

Solvent Extraction of Cottonseed Oil in India. H. V. Parekh (Bhavnagar Chem. Works, Ltd., Vartej). *Papers Symposium Cottonseed and By-products, Hyderabad, India* **1958**, Sect. III, 1–13.

Solubility of Cottonseed Oil in Ethyl Alcohol. K. S. Chari, K. Ramalingam, and S. H. Zaheer (Regional Research Lab., Hyderabad). *Ibid.* 13–15.

Refining of Indian Cottonseed Oil. I. Preliminary Studies. V. V. Krishna Rao and K. S. Murti (Oil Technol. Inst., Anantapur). *Ibid.* Sect. IV. 1–17.

II. Some Optimum Conditions of Refining. *Ibid.* 18–29.

Re-refining of Cotton-seed Oil for use in Vanaspati Industry by Continuous Refining Plant. K. G. Mathur (Kusum Prods., Ltd., Calcutta). *Ibid.* 35–9.

Refining of Cottonseed Oil. A Review. Om Prakash, T. R. Sharma and V. D. Athawale (Harcourt Butler Technol. Inst., Kanpur). *Ibid.* 43–50. 22 references.

Some Laboratory Studies on Refining Cottonseed Oil. V. P. Harigopal, S. Raghvendar Rao, K. T. Achaya, and S. A. Saletore (Regional Research Lab., Hyderabad). *Ibid.* 51–6.

Hydrogenation of Cottonseed Oil. J. S. Aggarwal (Regional Research Lab., Hyderabad). *Ibid.*, Sect. V, 1–6.

Hydrogenation of Cottonseed Oil. P. N. Mathur (White Food Prods. Co., Ltd., Howrah). *Ibid.* 10–19.

Cottonseed and Its Products. V. Neelkant (Kapadia Oil Mills & Refinery, Hyderabad). Sect. VI, 1–7.

Processing of Cottonseed Oil Soap Stock. J. G. Kane and Y. L. Pandya (Univ. Bombay). *Ibid.* 20–39.

Composition and Urea Separation of Fatty Acids from Indian Cottonseed Oils. K. T. Achaya and S. A. Saletore (Regional Research Lab., Hyderabad). *Ibid.* VII, 1–7.

Laboratory Method for Evaluating the Quality of Washed Cottonseed Oil. C. R. Das and Sushil Kumar (D. C. M. Chem. Works, Delhi). *Ibid.* 16–17. (*C. A.* **53**, 19413)

Wool Fat. IV. Volatile and Unsaturated Fatty Acids. H. Janecke and G. Senft (Univ. Frankfurt/Main, Ger.). *Deut. Apoth.-Ztg.* **97**, 820–2 (1957). Paper chromatographic examination of a steam distillate of wool fat showed the presence of butyric, isovaleric, nonanoic, capric, and lactic acids. The presence or absence of conjugated doubly unsaturated or of triply unsaturated acids could not be confirmed. Ultraviolet spectra indicated that a trace of such acids may be present.

V. Presence of Nitrogen- and Phosphorus-Containing Derivatives of Glucose, Glycerol, and Inositol in Wool Fat. *Ibid.* 839–41. Chromatographic methods indicated the presence of the following amino acids in wool fat hydrolyzates: asparaginic acid, glycine, glutamic acid, serine, alanine, cystine, α-aminobutyric acid, ornithine (or lysine). Traces of glucose, glycerol, and inositol were found in some samples. A lipoprotein present in the unsaponifiable portion of wool fat would explain these results. (*C. A.* **53**, 19410)

Effectiveness of 3,5-Di-(Tert-Butyl)-4-Hydroxytoluene and Propyl Gallate as Antioxidants of Lard. D. G. Knorre, Yu. N. Lyaskovskaya, V. I. Piul'skaya, and N. M. Emanuel. *Zhur. Priklad. Khim.* **32**, 1359–63 (1959). The effectiveness of propyl gallate, melting at 146°, and 3,5-di-(*tert*-butyl)-4-hydroxytoluene, melting at 70°, as antioxidants was determined by the increase in the peroxide number as a function of time. The activation energies, *E*, obtained from the linear functions log *t* versus peroxide number, of lard containing 0.1% propyl gallate or 3,5-di-(*tert*-butyl)-4-hydroxytoluene and of lard without antioxidants were, respectively, 20.6, 21.0, and 21.4 kilocalories (*t* is the time, hours, at which peroxide number = 0.1, taken from the peroxide number versus time curves). These values of *E* approximate the values obtained for butyl hydroxyanisole and ascorbic palmitate, 23.1 and 23.6, respectively. Obviously, in the initial stages of oxidation *E* is independent of the characteristics of the antioxidants and is a function only of the properties of the fat. (*C. A.* **53**, 18324)

Study of Losses During Neutralization of Alkaline Oils. M. Naudet. *Rev. fermentations et inds. aliment.* **14**, 51–8(1959). Refining losses, and losses of glycerides by entrainment and saponification vary, depending on the purity of the glycerides, composition of the crude oils processed, conditions of neutralization, and composition of refined oils. Some consideration is also given to losses by emulsification. Theories are presented for the reactions which contribute to the over-all losses in the processing of oils. (*C. A.* **53**, 18513)

The Determination of Fatty-Acid Composition by Gas Chromatography and Ultraviolet Spectrophotometric Methods. L. Malin. *Soap, Perfumery & Cosmetics* **32**, 597–9 (1959). A description. (*C. A.* **53**, 18512)

A Rapid Method for Estimating the Oil Content of Sunflower Seeds. A. L. Shewfelt and E. D. Putt (Can. Dept. Agr., Morden). *Can. J. Plant. Sci.* **38**, 419–23 (1958). The approximate method consists in placing a given number of seeds between layers of filter paper, pressing in a laboratory hydraulic press, and measuring the weight of oil absorbed by the filter paper. The oil values are approximately 73% of those obtained by the standard Soxhlet procedure. The method is particularly well-suited for making plant breeding selections. (*C. A.* **53**, 19415)

The Oxygenated Fatty Acid of Tragopogon Porrifolius Seed Oil. Mary J. Chisholm and C. Y. Hopkins (Div. of Pure Chem., Natl. Research Council, Ottawa, Can.). *Chem. & Ind.* **1959**, 1154–55. The seed oil of *Tragopogon porrifolius* L. (family Compositae) yielded a saturated epoxy acid and the evidence indicates that it is *cis*-9:10-epoxystearic acid. The content of 9:10-epoxystearic acid is estimated to be 3% of the total fatty acids of the oil.

Determination of sesamin in Sesame Oil. A. Chindemi. *Boll. lab. chim. Provinciali* (Bologna) **9**, 297–310 (1958). Use of the Pavolini-Isidoro reaction permits rapid analytical determination of sesamin. Sesamin varied from 0.46 to 0.67% in the oils tested. (*C. A.* **53**, 19415)

Transformation of Sterols During Neutralization and Bleaching of Rapeseed Oil. H. Niewiadomski and J. Sawicki. *Grasas y aceites* (Seville, Spain) **9**, 306–9 (1958). Refining of rapeseed oil by neutralization with strong alkali and bleaching on absorbents leads to chemical alteration of the sterols and prevents precipitation with digitonin. Neutralization induces oxidation and bleaching causes oxidation, dehydration, and possible isomerization. The modified sterols are probably physiologically active. (*C. A.* **53**, 19415)

V. Relationships Between Physical and Subjective Measurements. M. Naudet and E. Sanbuc. *Ibid.*, 537–543 (1959). In this study the authors determine the precision of the results of physical tests using a simple statistical study, and show that a correlation exists between physical measurements and subjective evaluations. This, according to the authors, corresponded to a zone of consistence for these results within which one could give an interpretation of the physical measurements in terms of subjective evaluations.

Measurements of Surface and Interfacial Tension of Surfactant Solutions. Mm. Marcou and Guillaumin (I.T.E.-R.G.). *Rev. Franc. Corps Gras* **6**, 544–555 (1959). A review of the methods of determination of surface and interfacial tension. The various methods are grouped under several main headings as follows: examination of droplet forms. capillary ascension methods, hanging drop methods, and methods involving traction measurement.

Paper Chromatographic Analysis of Fats. XXXVI. The Transparence Method for the Identification of Surface Active Agents Analyzed on Paper. H. P. Kaufmann and G. Walther (Deut. Inst. Fettforschung. Munster, Westf.). *Fette Seifen Anstrichmittel* **61**, 782–784 (1959). Nonionizable emulsifiers and washing agents are separated paper chromatographically by making use of papers impregnated with paraffin. Because of their wetting property, the separated zones can be made visible through a simple treatment with water or with a dyestuff solution.

Influence of Trace Impurities on the Quality of Distilled Glycerine During Storage. Mme. H. Goynberg and H. S. Zcycpanska (Inst. Corp Gras, Varsovie). *Oleagineux* **14**, 585–589 (1959). It was found that the quality of distilled glycerine deteriorated upon storage with the formation of a precipitate and a change in color. The authors showed by means of chromatographic studies that the quality deterioration was due to trace amounts of organic impurities (fatty acids, aldehydes, and amino acids). A paper chromatographic method was used for the determination of the aldehydes present in stored glycerine based on the precipitation of the carbonyl compounds as their phenylhydrazones. The derivatives were separated on acetylated paper; extracted from the papergrams; and determined colorimetrically. The method permits the determination of aldehydes in concentrations of 0.3 to 30 micrograms depending upon the chain length of the material. The reproducibility and the precision of the method is from 2–4%.

The Mechanism of Extraction of Soya by Different Solvents. D. F. Othmer and W. A. Jactinem (Brooklyn Polytech. Inst., Brooklyn, N. Y.). *Rev. Franc. Corps Gras* **6**, 408–415 (1959). A study of the mechanism of extraction of soya indicated that the amount of residual oil and the speed of extraction are exponential functions of the duration of the extraction. The maximum amount of extraction depends upon the micella concentration and shell thickness. Extraction velocity is strongly augmented with the diminution of shell thickness and the increase in residual oil content is also a function of this. The action of various solvents depend on their relative physical properties. The extraction speeds are proportional to the density and surface tension of the solvent and inversely proportional to its viscosity. Extractions with acetone are in good correlation with that of hexane. Other solvents present several variations, especially when the oil present in the micella affects the physical properties of the solvent.

Thoughts Concerning Unsaturated Essential Fatty Acids: Linoleic and Linolenic Acids. E. Andre (I.R.H.O., Marseille). *Oleagineux* **14**, 581–584 (1959). The author gives a short discussion of the history, chemistry, and biochemistry of linoleic and linolenic acids from the work of Chevreul in 1813 to the more recent work of Toyama concerning the structural determination of linoleic acid.

Positional Distribution of Saturated and Unsaturated Fatty Acids on Egg Lecithin. N. H. Tattrie (Div. Appl. Biology, Nat. Res. Council, Ottawa). *J. Lipid Research* **1**, 60–65 (1959). A method is described to determine the position of fatty acids on lecithin. Purified egg lecithin is enzymatically hydrolyzed to the corresponding mixture of α,β-diglycerides with lecithinase D. Myristic acid is incorporated into the α' position of the diglycerides and the resulting triglycerides are hydrolyzed with pancreatic lipase, which specifically cleaves fatty acids from the α and α' positions. Palmitic, myristic, and stearic acids were freed by the lipase, proving that the saturated acids are on the α' position, while the unsaturated fatty acids occupy the β position of egg lecithin. Since snake venom lecithinase A removes the unsaturated acids from lecithin, the site of hydrolysis must be at the β position of lecithin.

The Microtitration of Total Fatty Acids of Serum, with Notes on the Estimation of Triglycerides. Margaret J. Albrink (Dept. Internal Med., Yale Univ. Med. School, New Haven, Conn.). *J. Lipid Research* **1**, 53–59 (1959). A method is described for the determination of total fatty acids of serum by microtitration. The method is designed to permit also the determination of cholesterol and lipid phosphorus, and of triglycerides by difference. The essential steps include extraction of serum lipids, saponification, extraction and microtitration of the liberated free fatty acids. Recoveries of pure fatty acids and triglycerides were 97% complete. Short chain acids and intermediates of carbohydrate metabolism are not detected by this method.

Paper Chromatographic Analysis of Fats. XXXV. Detection of Adulteration in Olive Oil with the Help of Paper Chromatography. H. P. Kaufmann and M. Aparicio (Deut. Inst. Fettforschung). *Fette Seifen Anstrichmittel* **61**, 768–770 (1959). A method based on paper chromatography for checking the purity of olive oil is described. The adulteration of the oil can be established by comparing the number of triglyceride spots on the papergrams in case of pure and adulterated oils. The method is applicable up to 5–10% of the adulterant in oils.

Quantitative Glass Paper Chromatography: Phosphatidyl Choline and Sphingomyelin. J. E. Muldrey, O. N. Miller, and J. G. Hamilton (Dept. Biochemistry, Tulane Univ. School of Medicine, New Orleans). *J. Lipid Research* **1**, 48-52 (1959). A rapid chromatographic procedure for the separation of sphingomyelin, phosphatidyl choline, ethanolamine, phosphatidyl serine, phosphatidyl inositol, and free fatty acids on glass paper coated with sodium silicate is described. Phosphatidyl choline and sphingomyelin were determined quantitatively by densitometry of the charred papergram obtained by spraying the developed papergram with H_2SO_4 and heating in an oven. The separation of phosphatides on sodium silicate treated glass paper is more rapid than on silicic acid impregnated paper and simpler to prepare. The adaptability of the method to the analysis of natural products for phospholipid content is discussed.

Scintillation Counter for the Measurement of Radioactivity of Vapors in Conjunction with Gas Liquid Chromatography. G. Popjak, A. E. Lowe, D. Moore, L. Brown, and F. A. Smith (Hammersmith Hosp., London). *J. Lipid Research* **1**, 29–39 (1959). The instrument described in this paper was designed to measure the radioactivity of C^{14} fatty acids emerging as vapors from a gas liquid chromatographic column and to record the radioactive disintegrations parallel with the analytical chromatographic record. The construction and performance of a liquid scintillation counter is described. The resolving power of the counter is such that the radioactive fractions need only 25 seconds to pass through the chromatographic analyzer and may be clearly distinguished from other radioactive fractions.

Measurement of Rancidity in Fishery Products by 2-Thiobarbituric Acid Method. B. A. Ryan and M. E. Stansby (U. S. Bur. of Comm. Fisheries, Seattle, Wash.). *Com. Fisheries Rev.* **21**(1), 21–3 (1959). Whole Pacific herring *(Clupea pallasii)* were: (1) frozen, lightly glazed, and sealed in evacuated polyethylene bags; or (2) frozen in blocks of ice. They were stored at 0°F. for 90 days and assayed periodically for rancidity by sensory tests and by the 2-thiobarbituric acid (TBA) test. Good correlation was found between the 2 methods. TBA values ($E^{1\%/1cm.}$) of 0.05, 0.10 and 0.17 were obtained, respectively, for trace, slight, and extreme rancidity. (*C. A.* **53**, 17356)

Oleic, Linoleic, and Linolenic Acid Contents of Margarine. K. Lampi, H. Eikrem, and M. Antila. *Suomen Kemistilehti* **32B**, 14–15 (1959). Common margarines consumed in Finland were analyzed for unsaturated fatty acid content. The following concentration ranges were found: iodine number 38.1–54.3, oleic acid 21.0–44.6%, linoleic acid 3.7–12.1%, linolenic acid 0.7–3.8%. (*C. A.* **53**, 17354)

Physicochemical Properties of High-Melting and Low-Melting Fractions of Milk Fat. Yu. A. Olenev (Technol. Inst. Refrigeration Ind., Leningrad). *Izvest. Vysshikh Ucheb. Zavedenii, Pishchevaya Tekhnoĭ* **1958**, No. 4, 19–24. Results on various glyceride fractions of milk fat showed that the melting point and points of solidification decreased, and index of refraction and iodine numbers increased, with the increasing index number of the fractions. The first 3 fractions consisted primarily of the saturated fatty acid glycerides; the last 2 consisted of the unsaturated acids. Glyceride compound of milk fat varied; it depended on the cow's nutrition. (*C. A.* **53**, 17352)

Fatty Acid Composition of Carrot (Daucus Carota) Seed Oil. Om Prakash, Atma Ram, and J. C. Gupta (H. B. Technol. Inst., Kanpur). *J. Proc. Oil Technologists Assoc. India, Kanpur* **13**, Pt. 1–2, 42–6 (1957). Carrot seeds contain a nondrying oil and an essential oil in about 11 and 1% amounts, respectively. The fatty acids of the fatty oil, obtained as a byproduct in the preparation of the essential oil by solvent extraction were palmitic, petroselinic, oleic, and linoleic acids in the amount of 6.87, 55.5, 22.85, and 14.78% respectively. (*C. A.* **53**, 17540)

Deodorization of Neem Oil. Om Prakhash, Atma Ram, S. N. Chatterji, and A. Sattar (H. B. Technol. Inst., Kanpur). *J. Oil Technologists Assoc. India, Kanpur* **13**, Pt. 1–2, 14–17 (1957). The disagreeable odor of Neem (Margosa) oil can be removed by heating at 200° for approximately 0.5 hour, then boiling with alkaline potassium permanganate (1.5% of the weight of oil) for three hours, washing 3–4 times with saline water, and finally washing with hot water and drying. (*C. A.* **53**, 17540)

Bromine Saturation of Safflower Oil and Its Estimation by Refractive Index Method. D. Siva Ramaiah and B. S. Kulkarni (Osmania Univ., Hyderabad). *J. Proc. Oil Technologists Assoc. India, Kanpur* **13**, Pt. 1–2, 6–8 (1957). Details of saturation of safflower oil by bromine are given. The amount of saturation can be estimated by the relation: $Br_x = 12(\mu_o - \mu_o)$ *I.V.*, where Br_x is the bromine required to saturate 100 g. of sample, μ_x and μ_o are the $n^{40°}$ of the sample and original oil, respectively, and *I.V.* is the iodine value of the original oil. (*C. A.* **53**, 17540)

Keeping Quality of Mustard Oil on Storage in Different Types of Containers. Om Prakash, A. C. Gupta, T. R. Sharma, and V. D. Athawale (H. B. Technol. Inst., Kanpur). *J. Proc. Oil Technologists Assoc. India, Kanpur* **13**, Pt. 1–2, 26–41 (1957). The suitability of the metals for keeping mustard oil is in this order: tinned iron, galvanized iron, and mild steel. (*C. A.* **53**, 17540)

Fatty Acid Composition of Himalayan Pine (Pinus Griffithii) Seed Oil by Urea Adduct Method. Om. Prakash, T. R. Sharma, and A. Sattar (H. B. Technol. Inst., Kanpur). *J. Proc. Oil Technologists Assoc. India, Kanpur* **13**, Pt. 1–2, 47–51 (1957). The component fatty acids in the oil were: palmitic, stearic, oleic, linoleic, and linolenic in the amounts of 7.65, 6.50, 13.35, 52.15, and 20.30%, respectively. (*C. A.* **53**, 17540)

Alkali Refining of Safflowerseed Oil. E. V. A. Chari and B. S. Kulkarni (Osmania Univ., Hyderabad). *J. Proc. Technologists Assoc. India, Kanpur* **13**, Pt. 1–2, 1–5 (1957). In refining safflower oil by the A.O.C.S. cup technique, an alkali strength of 14° Baumé and an excess of 0.02% alkali gave the best over-all refining results, yielding good results in reducing acid value and color. (*C. A.* **53**, 17539)

Fatty Oil of a Snail, Euhadra Herklotsi. Toru Takagi and Yoshiyuki Toyama. *Mem. Fac. Eng., Nagoya Univ.* **10**, 84–7 (1958). Fatty oils were extracted from *Euhadra herklotsi* collected in three localities. The fatty acids contained approximately 20% saturated acids, consisting chiefly of stearic acid. Differing from polyethenoid acids of aquatic shellfish oils, the polyethenoid acids of the snail oil contained a remarkably large proportion of diethenoid acid while pentaethenoid acid was present in a relatively small proportion and hexethenoid acid was not present in detectable amounts. Oleic and linoleic acids were identified in monoethenoid and diethenoid acid portion, respectively. Sterol compounds consisted chiefly of cholesterol without noticeable amounts of sitosterol. The $\Delta^{5,7}$-conjugated sterol content of the total sterol was less than 5.5%. (*C. A.* **53**, 17537)

Variation in Physical and Chemical Characteristics of Herring, Menhaden, Salmon, and Tuna Oils. R. O. Simmons (North Carolina State Coll., Durham). *Com. Fisheries Rev.* **20**(11a), 15–7 (1958). The index of refraction, iodine number, free fatty acid, saponification number, nonsaponifiable matter, and Gardner color number of 126 menhaden and 14 herring body oils and 12 tuna and 12 salmon byproduct oils collected during each of 2 consecutive seasons are reported. (*C. A.* **53**, 17537)

Fractional Separation of Fatty Acids from Codling Oil by the Addition Reactions with Urea. Zbigniew Jedliński and Stanisław Szpakowski. *Przemysł Chem.* **37**, 648–50 (1958). The best selective separation is obtained when methanol is used as the solvent for the fatty acids and when the products of the addition reactions are precipitated with a methanol solution of urea. The optimum amount of urea is 20 moles per 1 mole of the fatty acids (i.e. 1.1 mole of urea per gram-atom of carbon in the fatty acids). The above method can be important in the paint and lacquer industry. (*C. A.* **53**, 17532)

Chemical Examination of the Oil from the Seeds of Clitoria Ternatea. R. D. Tiwari and R. K. Gupta (Univ. Allahabad). *J. Proc. Oil Technologists Assoc. India, Kanpur* **13**, Pt. 1–2, 9–13 (1957). A light yellow semidrying oil obtained from the seeds of *Clitoria ternatea* by petroleum ether extraction, followed by an animal charcoal-fuller's earth treatment has: specific gravity (25°), 0.9086; n^{25}, 1.4748; acid value, 6.2; saponification value, 185.98; acetyl value, 5.22; Hehner value, 91.82; R. M. value, 0; iodine value, 92.3; thiocyanogen value, 62.3; and unsaponifiable matter, 0.8%. The fatty acids found in the oil were: linoleic, oleic, palmitic, stearic, and lignoceric in amounts of 35.06, 34.10, 6.93, 6.6, and 10.03%, respectively. The unsaponifiable fraction consisted mainly of a sitosterol with small amount of a hydrocarbon. (*C. A.* **53**, 17539)

Refining of Oils with Ethanol as a Selective Solvent. M. Jaky and J. Peredi (Research Inst. for Plant Oil and Chemical Household Article Industry, Budapest). *Fette, Seifen, Anstrichmittel* **61**, 651–656 (1959). The possibilities of oil refining with ethanol as a selective solvent are examined and evaluated. The experiments carried out on a semi-commercial scale confirm the results and calculations applicable in case of laboratory experiments.

Application of Infrared Spectroscopy to Fats and Oils. II. Quantitative Determination of Unsaturated Trans Fatty Acids in Mixtures of Trans and Cis Isomers and Saturated Compounds. H. P. Kaufmann, F. Volbert, and G. Mankel (German Inst. for Fat Research, Münster, Westf.). *Fette, Seifen, Anstrichmittel* **61**, 643–651 (1959). In order to determine the amount of *trans* isomers of fatty acids, their esters and barium salts were tested by various methods. The investigations on monoene compounds, their natural and synthetic mixtures, show the infrared regions where various methods for their evaluations are practicable. The determinations of *trans* content in fats show that in certain cases glyceride structures can considerably influence the *trans* content as determined by infrared spectroscopy and yield false results.

Investigations on the Epoxidation of Petroselinic and Petroselaidic Acids. M. O. Farooq and S. M. Osman (Dept. of Chemistry, Muslim Univ., Aligarh, India). *Fette, Seifen, Anstrichmittel* **61**, 636–639 (1959). The authors describe the epoxidation of the *cis* and *trans*-isomers of 6,7-octadecenoic acid with permonophthalic and peracetic acids as well as the preparation of epoxides through chlorohydrin synthesis. Infrared investigations showed that during epoxidation, these acids or their esters retained their original configurations.

The Chemical Constitution of Plasmalogens. H. Debuch (Inst. Biological Chemistry, Univ. Cologne). *Fette, Seifen, Anstrichmittel* **61**, 639–642 (1959). After giving a definition of acetalphosphatides, also called plasmalogens, the author discusses the nature of aldehyde-glycerol bonds. This linkage in the plasmalogen molecule exists in an ether-like and not in an acetal form. The author has not been able to establish the attachment of the aldehyde function at the *alpha* or *beta* position in the plasmalogen molecule with certainty.

Paper Chromatography in Fat Chemistry. XXX. The Paper Chromatographic Analysis of Glycerides. H. P. Kaufmann and H. Schnurbusch (Inst. of Pharmacy and Food Chemistry, and the German Inst. for Fat Research, Münster, Westf.). *Fette, Seifen, Anstrichmittel* **61**, 523–28 (1959). The authors describe a paper chromatographic method for the analysis of soya oil glycerides. Paraffin oil or silicone oil was employed as the stationary phase, and acetone/acetonitrile mixtures as the mobile phases. The glyceride spots were detected by saponification of the spots with KOH on the paper; the resulting fatty acids were made visible by treatment with Rhodamine B, Victoria Blue R, Nile Blue Sulfate, etc. The identification of the individual glycerides is accomplished by elution, saponification, and subsequent separation of the fatty acids in a undecane/acetic acid-acetonitrile system. In this way the authors were able to separate five different glycerides of soya oil and determine them quantitatively. A comparison of a natural soya oil and a re-esterified product shows a remarkable difference in the glyceride structure.

Separation of Fatty Acid Esters by Gas Chromatography. A. Jart (Danish Inst. of Fat Research, Copenhagen). *Fette, Seifen, Anstrichmittel* **61**, 541–547 (1959). With the help of gas chromatography the author analyzes various fats both qualitatively and quantitatively after converting the fats to their methyl esters. A description of the apparatus used is given in the experimental part and the results are discussed. Fatty acids from eight to twenty-four carbons in length were separated.

Paper Chromatography in the Field of Fats and Oils. XXXI. The Paper Chromatographic Separation of Synthetic and Natural Triglyceride Mixtures. H. P. Kaufmann and Z. Makus (German Inst. for Fat Research, Münster, Westf.). *Fette, Seifen, Anstrichmittel* 61, 631–636 (1959). Using undecane/acetic acid as the mobile phase and paper made hydrophobic with undecane or solid paraffin, the authors separated various mixtures consisting of 12 synthetic and 17 natural fats. New methods of coloration have been employed to make the triglycerides visible.

The Influence of the Quality of Rape Seeds on the Stability of the Oil. A. Rutkowski and Z. Makus (Inst. for the Fat Industry, Warsaw, Poland). *Fette, Seifen, Anstrichmittel* 61, 532–535 (1959). The stability of rapeseed oil, obtained from the seeds at different stages of ripening, has been investigated. The authors found that change in fatty acid composition towards the last stages of ripening does not influence the stability of the oil as much as the presence of accompanying matter. Oil from ripe rapeseeds has been found to be the most stable. Storage conditions affect the oil stability markedly. Refined oil obtained from seeds affected by mold is less stable. The free fatty acid and peroxide content in the case of oil from damaged seeds is higher.

Relative Antioxidant Activities of the Seven Tocopherols. C. H. Lea (Low Temperature Research Station, Cambridge) and R. J. Ward. *J. Sci. Food Agr.* 10, 537–548 (1959). The three tocopherols unsubstituted in the 5 position (δ, γ, and η) were more effective than the other 4 in protecting carotene in mineral oil solution at 75°. In lard esters at 90° and in methyl linoleate at 50°, δ, γ, η, and β were the most and ϵ, ζ, and α the least effective, the precise order depending on the conditions and concentrations used. The tocopherols were much less effective in protecting lard esters exposed to light, δ being the best of the series.

Edible Oil Emulsions. Beverly M. Eagon and G. K. Greminger (Dow Chemical Co.). *U. S. 2,906,626.* Edible oil emulsions having improved shelf life and resistance to microbial attack are made by a process in which a hydroxypropyl methyl cellulose (2 to 5% by weight) is wetted with an edible oil (5 to 25% by weight) and emulsified by adding to it with agitation to aqueous propylene glycol (5 to 30% by weight propylene glycol).

Pork Rind Cooking Process. E. D. O'Brien and R. E. O'Brien. *U. S. 2,907,660.* A puffed edible food product is produced by heating bacon rinds with bacon grease at pressures of 5 to 20 p.s.i.

Hydrogenated Lecithin and Process for Preparing Same. R. D. Cole (Glidden Co.). *U. S. 2,907,777.* Vegetable phosphatides are hydrogenated in the presence of chlorinated solvents and a platinum or palladium catalyst at between 0 and 120 lbs. gauge pressure and a temperature between 32 and 175°F.

Reclaiming Oil Composition and Method of Making It. E. A. Van Valkenburgh. *U. S. 2,908,676.* A process for the preparation of a tall oil suitable for use in reclaiming rubber is described. Heating the crude tall oil at approximately 130° for 24 to 36 hours and then adding 3.5 to 7.5% of a stabilizing solution (liquid aromatic hydrocarbon oils, liquid naphthenic oils, diethylene glycol, or mixtures of such materials) prevents crystallization of the abietic acid.

Gravy or Sauce Mix. H. M. Keller (General Mills, Inc.). *U. S. 2,909,431.* A dry gravy or sauce mix consists of starch or cereal flour (65–85%), a leavening agent (10–20%), and a separating medium for the starch particles (5–15%). The separating medium may be a liquid oil, hydrogenated vegetable shortening, animal fat, or whey solids.

Fluid Shortening. L. L. Linteris (Lever Bros. Co.). *U. S. 2,909,432.* A stable liquid shortening which will produce cakes comparable to those made with all hydrogenated superglycerinated plastic shortening consists of an edible liquid oil containing 1 to 8% of a non-fish oil hydrogenated triglyceride.

Coating of Raisins and Other Foods. G. G. Watters and J. E. Brekke (Secy. Agr., U. S. A.). *U. S. 2,909,435.* Foods such as raisins which have surface deposits of sugar, are first coated with starch and then with a wax plasticized with lecithin or an acetylated glyceride.

Wax Polish. R. G. Landwerlen and H. W. Vahlteich (Corn Products Co.). *U. S. 2,909,437.* The addititon of a dialkyl citrate (dioleyl or distearyl) to a carnauba wax formulation produces a polish which is easily buffed, has high gloss, and has no tendency to chalk.

Sperm Oil Ester Adducts. J. Dazzi (Monsanto Chemical Co.). *U. S. 2,909536.* Adducts formed by heating sperm oil with an alkyl fumarate are useful as plasticizers for vinyl chloride polymers.

Vegetable Oils. VII. Strophanthus Seed Oils. F. D. Gunstone (Chemistry Dept., The University, St. Andrews) and L. J. Morris. *J. Sci. Food Agr.* 10, 522–526 (1959). The fatty acid composition of 13 species of *Strophanthus* oils were determined. All contained 9-hydroxyoctadec-12-enoic acid (6–15%) and may also contain minor amounts (less than 0.1%) of erythro-9,10-dihydroxystearic acid. Saturated acids were present at concentrations of 24 ± 3%, and the oleic and linoleic acid concentrations varied inversely. The former rose from 29 to 45% while the latter fell from 37 to 21%.

Storage of Hay. I. Effects of Temperature on the "Soluble" Nitrogen, Sugar, and Fat Contents. Jean F. Couchman (Fodder Conservation Section, Commonwealth Scientific & Industrial Res. Org., Melbourne, Australia). *J. Sci. Food Agr.* 10, 513–519 (1959). After storage at temperatures between −18 and 32°, the total crude fat contents of the hays decreased. Real losses of fatty materials seemed unlikely, but it was possible that changes had occurred in the fats which led to a decrease in their solubility.

Refining of Fatty Acid Esters for Food Use. Noblee & Thoerl G.m.b.H. *Brit. 804,022.* An improved procedure is described for deacidification in one step of fatty acid esters, especially those intended for human consumption, by addition of controlled amounts of water and alkali. An amount of alkali at least sufficient to neutralize the free acid present is added to the ester. The concentration is such that the total amount of water present is $\leqq$ 1.5 times the weight of soap formed. This amount of water is usually sufficient to unite these soaps into solid conglomerates which adsorb other undesirable impurities, such as nickel catalysts, and are readily removed from the neutral oil by centrifugal separators. (*C. A.* **53**, 19220)

Esterification of Fatty Acids with Alcohols. A. Milbers (Metallgesellschaft Akt.-Ges.). *Ger. 951,070.* Fatty acids are esterified with glycerol or other alcohols *in vacuo* at 30–70 mm. to obtain oils or fats with small amounts of by-products. The process is accelerated by adding the distillation products (glycerol and possibly fatty acids) portionwise to the reaction vessel. Continuous recycling requires approximately double the time. Condensation of the distillation products takes place at 3–5 mm. Upon condensation at high vacuum, no darkening of the distillate takes place. Efficient mixing is necessary for high yields. Steam is also passed in at the bottom of the reactor. The crude product is refined by heating the reaction mixture in a high vacuum and distilling off the excess of fatty acids and other volatile compounds. Catalysts are phosphates of heavy metals or better of alkali or alkaline earth metals. The procedure can also be applied to resinous and other acids. (*C. A.* **53**, 18517)

Trans, Trans-Muconic Acid and Esters. H. Sauer and A. Tusch (Rütgerswerke Akt.-Gee.). *Ger. 956,502.* Adipic acid esters are chlorinated in the presence of BF_3, or its complex compounds to the corresponding α,α'-dichloroadipic acid esters and hydrochloric acid is split off in usual manner. (*C. A.* **53**, 18872)

Apparatus for Extraction of Oil-Containing Materials. P. Gordinsky and F. Krudewig (Miag Vertriebsgesellschaft m.b.H.). *Ger. 1,004,309.* Addition to Ger. 951,031. (*C. A.* **53**, 19418)

Apparatus for Extraction of Finely Powdered Oil-Containing Materials. H. Stoltenberg (Tijmen van der Meulen G.m.b.H.). *Ger. 1,004,310.* Extraction, for example of polished rice flour with solvents, e.g., benzene, is done in countercurrent flow with the apparatus described. (*C. A.* **53**, 19418)

Bleaching of Waxes, Fatty Oils, and Fats. R. Schirmer, H. Voit, and H. Hoyer (Farbwerke Hoechst Akt. Ges. vorm. Meister Lucius & Bruning). *Ger. 1,007,918.* Bleaching is accomplished by use of chromium trioxide + sulfuric acid in presence of foam destroyers, if necessary. The mixture then passes through one or more gas or vapor separators. At one or more locations in each separator, fresh bleaching agent, or at least one constituent of it, is added to the reaction mixture. (*C. A.* **53**, 19416)

Apparatus for Periodic Clarification of Bleached Oily Suspensions. W. Buddeberg and H. v. Posern (Krauss-Maffei Imperial G.m.b.H. & Co.). *Ger. 1,007,919.* The solid bleaching agent, e.g., bleaching earth, is removed from the suspensions by a centrifugal apparatus. (*C. A.* **53**, 19418)

Mixtures of Paraffin Waxes and Wax Carboxylic Acids. H. Kolling and F. Rappen (Ruhrchemie Akt.-Ges.). *Ger. 1,008,726.* The known process for manufacturing heat-resistant, anhydrous waxy pastes from mixtures (C_{30}–C_{40}) prepared from paraffin hydrocarbons by chlorination, dehydrochlorination, catalytic addition of water gas, hydrogenation, and use of an alkali melt is improved by mixing 0.7–3.0 parts by weight of a C_{25}–C_{30} mixture of a partially lime-saponified wax carboxylic acid and paraffin waxes containing 10–30% calcium soap with 1 part by weight of a mixture of paraffin waxes and wax carboxylic acids having >30 carbon atoms and preferably separating 10–30% compounds with a low solidification point by extraction with carbonyl containing solvents (acetone) before partial neutralization of the C_{25}–C_{30} mixture. The mixtures are preferably prepared from solid paraffin hydrocarbons obtained by hydrogenation of CO. (*C. A.* **53**, 18518)

Refining and Stabilization of Fatty Hydroxyl and Carboxyl Compounds. A. Nichterlein. *Ger. 1,001,013.* The process deals with the treatment of hydroxyl terminally substituted compounds and esterified or unesterified carboxyl compounds with an unsaturated carbon chain. Oxygen acceptors, e.g., lower aliphatic aldehydes, sulfurous acid, sulfites, bisulfites, dithionites, or sulfoxylates are used, either as such or in the form of their addition compounds with lower aliphatic aldehydes, at super atmospheric pressure and an elevated temperature. Reaction takes place with exclusion of air at 2–50 atmospheres pressure and a temperature close to the boiling point of water. For example, rancid neutral fats or fatty alcohols with olefinic chains are treated with sulfurous acid and sodium acid sulfite or sodium hyposulfite in an autoclave at 3 atmospheres pressure and 105° until the peroxide number is zero. A total addition of 0.2% is required. The stabilized fat is subsequently deodorized with steam under reduced pressure until it is pale in color and odorless. (*C. A.* **53**, 19416)

Bleaching of Oils and Fats. K. Kühn (Kali-Chemie Akt.-Ges.). *Ger. 1,012,014.* A highly viscous solution of an alkali metal pyrophosphate in hydrogen peroxide (1–3:7 mole ratio) is used as bleaching agent, e.g., 45% $Na_4P_2O_7$, 44% H_2O_2, and 11% water. (*C. A.* **53**, 19516)

Purification of Micella-Containing Sediment. W. Depner. *Ger. 1,015,560.* The process relates to the purification of micella, for example, of oil seeds, in the solvent from the extractors. (*C. A.* **53**, 19418)

Fat Liquors from Nonedible Oil. V. Radhanandakishore and Y. Nayudamma (Indian Council of Agricultural Research). *Indian 62,348.* Pongam oil is sulfonated to yield a fat liquor. (*C. A.* **53**, 18518)

Separation of Mixtures of Synthetic Fatty Acids. B. N. Tyutyunnikov, N. K. Man'kovskaya, and G. B. Al'terman. *U. S. S. R. 117,330.* The mixture of synthetic fatty acids is neutralized with an alkali and the aqueous solution of the neutralized mixture is treated with carbon dioxide at ≦65° and ≦50 atmospheres. The resulting suspension of acid salts in an aqueous bicarbonate solution and a salt of low molecular weight fatty acids is filtered, centrifuged, or allowed to settle. The precipitate is treated consecutively or simultaneously with an aqueous alcohol solution and a hydrophobic solvent for fats. The alcohol causes the acid salts to dissolve in the high-molecular fatty acids, which in turn dissolve in the hydrophobic solvent and neutral salts of low-molecular fatty acids, which dissolve in the aqueous alcohol layer. The latter is mixed with a new aliquot of hydrophobic solvent, and the resulting mixture is treated with carbon dioxide. The separation of fractions is repeated as above. In another procedure, the original mixture of fatty acid salts is treated with carbon dioxide in the presence of a hydrophobic solvent for fats. (*C. A.* **53**, 19417)

◆

• Fatty Acid Derivatives

Synthesis of Long-Chain Fatty Acid Amides of Amino Acids. B. Weiss (Dept. of Biochem., Columbia Univ. and N. Y. State Psychiatric Inst.). *J. Org. Chem.* **24**, 1367 (1959). The non-aqueous system used for preparation of long-chain fatty acid amides of sphingosine and dihydrosphingosine has been successfully extended to the synthesis of several long-chain fatty acid amides of serine and its methyl ester.

Impregnating Agent. A Doser (Farbenfabriken Bayer Aktiengesellschaft). *U. S. 2,906,776.* Textile materials are impregnated with aqueous solutions or dispersions of stearyl carbamic acid and dried at temperatures above 100° to give water-repellent finishes.

Fungicidal Preparations. G. S. Hartley and P. O. Park (Fisons Pest Control Ltd., Bourn, England). *U. S. 2,907,691.* A certain group of compounds are claimed to act both as dispersing agents and as sticking agents in an agricultural spray. These compounds are salts of a volatile base (ammonia, triethylamine, etc.) and a long-chain fatty acid, either saturated or containing at least 2 double bonds.

Methods for Producing Beadlets. H. M. Kascher (Eastman Kodak Co.). *U. S. 2,908,041.* A method is described for beading a solid, fusible higher fatty acid ester of glycerine.

Wax Emulsion Polishes. G. Barker (Witco Chemical Co., Inc.). *U. S. 2,908,578.* Ingredients include wax or wax-like resins and from 5 to 30% of a reaction product of (1) a water-soluble amine and (2) an amide of an alcohol nontertiary amine in which one reactive hydrogen has been replaced by a fatty acid acyl radical of 8 to 24 carbon atoms and a second reactive hydrogen has been replaced by an acyl radical of a polycarboxylic acid, e.g., oleic acid amide of monoethanolamine maleate.

Anti-Rust Emulsion Resistant Mineral Oil Composition. E. P. Cunningham & D. W. Dinsmore (Monsanto Chemical Co.). *U. S. 2,908,649.* A corrosion inhibitor consists of (1) mineral oil, (2) a reaction product of a fatty acid of 10 to 30 carbon atoms with a polyalkylene polyamine and an alkenyl succinic anhydride, (3) a dimeric acid produced by condensation of unsaturated fatty acids of 16 to 18 carbon atoms, and (4) alkyl substituted phenyl esters of phosphoric acid.

Esters of 2-Hydroxypropyl Sucrose. A. W. Anderson and J. L. Melstad (Dow Chemical Co.). *U. S. 2,908,681.* Fatty acid esters of octakis (2-hydroxypropyl) sucrose in which 1 to 8 of the hydroxyl groups have been esterified are used for surfactants, anti-foam agents, plasticizers, thermoplastic water-soluble resins, surface coatings, and modifiers in alkyd or urethane resins.

Itaconic Acid-Amine Reaction Product. R. E. Halter and J. J. McGrath (Gulf Research and Development Co.). *U. S. 2,908,711.* Anti-rust agents are prepared by the reaction of itaconic acid with a diamine containing an aliphatic radical of 8 to 30 carbon atoms (3-"soya"-aminopropylamine).

Method of Coating Articles of Food and Product Obtained Thereby. Lorraine E. Patten and H. C. Kelly (Dow Chemical Co.). *U. S. 2,909,434.* A typical hot melt coating consists of ethyl cellulose, a non-toxic plasticizer such as a fatty acid derivative, mineral oil, wax, an epoxidized natural glyceride of unsaturated fatty acids, and an antioxidant.

Alkadienedioate—Fumarate Adducts, Method of Making, and Polyvinyl Chloride Plasticized Therewith. J. Dazzi (Monsanto Chemical Co.). *U. S. 2,909,500.* Plasticizers for polyvinyl chloride are prepared by the reaction of alkyl or alkoxyalkyl fumarate (1 to 8 carbon atoms in each alkyl radical) with a long-chain (20 to 30 carbon atoms) non-conjugated dialkyl alkadienedioate. In a typical example, di-n-butyl 1,12-eicosadienedioate is reacted with di-n-butyl fumarate by refluxing under nitrogen for about 8 hours at 240°.

Novel Higher Aliphatic Acid Derivatives and Compositions Containing the Same. E. Jungermann (Colgate-Palmolive Co.). *U. S. 2,909,535.* The preparation of such compounds as mono-sodium monomethyl N-lauroyl aspartate and mono-sodium monomethyl N-myristoyl glutamate and their inclusion in dental creams, tooth powders, and mouth washes are described.

A Process for the Preparation of High Molecular Weight Condensation Products. C. B. Linn (Universal Oil Products Co.). *U. S. 2,909,539.* A monobasic aliphatic acid such as oleic is condensed with a diaryl-desoxy-glucitol such as 1,1-diphenyl-1-desoxy-glucitol in the presence of a hydrogen fluoride catalyst to give a product suitable for use in the preparation of surface coatings, plasticizers, or detergents.

Monoglyceride Preparation. G. E. Woods (Atlas Powder Co.). *U. S. 2,909,540.* Monoglycerides are obtained by reaction of glycerol with triglyceride oil at temperatures of about 240–250° in the presence of an alkaline catalyst. High yields are obtained if, at completion of the reaction, the mixture is cooled rapidly by adding glycerol to the mixture and distilling glycerol off without adding heat. Reversion to higher glycerides and free glycerol is thus prevented.

• Biology and Nutrition

The Role of Cholesterol Esters in the Transport of Fats. F. Tayeau and R. Nivet (Fac. méd. Bordeaux, France). *J. physiol.* (Paris) **49**, 399–401 (1957). Esters of cholesterol are considered to play a greater part in the transport of fats and in the deposition of fatty acids in adipose tissue than has been supposed. (*C. A.* **53**, 18234)

Serum Triglycerides in Coronary Artery Disease. Margaret J. Albrink, Evelyn B. Man, and P. Bondy (Yale Univ.). *Trans. Assoc. Am. Physicians* **71**, 162–73 (1958). Triglyceride fatty acids of the serum were determined by subtraction from its total fatty acids the sum of those present as cholesterol esters and in phospholipides. Elevation of serum triglycerides above 5.5 milliequivalent/1 (approximately 160 mg./100 cc.) occurred in only 5% of the normal young adults, in no more than 30% of the normal men over 50, and, excluding the effects of acute disease, in 85–90% of patients with coronary artery disease. Few, if any, other lipide measurements which have been reported effect so clear-cut a separation between normal individuals and those with coronary disease. An error in the metabolism of triglycerides is the lipide abnormality operative in coronary artery disease. (*C. A.* **53**, 19113)

Effect of α-Tocopherol on Serum Lipides and Lipoproteins in Experimental Cholesterol Atherosclerosis. B. Krishna, R. N. Chakravarti, and S. H. Zaidi (Central Drug Research Inst., Lucknow). *J. Sci. Ind. Research* (India) **18C**, 57–61 (1959). Parenteral administration of DL-α-tocopherol acetate during the development of experimental atherosclerosis in rabbits produced progressive hypercholesterolemia and β-lipoproteinemia with a marked rise of the total cholesterol/lipide P ratio and cholesterol from the β-zone of an electrophoretogram. In the untreated animals fed with cholesterol in olive oil, peak of hypercholesterolemia was noted at six weeks which was maintained up to 12 weeks. Feeding of olive oil did not give rise to an increase of serum cholesterol level but produced relative increase of serum β-lipoproteins. (*C. A.* **53**, 19104)

Serum Cholesterol Response in Man to Oral Ingestion of Arachidonic Acid. A. Keys, J. T. Anderson, and F. Grande (Hastings State Hosp., Minneapolis, Minn.). *Am. J. Clin. Nutrition* **7**, 444–50 (1959). Six middle-aged men ingested capsules containing a concentrate of arachidonic acid during experimental periods, or oleic acids during control periods. Three other men had only oleic acid capsules. The dosage of arachidonic acid was 4–5 g. daily for 11 days. The concentration of total cholesterol did not change during the first few days, but tended to rise thereafter, and it remained elevated following the withdrawal of the arachidonic acid. (*C. A.* **53**, 19127)

Biosynthesis of Cholesterol and Fatty Acids and Hepatic Regeneration. R. Paoletti (Univ. Milan). *Rend. ist. lombardo sci. Pt. I Classe Sci. mat. e nat.* **92**, 389–400 (1958). The incorporation of acetate-*1*-C^{14}, butyrate-*1*-C^{14}, and glucose-*U*-C^{14} into regenerating liver was studied in rats after partial hepatectomy. The incorporation of acetate and butyrate into the lipides is greatly increased, while mevalonate and glucose incorporation are not modified. (*C. A.* **53**, 18226)

Incorporation of Carbon-14 Into the Lipids of Nicotiana Tabacum. W. W. Reid (Research Dept., Carreras Ltd., 221 Stanhope Street, London, N.W. 1). *Chem. & Ind.* **1959**, 656. The lipids of tabaco plants fed carbon-14 precursors were separated and fractionated. Higher incorporation of activity was found in the hard resin fraction.

Serum Lipoproteins and Atherosclerosis in the Elderly. P. G. Ackermann, G. Toro, and W. B. Kountz (St. Louis Chronic Hosp., St. Louis, Mo.). *Congr. Intern. Assoc. Gerontol. 4th, Merano, Italy* **2**, 18–22 (1957). The authors found that the use of zone electrophoresis in a starch-supported medium served as a useful tool in the study of the serum lipoproteins in elderly individuals. The percentage of cholesterol in the β-fraction increased with an increase in the total cholesterol. In all ranges the percentages of cholesterol in the β-fraction was less for women than for men. Increased β-lipoprotein levels above that which would be expected from the cholesterol level usually indicates an increased tendency toward cardiovascular disease. A correlation also exists between the presence of a high α_2-lipoprotein level and a history of previous myocardial infarctions. (*C. A.* **53**, 18225)

Effect of β-Sitosterol on Serum Cholesterol Concentration in the Rat. Narindar Nath and A. E. Harper (Univ. of Wisconsin, Madison). *Am. J. Physiol.* **197**, 102–4 (1959). β-Sitosterol, added to a diet containing cholesterol alone or with cholic acid, diminished the accumulation of serum and liver cholesterol in the rat. Addition of β-sitosterol to a diet containing corn oil enhanced the hypocholesteremic effect of corn oil. Calciferol and Q275 (coenzyme Q of Lester, *et al.*) when fed to rats, had no significant effect on serum cholesterol concentration, but calciferol caused an increase in the deposition of cholesterol in the liver. (*C. A.* **53**, 18221)

The Anti-Coronary Club, Including a Discussion of the Effects of a Prudent Diet on the Serum Cholesterol Level of Middle-Aged Men. N. Jolliffe, S. H. Rinzler, and M. Archer (Dept. of Health, New York, N. Y.). *Am. J. Clin. Nutrition* **7**, 451–62 (1959). The average control cholesterol level of 79 men of normal weight, aged 50–59 years, was 251 mg./100 ml. They were placed on a diet of 2000–2700 calories with fat 66–97 g., protein 130–150 g., and carbohydrate 225–80 g. After 6 months on this diet the group cholesterol average fell to 222 mg./100 ml. (*C. A.* **53**, 18209)

Codliver Oil as Both Source and Antagonist of Vitamin E. T. Moore, I. M. Sharman, and R. J. Ward (Univ. Cambridge, Engl.). *Brit. J. Nutrition* **13**, 100–10 (1959). Codliver oil showed 10 mg. of α-tocopherol per 100 g. by chemical tests. Other forms of tocopherol were not present. Even the inclusion of 10% codliver oil in the diet of rats failed to prevent the abnormalities caused by avitaminosis E. These were readily prevented by a small weekly dose of DL-α-tocopherol acetate. The failure of whole codliver oil to act as a good source of vitamin E in accordance with the results of chemical tests is explained by the antagonistic action of its other components, particularly its highly unsaturated fatty acids. (*C. A.* **53**, 19065)

The Conversion of 11-Cis- into All-Trans-Vitamin A in the Rat. P. A. Plack (Natl. Inst. Research Dairying, Shinfield, Engl.). *Brit. J. Nutrition* **13**, 111–27 (1959). The biological activity of 11-*cis*-vitamin A in the rat is due to its conversion predominately into the all-*trans* form in the small intestine and at other sites. 41 references. (*C. A.* **53**, 19066)

Feeding Pigs on a Low-Fat Diet with and without Supplementary Tocopherol. G. A. Garton, W. R. H. Duncan, K. A. Madsen, P. L. Sharks, and I. S. Beattie (Rowett Research Inst., Bucksbrun, Scotland). *Brit. J. Nutrition* **12**, 97–105 (1958). Typical symptoms of vitamin E deficiency could not be readily induced. Somewhat abnormal livers were noted in pigs having serum tocopherol values of 25 to 50 per 100 ml. Liver lesions, especially portal febrosis, seemed to be associated with tocopherol depletion. No dystrophic muscles were observed in tocopherol deficient pigs. (*C. A.* **53**, 19065)

Nutritional Role of Antioxidants in the Diet of the Rat. H. H. Draper, S. Goodyear, K. D. Barbee, and B. Connor Johnson (Univ. of Illinois, Urbana). *Brit. J. Nutrition* **12**, 89–97 (1958). When supplemented with *N*, *N′*-diphenyl-*p*-phenylenediamine or methylene blue, vitamin E deficient diets containing distilled lard as a fat source sustained reproductivity in 60 female rats during 2 reproductive cycles. (*C. A.* **53**, 19065)

Interrelation of Cholesterol, Palmitic Acid, and Unsaturated Fatty Acids in the Growing Mouse and Rat. D. K. Bosshardt, Maria Kryvokulsky, and E. E. Howe (Merck Institute for Therapeutic Research, Rahway, New Jersey). *J. Nutrition* **69**, 185–190 (1959). Weanling male mice grow well on a purified diet containing 20% of palmitic acid and 1% of cholesterol, but succumb or fail to grow when 0.1% of oleic acid is added to the diet. Further addition of as little as 0.1% of this acid again affords good growth and survival. If 0.1% of linoleic acid is incorporated into the diet, the critical lethal level of oleic acid becomes 0.8% and again increasing the oleic acid fed affords survival and a rapid rate of growth. Mature male mice and weanling male rats survive on these diets but lose weight or grow very poorly. A high percentage of weanling female mice succumb on a diet containing 20% of palmitic acid with or without cholesterol but survive when unsaturated fatty acids are added to their diets.

Volatile Fatty Acid Rations for Growing Lambs. H. W. Essig, E. E. Hatfield, and B. C. Johnson (Department of Animal Science, University of Illinois, Urbana). *J. Nutrition* **69**, 135–41 (1959). Rations containing casein and cerelose in combination with salts of volatile fatty acids were not satisfactory for 55-lb. lambs which had been receiving roughage. A new ration was evolved, containing soy protein, starch, sucrose, and volatile fatty acid salts, which gave adequate feed intakes and normal gains. Such rations with salts of volatile fatty acids as a major energy source produced average daily gains that were equal to, or better than, those containing salts of volatile fatty acids. Various ratios of acetic, propionic, and butyric acids fed as their salts produced equal gains.

Beneficial Effects of Alfalfa Meal and Other Bulk-Forming Materials on Symptoms of Tween 60 Toxicity in the Immature Mouse. B. H. Ershoff and H. J. Hernandez (Department of Biochemistry and Nutrition, University of Southern California, Los Angeles and Nutrilite Products, Inc., Buena Park, California). *J. Nutrition* 69, 172–178 (1959). Immature mice fed a highly purified low-fiber diet containing 7.5% of polyoxyethylene (20) sorbitan monostearate (Tween 60) exhibited retardation in growth, diarrhea, an unthrifty appearance and decreased survival. These effects were largely counteracted by the concurrent administration of alfalfa meal, or dehydrated rye grass, orchard grass, wheat grass or fescue grass at a 10% level in the diet or carrageenin, sodium alginate or agar at a 5% level of feeding. Cellulose in the form of Solka Floc or cellophane spangles when fed at a 5 or 10% level, yeast at a 10% level and carboxymethylcellulose, celite and calcium silicate at a 5% level of supplementation prevented diarrhea and promoted survival but were not as active as the substances indicated above in counteracting the retardation in growth.

Fat Digestibility by Dairy Calves. D. T. Hopkins, R. G. Warner, and J. K. Loosli (School of Nutrition and Animal Husbandry Department, Cornell University, Ithaca, New York). *J. Dairy Sci.* 42, 1815–20 (1959). The utilization of fat in milk replacers by the dairy calf was studied. When a milk replacer composed predominantly of dried skimmilk was supplemented with tallow, coconut fat, grease, or butter, in the unhomogenized state, the fat was poorly digested. However, the inclusion of crude soybean lecithin in the milk replacer improved the utilization of tallow, coconut fat, and grease. The digestibility of coconut fat was improved to a greater extent than was that of tallow or grease by the inclusion of lecithin in the milk replacer.

Dietary Modification of Serum Cholesterol in the Chick. B. E. March and J. Biely (Poultry Nutrition Laboratory, University of British Columbia, Vancouver, Canada). *J. Nutrition* 69, 105–110 (1959). Chicks were fed herring oil, corn oil, Crisco, lard, butter, and chicken fat in diets containing 20 and 26% of protein. The chicks fed the higher protein level showed lower serum cholesterol levels than those fed the lower protein level whether or not the diet was supplemented with fat and regardless of the type of fat added to the diet. After the experiment, the weights of the thyroid glands of chicks fed the various diets were determined. The data suggest that the effect of the diet upon serum cholesterol level may be mediated to some extent through the thyroid gland.

Repletion and Depletion of Polyunsaturated Fatty Acids in Cebus Monkeys. O. W. Portman, T. Hayashida, and Dorothy Bruno (Dept. of Nutrition, Harvard School of Public Health, Boston, Massachusetts). *J. Nutrition* 69, 245–252 (1959). The pattern of depletion and repletion of polyunsaturated fatty acids (PFA) in the serum and certain tissues from Cebus monkeys, which were changed from diets very rich in linoleic acid to fat free diets and vice versa, were studied. When monkeys fed diets containing 45 or 15% of calories as corn oil for 8 months were changed to fat free diets, the total PFA concentrations as well as the total fatty acid levels in sera declined rapidly. The polyunsaturated fatty acid concentrations in the serum cholesterol ester fractions also declined sharply and were largely replaced by monounsaturated and saturated fatty acids.

Serum Polyunsaturated Fatty Acids in Groups of Africans with Low and High Fat Intake. O. A. Roels, P. Leurquin, and Marian Trout (Nutrition Laboratories, Institut pour la Recherche Scientifique en Afrique Centrale (I.R.S.A.C.) Lwiro Bukavu, Belgian Congo). *J. Nutrition* 69, 195–201 (1959). There were no significant differences between two tribes in total serum fatty acids, despite their vastly different dietary fat intake. The differences between the sums of the polyunsaturated fatty acids for both groups were, however, highly significant when this sum was expressed either in milligrams per 100 ml. of serum or as a percentage of the total serum fatty acids. The significantly higher level of polyethenoid fatty acids in the serum of the group with the greater fat intake is due to their considerably higher serum levels of dienoic and tetraenoic fatty acids, although their levels of trienoic, pentaenoic, and hexaenoic serum fatty acids are significantly lower than those of the group with the low fat diet.

Production of Low-Fat Milk. I. Effect of Quality and Quantity of Concentrate on the Volatile Fatty Acids of the Rumen and on the Composition of the Milk. J. C. Shaw, R. R. Robinson, M. E. Senger, S. Lakshmanan, and T. R. Lewis (Dairy Dept., Univ. of Maryland, College Park). *J. Nutrition* 69, 235–244 (1959). Cows receiving rations made up primarily of cooked high-starch feeds produced milk with a low-fat content. Cows receiving the more commonly fed concentrates with even lower levels of roughage produced milk with only slight decreases in the fat content.

Comparison of Atherogenesis in Rabbits Fed Liquid Oil, Hydrogenated Oil, Wheat Germ, and Sucrose. E. Van Handel and D. B. Zilversmit (Department of Physiology, University of Tennessee, Memphis). *J. Nutrition* 69, 202–8 (1959). With rabbits fed cholesterol supplemented chow, equicaloric amounts of the following were compared for their effect on atherogenesis: cottonseed oil, hydrogenated cottonseed oil, wheat germ, and sucrose. Severity of atherosclerosis after 5 months was greatest on the wheat germ supplemented diet, whereas there were no differences among the other three groups. There was no correlation between the severity of atherosclerosis and either terminal plasma or liver cholesterol concentrations. The animals on the sucrose diet exhibited the lowest serum cholesterol levels. One litter, distributed among all dietary groups, developed practically no lesions. Animals on the high fat diets exhibited liver cholesterol concentrations about three times as high as those on the low fat intake. Most of this increase occurred in the cholesterol ester fraction.

Effect of Thiamine Deficiency and Thiamine Injection on Total Liver Lipids, Phospholipid, Plasmalogen, and Cholesterol in the Rat. J. N. Williams, Jr. and C. E. Anderson (Dept. of Biochemistry and Nutrition, School of Medicine, Univ. of North Carolina, Chapel Hill). *J. Nutrition* 69, 229–234 (1959). The response of total liver lipids, phospholipid, plasmalogens, and cholesterol to thiamine deficiency has been studied in the rat. As expected, neutral lipid, except for cholesterol, fell rapidly to well below the normal control levels. Phospholipids were mainly unaffected during the deficiency, and plasmalogens showed a tendency to be maintained at a high level regardless of the deficiency. Cholesterol was higher in thiamine deficient rat liver than in the normal controls. The sudden reintroduction of thiamine by injection caused total lipids to rebound to a high normal level and cholesterol, when expressed in terms of body weight, to reach a level almost twice that of normal. Phospholipids and plasmalogens followed patterns after thiamine injection that can be explained in terms of the maintenance of important cellular components that resist dietary changes.

The Function of Stratum Corneum Conjunctum of Skin as the Water Barrier in the Case of Human Beings: The Role of Lipids. A. Szakall (Chem. Fabrik Promonta GmbH., Hamburg). *Fette Seifen Anstrichmittel* 61, 774–782 (1959). The sealing of the human body against the action of foreign agents takes place through the stratum corneum conjunctum of the horny layer of the epidermis. While exercising its function as the barrier, the depot lipids play a decisive part. The experiments undertaken show that the effectiveness of various solvents in their ability to retard the barrier activity by the removal of lipids varies very much. The author examined further the relationship between the periodic abolition of the barrier function and the regeneration of the barrier lipids. He discusses the subject of the replacement of those barrier lipids which have been lost through extraction, by the oils and fats which are normally foreign to the skin lipids.

Qualitative Microanalysis and Estimation of Sphingolipid Bases. C. C. Sweeley and E. C. Moscatelli (Natl. Heart Inst. N.I.H.). *J. Lipid Research* 1, 40–47 (1959). A method is described for the identification and determination of sphingolipid long chain bases in various animal and plant lipids. Sphingosine and related bases, isolated as a mixture from acid hydrolysates of sphingolipids, are oxidized by sodium metaperiodate and the fatty aldehyde reaction products are isolated and analyzed, using gas chromatography. A preliminary survey of various tissues is reported and the types of long chain base found for each tissue is given. Evidence is presented for the presence of a new long chain base associated with the sphingomyelin fraction of human plasma lipids.

Biosynthesis of Fatty Acids and Cholesterol Considered as Chemical Processes. J. W. Cornforth (Nat. Inst. Medical Research, London). *J. Lipid Research* 1, 1–28 (1959). The author has reviewed the literature and has presented a survey, from the viewpoint of an organic chemist, of the processes leading to fatty acid and cholesterol biosynthesis. With 120 references.

THE EFFECT OF DIETARY LINOLEIC ACID ON SERUM CHOLESTEROL IN THE RAT. G. S. Boyd and E. Barbara Mawer (Dept. of Biochem., Univ. of Edinburgh). *Biochem. J.* **73**, 9P–10P (1959). Rats which had been maintained on various low fat diets were injected with (1-C^{14}) acetate and the rate of incorporation of C^{14} into cholesterol determined. Methyl linoleate or sunflower seed oil (10% of total calories of a standard low fat diet) resulted in the half-life of the serum cholesterol being decreased to 60% of the control and the rate of synthesis increased to 160% of the control. On feeding methyl stearate (10% of calories) the ''half-life'' increased and the rate of synthesis decreased. Serum cholesterol levels were also lower for the unsaturated acid fed animals. In all cases the rats grew normally and showed no signs of essential fatty acid deficiency.

BIOSYNTHESIS OF CAROTENES IN CARROT EXTRACTS. V. V. Modi and D. K. Patwa (Dr. K. G. Naik Biochem. Dept., M. S. Univ. of Baroda, Baroda). *Nature* **184**, 983–984 (1959). Carrot extracts can form significant amounts of carotene from glucose as well as from acetate although the acetate is a somewhat superior substrate. Yeast extract stimulates synthesis in both media, possibly due to the presence of coenzyme A and adenosine triphosphate in the yeast.

A LOW CONCENTRATION OF CERTAIN BLOOD CONSTITUENTS OBSERVED IN OFFSPRING OF ALLOXAN-DIABETIC RABBITS. O. V. Sirek and Anna Sirek (Dept. of Physiology and Banting & Best Dept. of Medical Res., Univ. of Toronto). *Nature* **184**, 456–457 (1959). Significantly low levels of plasma cholesterol, albumin, and protein-bound hexose were observed within the first 18 hours of life.

INCORPORATION OF DL-(1-C^{14}) LEUCINE AND (1-C^{14}) ISOVALERIC ACID INTO MILK CONSTITUENTS BY THE PERFUSED COW'S UDDER. R. Verbeke, Monique Lauryssens, G. Peeters (Physiological Dept. of the Veterinary College, Univ. of Ghent, Belgium) and A. T. James. *Biochem. J.* **73**, 24–29 (1959). Although leucine is rapidly incorporated as such into milk proteins, it acts neither as a precursor of fatty acids nor as an energy yielding substrate. Isovaleric acid, however, is rapidly metabolized and acts as a precursor of both fatty acids and certain nonessential amino acids. Of the added C^{14}, 20% was found in the fat. Specific activities of the fatty acids from the udder tissue were about 100 times as great as those of the acids in the milk. Activity of the lower fatty acids increased with increasing chain length to a maximum at C_{10} and then fell progressively with further increase in chain length. No incorporation of the C^{14} into the branched-chain fatty acids could be demonstrated.

INCORPORATION OF SODIUM (1-C^{14}) HEXANOATE AND SODIUM HYDROGEN (C^{14}) CARBONATE INTO MILK CONSTITUENTS BY THE PERFUSED COW'S UDDER. Monique Lauryssens, R. Verbeke, G. Peeters, and Agnes Donck (Physiological Dept. of the Veterinary College, Univ. of Ghent, Belgium). *Biochem. J.* **73**, 71–75 (1959). Specific activities of the milk constituents in the hexanoate experiment decreased in the following order: citric acid, casein, lower fatty acids, higher fatty acids and lactose. Cholesterol, glycerol, and phospholipids did not show any activity. Fatty acids from udder tissue were approximately 40 times as active as the corresponding milk fatty acids. Of the added C^{14}, 14% was recovered in the fat. It is therefore assumed that the hexanoate is broken down to C_2 fragments with high acetylating capacity which are utilized for the synthesis of fatty acids and are metabolized by way of the Krebs cycle.

THE LIPIDS OF WHOLE BLOOD. I. LIPID BIOSYNTHESIS IN HUMAN BLOOD IN VITRO. A. T. James, J. E. Lovelock, and Joan P. W. Webb (National Inst. for Med. Res., Mill Hill, London, N.W. 7). *Biochem. J.* **73**, 106–115 (1959). Cellular components of human blood are shown to be a convenient system for studies of fatty acids and lipid synthesis and exchange. After incubation of whole blood with (Me-C^{14}) acetate, all the common saturated and unsaturated acids as well as the ''essential'' fatty acids (arachidonic, linoleic, and linolenic) are found to be labeled. The long chain fatty acids are incorporated into triglycerides and some neutral lipids of undefined structure, as well as into phospholipids, but not into cholesterol esters. The neutral lipids are rapidly secreted into plasma, where they are incorporated into the plasma alpha-lipoproteins but not into beta-lipoproteins. The phospholipids are more readily incorporated into the plasma beta-lipoproteins.

STUDIES OF SEBUM. 9. FURTHER STUDIES OF THE COMPOSITION OF THE UNSAPONIFIABLE MATTER OF HUMAN-FOREARM SEBUM. Barbara Boughton (Dept. of Pharmacology, University College London, London, W. C. 1). *Biochem. J.* **73**, 144–149 (1959). The sterol and wax alcohol fractions of the unsaponifiable matter of human-forearm sebum (skin surface fat) were studied. The alcohols formed a homologous series (C_8 to C_{20}) similar to that of the fatty acids of sebum. There were fewer unsaturated and highly branched alcohols in comparison with the acids, and the average chain length of the major alcohols appeared to be longer than that of the major acids. In addition to cholesterol, the sterol fraction contained traces of 7-dehydrocholesterol, isocholesterol, and unidentified keto steroids.

ISOLATION OF FATTY ALCOHOLS WITH PLANT-GROWTH PROMOTING ACTIVITY FROM MARYLAND MAMMOTH TOBACCO. A. J. Vlitos (Caroni Ltd. & Ste. Madelaine Sugar Co., Carapichaima, Trinidad) and D. G. Crosby. *Nature* **184**, 462–463 (1959). The plant growth regulating activity of a tobacco isolate as well as that of 60 long chain fatty alcohols and related compounds were measured. The tobacco isolate and C_{18} to C_{22} alcohols and their acidic esters exhibited significant activity.

TWO ENZYMIC MECHANISMS FOR HYDROGEN TRANSPORT BY PHENOLIC ESTROGENS. H. G. Williams-Ashman, M. Cassman, and Margaret Klavins (University of Chicago). *Nature* **184**, 427–429 (1959). Two types of enzymatic reactions in which natural and synthetic phenolic estrogens function as hydrogen carriers are discussed.

STABLE VITAMIN A FOR AQUEOUS DISPERSIONS. W. E. Stieg and J. A. Kardys (Chas. Pfizer & Co., Inc.). *U. S. 2,907,696.* An aliphatic ester of synthetic vitamin A_1 is mixed with an aliphatic ester of neovitamin A_1 and the mixture is suspended in an aqueous medium.

VITAMIN A ALDEHYDE DERIVATIVE. C. H. Benton, Jr. (Eastman Kodak Co.). *U. S. 2,907,761.* Vitamin A aldehyde glyoxalidine possesses high biological availability and improved oxidative stability. In carriers such as gelatin, gum arabic, waxes, beef tallow, sugar, vegetable oil, etc., the derivative is particularly useful for fortifying animal feeds.

PREPARATION OF VITAMIN A ACID AND VITAMIN A ALCOHOL. H. C. Klein (Nopco Chemical Co.). *U. S. 2,907,796.* Vitamin A aldehyde is reacted at room temperature with silver oxide under alkaline conditions to give vitamin A alcohol and vitamin A acid which can readily be converted to the alcohol.

PROCESS OF ALLEVIATION OF BLOAT IN RUMINANTS USING CITRIC ACID ESTERS. H. G. Luther (Chas. Pfizer & Co., Inc.). *U. S. 2,908,608.* The administration of lower trialkyl (1- to 8-carbon atoms) esters of citric acid or acetyl derivatives of such compounds will alleviate bloat in ruminant animals.

• Paints and Drying Oils

SULPHURIZED OILS. II. SULPHURIZATION OF LINSEED OIL WITH SCl_2, S_2Cl_2, OR S_5Cl_2. G. Schiemann, H. During, and M. Acanal (Inst. of Chemical Engineering, School of Technology, Hanover). *Fette Seifen Anstrichmittel* **61**, 575–578 (1959). The authors have investigated the conditions of manufacture of sulphurized oils (linseed oil) and the relationship between the methods of sulphurization and the suitability of the resultant oil as a film former. The sulphurization of linseed oil is carried out with SCl_2, S_2Cl_2, and S_5Cl_2. Linseed oil, sulphurized with the above reagents in various ways gave corresponding sulphurized oils which were compared with one another with respect to the course of sulphurization, viscosity, density, color number, and film formation.

COPOLYMERIZATION IN THE FIELD OF SURFACE COATING MATERIALS. I. THE REACTION OF CYCLOPENTADIENE ON DRYING OILS. H. P. Kaufmann and H. Gruber (Deut. Inst. Fettforschung, Munster [Westf.]). *Fette Seifen Anstrichmittel* **61**, 743–748 (1959). The copolymerization of cyclopentadiene with drying oils yields products which possess characteristic properties as surface coating materials. The authors describe the methods used for the manufacture of copolymers and discuss the reaction mechanisms involved. It is suggested that it involves a Diels-Alder addition. Dicyclopentadiene or polycyclopentadiene serve as dienophile partners whereas diene components are furnished by the oils which isomerize to conjugated oils under the reaction conditions.

ASSOCIATION REACTIONS FOR POLY(ALKYLENE OXIDES) AND POLYMERIC POLY(CARBOXYLIC ACIDS). K. L. Smith, A. E. Winslow and D. E. Petersen (Research Dept., Union Carbide Chemicals Co., South Charleston, W. Va.). *Ind. Eng. Chem.* **51**, 1361–1364 (1959). Methods for insolubilizing and radically altering the physical properties of water-soluble high polymers by a simple, low-energy reaction were sought. Combinations of poly(alkylene oxides) or other polymer ethers with polymeric poly(carboxylic acids) have water insolubility, flexibility, heat resistance, and elastic recovery characteristics different from either component alone. This suggests extensive hydrogen bonding between ether and carboxylic groups in the polymers. The ease of formation of such association products, instantaneously and at room temperature, the ready control of such formation by a variety of inhibitors, and the wide range of properties possible in the products commend this reaction for consideration wherever *in situ* production of hydrophilic elastomers is desired.

Diisocyanate Coatings Based on Castor Oil. G. C. Toone and G. S. Wooster (National Aniline Division, Allied Chemical Corp., Buffalo, N. Y.). *Ind. Eng. Chem.* **51**, 1384–1385 (1959). In an attempt to lower the average distance between cross-linking sites, a triol such as glycerol was cold blended with castor oil before adduct formation with tolylene diisocyanate. Improved coatings resulted.

Preparation of Drying Oils by the Polymerization of the Products from the Codehydrogenation of Butane and Ethyl Benzene. J. C. Hunt, D. S. Maisel, and D. W. Wood (Esso Research & Engineering Co.). *U. S. 2,906,787.* A mixture of ethyl benzene and a hydrocarbon such as butane is catalytically dehydrated to give a mixture of butadiene and styrene. The unseparated mixture is then polymerized to give a drying oil.

Treatment of Hydrocarbon Drying Oils with Epoxidized Triglyceride Oils. G. H. Tulk and T. A. Neuhaus (Glidden Co.). *U. S. 2,907,669.* Coating compositions whose cured films possess improved flexibility and adhesion are prepared by the addition of 5 to 50% epoxidized glyceride oils to hydrocarbon drying oils such as liquid polybutadiene or oily butadiene-copolymers.

Composition of 4,4-Bis(hydroxyaryl)pentanoic Acid Co-esters and Polyepoxides. S. O. Greenlee (S. C. Johnson & Co., Inc.). *U. S. 2,907,723.* Products useful in the manufacture of varnishes, molding compositions, adhesives, films, etc., are prepared by the reaction of polyepoxides with mixed ester of hydroxyaryl substituted aliphatic acids, fatty acids, and polyhydric alcohols. If the modifying acids of the mixed esters are drying oil acids, products are self-plasticizing as well as air drying. The polyepoxides used include epoxidized alkyd resins or drying oils. Similar products by the same inventor are described in the following: Mixed Esters. *U. S. 2.907,724*; Polyepoxide, Phenol-Aldehyde Condensates, Mixed Ester Compositions. *U. S. 2,907,725*; Diphenolic Pentanoic Acid, Alkyl Acid Ester, Polyepoxide Reaction Products. *U. S. 2,907,726*; Autoester Polyepoxide Compositions. *U. S. 2,907,727*; Compositions of Diphenolic Acid Co-amides and Polyepoxides. *U. S. 2,907,728*; Epoxide, Diphenolic Acid Aldehyde Condensates. *U. S. 2,907,729*; Diphenoleic Acid, Epoxide Compositions. *U. S. 2,907,730*; Epoxide, Monohydric Alcohol—Diphenolic Acid Ester Compositions and the Modification Thereof with Aldehyde Condensates. *U. S. 2,907,731*; Polycarboxylic Acid, Epoxide Compositions and Aldehyde Condensate Modifications Thereof. *U. S. 2,907,732*; Diphenolic Acid Modified Oil-Aldehyde Condensates. *U. S. 2,907,733*; Compositions of Polyepoxides, Ammonia Derivative—Aldehyde Condensates and Mixed Esters. *U. S. 2,907,734*; Esterified Epoxy Polyesters. *U. S. 2,907,735*; Esters of Polyhydric Phenols. *U. S. 2,907,736*; Compositions of Novel Polyhydric Phenols and Polyepoxides. *U. S. 2,907,741*; Polyurethane of a Polyisocyanate, an Active Hydrogen Compound, and a Hydroxyaryl Aliphatic Acid. *U. S. 2,907,745*; Esters of Polyhydric Phenol Amides. *U. S. 2,907,778*; Unsaturated Diester Acids. *U. S. 2,907,779*; Polyurethane of a Polyisocyanate, an Active Hydrogen Compound, and a Resinous Polybasic Acid and Method of Preparing Same. *U. S. 2,907,718*; Polyurethane of a Polyisocyanate, an Active Hydrogen Compound, and a Hydroxyaryl Aliphatic Acid—Aldehyde Condensate and Method of Preparing Same. *U. S. 2,907,719.*

Clear and Pigmented Multi-component Oil-in-water Resin Emulsion Textile Decorating Compositions and Process for Preparing Same. L. Auer (J. R. Geigy, S. A. Basel). *U. S. 2,907,720.* Oil-in-water emulsion pigment colors are prepared by using fatty acid resin binders which are emulsion polymerized or emulsion aggregated.

Clear and Pigmented Oil-in-water Resin Emulsions Containing Pentaerythritol Alkyd Resins. L. Auer (J. R. Geigy, S. A. Basel). *U.S.2,907,721.* Improved oil-in-water resin emulsion pigment colors are prepared by using an alkyd resin (of which at least 50% of the polyol is pentaerythritol) in combination with an amino-aldehyde resin as the resin binder.

Thermoplastic Adhesives of Polyamide Resins and Polybasic Aliphatic Acids. D. Aelong (General Mills, Inc.). *U. S. 2,908,584.* Heat sealing adhesives that do not block at room temperature are prepared by the reaction of polyamides (prepared from polymeric unsaturated fatty acids such as linoleic or linolenic and a polyamine such as diethylenetriamine) with weak polybasic acids such as succinic, citric, oxalic, boric, etc.

Viscosity Stable Oxidized Polymer Solutions. D. F. Koenecke (Esso Research & Engineering Co.). *U. S. 2,908,585.* Hydrocarbon solutions of oxidized butadiene polymeric drying oils are stabilized by replacing 1 to 25% of the hydrocarbon solvent with a liquid saturated alcohol containing 1 to 9 carbon atoms.

Carboxyl Rich Alkyd Resin—Ethoxyline Resin Compositions and Process for their Preparation. J. Rosenberg (General Electric Co.). *U. S. 2,909,495.* Resins with improved electrical properties result from the combination of an alkyd containing free carboxyl groups, prepared by reaction of a higher saturated or unsaturated fatty acid with hexachloroendomethylenetetrahydrophthalic acid, with ethoxyline resins.

Product of Reaction of Fatty Acids, C=C Aromatics and Epoxide Resins. L. E. Edelman (Westinghouse Elec. Corp.). *U. S. 2,909,497.* Air drying or baking coatings with excellent alkali and water resistance are prepared from drying oil fatty acids (or mixtures of drying oil and rosin acids), styrene, and a resinous epoxide.

Drying Oils. H. W. Chatfield (A. Boake, Roberts & Co., Ltd., London). *U. S. 2,909,537.* A mixture of drying oil (or semi-drying) fatty acids and an epoxidized drying oil is heated at 230° to give a drying oil which dried rapidly to a hard, tough coating.

• Detergents

Antioxidants for Soap. Anon. *Manuf. Chemist* **30**, 324 (1959). Various factors influencing rancidity in soap are discussed. These include metallic impurities, colors, and perfumes. Heat, moisture, and light also contribute to this oxidation process. Therefore antioxidants must be added to counteract these factors. Materials which may be used for this purpose include sodium hydrosulphite, sodium sulphoxylate, thiosulphates and sulphites, phenols, amines, and many others.

Soap Plant Corrosion Control. Anon. *Soap, Chem. Specialties* **35**(9), 161–3 (1959). Recent developments in lacquer technology have helped overcome the corrosion problem in soap and detergent manufacture caused by the corrosive effects of fatty oils, fatty acids, caustic alkalies and organic sulfates and sulfonates. These new lacquers are based on polyurethanes, amine hardened epoxy resins and coatings formulated from mixed vinyl polymers.

Textile Trends and Detergency. H. C. Borghetty and G. M. Gantz (General Aniline & Film Corp., New York). *Soap, Chem. Specialties* **35**(9), 63–5, 199 (1959). New textile fibers and developments are reviewed with respect to their possible effect on detergent developments. The following suggestions were given: develop formulas with improved soil suspending properties, find better brighteners or increase brightener concentration for wash and wear cotton, develop more versatile detergent formulations for new synthetic fibers in blends with natural fibers, develop more versatile detergent formulations to function in cold, warm, and hot water, develop detergent formulations with better emulsifying action for synthetic fiber textiles, and develop a synthetic fiber rinse to eliminate pickup of static electricity.

Problems Presented by Syndets in Water Supplies. J. M. Cohen (U. S. Public Health Service, Cincinnati, O.). *Soap, Chem. Specialties* **35**(9), 53–6, 119, 121 (1959). The problems in water supplies and purification systems caused by syndets are reviewed. The syndets, unlike soaps, are not precipitated by hardness, are not decomposed by acid treatments or biological activity, which are the usual methods of water purification, and furthermore, the syndets often contain polyphosphate which will provide nutrients for biological life and increase bacterial contamination.

Bleaches and Brighteners. R. E. Ferris (Purex Corp., South Gate, Calif.). *Soap, Chem. Specialties* **35**(9), 79–81, 126–7 (1959). The uses of both bleaches and brighteners in laundering procedures were reviewed. Since not all brighteners are stable to chlorine bleaches, a compatibility problem exists. This could be solved by the use of chlorine stable brighteners which could be incorporated into either the bleach or the detergent. There is a need for chlorine stable brighteners effective on a wider range of fabrics than are those currently available.

Viscosity of Aqueous Solutions of Sodium Oleate in the Presence of Various Alcohols. R. V. Kucher, G. F. Storozh, and A. I. Yurzhenko (I. Franko State Univ., Lvov.). *Dopovidi Akad. Nauk Ukr. R.S.R.* **1959**(1), 60–3. The alcohols used were EtOH, BuOH, iso-AmOH, ethylene glycol, and glycerol. Aqueous soap solutions show, as is known, 2 breaks in the viscosity curves, referred to as 1st and 2nd critical concentration of micelle formation. By use of pure Na oleate it was found that in the pure aqueous solution their exists a 3rd break in the curve, intermediate between the 2 older known ones, which is termed ''middle critical concentration,'' and this value can be accurately determined from the minimum of the concentration curves at a given specific viscosity. The various alcohols lower this middle critical concentration, if applied in small amounts, and the water soluble ones, if applied in large amounts, raise it. (*C. A.* **53**, 16650)

Flocculation-Deflocculation in Agitated Suspensions. I. Carbon and Ferric Oxide in Water. I. Reich and R. D. Vold (Univ. of Southern Calif., Los Angeles, Calif.). *J. Phys. Chem.* **63**, 1497–1501 (1959). This study was undertaken as the initial step in an investigation of the effect of deflocculation on soil redeposition during detergency. The degree of flocculation of aqueous suspensions of ferric oxide and carbon was studied as a function of concentration and of time and intensity of agitation. Average floc sizes were determined from turbidity measurements. The average floc size always increased with increasing concentration and with decreasing speed of agitation.

The Equivalent Weights of Wetting Agents. G. Russell and E. Whitaker (Ilford Ltd., Brentwood, Engl.). *Analyst* **84**, 253–4 (1959). Equivalent weights of commercial anionic or cationic wetting agents are determined by passing a warm aqueous solution of the agent through a Zeo-Karb-225(H) ion-exchange column, followed by titration with standard sodium hydroxide. Application is made to a wide range of types of wetting agents. (*C. A.* **53**, 16805)

Brighteners for Soaps, Blended Detergents and Laundry Aids. F. H. Villaume and E. Allan (American Cyanamid Co., Bound Brook, N. J.). *Soap, Perfumery, Cosmetics* 32, 892–6, 914 (1959). A brief history of optical bleaches and some chemical aspects of their structures have been presented. A description has been given of the behavior of optical bleaches in soaps and detergents and of several methods by which they are evaluated. The various chemical types of brighteners available are described, and the differences between them as to substantivity, degree of exhaustion, fastness properties, etc., have been pointed out. The differences in behavior of certain brighteners with variations in the detergent formulation and washing procedure have also been shown.

Skin Fats in Textiles and Their Removal. E. Walter. *Melliand Textilber.* **40**, 646–51 (1959). Skin fats have a high content of lime soaps, and in hard water they also form more. If these are not completely removed in washing, they cause yellowing and bad odors in storage, even though the goods may have been washed to complete whiteness. $Na_2P_2O_7$ (3%) dissolves Ca soaps, causes the solution of skin fats, and produces the maximum brightness of shade. Fe contamination and the accompanying staining requires increased amounts of $Na_2P_2O_7$, but even then the removal of Fe is incomplete. The mechanism of the $Na_2P_2O_7$ reaction depends on the composition of the detergent and on the nature of the contamination. Paper chromatography reveals that skin fats change as they age, with resulting growth of molecular size, hardening, and formation of colored substances, so that soiled garments are harder to clean after storage. The fatty acids in skin fats form first ferrous soaps, which change to Fe_2O_3 by oxidation, so that longer wear and storage increase the yellowing to such an extent that it may not be removable at all without special treatment. Skin fats produce noticeable yellowing with 30 mg. of Fe/kg. of goods; with 50 mg./kg. strong yellowing occurs. Goods free of Fe and skin fats show no yellowing after ¾ year in storage in sunlight, but they do show a graying because of dust and soot pickup. (*C. A.* **53**, 17522)

Nonionic Surface-Active Compounds. I. Critical Micelle Concentrations of Water Soluble Ether Alcohols. P. Becher (Atlas Powder Co., Wilmington, Del.). *J. Phys. Chem.* **63**, 1675–6 (1959). The critical micelle concentrations in aqueous solution of commercial polyoxyethylene lauryl, stearyl, oleyl, and tridecyl alcohols, as well as commercial polyoxyethylene sorbitan monolaurate have been determined by means of the iodine solubilization technique of Ross and Olivier. As found by previous workers, there is a linear dependence between the logarithm of the critical micelle concentration and the ethylene oxide content. However, it is found that ''with the exception of sorbitan monolaurate'' these lines vary only in slope from one alcohol to another, having a common intercept at zero ethylene oxide concentration. The sorbitan monolaurate has a much higher intercept. The difference is ascribed to the difference in hydrophobicity of the non-ethylene oxide portion of the molecule.

Influence of Free Alkali Content on Soap Stability. W. Chendor. *Tłuszce i Srodki Piorace* **2**, 213–16 (1958). Experiments concerning the storage properties of soap produced from tallow 60–80, lard 0–20, coconut oil 10–20, and castor oil 3–7% showed free alkali contents of 0.1, 0.06, or 0–0.003% to be excessive, adequate, or inadequate, respectively. (*C. A.* **53**, 19416)

Influence of $Na_5P_3O_{10}$-$CaCl_2$-H_2O Phase Equilibrium on Laundering of Cotton Fabric. W. J. Diamond (Brunswick-Balke-Collender Co., Muskegon, Mich.) and J. E. Grove (General Foods Co., Battle Creek, Mich.). *Textile Research J.* **29**, 863–72 (1959). Redeposition of soil in cotton fabric and rinsing of detergent from cotton fabrics are substantially influenced by the phase region of the Ca^{++}-$Na_5P_3O_{10}$ system in which washing and rinsing takes place. Rinsing of detergent is improved as the concentration of tripolyphosphate is increased or as the Ca^{++} concentration is decreased in the detergent bath. Higher tripolyphosphate concentrations in the wash cycle retard redeposition and promote the rinsing of detergent from cotton fabrics. Hardness of water definitely influences both redeposition and rinsability. The influence of tripolyphosphate on redeposition is most pronounced at low soil loads.

Gluconates in Alkaline Cleaners. T. A. Downey and J. J. McCallion (Chas. Pfizer & Co., Inc., Brooklyn, N. Y.). *Soap & Chem. Specialties* **35**(10), 45–7, 58 (1959). Most caustic cleaning formulations can benefit from the incorporation of gluconates. Ability to chelate with divalent and trivalent metal ions makes this versatile anion useful in a wide variety of applications. These include bottle washing, paint stripping, and particularly aluminum cleaning. The gluconate ion is available in solid and liquid form, making it adaptable for incorporation in either type of caustic cleaning product.

Monolayers in Equilibrium with Lenses of Oil on Water. II. Dependence of Equilibrium Pressures on pH and on Concentration of Surfactant. F. M. Fowkes, G. S. Ronay, and M. J. Schick (Shell Development Co., Emeryville, Calif.). *J. Phys. Chem.* **63**, 1684–6 (1959). The equilibrium spreading pressure (π_w) of oil solutions of surface-active substances on aqueous substrates can be measured easily and rapidly. These are found useful as analytical tools to determine type and concentration of surface active substances in the oil phase. Surface active acids, bases, salts, and non-ionizable substances are easily distinguished by the pH dependence of π_w. The concentration dependence of π_w can be used to determine the *molecular area*, and π_w measurements of the supernatant oil can be used to measure surface areas of solids and heats of adsorption thereon.

A Radiotracer Study of Adsorption of an Ethylene Oxide-Propylene Oxide Condensate on Quartz Powders. H. R. Heydegger and H. N. Dunning (Bureau of Mines, Bartlesville, Okla.). *J. Phys. Chem.* **63**, 1613–15 (1959). The adsorption isotherm of a non-ionic detergent, an ethylene oxide-propylene oxide condensate, on a standard quartz powder has been determined by radiotracer methods. Because of the high specific activity of the labeled detergent, it was possible to extend the measurements to equilibrium concentrations as low as one p.p.m. The extent of adsorption is considerably less than that of other non-ionic detergents tested on the same quartz sample.

Use of Radioisotopes in Detergent and Cosmetic Research. M. F. Nelson (Atlas Powder Co.). *J. Soc. Cosmetic Chemists* 10, 320–32 (1959). The various uses of radioisotopes in cosmetic and detergent problems are outlined. 28 references.

The Nature of Tenaciously Bound Soil in Cotton. W. C. Powe (Whirlpool Corp., St. Joseph, Mich.). *Textile Research J.* 29, 879–84 (1959). A serious problem in drycleaning and laundering is the progressive deterioration in the appearance of fabrics caused by the gradual accumulation of unremoved and redeposited soil. Electron micrographs of natural soil *in situ* were taken to determine the identity and particle size of this material. These electron micrographs suggest that clay minerals 0.01–1 μ in diameter are the major particulate material causing soil build-up on cotton fibers. Properties of clay minerals which contribute to their forming strong bonds with cotton fibers are discussed.

The Desorption of Sodium Dodecyl Sulfate Spread on an Aqueous Substrate. H. L. Rosano and G. Karg (Lever Bros. Co., Edgewater, N. J.). *J. Phys. Chem.* 63, 1692–5 (1959). Sodium dodecyl sulfate was spread on distilled water and on 5% and 20% NaCl solutions, and surface pressures were measured as functions of time. The author attempted to apply an empirical equation for rate of desorption on a soluble monolayer, extrapolating the pressure back to the time of initial spreading. This should permit calculation of the molecular weight of the detergent from the two-dimensional gas law, provided the measurements are made at sufficiently low surface concentrations. It was found that this approach is valid only when the rate of desorption is decreased by having sufficient electrolyte present in the substrate. A discussion of the mechanism of desorption of soluble monolayers is presented.

A New Method for the Determination of Critical Micelle Concentrations of Un-ionized Association Colloids in Aqueous or in Non-aqueous Solution. S. Ross and J. P. Olivier (Rensselaer Polytechnic Institute, Troy, New York). *J. Phys. Chem.* 63, 1671–4 (1959). A new method for the determination of critical micelle concentration (CMC) of un-ionized surface-active agents is developed, and shown to be applicable in a number of different solvents. The method depends on the formation of a colored iodine-micelle complex. The absorption maximum of the complex is always at 360 mμ for different agents and for different solvents. Critical micelle concentrations in water, benzene, carbon tetrachloride and petroleum ether solutions have been determined. The results by the new method are found to agree with those obtained by independent methods, namely, measurements of static surface tension and relative differential refractive index. Colored impurities in the agent are not troublesome except at high concentrations, and even there an empirical correction can be applied. An isosbestic point in the absorption spectra is evidence that dissolved iodine is in equilibrium with the iodine in the micelle and that only one type of iodine-micelle complex is present in the solution.

Cleaning Composition. S. Spring (Pennsalt Chemicals Corp.). *U. S. 2,901,433.* A cleansing composition for grease removal consists of a soap, a weak organic acid, a neutral salt, water, and an organic solvent with or without an alcohol, wherein a synergistic relationship exists between the fatty acid and the neutral salts in the presence of the soap and water, which provides greater solubilization of the grease than would otherwise have been predicted.

Processing of Soap. L. D. Jones (Sharples Corp.). *U. S. 2,902,502.* Processing of soap to convert grained soap into neat soap comprises mixing an aqueous solution of soap with grained soap in the presence of an electrolyte, limiting the solubility of soap and an electrolyte-containing aqueous solution of soap and separating the neat soap from the aqueous solution.

Nontarnishing Detergent Compositions Containing Stannous Salts. E. E. Ruff and E. E. Smith (Lever Brothers Co.). *U. S. 2,903,431.* It has been found that polyphosphate detergent compositions will not tarnish copper, nickel and alloys such as german silver, if they contain a tarnish inhibitor such as a water-soluble inorganic and organic stannous salt, for example, stannous chloride, fluoride, tartrate, etc.

Preparation of Acyl Taurides. C. T. Walling, L. F. McKenney, and R. Geitz. (Lever Brothers Co.). *U. S. 2,903,466.* Alkali metal acyl taurides are prepared continuously and in high purity by continuously mixing violently a stream of acyl chloride with a stream of an aqueous solution of an alkali metal tauride and an alkali metal hydroxide and then continuously withdrawing the end reaction product.

Skin Disinfectant. C. H. Davis and C. G. Grand (Carlen Corp.). *U. S. 2,904,468.* A widely effective skin germicide consists of the combination of a polyoxyethylene alkyl phenol nonionic detergent, an active wetting agent such as organic sulfate or sulfonate salt and a calcium sequestering agent such as ethylene diamine tetraacetic acid or its salts. These three components are readily soluble and dispersible in water, and are compatible through wide ranges of proportions and at various dilutions.

Germicidal Compositions. P. Maurice (Monsanto Chemicals, Ltd.). *U. S. 2,906,664.* A new germicidal composition derived from dichloro-*m*-xylenol having a comparatively high activity against gram positive bacteria also has an unexpected high activity against gram negative bacteria due to the increased solubility of chloro-*m*-xylenol salts by the addition of a proportion of a soap or other anionic surface-active agent.

Toilet Detergent Composition Containing Synergistic Di- and Tri-halo Salicylanilide Mixtures. H. C. Stecker. *U. S. 2,906,711.* An antiseptic toilet detergent with unusual lasting germicidal effectiveness consists of a soap or synthetic detergent and from 0.1 to 10% by weight of a germicide consisting of a synergistic mixture of 65 to 98% of 3,5,4′-trihalosalicylanilide and 35 to 2% of 5,4′-dihalosalicylanilide.

Liquid Detergent Composition. R. A. Grifo (Colgate-Palmolive Co.). *U. S. 2,908,651.* A clear, single phase, concentrated liquid detergent is prepared consisting of an alkyl aryl sulfonate salt, a foam and detergency improving inorganic salt such as magnesium chloride, magnesium sulfate or calcium chloride solubilized in a mixture of low molecular weight alcohol and water.

Improvements Relating to Liquid Detergent Compositions. P. J. Pengilly (Thomas Hedley & Co.). *Brit. 815,850.* A heavy-duty detergent in the form of a stable, opaque, mucilaginous, aqueous liquid which does not separate into 2 or more layers contains from 10 to 22% of sodium dodecylbenzenesulfonate, from 15 to 22% potassium pyrophosphate, from 2 to 5% fatty acid monoethanolamide, from 3 to 5% ethyl alcohol and from 3 to 5% of glycerol or from 1 to 3% propylene glycol.

Improvements Relating to Liquid Detergent Compositions. R. Coskie (Thomas Hedley & Co., Ltd.). *Brit. 815,851.* A light-duty, liquid detergent composition which remains clear with no phase separation from 40°F. to 80°F. can be prepared containing from 10 to 25% sodium dodecylbenzenesulfonate, from 1 to 5% fatty acid monoethanolamide in which the acid moiety contains from 10 to 14 carbon atoms, from 2 to 10% potassium pyrophosphate, from 10 to 12% urea, from 5 to 10% ethyl alcohol, and from 1.5% to 4% citric acid, the balance being water and the pH adjusted to 5 to 7.

Improved Germicidal Soaps. Farbenfabriken Bayer Aktiengesellschaft. *Brit. 817,130.* The effectiveness of soaps containing germicides such as halogenated hydroxydiphenyl compounds, halogenated or non-halogenated salicylic acid anilides and thiuram compounds is improved by the addition of zinc carbonate and/or zinc phosphate during the milling of the soap which provides light stability and permits widening of the effective range of the germicide.

Soaps and Cosmetics Sensitive to Temperature Changes. L. Lehner. *Ger. 1,002,105.* Ag tetraiodomercurate is added to soap. This substance changes color upon exceeding a definite temperature limit. Increasing the temperature beyond this point causes destruction of the hormones, enzymes, and similar biological compounds present in the soap. (*C. A.* 53, 18405)