for each solution composition. The average deviation in the groups of four was 0.01%. Single analyses were made on each of the duplicate solutions of calcium sulfate. The average difference between these determinations was 0.009%. The solubility data for sodium and calcium sulfates are given in Tables I and II.

Specific gravity at 25°C. and refractive index at 25°C. were also determined for each saturated solution. It was possible to make these determinations at 25°C. on solutions saturated at higher temperatures because of the negative coefficient of solubility of both salts. None of the solutions saturated at 20°C. showed signs of precipitation during the time required to make these physical measurements at 25°C.

Acknowledgment

The work was sponsored by the Glycerine Division, Association of American Soap and Glycerine Producers, New York, N. Y.

REFERENCES

1. Bosart, L. W., and Snoddy, A. O., Ind. Eng. Chem., *19*, 506–510 (1927).
2. Seidell, A., "Solubilities of Inorganic and Metal Organic Compounds," Supplement to the Third Edition, p. 482, New York, O. van Nostrand Co. Inc. (1952).
3. Seidell, A., *ibid.*, Third Edition, vol. I, p. 1301 (1940).
4. Hill, A. E., J. Am. Chem. Soc., *59*, 2242 (1937).

[Received June 20, 1956]

Letter to Editor

Johnson, Hunt, Neustadt, and Zeleny report that the Stein mill is an efficient dry grinding mill for soybeans, flax, and safflower seeds but not for sunflower seeds. In our laboratory we have been successfully using this instrument for several years in the grinding of sunflower seed samples. Our technique differs in several particulars from that of the above authors. We grind a 50-g. sample for one minute, then transfer the contents to a 5-in. hemispherical, 16-mesh household type of sieve and work the meats through the mesh. This completely breaks up the cake. Hulls remain on top of the wire. If there are only a few whole seeds, they are picked out and discarded. If a substantial amount remains unground, the coarse fraction is reground for 30 seconds and rescreened. Then the two fractions are blended together. By this technique we are able to use a 1-g. sample for the extraction, otherwise following AF 3-54 method for oil content of flax seed.

MAX C. MARKLEY
The Markley Laboratories
Minneapolis, Minn.

July 9, 1956

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

• Oils and Fats

S. S. Chang, Abstractor
Sin'itiro Kawamura, Abstractor
Dorothy M. Rathmann, Abstractor

The detection of chemical reactions in complex mixtures of food antioxidants by infrared spectrometry. L. A. Hall (The Griffith Labs., Inc., Chicago, Ill.) and G. L. Clark. *Food Tech.* 10, 384–6 (1956). Infrared spectrometry has been used as a modern instrumental technique of characterizing complex mixtures of as many as seven constituents in effective food antioxidants with comparison of data for three typical blends with the absorption band frequencies for the individual constituents. It is demonstrated that the infrared spectrum is highly characteristic for each blend and that there is clear evidence of reactions among the constituents such as the formation of lecithin citrate.

Which antioxidants for your fat-containing foods. B. N. Stuckey (Res. Div., Eastman Chemical Products, Inc., Kingsport, Tenn.). *Food Eng.* 28(7), 76, 78 and 198. There are many fat-soluble antioxidants with which the shelf life of animal fats, vegetable oils, dry cereals, essential oils, vitamins, nuts and confections can be extended. Most complaints arising from the use of antioxidants in fats and oils are due to inadequate mixing of the antioxidants into the fat. It is well known that it is not practical to attempt to stabilize a fat that has already started to show substantial peroxide formation.

The sterol and carbohydrate constituents of the walnut (Juglans regis). L. Jurd (Western Utilization Res. Branch, Agr. Res. Service, U. S. Dept. of Agr., Pasadena, Calif.). *J. Org. Chem.* 21, 759–60 (1956). The sterol and carbohydrate constituents of the walnut have been isolated and identified as β-sitosterol, β-sitosteryl-D-glucoside, and sucrose.

Contributions to the study of marine products. XL. Waxes and triglycerides of sea anemones. W. Bergmann, S. S. Creighton and W. M. Stokes (Sterling Chem. Lab. and the Bingham Oceanographic Lab., Yale Univ.). *J. Org. Chem.* 21, 721–28 (1956). Certain lipid fractions from three sea anemones have been investigated. The warm water anemone *Condylactis gigantea* has been shown to contain substantial quantities of solid lipides. These were found to consist of a mixture of myristyl myristate and myristyl palmitate and symmetrical palmityldimyristin. Two cold-water anemones *Bolocera iuediae* and *Actinostola collosa* have been shown to contain substantial quantities of liquid lipides. These were found to consist mainly of esters of unsaturated alcohols and acids of the order C_{20} and C_{22} and triglycerides of acids of the same order. Two new alcohols, 11-eicosenol and 11-docosenol, have been isolated. Cholesterol has been shown to be the principal sterol of the cold-water anemones.

An improved procedure for the isolation of neoabietic acid from pine oleoresin and rosin. Virginia M. Loeblich and R. V. Lawrence (Naval Stores Res. Sec., U. S. Dept. of Agr., Olustee, Florida). *J. Org. Chem.* 21, 610–11 (1956). A method is described for isolating neoabietic acid from pine oleoresin or rosin in 8–12% yield by recrystallization of the 2-amino-2-methyl-1,3-propanediol salt of the resin acids from methyl ethyl ketone.

A note on component fatty acids of the oil from the seeds of Momordica charantia, Linn. J. P. Verma and J. S. Aggarwal (Natl. Chem. Lab. of India, Poona). *J. Indian Chem. Soc.* 33, 357–8 (1956). The fatty acid composition of the oils from the seeds of *Momordica charantia*, Linn. as obtained by the present analysis is α-elaeostearic acid, 46.7%; linoleic acid, 7.7%; oleic acid, 15.8%; and stearic acid, 29.8%.

Fat absorption studies. IV. Polyunsaturated fatty acids in the feces of infants. L. Söderhjelm. *Acta Soc. Med. Upsaliensis* 57, 438–47 (1952). In the feces of breast-fed infants 1.8–7.1% of the fatty acids contained more than one double bond, compared with 0.4–2.0% in the feces of infants fed with cow milk; the value for meconium was about 3%.

V. Polyunsaturated fatty acids in fetal organs. *Ibid.* 448–54. Polyunsaturated fatty acids were estimated in brain, heart, muscle, liver, lung, kidney, and subcutaneous fatty tissue of fetuses obtained from surgical abortions and premature infants. In all the organs examined appreciable amounts of tetra- and hexaenoic acids were always present, but dienoic acids were not always found and occurred rarely in brain tissue. (*C. A.* 50, 7973)

The chemistry of branch-chain fatty acids. II. K. E. Schulte, W. Weisskopf, and J. Kirschner (Deut. Forsch. Lebensmitt, Munich, Ger.). *Hoppe-Seyler's Z. physiol. Chem.* **288**, 69–82 (1951). The influence of alkyl substituents at the α- or β-position in mono-carboxylic acids on the reaction velocity constant of esterification was studied. A methyl or ethyl on the C_4 or further carbon atom on the main chain does not affect the reaction velocity. The K values of α-alkyl substituted acids jump from methyl to ethyl, but substitution of a longer alkyl has almost no effect. β-Methyl substitution has a greater effect on the K value than an α-methyl, while ethyl in the β-position reduced the reaction velocity less than the α-substitution. Measurement of the K value permits the differentiation between the presence of an ethyl or methyl group on the α- or β-carbon or even in a position further remote from the carboxylic group, and indicates whether the side chain in the α- or β-position consists of 1, 2, or more carbon atoms. (*C. A.* **50**, 9760)

Studies in the deep-fat frying of cashew kernels. M. Prasad and P. B. Mathur(Central Food Tech. Res. Inst., Mysore, India). *Food Research* **21**, 306–11(1956). A temperature of 160°C. and a duration of 80 seconds have been found to be the optimum conditions for the deep-fat frying of cashew kernels. The oil-uptake tended to be the same at all the frying temperatures and with respect to all the durations of frying investigated. The moisture loss from the kernels is greater and the oil-uptake by the kernels increased if the proportion of kernels with respect to a given quantity of oil is reduced. The deterioration is far greater in the case of peanut oil as compared to ''vanaspati'' during the frying of cashew kernels.

Setting of the gels of sodium oleate and stearate in some organic solvents. Part I. Time and temperature of setting. K. B. Deshpande and K. P. Buch(Dept. of Chem., Inst. of Sci., Bombay, India). *J. Indian Chem. Soc.* **33**, 321–2(1956). The study of the time and temperature of setting of gels of sodium oleate in nujol, pinene and xylene and of sodium stearate in nujol and benzyl alcohol has shown that (1) the time of setting for any concentration depends upon the rate of cooling; (2) the setting temperature of a given system is constant and independent of the rate of cooling, but increases with increased soap concentration.

Part II. Cooling curves of soap-solvent systems. *Ibid.* **33**, 346–50(1956). The study of the cooling curves of the solutions of sodium oleate and stearate in nujol has shown that heat is evolved during gelation. The heat of gelation has been calculated for gels of different concentrations under various rates of cooling. It has been observed that the values of the ratio of the heat of gelation per gram molecule of soap to the temperature of setting in absolute units are very nearly constant and are independent of the rate of cooling and the concentration of the soap.

Antioxidants and their uses. W. O. Lundberg(Univ. of Minnesota, Minneapolis). *Mfg. Confectioner* **33**(4), 19(1953). Types and natures of fat rancidities, stability tests, methods of combatting rancidity, and the mode of action of antioxidants are discussed. The application of antioxidants in the candy industry is discussed. (*C. A.* **50**, 9759)

Paper chromatographic determination of metal traces in edible fats. K. Taufel and K. Romminger(Humboldt Univ., Berlin). *Fette-Seifen-Anstrichmittel* **58**, 104–12(1956). The qualitative and semiquantitative paper chromatographic method will indicate as little as 0.1 p.p.m. of iron, 0.05 p.p.m. copper or manganese, and 0.02 p.p.m. of nickel. (*C. A.* **50**, 9643)

A quality control test for refined white grease in lard. J. B. Roos(Staatl. Molkereistat., Leiden, Neth.). *Fette-Seifen-Anstrichmittel* **58**, 118–21(1956). Excessive cholesterol (0.01–0.02%) content of commercial lards points toward adulteration with white grease. Cholesterol concentration of more than 0.02% indicates admixture of refined refuse fats. (*C. A.* **50**, 9643)

Autoxidation and antioxidants of edible fats and oils. V. P. Ramos(Estaç. Agron. nacl., Sacavém, Port.). *Agron. Lusitana* **17**, 17–53(1955). The incorporation of 0.01–0.03% nordihydroguaiaretic acid, 3-(tert-butyl)-anisol, ethyl gallate, and hydroquinone slightly improved the stability of palm oil and its liquid or solid fractions. The beneficial effects of citric and phosphoric acids were mainly due to their inactivation of iron. The liquid fraction of palm oil was more stable than the solid fraction under normal conditions of storage. (*C. A.* **50**, 9643)

Traces of elements in fatty foodstuffs. II. Colorimetric determination of iron and copper in olive oil. A. Vioque and M. del Pilar Villagrán(Inst. grasa y sus derivados, Seville, Spain). *Mikrochim. Acta* **1956**, 804–11. Ash 50 g. of olive oil in the presence of magnesium nitrate, extract copper and iron as dithizone and oxine complexes with chloroform, and determine these elements photometrically by means of sodium diethyldithiocarbamate and *o*-phenanthroline. As little as 100 γ of iron and 1 γ of copper can be determined with errors of 10 and 20% respectively. (*C. A.* **50**, 9642)

The composition of Dutch butterfat. II. Seasonal variations in the saturated fatty acid composition of butter fat. J. Stadhouders and H. Mulder(Agr. Univ., Wageningen). *Neth. Milk Dairy J.* **10**, 53–9(1956). Propionic, caproic, caprylic, capric, and to some extent lauric acid were higher in spring than in fall. Myristic and palmitic acid were higher in winter than in summer. The stearic acid content was not related to that of the other higher fatty acids. (*C. A.* **50**, 9642)

Sorption of acetic and stearic acids on gumbrin and ascanite clays. G. V. Tsitsishvili and D. N. Barnabishvili(P. G. Melikishvili Inst. Chem., Tiflis). *Soobshcheniya Akad. Nauk Gruzin. S.S.R.* **16**(1), 41–6(1955). Acetic acid is absorbed equally well on natural and acid-activated clay specimens of gumbrin; ascanite shows somewhat greater adsorption after activation. Stearic acid is adsorbed better on activated than on natural samples of both types of clay. (*C. A.* **50**, 9097)

Effect of operating variables on hydrogenation of cottonseed oil. I. A. Eldib(Univ. of Oklahoma, Norman). *Univ. Microfilms* (Ann Arbor, Mich.), **Publ. No.** 15449, 112 pp. *Dissertation Abstr.* **16**, 302(1956). (*C. A.* **50**, 8232)

Pale fatty acids from cottonseed and peanut oil foots. K. T. Achaya, B. P. Baliga, S. A. Saletore, and S. H. Zaheer(Central Labs. Sci. Ind. Research, Hyderabad). *J. Sci. Ind. Research(India)* **14B**, 665–7(1955). The formation of crystalline adducts of fatty acids with solid urea in the presence of ethanol was used for the two-stage recovery of pale colored fatty acids from dark-colored cottonseed oil foots in a yield of 82–8%. The procedure can be used to recover fatty acids from peanut soapstocks. (*C. A.* **50**, 8232)

Semimicro butyric acid values, semimicro total values, and semimicro residual values of cocoa butter and cocoa-butter-substitute fats. J. Kleinert. *Rev. intern. chocolat.* **10**, 449–54 (1955). Analytical data are given for cocoa butter and various substitutes, i.e. Illipebutter (obtained from *Bassia longifolia*), ''Tenkawank butter'' (also known as Borneo tallow), ''Biscuitine'' fat, peanut oil, and palm kernel butter, to evaluate their desirability as total or partial substitutes for cocoa butter in the chocolate industry. (*C. A.* **50**, 8231)

Fat and ash content of varieties of almond and apricot kernels. H. Fincke(Süsswarenwiss. Zentralstelle, Cologne, Ger.). *Zucker- u. Süsswareneirtsch.* **9**, 210(1956). The percentages of fat and ash respectively of the kernels were: sweet almonds 60.3–66.4, 2.66–3.23; bitter almonds 60.5–63.2, 2.73–3.21; sweet apricots 58.9–62.7, 2.39–2.50; Bulidas apricots 41.8–42.9, 3.54–3.79. (*C. A.* **50**, 8231)

Fractionation and separation of lipides by solvents at low temperatures. M. Loury. *Compt. rend. 27^e^ congr. intern. chim. ind.*, Brussels **1954**, 3; *Industrie chim. belge* **20**, **Spec. No.**, 713–16(1955). The separation of fatty acids by low temperature fractionation with different solvents was investigated. The best solvent appears to be sym.-dichloroethane, which is in agreement with the solubility data of Ralston for stearic and palmitic acids in organic solvents. (*C. A.* **50**, 8231)

Separation of fatty acids through urea-adduct formation and amide crystallization. K. T. Achaya, B. P. Baliga, S. A. Saletore and S. H. Zaheer(Central Labs. Sci. Ind. Research, Hyderabad). *J. Sci. Ind. Research(India)* **14B**, 348–54(1955). Fatty acids of peanut, safflower seed, linseed, cottonseed, castor, and dehydrated castor oils were separated into 2 to 4 fractions through urea-adduct formation by use of saturated solutions of urea in methyl alcohol, ethyl alcohol of various dilutions, and in water, and solid urea. Resolutions with solid urea were nearly as effective as with urea in methyl alcohol and varied in degree with the amount of urea used. Urea in water was not as effective as urea in methyl alcohol. Resolution of methyl esters of fatty acids by urea-adducts is poor. Resolution of the amides of fatty acids of safflower seed oil by fractional crystallization from solvents was poorer than urea-adducts. (*C. A.* **50**, 8230)

Influence of various molecular structures on the elimination maximum of fatty acids. G. J. Demakis(Virginia Polytech. Inst., Blacksburg). *Univ. Microfilms*(Ann Arbor, Mich.). **Publ. No.** 15616, 208 pp. *Dissertation Abstr.* **16**, 301–2(1956). (*C. A.* **50**, 8230)

Analyses of total fatty acids and cholesterol in the blood. Taro Nakamura, Hiroyuki Koike, Shigeo Amino and Eishiro Hara (Senshu Hosp., Osaka). *Nisshin Igaku* **43**, 147–52(1956). Analyses for fatty acid and cholesterol in the blood were made. (*C. A.* **50**, 7924)

Symposium on the chemistry and physiology of phospholipides. Synthesis of glycerol phosphatides. E. Baer (Univ. Toronto). *Can. J. Biochem. and Physiol.* **34**, 288–304 (1956); **Chemistry of the phosphoinositides.** J. Folch and F. N. Lebaron (Harvard Med. School, Boston, Mass.). *Ibid.* 305–19. **Chemistry of the sphingolipides.** H. E. Carter, D. S. Galanos and Y. Fujino (Univ. of Illinois, Urbana). *Ibid.* 320–30. **Biological synthesis of phospholipides.** E. P. Kennedy (Univ. of Chicago). *Ibid.* 334–47. **Metabolism of phospholipides in vitro.** L. E. Hokin and Mabel R. Hokin (McGill Univ., Montreal). *Ibid.* 349–60. **Function of phospholipides.** J. M. R. Beveridge (Queen's Univ., Kingston, Ont.). *Ibid.* 361–9.

Stability of thermal polymers of ethyl linoleate to autoxidation. A. E. Aaland (Univ. of Illinois, Urbana). *Univ. Microfilms* (Ann Arbor, Mich.), **Publ. No. 15176**, 61 pp. *Dissertation Abstr.* **16**, 312 (1956). (*C. A.* **50**, 7748)

Refractometry of fats. VI. Detection of foreign fats in lard. H. P. Kaufmann and J. G. Thieme (Deut. Inst. Fettforsch, Münster, Westf., Ger.). *Fette-Seifen-Anstrichmittel* **57**, 726–34 (1955). The polyphase index of refraction as related to temperature is plotted for lards containing 5, 10, 20, and more percent additions of, respectively, coconut oil, tallow and hardened lard, and peanut oil, and data are also tabulated for lards containing hardened corn and poppyseed oils. The changes caused by adding the above oils to lard were usually within the natural variations of the melting refraction of pure lard unless extremely large amounts of the foreign fat were added. When the solid phase of lard, obtained by pressing out all oil at 20° on a filter paper, was studied the melting refraction curves did not show wide variations and presence of added foreign oil or fat was more discernible. Curves with this technique are illustrated for lards containing various amounts of coconut oil, tallow and hardened lard, palm oil, peanut oil, soybean oil, and poppyseed oil. Each additive causes characteristic changes in the refraction of solid phase of lard. (*C. A.* **50**, 8090)

A colorimetric method for the estimation of butylated hydroxyanisol in fats. K. Krishnamurthy and M. Swaminathan (Central Food Tech. Research Inst., Mysore). *Current Sci. (India)* **25**, 16–7 (1956). Extracts of butylated hydroxyanisol containing 4–30 γ BHA were pipetted into test tubes and diluted to 10 ml. with 72% alcohol. Potassium ferricyanide 0.5 and ferric sulfate 0.5 ml. were added, the color was developed in the dark for 15 minutes and the color measured photoelectrically. A linear relation existed between the amount of BHA present and the intensity of the color. (*C. A.* **50**, 8229)

A general method for the acetylation of hydroxy fatty acids and their glycerides. K. D. Pathak and J. S. Aggarwal (Natl. Chem. Lab. India, Poona). *J. Sci. Ind. Research (India)* **14B**, 637–9 (1955). At 27–32°, acetyl chloride in ether solution acetylates unsaturated hydroxy fatty acids having conjugated double bonds. If the fat is highly polymerizable, acetylation must be carried out at 0–5°. The method was used with castor oil, α- and β-kamololenic acids, 12-mono- and 9,10-dihydroxystearic acid. (*C. A.* **50**, 8230)

Experiences with imported lard. II. Importance of the smokepoint and neutral-fat tests in the evaluation of lard. J. Wurziger and E. Lindemann (Staatl. Chem. Untersuchungsanst., Bremen, Ger.). *Fette u. Seifen Anstreichmittel* **56**, 786–90, 920–6 (1954). No chemical or physical method shows incipient rancidity in all cases; smell and taste remain important criteria. The odor developed by a sample during the smoke-point and the neutral-red tests are often valuable indications. (*C. A.* **50**, 6700)

Antioxidant for foods. Yusuke Sumiki and Saburo Tamura. *Japan 8521.* Edible fats and oils or their products are treated with 0.005–0.5% of 6,3,4-$R(HO)_2C_6H_2(CH_2)_nCOOR'$, where R = H or alkyl, R′ = alkyl, and n = 3–9), alone or mixed with 0.001–0.1% nordihydroguaiaretic acid, pyrogallic acid ester, and citric, ascorbic or phosphoric acid. (*C. A.* **50**, 9650)

A summary of methods for the detection of foreign fats in dairy products. V. R. Bhalerao and F. A. Kummerow (Dept. of Food Tech., Univ. of Ill., Urbana, Ill.). *J. Dairy Sci.* **39**, 956–963 (1956). It appeared that one could not rely on determinations based on either the mixed fatty acid composition or the unsaponifiable fraction as a method suitable for detecting the presence of all conceivable mixtures of substitute fats. However, butterfat has a characteristic glyceride structure, and to date it is not possible to duplicate a fat with the exact glyceride components that are present in butterfat.

Lipids of wheat flour. I. Characterization of galactosylglycerol components. H. E. Carter, R. H. McCluer and E. D. Slifer (Noyes Chem. Lab., Univ. of Ill., Urbana, Ill.). *J. Am. Chem. Soc.* **78**, 3735–3738 (1956). A benzene extract of bleached wheat flour was fractionated by Craig distribution between *n*-heptane and 95% methanol into triglyceride, steroid, lipoprotein and lipocarbohydrate fractions. The lipocarbohydrate was further fractionated from acetone into a more soluble and a less soluble component. In a study of these two materials the carbohydrate moiety of the more soluble fraction was identified as β-D-galactopyranosyl-1-glycerol and the carbohydrate moiety of the less soluble fraction as α-D-galactopyranosyl-1,6-β-D-galactopyranosyl-1-glycerol.

FATTY ACID DERIVATIVES

Sultones. I. Kiyohisa Furukawa, Taichi Okada, Iwao Tamai, and Ryôhei Oda (Kyoto Univ.). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **59**, 221–4 (1956). Surface-active agents were synthesized from propane sultone and monyl phenol, lauramide, stearamide, lauryl alcohol, or lauramide.

Reaction of unsaturated fatty acids with maleic anhydride and its application. II. Addition of maleic anhydride to monoolefinic unsaturated fatty acid and the utilization of these adducts as plasticizers for polyvinyl chloride resin. Yoshihiro Shigeno, Saburo Komori, and Hiromi Yamamoto (Osaka Univ.). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **59**, 63–7 (1956). Maleic anhydride addition products were examined as the plasticizer for PVC resin in the form of methyl or butyl ester from domestic raw material rich in monoölefinic fatty acid such as the fatty acid from sodium soap of sperm oil, tallow, neats' foot oil, and rape oil, and oleic acid part of cuttle-fish oil. By distillation, saturated fatty acids could be completely recovered in the earlier distillate as their esters.

III. Preparation of plasticizers from maleic anhydride and monoölefinic unsaturated fatty acid of the sperm oil or rape oil. Y. Shigeno, S. Komori, and Masahisa Yasui. *Ibid.* 186–90 (1956). Optimum conditions were studied for preparing the plasticizer as the triesters of maleated fatty acid.

IV. Utilization of fore- and rear-fractions of the maleic fatty acid ester type plasticizer prepared from the fatty acid of sperm oil or rape oil. Y. Shigeno and S. Komori. *Ibid.* 191–6 (1956). Both distillate fractions could be used as plasticizers.

V. Properties of several esters of maleated oleic acid or erucic acid, as the plasticizers for vinyl chloride polymers. Y. Shigeno, S. Komori, Tomoo Sugiyama, Toshio Karaki, and Shigeharu Takazawa. *Ibid.* 913–18 (1956). Comparisons were made for trimethyl, triethyl, and tripropyl esters of maleated oleic acid and trimethyl and triethyl esters of maleated erucic acid.

VI. Decolorization and stability of the plasticizer, trimethyl ester of maleated oleic acid. Y. Shigeno, T. Sugiyama, Shigeo Miyamori, T. Karaki, and S. Komori. *Ibid.* 919–25 (1956). Pale-colored raw material fatty acids gave pale-colored products. Decolorization could be effected with active carbon, exposure to sunlight, and excessive hydrogenation with high-pressure hydrogen.

Arylation of esters of erucic acid. Ng. Ph. Buu-Hoï, Ng. D. Xuong and Elie Lescot (Dept. of Org. Chem., Radium Inst., Univ. of Paris, Paris, France). *J. Org. Chem.* **21**, 621–23 (1956). The double bond in the molecule of alkyl erucates is shown to undergo aluminum chloride-catalyzed arylation with various aromatics, and the properties of the resulting alkyl arylbehenates are investigated. Several high molecular ketones derived from erucic and behenic acids are described.

Epoxidizing organic esters. Food Machinery and Chemical Corp. *Brit. 739,609.* Esters of the higher unsaturated fatty acids (12 to 22 atoms) are epoxidized by water, acetic acid, and a small amount of sulfuric acid as a reaction temperature of 60–110°. Butyl oleate thus epoxidized had an iodine number of 8.5 and contained 3.40% of oxirane oxygen. (*C. A.* **50**, 9766)

Fatty acid nitriles. Soc. anon. d'innovations chimiques dite: Sinnova ou Sadic. *Fr. 986,870.* Fatty acid nitriles are made by passing at suitable temperatures, e.g. 400°, a mixture of gaseous fatty acids and a gaseous hydroxy amino ether, e.g. $H_2NCH(OH)OCH_3$ over a catalyst consisting of a mixture of iron, ferrous oxide, and manganous oxide. The hydroxyamino ether is prepared by adding $HCONH_2$ to a small amount of sodium in the respective alcohol and separating the resulting nitrile from the simultaneously formed ketone by fractional distillation. (*C. A.* **50**, 7843)

Derivatives of suberic acid. Shiro Ohuchi (Shionogi Drug Manufg. Co.). *Japan. 6126.* Compounds of the formula $[CH_2CH_2CH(SR)CO_2H]_2$ where R = H, phenyl, ethyl, propyl, butyl, and $CH_3(CH_2)_5$ were prepared and their constants given. (*C. A.* **50**, 7871)

• Biology and Nutrition

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

The oral toxicity and pathology of polyoxyethylene derivatives in rats and hamsters. E. Eagle and C. E. Poling(Res. Labs., Swift & Co., Chicago). *Food Research* 21, 348–61(1956). Acute oral toxicity studies were performed in rabbits, hamsters, and or rats on polyoxyethylene monostearates, polyoxyethylene-20-sorbitan monolaurate, glyceryl monolaurate, polyoxyethylene-4-sorbitan monostearate, polyoxyethylene-20-sorbitan monooleate, and sorbitan monostearate, with cottonseed oil monoglyceride, cottonseed oil mono- and diglycerides, cottonseed oil, lard mono- and diglycerides, lard and distilled water as controls. The experimental animals showed unusual incidences of gross and histopathological findings. Six large stones 4.5–5.5 mm. in diameter and varying from 53–94 mg. in weight were removed from the urinary bladders of hamsters which were fed polyoxyethylene monostearates for periods varying from 74 to 260 days.

Effects of feeding polyoxyethylene preparations to rats and hamsters. C. E. Poling, E. Eagle and E. E. Rice(Res. Labs., Swift & Co., Chicago). *Food Research* 21, 337–47(1956). The effects of ingesting various levels of polyoxyethylene-derived surface active preparations(two polyoxyethylene stearates and polyoxyethylene sorbitan monolaurate) were observed in rats and hamsters with lard or mono- and diglycerides as control substances. In general, the animals fed the experimental substances showed: retardation of growth, decreased adult size, markedly decreased efficiency of food utilization, increased water consumption in rats, a generally unthrifty appearance, increased mortality, consistent moderate to severe diarrhea, and hemorrhage from the genitourinary tract in hamsters. The harmful effects observed in animals fed polyoxyethylene-derived surface active agents at dietary levels as low as 5% indicate that considerable caution should be exercised before such substances are used in foods for human consumption.

The colorimetric analysis of cholesterol in animal tissues. S. Oeriu and R. Vladescu. *Comun. Acad. Rep. Populare Române* 4, 143–7(1954). A stable solution, and with the same coloration as cholesterol in choloform containing acetic anhydride and sulfuric acid, was obtained by mixing a methylene blue solution with an alkaline solution of phenol red. The color scale prepared in this way is absolutely stable. (*C. A.* 50, 9485)

Fat in the diet of the dog in relation to nutrition of the skin and hair. Hilda F. Wiese(Univ. of Texas, Galveston). *Southwestern Vet.* 9, 32–4(1955). Young dogs kept on diets containing 1% fat showed dryness and loss of hair and peeling of the skin in 2–6 months and were much more susceptible to infection than controls receiving diets containing 15–30% lard. These changes were reversible and could be cured by addition of fat to the diet. The tissues and blood serum of fat-deficient dogs showed an abnormal low content of linoleic and arachidonic acids and a relatively large amount of a trienoic acid which is probably not linolenic acid. (*C. A.* 50, 9536)

Metabolism of fatty acids of medium length. IV. In liver metabolism. G. Weitzel, H. Schön, F. Gey, and Ursula Roester(Max Planck Inst., Gottingen, Ger.). *Hoppe-Seyler's Z. physiol. Chem.* 303, 184–95(1956). The saturated fatty acids of 8–12 carbon atoms, fed as ethyl esters or glycerides, are incorporated into liver fat only in traces. These acids have less tendency to produce fatty degeneration than do the long-chain compounds. However, when fed large doses in a choline-free diet, these acids did produce fatty degeneration. The medium-chain length fatty acids constituted less than 5% of the fat deposited in the liver. (*C. A.* 50, 9538)

The distribution of lipide and phospholipide in paper electrophoresis of normal serum lipoproteins. M. A. Chapin(Central Maine General Hosp., Lewiston, Me.). *J. Lab. Clin. Med.* 47, 386–91(1956). Approximately 73% of total lipide and 61% of phospholipide were found in the β-lipoproteins. Phospholipide constituted an average of 42% of the total lipide, 38% of the β-, and 47% of the α-lipide. (*C. A.* 50, 9545)

The lipoperoxide content of blood. J. Glavind and S. Hartmann(Polytech. Inst., Copenhagen). *Congr. intern. biochim., Résumés Communs., 2e Congr., Paris* 1952, 356. The existence of peroxides of lipides in pathological tissues has been demonstrated. More recently, they have been found as constituents of normal blood. Some typical values, in g. of lipides and meq. of lipoperoxides per liter of blood, respectively, were whole blood 0.7, 0.006; plasma 0.3, 0.0015; erythrocytes 0.3, 0.02; leucocytes 0.1, 0.0025. (*C. A.* 50, 9566)

Tocopherol and vitamin A content of some marine blubber oils. Christine A. Heller(Cornell Univ., Ithaca, N. Y.). *Univ. Microfilms*(Ann Arbor, Mich.), **Publ. No. 15601**, 28 pp. *Dissertation Abstr.* 16, 226–7(1956). (*C. A.* 50, 8233)

Fat metabolism in liver on lipide or carbohydrate administration. C. Musso(Univ. Turin, Italy) and F. Vacirca. *Med. sper.* 24, 415–19(1953). The total fat(g. %, fresh weight) of liver in rats fed (1) a protein-lipide, (2) a protein-carbohydrate, and (3) a protein-carbohydrate-lipide diet was (1) 5.15, 4.47, and 3.94; (2) 2.04, 3.93, and 6.97; and (3) —, —, and 2.25 after 15, 60, and 120 days respectively. (*C. A.* 50, 7980)

Fat metabolism in infancy. I. Total fat, fatty acids, and phosphatide balance in infants with parenteral infection. W. Droese and Helga Stolley(Univ. Kiel. Ger.). *Z. Kinderheilk.* 77, 532–43(1956). The fat utilization is lowered even in slight grippal infections. The utilization of the saturated fatty acids and phosphatides is influenced more than that of the unsaturated fatty acids. Bacterial skin infections do not influence the fat metabolism. (*C. A.* 50, 7978)

Cholesterol and arteriosclerosis. B. S. Schweigert. *Am. Meat Inst. Foundation Circ.* **No.** 19, 21 pp.(1955). Review with 39 references. (*C. A.* 50, 8022)

Occurrence in plasma of an extractable lipide mobilizer. J. Seifter and D. H. Baeder(Wyeth Inst. Med. Research, Radnor, Pa.). *Proc. Soc. Exptl. Biol. Med.* 91, 42–5(1956). Freeze dried dialyzates from plasma of dogs, rats, and horses treated with cortisone contained a *lipide mobilizer* which markedly elevated plasma levels of free and esterified cholesterol, lipide phosphorus, and total fatty acids when administered to fasted mice, rats, rabbits, guinea pigs, dogs, and human subjects by intramuscular or intravenous injection. The lipide mobilizer is not active if given orally. (*C. A.* 50, 7987)

Statistical analysis of the epicardial fat weight in human hearts. L. Reiner, A. Mazzoleni, and F. L. Rodriguez(Beth Israel Hosp., Boston, Mass.). *Arch. Pathol.* 60, 369–73(1955). Epicardial fat may be as much as one-third or more of the total heart weight. The percentage is greater in women than men, and so is the variability of the percentage. The absolute weight shows a linear correlation with body obesity, but the relative weight is correlated in women. (*C. A.* 50, 7982)

The site of fat absorption in the small intestine of the rat. J. A. Benson, Jr., G. N. Chandler, F. E. Vansteenhuyse, and J. O. Gagnon(Massachusetts General Hosp., Boston). *Gastroenterology* 30, 53–61(1956). Optimal absorption of olive oil occurs in the third quarter of the small intestine of the rat. This capacity does not depend upon the duration of the period of absorption, within experimental limits, nor upon the anatomic proximity of this area to the stomach. (*C. A.* 50, 6618)

Serum lipides and lipoproteins in infancy and childhood. S. Rafstedt(Univ. Lund, Sweden). *Acta Paediat.* 44, 588–9, Suppl. 102, 109 pp.(1955). The total lipide, total and free cholesterol, and the phospholipide levels in serum from umbilical cord blood of infants were analyzed and studied (*C. A.* 50, 6616)

Iodometric method for determining the peroxide value of food fats. Cl. Franzke(Humboldt-Univ., Berlin). *Z. Lebensm.-Untersuch. u. -Forsch.* 103, 108–12(1956). The peroxide determination methods of Lea, Taufel and Rothe, Hadorn and Jungkunz and Sully are compared on 9 samples of vegetable oils. (*C. A.* 50, 6700)

The antioxidative properties of vitamin E. M. P. Zakharova. *Trudy vsesoyuz. Nauch. Issledovatel. Vitamin. Inst.* 5, 163–6 (1954). That tocopherol stabilizes carotene dissolved in fat against oxidation was demonstrated by tests with corn and sunflower seed oil and with lard. (*C. A.* 50, 6608)

Influence of substances reducing surface tension on the electrophoretic mobility of plasma lipoproteins. R. Mora, P. Rebeyrotte, and J. Polonovski(Fac. méd., Paris). *Bull. soc. chim. biol.* 37, 957–8(1955). The plasma lipoproteins migrate independently of the other protein fractions. At pH 8.6 small amounts of sodium oleate accelerate the electrophoretic migration of the α- and β-lipoproteins. Sodium cholate accelerates the migration of β-lipoproteins. Very small amounts of Tween 40 slow the migration of the α-lipoproteins. Cationic detergents combine with the lipoproteins and neutralize their negative charges, thus slowing or completely checking their electrophoretic migration. (*C. A.* 50, 6529)

Chemical and biochemical studies on cardiolipin. III. Paper chromatography of cardiolipin. Ichiro Hara(Univ. Tokyo). *J. Chem. Soc. Japan, Pure Chem. Sect.* 77, 255–6(1956).

Similar R_f values were obtained for cardiolipin with butanol-acetic acid-water, butanol-ethylene glycol-water, and butanol-pyridine-water. Lower temperature (20° against 30°) decreased the R_f values.

Conditions for the preparation of cultured milk as the raw material for margarine. Kimitoshi Nakazawa, Shuji Arai, and Jun Kawai (Nihon Yushi Co., Tokyo). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **59,** 111–13 (1956). The formation of biacetyl and acetyl methyl carbinol was examined in relation to the conditions of preparing cultured milk for margarine. Citric acid should be added before fermentation of milk.

Concentration of fat-soluble vitamins by molecular distillation. IV. Preparation of high-potency vitamin A from natural vitaminic oils. Toshio Agawa, Junzo Tsujimoto, and Saburo Komori (Osaka Univ.). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **59,** 460–3 (1956) Ishinagi liver oil and whale liver oil were suitable raw materials. Molecular distillation gave the product containing vitamin A of higher than 2 million I.U.

Sterols of fresh-water green algae, Vallinsneria spiralis. T. Matsumoto and Shunsuke Ito (Nihon Univ., Tokyo). *J. Chem. Soc., Pure Chem. Sect.* **77,** 524–6 (1956). The unsaponifiable matter contained chondrilasterol and β-sitosterol, together with eicosanol.

The unsaponifiable matter of the echinoderms. III. Sterol components of Ophioplocus japonicus. Taro Matsumoto and Toshitake Tamura (Nihon Univ., Tokyo). *J. Chem. Soc. Japan, Pure Chem. Sect.* **77,** 376–8 (1956). The sterols contained were poliferasterol, chryonasterol, β-sitosterol, and stigmasterol.

IV. Δ^7-Stigmastenol and stellasterol in the fat of star-fish. T. Matsumoto, Toru Wainai, and Choichiro Hirai. *Ibid.* 531–3. The unsaponifiable matter of *Asterias amurensis* contained the 2 sterols in the subtitle. The latter was presumed by identification of d-methylisopropyl aldehyde obtained by ozone oxidation of mixed sterols.

Hydrogenation of organic compounds with the Urushibara nickel. I. Hydrogenation of steroids. Shigeo Nishimura (Univ. Tokyo). *J. Chem. Soc. Japan, Pure Chem. Sect.* **77,** 340–3 (1956). By use of the Urushibara nickel, obtained by alkali or acid treatment of the precipitate produced by reacting aqueous solution of Ni chloride with zinc powder [*Bull. Chem. Soc. Japan* **25,** 280 (1952); **27,** 480 (1954); **28,** 446 (1955)], cholestanone gave 90% cholestanol and 10% epicholestanol, coprostanone gave 42% coprostanol and 58% epicoprostanol, 6-ketocholestanol gave 3β,6β-cholestanediol quantitatively, 7-ketocholestanol gave about the same amounts of 3β,7α-cholestanediol and 3β,7β- cholestanediol, dehydrocholic acid gave easily reductodehydrocholic acid in alkaline solution, Δ^4-cholestenone gave 50% cholestanol and 3 stereoisomeric cholestanols, 7- ketocholesteryl acetate gave 7-ketocholestanyl acetate, and 6-nitrocholesteryl acetate gave 6-ketocholestanyl acetate oxime.

Terpenoid intermediates in the biosynthesis of cholesterol. F. Dituri, Florapearl A. Cobey, Jessie V. B. Warms and S. Gurin (Dept. of Biochem., School of Med., Univ. of Penna., Philadelphia). *J. Biol. Chem.* **221,** 181–189 (1956). A particle-free enzyme system prepared from rat liver was capable of incorporating C^{14}-acetate into squalene. The same system was able to convert squalene into cholesterol or closely related sterols. When labeled β-hydroxy-β-methylglutarate is employed as a substrate, the supernatant fluid alone was capable of incorporating the substrate into squalene. By employing this system, it has been demonstrated that the addition of nonlabeled farnesol or farnesenic acid was able to reduce the incorporation of substrate into squalene. The recovered farnesenic acid was shown to contain significant radioactivity.

The titration of some phosphatides and related compounds in a non-aqueous medium. J. E. Garvin and M. L. Karnovsky (Dept. of Biol. Chem. and the Biophys. Lab., Harvard Med. School, Boston, Mass.). *J. Biol. Chem.* **221,** 211–221 (1956). An electrometric titration method has been developed in which a solvent system consisting of 99% (volume per volume) 2-ethoxyethanol, 1 per cent water, and 0.001 M KCl was used. The method has been used to titrate a variety of phosphatides and related compounds in amounts of about 1 μ eq. The properties of the titration curves were such as to permit assignment of ionic species present in solution for each of the materials over a wide range of apparent pH. Approximations to the behavior of dissociable groups of the phosphatides in true water solution have been made by analogy with compounds having similar functional groups but which are soluble both in the 2-ethoxyethanol solvent system and in water.

Effect of glucose on fatty acid and glyceride synthesis in rat mammary gland. P. F. Hirsch, W. J. Lossow and I. L. Chaikoff (Dept. of Physiol., Univ. of Calif. School of Med., Berkeley). *J. Biol. Chem.* **221,** 509–515 (1956). Rat mammary gland slices were incubated, in the presence and absence of glucose, with the sodium salts of the following fatty acids: acetate-1-C^{14}, butyrate-1-C^{14}, hexanoate-1-C^{14}, and octanoate-1-C^{14}. The recoveries of the C^{14} in CO_2 and in the glyceride fraction were determined. The glyceride fraction was analyzed for C^{14}-labeled, short and long chain fatty acids. In the case of octanoate, glucose promoted its direct esterification, and this appeared to be the sole action of the carbohydrate in promoting lipogenesis from octanoate. Glucose also promoted the direct esterification of hexanoate, but this was not the sole action of the carbohydrate in promoting lipogenesis from this short chain fatty acid. Direct esterification did not account for the action of glucose on lipogenesis from acetate and butyrate. The C^{14} of acetate-1-C^{14} and butyrate-1-C^{14} was recovered in fatty acids containing 8 or more carbons. The possibility that glucose increased the esterification of newly synthesized fatty acids, thereby promoting further condensation of 2-carbon fragments, was considered. The evidence presented suggested that long chain fatty acid formation in rat mammary gland occurs primarily from condensation of 2-carbon units rather than from elongation of pre-existing, short chain fatty acids.

Short-term feeding studies on acetin fats. F. H. Mattson, J. C. Alexander, F. J. Bauer and H. H. Reller (Res. Div., Proctor and Gamble Co., Cincinnati, Ohio). *J. Nutrition* **59,** 277–285 (1956). The nutritive value of mono- and diacetin fats prepared from completely or partially hydrogenated vegetable oils was measured in a series of studies on weanling male rats. The gains in body weight and food consumption of animals fed these fats at relatively high levels were essentially the same as those of animals fed the corresponding conventional triglycerides. The long-chain fatty acids of a diacetin fat prepared from partially hydrogenated vegetable oils were absorbed as well as those of the conventional triglyceride from which it was prepared. On the other hand, the coefficient of utilization of stearic acid was markedly increased over that of tristearin by incorporating this fatty acid into a diacetin fat molecule.

Radiation-induced fecal fat formation in the rat. Margaret G. Morehouse and R. L. Searcy (University of Southern California, Los Angeles). *Science* **123,** 1032 (1956). Comparisons of lipogenesis have been made by noting the total counts found in the fecal fat from irradiated and non-irradiated animals. Such comparisons clearly show that the treated rats incorporated into the fecal lipids more than 4 times as much acetate-C^{14} as did the controls. In addition, the increase in specific activity from 1.3 in the controls to 3.5 in the irradiated animals would also be indicative of a stimulation in the fecal-fat synthesis.

Tributyrin lard and tallow in feeding of "filled milk" for veal production. S. J. Ritchey, J. Hopper, K. E. Gardner, and B. C. Johnson (Univ. of Illinois, Urbana). *J. Dairy Sci.* **39,** 1070–1071 (1956). These data showed that the calf can utilize tributyrin lard and tallow as sources of fat to make gains essentially equivalent to those made on whole milk. The results point out that not only lard containing butyrate but also beef tallow can satisfactorily replace milk fat in the ration of the veal calf.

Reversal of respiratory decline in necrotic liver degeneration by intraportal tocopherols. G. P. Rodnan, S. S. Chernick and K. Schwarz (Biochem. and Nutrition Lab., National Institutes of Health, Bethesda, Maryland). *J. Biol. Chem.* **221,** 231–238 (1956). The effects of intraportal injections of various tocopherols on the respiratory defect of liver slices in dietary necrotic liver degeneration were investigated. Emulsions of various tocopherols and water-soluble D-α-tocopherol polyethylene glycol-1000 succinate did not markedly alter the initial rate of oxygen consumption, but reversed the respiratory decline, as evident from the pre- and post-injection oxygen consumption after 90 to 120 minutes of incubation. The degree of decline of oxygen consumption diminished with increasing doses of tocopherol.

Enzymes of fatty acid metabolism. III. Breakdown and synthesis of β-keto fatty acids. J. R. Stern, M. J. Coon, and Alice del Campillo (Dept. of Pharmacology, School of Med., Western Reserve Univ., Cleveland 6, Ohio). *J. Biol. Chem.* **221,** 1–13 (1956). The cleavage of β-keto fatty acids by soluble enzyme preparations from animal tissues required preliminary activation to the corresponding CoA thio ester derivatives. In heart muscle these derivatives were formed in the case of acetoacetate, β-ketovalerate, and β-ketocaproate, by transfer of CoA from succinyl CoA. Cleavage of the activated β-keto acids yielded acetyl CoA and the acyl CoA derivative shorter by 2 carbon atoms than the parent β-keto acid. The separation and some properties of two enzymes from pig heart extracts catalyzing the CoA transfer (transferase) and cleavage (thiolase) reactions were described. Reversibility of these reactions was responsible for the synthesis of acetoacetate from acetyl CoA in the presence of the two enzymes and succinate. The isolation and characterization of acetoacetyl-S-CoA, formed by the enzymatic transfer of CoA from succinyl CoA to acetoacetate, were also described.

Reproduction and lactation of rats receiving corn oil or butterfat in the presence of sulfathalidine. T. Viswanatha and I. E. Liener(Dept. of Agricultural Biochem., Univ. of Minn., St. Paul). *J. Nutrition* 59, 197–209(1956). Corn oil and butterfat in the presence of 2% sulfathalidine were compared with respect to their ability to promote reproduction and lactation of female rats in successive litters and generations. In studies on the parent generation, the postnatal mortality of the young from mothers on the corn oil diet ranged from 9 to 48% within the first three days, tending to be highest after the second gestation period. When corn oil was replaced with butterfat almost complete survival of the young was obtained. Lactation performance, as judged by the weight of the young at weanling and the weight change of the mother during lactation, was also significantly in favor of butterfat.

The effect of various dietary lipids on the blood plasma polyunsaturated fatty acids of dairy calves. R. S. Allen, N. L. Jacobson, Ruth M. Ward, and J. H. Zaletel.(Depts. of Chem. and Animal Husbandry, Iowa Agric. Exptl. Station, Ames). *J. Dairy Sci.* 39, 1161–1169(1956). Studies of the blood plasma of calves fed different types of lipids(milk fat, butter oil, crude soybean oil, hydrogenated soybean oil, and lard) showed the effect of dietary lipids on the plasma polyunsaturated fatty acids. Higher plasma arachidonic acid values were maintained in calves fed milk fat.

Retinene isomerase. Ruth Hubbard(Biol. Labs., Harvard Univ., Cambridge). *J. Gen. Physiol.* 39, 935–62(1956). Rhodopsin is formed by the condensation of opsin with a *cis* isomer of retinene, called neo-b. The bleaching of rhodopsin releases all-*trans* retinene which must be isomerized back to neo-b in order for rhodopsin to regenerate. Both retinene isomers are in equilibrium with the corresponding isomers of vitamin A, through the alcohol dehydrogenase system. The nature of the enzyme which catalyses the transformation of neo-b to rhodopsin is described in detail.

Acid-base properties of rhodopsin and opsin. C. M. Radding and G. Wald(Biol. Labs., Harvard Univ., Cambridge). *J. Gen. Physiol.* 39, 909–22(1956). Purified preparations of cattle rhodopsin were titrated to various pH, irradiated, and the pH changes followed thereafter. In this way, titration curves were obtained for rhodopsin, the immediate products of irradiation, and the final product of irradiation (opsin). Results are discussed in terms of changes in molecular structure.

The stability of rhodopsin and opsin. Effects of pH and aging. C. M. Radding and G. Wald(Biol. Labs., Harvard Univ., Cambridge). *J. Gen. Physiol.* 39, 923–33(1956). The stability of cattle rhodopsin and its protein moiety opsin toward acids and alkalies and on aging were determined by two criteria: maintenance of absorption spectra and capacity to regenerate after exposure to light. At 3° and a pH near neutrality, the absorption spectrum may remain unchanged for 6 months but regenerability gradually declines. Exposure to light or to pH outside the range from 3.9 to 9.6 markedly decreases stability.

Role of the liver and intestine in the turnover of plasma phosphatides in the rat. D. B. Zilversmit and J. L. Bollman(Univ. of Tenn.). *Arch. Biochem. Biophys.* 63, 64–72(1956). The synthesis of plasma phosphatides in the fasting rat was reduced to insignificant amounts by removal of the liver. In cream-fed rats, the intestine contributed appreciable amounts of phosphatide to the plasma. The removal of phosphatides from the plasma continued, although at a somewhat slower rate, in the absence of the liver and intestine. The role of the liver and intestine in the metabolism of plasma phosphatides in different species of animals is discussed.

Biological utilization of various fat-soluble esters of pyridoxine by rats. T. Sakuragi and F. A. Kummerow(Univ. of Illinois). *Arch. Biochem. Biophys.* 63, 32–39(1956). It was demonstrated that in rats a longer retention of vitamin B_6 could be maintained when pyridoxine trilinoleate was fed than when an equivalent amount of pyridoxine triacetate or pyridoxine hydrochloride was fed. Unchanged pyridoxine triacetate did not appear to be excreted in the urine after the administration of a large dose of the triacetate. A commercial "steapsin" or "pancreatin" failed to hydrolyze pyridoxine trilinoleate at 37°C. in a 2-hr. period.

Effect of cholesterol on the turnover of lecithin, cephalin and sphingomyelin in the rabbit. Esther L. McCandless and D. B. Zilversmit(Univ. of Tenn.). *Arch. Biochem. Biophys.* 62, 402–410(1956). The turnover of lecithin, sphingomyelin and non-choline-containing phospholipides in the aorta, plasma, and liver of control and cholesterol-fed rabbits was studied with the aid of radioactive phosphorus. In the cholesterol-fed animals, aortic lecithin and sphingomyelin, as well as plasma cephalins, lecithin and sphingomyelin showed highly significant increases in concentration and rate of synthesis. The fact that in the greater proportion of the cholesterol-fed animals the specific activities of individual aortic phosphatides exceeded those of the corresponding lipides in plasma is presented as further evidence that the aortic phospholipides are synthesized in the aorta itself rather than derived from the plasma by deposition.

The identification and determination of vitamin A and β-carotene in an animal-fat mixture. J. Gillman, K. Barbara Norton, D. E. A. Rivett and D. A. Sutton(Joint Nutrition Unit of the S. A. Council for Scientific and Industrial Research, Johannesburg, South Africa). *Biochem. J.* 63, 458–460(1956). The vitamin A activity(as indicated by bioassay) of a mixture of rendered beef and mutton fats(4:1) has been shown to be due entirely to vitamin A, together with a minor amount of β-carotene. An enormous concentration of the vitamin A in the unsaponifiable portions was effected by means of reversed-phase partition chromatography.

Effects of corticosterone, cortisone and hydrocortisone on fat metabolism. W. E. Dulin(Dept. Endocrinol., Upjohn Co.). *Proc. Soc. Exp. Biol. and Med.* 92, 253–255(1956). Hydrocortisone and corticosterone caused an increase in liver, visceral and carcass fat in the chick while cortisone was without effect. The relative effectiveness of these 3 steroids on body growth inhibition in the growing chick is in the following order: hydrocortisone, corticosterone and cortisone. None of these 3 hormones caused an inhibition of relative adrenal weights.

Effect of choline on phosphatide metabolism of choline-deficient and cholesterol-fed rabbits. N. R. Di Luzio and D. B. Zilversmit(Div. of Physiol., Univ. of Tenn.). *Proc. Soc. Exp. Biol. and Med.* 92, 454–456(1956). In rabbits maintained on a high-fat, low-protein, choline deficient diet for a period of 14 days, the synthesis of liver phosphatides was markedly increased. A single dose of intravenous choline was associated with a further increment in phosphatide synthesis, while chronic choline supplements depressed liver phosphatide synthesis. The plasma phosphatide concentrations and synthesis were markedly elevated in all the fat-fed animals. The aortic phosphatide synthesis remained unaltered. Choline administration to cholesterol-fed rabbits did not alter the plasma or liver phosphatide metabolism.

• Drying Oils and Paints

Raymond Paschke, Abstractor

Automatic batching. Anon. *Paint Varnish Production.* 46(7) 39(1956). A novel system for automatically compounding batches of coating material in mixing tanks by weighing the tanks electrically on load cells is discussed.

How will future automobiles be painted? N. P. Beckwith(Rinshed-Mason Co. of Canada, Ltd., Windsor). *Off. Dig.* 28 (378), 544(1956). History is discussed and predictions are made for 2, 5, and 10 years.

Evaluation of organic coatings. U. K. Benegal and S. K. Bose (Govt. Test House, Calcutta). *Paintindia Annual* 6(1), 111 (1956). A review. Twenty-five references.

Some physical characteristics of epoxy resin films. T. F. Bradley(Shell Development Co., Emeryville, California). *Oil Colour Chemists' Assoc. J.* 38, 752(1955). The superiority of alkyd and pure phenolic resin varnishes over natural resin varnishes is reviewed from the physical standpoint; it is probably due both to the greater strength and toughness of these synthetic resins compared with the natural resins as well as to their ability to alter the chemical structure and so to reduce the previously required amounts of drying oil. Epoxy resins continue this evolutionary pattern by further reduction of drying oil to the point where, in certain types, oils can be totally eliminated with attendant advantages in film strength and in chemical resistance. The amine-cured epoxy resins maintain their exceptional strength over the range −40°C. to +25°C. or slightly higher but at about +40°C. they begin to soften. This increases their extensibility at the expense of strength. Adhesion in its practical sense is dependent upon a considerable number of factors, including film strength or cohesion, wetting of the substrate, volume change with temperature and during cure, water and chemical resistance, etc., and not merely upon the forces of pure adhesion. The value of epoxy resins in adhesives, surface-coatings and plastics depends not on any one characteristic but on a balance of many properties. Some of these properties are described and discussed.

Why wrinkles wrinkle. H. Burrell. *Org. Finishing* **17**(7), 13 (1956).

Silicones and their application in protective coatings. H. L. Cahn (Gen. Electric Co.). *Off. Dig.* 28(378), 590(1956).

The disc method for the determination of the melting point of solid resins. S. Diamond(Imperial Chemical Ind. Ltd., Manchester). *Oil Colour Chemists Assoc. J.* **39**, 472(1956). The Disc Method for determining the melting point of resins is described. This is designed to overcome difficulties encountered with other methods, particularly with resins which froth badly when heated. The temperature is noted at which a small plug of resin, subjected to a pressure of 15 mm. head of mercury, is forced out of an orifice. The apparatus is robust and the method is not difficult to carry out. The method is capable of giving reproducible results with different observers.

Physical properties of latex films. E. J. Dunn, Jr.(Nat. Lead Co.). *Off. Dig.* 28(378), 564(1956). Discussed are microscopy, water permeability, water sorption, water solubility, tensile strength, elongation, and blister box tests.

A survey of some synthetic resin coatings. E. Engel. *Org. Finishing* **17**(7), 18(1956).

Varnish making. B. Farber(Farnow, Inc.). *Paint Ind. Mag.* **71**(5), 20(1956).

How efficient are fungicidal paints? A. H. Jones, J. G. Desmarais, K. E. Winfield(Dept. Agricultural, Ottawa, Can.). *Can. Paint Varnish Mag.* 30(5), 30(1956). A study was made of the efficiency of 16 fungicidal paints on the Canadian market against species of bacteria, yeasts and molds, under both laboratory and cold storage room conditions. Paints containing di-(phenyl mercury) dodecenyl succinate were superior to either chlorinated rubber base paints or paints to which copper-8-quinolinolate had been added. Paints to which other mercury salts such as naphthenate had been added also showed excellent inhibitory properties. Applied properly they effectively control micro-organisms over a long period of time.

Structural features of paint films. L. A. Jordan(Paint Res. Sta., Teddington). *Paintindia Annual* **6**(1), 65(1956). A short review.

The use of polyamide resins in surface coatings. H. W. Keenan (Beck, Koller & Co., Liverpool). *Oil Colour Chemists' Association J.* **39**, 299(1956). The curing of epoxide resins is brought about by polyamide resins both at room and elevated temperatures. Experiments are discussed in order to show the important influence of epoxide/polyamide ratio on the chemical and physical properties of clear and pigmented films. A study of pigmentation at different epoxide/polyamide levels indicates that variations of the ratio lead to certain unforeseen effects on flexibility and impact tests, and that the temperature of curing has a significant effect also. No references.

A quantitative study of the autoxidation products of oleic acid. G. King. *J. Chem. Soc.* **1956**, 587. Oleic acid has been oxidized with gaseous oxygen at room temperature, at 49° and at 78°, with and without a cobalt catalyst. Oxidation of the pure acid at room temperature is very slow, the principal products being oxo acids, but in the presence of cobalt relatively high yields of 8- and 11-oxo-oleic acids, epoxide, and cleavage products are obtained. At 49° and 78° the oxidations follow the same general patterns as those already observed with elaidic acid but, in the absence of a catalyst, derivatives of both forms of 9:10-dihydroxystearic acid are produced, whereas elaidic acid appears to give only the higher-melting, erythro-form.

Failure of organic coatings. S. Krishnamurthy(Indian Standards Inst., New Delhi). *Paintindia Annual* **6**(1), 119(1956). A review covering wood primers, durability, blistering, blooming, chalking, discoloration, drying defects, dulling, flocculation, holidays, livering, peeling, and failure on electroplated coatings.

Paint-testing anomalies. R. M. C. Logan(Metal Containers Ltd., Ellesmere, Cheshire). *Oil Colour Chemists' Assoc. J.* **39**, 478(1956). The results of tests for brittleness in paints depends greatly upon the individual lot of steel panels used.

Epoxide esters. A. G. North(Cray Valley Products, Ltd., St. Mary Cray, England). *Oil Colour Chemists' Assoc. J.* **39**, 318 (1956). Epoxide resins in the form of fatty acid esters, possess most of the merits of the pure epoxide resins to a useful degree and in addition have the advantages of solubility in hydrocarbons and the ability to cure by air-drying or low-temperature stoving. This paper deals with the effect of variations of fatty acid type and percentage on performance of epoxide esters, with the use of amine-resin modifiers in stoving finishes and with a number of the problems that have been experienced with these resins in practical use.

Thixotropic alkyds. A. G. North(Cray Valley Products Ltd.). *Paint Technology* **19**(219), 409(1956).

Epoxide resins and their use in cold-setting coating systems. S. H. Ott and H. Zumstein(Aero Res. Ltd., Duxford, England). *Oil Colour Chemists' Assoc. J.* **39**, 331(1956). Epoxide resin surface-coatings cured with free aliphatic polyamines have the disadvantage of incomplete cure, high sensitivity to moisture, poor heat resistance and inadequate durability, apart from the unpleasantness of the amine in handling. The complete alkylation of such polyamines reduces their toxicity, reduces the sensitivity to moisture on curing, and improves the heat resistance. The degree of cure, however, is hardly any better than with the free polyamines. The use of an adduct from a free aliphatic polyamine and an epoxide resin as a hardener reduces the sensitivity to moisture on curing, improves the degree of cure, but lowers the heat resistance, which is already inadequate. The use of polyamide resins from polyamines and dimerized fatty acids as hardeners, in optimum proportions, results in much the same improvements as are achieved by using amine adducts and in a somewhat better heat resistance. The use of a modified resinous polyamine as hardener gives good average values with all the tests studied; sensitivity to moisture during curing, flexural strength, surface hardness, heat-resistance, and water- and solvent-resistance.

Determination of the oil content of putty. R. Paulson. *Oil Colour Chemists' Assoc. J.* **39**, 469(1956).

Acrylonitrile in surface coatings. J. C. Pullman(Am. Cyanamid Co.). *Paint Varnish Production* 46(7), 27(1956).

Identification tests for epoxide resins. H. W. Rudd and J. J. Zonsveld(Shell Petroleum Co., London). *Oil Colour Chemists' Assoc. J.* **39**, 314(1956). Two rapid and simple identification tests, originally described by Foucry, which so far as present evidence shows, are specific for epoxide-type resins derived from diphenylolpropane, are described. A wide range of oils and other resins and raw materials has also been examined and shown to give negative reactions in the tests and to have no effect on the reactions when present in mixtures with the epoxide resins.

Epoxidation and uses of epoxides in coatings. Part 1. Preparation of epoxy compounds. D. Swern(Eastern Reg. Res. Lab., Philadelphia) *Paint Varnish Production* 46(5), 27(1956). **Part II. Plasticizers, stabilizers, and mechanism of their action.** *Ibid.* 46 (6), 29(1956). **Part III. Epoxy plasticizers and stabilizers.** *Ibid.* 46 (7), 35(1956). **Part IV. Epoxy resins, reactions and uses of epoxides.** *Ibid.* 46 (8), 32(1956).

Some problems in the fundamental study of alkyd resins. A. R. H. Tawn (Coates Brothers & Co., Ltd., St. Mary Cray, England). *Oil Colour Chemists' Assoc. J.* **39**, 223(1956). A comprehensive discussion. Sixty references.

Recent developments in the epoxide resin field. R. W. Wheeler (Shell Chemical Co., London). *Oil Colour Chemists' Assoc. J.* **39**, 346(1956). A review. 44 references.

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• Detergents

Lenore Petschaft Africk, Abstractor

Determination of hexachlorophene in liquid soaps. R. F. Childs and L. M. Parks(Univ. of Wisconsin, Madison). *J. Am. Pharm. Assoc.* **45**, 313–16(1956). Hexachlorophene is determined in liquid soap by a differential spectrophotometric method consisting of the measurement of the absorbance of a diluted sample at 312 mμ at pH 8 and pH 3. (*C. A.* **50**, 10430)

Film drainage transition temperatures-salt effect. M. B. Epstein, A. Wilson, J. Gershman and J. Ross(Colgate Palmolive Co., Jersey City, N. J.). *J. Phys. Chem.* **60**, 1051-4(1956). For the system sodium lauryl sulfate, lauryl alcohol and water data on the film drainage transition temperatures are extended to include the effects of sodium chloride, a typical strong electrolyte. Over the micellar region, the temperatures are related quantitatively to the micelle composition. The relation is treated as a temperature-solubility function between two assumed quasi-phases, the micelles and the surface. Heats of transition are calculated conventionally.

Alkyl sulfates. I. Critical micelle concentrations of the sodium salts. H. C. Evans. *J. Chem. Soc.* 1956, 579–86. Critical micelle concentration of a number of Na alkyl sulfates, in which the total hydrocarbon chain contains 8–19 C atoms and the position of the sulfate group ranges from terminal to medial, are determined by repeated measurement of conductivity as the solution is diluted. Data are also given for Na 1-tetradecylpentadecyl sulfate. The slopes of the plots are used in estimating the number of gegenions in the micelles.

The shape of the colloidal soap micelles. S. L. Gupta(Univ. Coll. Sci., Calcutta). *Science and Culture*(India) 21, 470(1956). Below the critical micelle concentration, C.M.C., the micelles are spherical and completely ionic with diffused double layers of the Gouy pattern. At and after the C.M.C. the long-chain alkyl soaps aggregate in parallel groupings, diagrams for which are given. The proposed shapes apparently account for equivalent conductivity data. (*C. A.* 50, 10430)

Wetting agents in metal-finishing processes. W. M. Halliday. *Product Finishing*(London) 9(3), 50–6(1956). The application of anionic and cationic wetting agents in metal-cleaning solutions is discussed, and some information is given on methods for evaluating the deterging efficiency of a cleaning solution. (*C. A.* 50, 11036)

Detergent substances. II. Synthetic detergent substances. H. Hofmann and E. Bolland(Friedrich Schiller Univ., Jena, Ger.). *Pharmazie* 10, 345–8. A review of the history, mode of action, and their effects on the human skin as compared to soap. **III. Experimental investigations on the question of the compatability (with the skin) of several synthetic detergent substances.** *Ibid.* 515–24. Experimental studies were made on: Mersolat D(an alkyl sulfonate)(I); ''Emulsifier E 30''(a low-salt alkali monosulfonate, almost free of disulfate and oil) (II); and nonsaponifiable matter from I(a mixture of various hydrocarbons; thought especially irritant)(III). Patch and painting tests on humans, guinea pigs, and rabbits show that at the ordinarily used concentrations, these detergents are not irritating to the skin. With humans, no irritation manifests below concentrations of 0.5% for II, 5% for I, and 25% for III. Depilation was produced on guinea pigs by 14-day applications of 0.2% solution of II and with I and III in 0.5% solutions. Exposure to 50% solutions for 10 min. at 20° did not affect human hair. The strength and elasticity is affected at extremely high concentrations of very long exposures. Allergic reactions were very rare. Intradermal injections into guinea pigs produced erythema in low concentrations and ulceration and hairfall with higher amounts of I and II; III had no effect. Peroral administration to rats and mice showed low toxicity. L.D.$_{50}$ (rats) was 1.2 g./kg. for I, 2.0 g./kg. for II; III was nontoxic. Chronic toxicity was evidenced in liver damage after daily doses of 0.2 g./20 g. of I and II for 10 days. Smaller doses showed no effect. 16 references. (*C. A.* 50, 10431)

Fatty alcohols and their derivatives in modern soaps and detergents. R. Huttenlocher(Chem. Fabrik Duren G.m.b.H., Duren, Ger.). *Seifen-Ole-Fette-Wachse* 81, 757–9(1955); 82, 4–5 (1956). The effect of the presence of dodecyl alcohol(I) in dodecyl sodium sulfate(II) on the washing properties was studied. Addition of 5% I to II lowers the surface tension of solutions in distilled H_2O at 40°; thus, the concentration of detergent (g./l.) and the surface tension (dyne/cm.) of solutions of pure II and II containing 5% I, respectively, are 1, 50, 41; 2, 40, 33; 3, 39, 31; and 4, 38, 29. The amount of foam and the foam stability are also increased by addition of 5% I. In wool washing at 40° in water of 5° German hardness, the washing capacity of pure II is 12.5%, that of II containing 5% I 17.5%, and that of II containing 10% I 14% (*C. A.* 50, 10430)

Trilon in soaps and detergents. O. Schmidt(Badische Anilin & Soda-Fabrik A.-G., Ludwigschafen, Ger.). *Seifen-Ole-Fette-Wachse* 81, 721–3, 756–7(1955). A review on the use of Trilon BW(principal active component, tetra Na ethylenediaminetetraacetate). 7 references. (*C. A.* 50, 10431)

Influence of carboxymethylcellulose in detergent solutions on the ash contents of textile fabrics. K. H. Tan and K. J. Nieuwenhuis. *Bull. Inst. Text.* (France) 58, 69–88(1956). Results of a large number of washing tests to assess the effect of carboxymethylcellulose(CMC) on the ash contents of laundered textile fabrics(cotton, linen, rayon) are summarized. Some of the data are original; others are taken from the literature. In almost all cases the addition of CMC to the washing preparations results in a significant decrease in the ash content of the laundered articles. The effect is most marked when hard water is employed, whether the washing agent be soap + alkali, synthetic detergent + alkali, or alkali salts alone. In soft water, a significant decrease in ash content is obtained when the washing agent is synthetic detergent + alkali. Little or no reduction is observed with soft water and soap + alkali or alkali salts alone. In no case does addition of CMC result in an increase in the ash content.

Isothermal dehydration of hydrous sodium palmitate. H. E. Wirth and W. L. Kosiba(Ohio State Univ., Columbus, Ohio). *J. Phys. Chem.* 60, 923–6(1956). A physical picture of the nature of the binding of water in low moisture soap phases is presented.

Phase transitions in sodium palmitate by dielectric constant measurements. H. E. Wirth and W. W. Wellman(Ohio State Univ., Columbus, Ohio). *J. Phys. Chem.* 60, 921–3(1956). The first-order ''genotypic'' transition in sodium palmitate, first reported by Thiessen and co-workers, has been shown to be due to the presence of palmitic acid impurity in their samples. Definite changes in dielectric constant are associated with the crystal-subwaxy, subwaxy-waxy, waxy-superwaxy, and superwaxy-subneat transitions in anhydrous sodium palmitate. The temperatures at which these transitions occur are 117.8, 137, 162, and 206°, respectively.

Surface activity and detergents. Phenomena of surface activity, physical structure, and electro-colloid behavior. J. Moreno Calvo. *Revista de Ciencia Aplicada* 10, XXX(49), 111–123 (1956). This is the first part of a two-part article upon the study of surface activity and deteragents. Ten figures help to clarify the reasons why detergents have certain properties. **Surface activity and detergents II. Phenomena of surface activity and its relations to detergency.** *Ibid.* 10(50), 210–225(1956). This article discusses the theory of surface activity and its effect on detergency. The two articles provide three tables, 15 figures, and 211 references.

Iron elimination of pottery stone by soap flotation. Harumichi Kawasaki and Aizo Yamamoto(Nagasaki Univ.). *J. Chem. Soc. Japan, Ind. Chem. Sect.* 58, 910–12(1955). Aluminum salts were used as activator and inhibitor, sodium oleate as catcher in the inversed flotation for iron elimination from pottery stone at Izumiyama, Saga Prefecture.

Dispersing effects of surfactants. Dispersion of inorganic pigments. Kenjiro Meguro(Musashi Univ., Tokyo). *J. Chem. Soc. Japan, Ind. Chem. Sect.* 58, 905–7(1955). Pigments (red ferric oxide, yellow ocher, and titanium white) could not be dispersed in water nor in surfactant solution. It was considered to be due to the lack of electric charge on the surface of pigment particles. It was substantiated by experiments with added electrolytes (ferric chloride or aluminum nitrate). The dispersion was effectuated by adding the electrolyte and surfactants (sodium dodecyl sulfate, polyoxyethylene lauryl ether, Tween 80, and dodecylpyridinium bromide). The possibility was discussed that the pigment particles were coated with double adsorption membranes.

Soil retention in detergent process. A model experiment. Taro Tachibana and Michi Tsuzuki(Ochanomizu Univ., Tokyo). *J. Chem. Soc. Japan, Ind. Chem Sect.* 58, 895–9(1955). A model experiment was made on the principle that the retention of soil (carborundum, calcium carbonate, or glass powder) may be counted as follows. The above-mentioned fine particles (av. diam. ca. 20 μ) were dispersed in the washing solution, the number of particles deposited on a smooth surface (cellophane) was counted with a microscope, the surface was inversed, and the number of particles yet adhering was counted. The cleaning compositions used were sodium lauryl sulfate, lauryl pyridinium bromide, and polyoxyethyleneglycol lauryl ether. Several high polymers were also tested singly or as additives such as sodium carboxymethylcellulose, sodium alginate, polyvinyl alcohol, methyl cellulose, sodium polyacrylate, and polyoxyethylene glycol. The results were in good accordance with previous data in the literature. This model experiment was considered to evaluate one elementary process out of the complicated processes of laundering.

Contact angles of aqueous solutions of several surfactants on the paraffinized glass plates. Teruzo Awanara and Ken'ichi Gotô(Univ. Tokyo). *J. Chem. Soc. Japan, Ind. Chem. Sect.* 58, 864–7(1955). Experiments were made with lauryl pyridinium bromide, sodium lauryl sulfate, octylphenol plus ethylene oxide 8.5 moles, nonylphenol plus ethylene oxide 9.5 moles, polyoxyethylene sorbitan monolaurate, and polyoxyethylene sorbitan monooleate. In general, contact angles showed the same tendencies as surface tension and interfacial tension (water-kerosene) to vary with concentration.

Colloidal studies on textile agents. I. Non-Newtonian flow of aqueous solutions of surface-active agents. Shigetaka Kuroiwa, Kunisato Shimizu, and Yasuhiro Yano(Shinshu Univ., Ueda). *J. Chem. Soc. Japan, Ind. Chem. Sect.* 58, 859–63(1955). To clarify the micelle formation of nonionic surface active agents of polyoxyethylene glycol type, the viscosity behavior was examined for their aqueous solutions. Two types were found. One type

$$[C_{11}H_{23}COO(CH_2CH_2O)_nH\ (n = ca.\ 30)\ \text{and}$$
$$C_{17}H_{33}COO(CH_2CH_2O)_nH\ (n = ca.\ 20)]$$

formed approximately globular micelles, while the other

$$[C_{18}H_{35}O(CH_2CH_2O)_nH\ (n = ca.\ 9)]$$

showed non-Newtonian flow in concentrations over 3 x 10^{-3} mole/l. and presumably its micelles considerably deviated from globular.

Solubilization properties of nonionic surface-active agents of sorbitan ester type. Hisahiro Kita, Meiken Nakajima, and Tokusaburo Kubota(Kaô Soap, Co., Wakayama). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **58**, 855–9(1955). *n*-Octanol, capable of forming mixed micelles with active agents, showed specific solubilization phenomenon for polyoxyethylene sorbitan monooleate (containing 28 moles of ethylene oxide as condensate); it had 2 critical points of solubilization. Concerning the relation between the cloud point and the amount solubilized, the raising of cloud point was accompanied by the increase in the amount solubilized (but not in proportion) with *n*-octanol (polar-nonpolar type), while the relation was proportional with benzene (nonpolar type).

Dispersing effects of surfactants. II. Coagulation and dispersion of negative colloid by cationic surfactant. Kenjiro Meguro(Musashi Univ., Tokyo). *J. Chem. Soc. Japan, Pure Chem. Sect.* **77**, 77–9(1956). Various amounts of dodecylpyridinium bromide were added to arsenic sulfide sol. Coagulation occurred at lower concentrations, while dispersion occurred at higher concentrations. The result was discussed by double adsorption on the surface of arsenic sulfide sols.

Textile finishing agents. I. Statical friction coefficient of unit components of various finishing agents. Koshitami Takahashi, Sadamichi Nishikawa, Fumitoshi Jin, Takashi Seino, and Masamitsu Koshimura(Nihon Yushi Co., Osaka). *J. Japan Oil Chemists' Soc.* **5**, 78–82(1956). The values obtained are tabulated for 143 compounds. Among surface active agents cationic agents were most slippery and among nonionic agents some polyhydric alcohol esters were slippery and among anionic agents some soaps and Turkish red oils were slippery. Polyethylene glycol derivatives were not slippery. The agents with 16–18 C atoms were low in friction coefficients. Compounds with high m.p. such as stearic acid, stearyl alcohol, hard paraffin, spermaceti, stearyl amide, N,N-dioxyethylstearyl amide, and Japan wax gave the coefficient approximate to that of olive oil, when dissolved in olive oil, while they gave lower coefficient when dissolved in spindle oil.

II. Friction coefficient of nonionic surface active agents. K. Takahashi, S. Nishikawa, T. Seino, and M. Koshimura. *Ibid.* 82–5(1956). Kinetic and static friction coefficients were measured for ether and ester types of polyethylene glycol derivatives of straight-chain fatty acids. The effects of C number of lyophilic group and molecular weight of polyethylene glycol group were evident.

Corrosion of metals by aqueous solutions of nonionic surface-active agents. Yôichi Katô and Seimi Satô(Kôgyô Shidôsho, Nagoya). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **59**, 503–6 (1956). Experiments were made with a derivative of lauryl alcohol with polyethylene oxide (PEO), a derivative of nonyl phenol with PEO, and a derivative of lauryl amine with PEO, on soft steel, zinc, aluminum, or tin. The latter two were essentially uncorroded. The corrosion could be inhibited with 0.1% salt such as $NaNO_2$, K_2CrO_4, Na_3PO_4, and Na benzoate.

The interactions between dyes and surfactants. I. Aggregation and dispersion of dyes by surfactants. Kenjiro Meguro(Musashi Univ., Tokyo). *J. Chem. Soc., Pure Chem. Sect.* **77**, 72–6(1956). Various amounts of Na dodecylsulfate were added to a dilute solution of malachite green oxalate and the state of the mixture(aggregation and dispersion) was observed; the change of electric conductivity was also measured. The addition product of these 2 compounds (about 1:1) was soluble in benzene. Similar experiments with dodecylpyridinium bromide showed that about 5 moles of the surfactant was necessary for dispersing 1 mole of eosine. Paper chromatography was applied in the study of these systems.

Studies on lignin and pulp. VII. Effect of surface active agents on the penetration of sulfite cooking acid. Ryôiti Senzyu, Tadao Koshizaki, and Yasutoshi Watanabe (Kyûshû Univ., Fukuoka). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **59**, 22–4(1956). No beneficial effects were found with nonionic and anionic agents.

Synthetic emulsifying agents. Mary Fieser, L. F. Fieser, E. Toromanoff, Y. Hirata, H. Heymann, M. Tefft, and S. Bhattacharya(Chem. Lab., Harvard Univ., Cambridge, Mass.). *J. Am. Chem. Soc.* **78**, 2825–2832(1956). Various synthetic compounds containing both lipophilic and hydrophilic groups were prepared and their emulsifying properties examined. Conjugates of various amino acids with stearylamine, *n*-$C_{18}H_{37}$-$NHCOCH(R)NH_2$, were found to have promising emulsifying properties. These contrasted with peptides of the type $C_{17}H_{35}$-$CONHCH(R)COOH$, which were at the most, weak emulsifying agents.

Process for making detergents compositions. L. E. Wells, Jr., and H. F. Moss(Monsanto Chem. Co.). *U. S. 2,746,930.* The retentivity of finely divided anhydrous tetrasodium pyrophosphate for an oily detergent derived from the condensation of ethylene oxide and tall oil is increased by gradually adding water to the salt while intimately mixing the latter in the finely divided solid state with the oily detergent in an amount corresponding to about 0.5 part of the detergent for each part of the pyrophosphate. Water is added only in an amount sufficient to form the decahydrate of the salt.

Toilet detergent bar and process of preparing same. R. G. Faier (Colgate-Palmolive Co.). *U. S. 2,749,315.* A suitable toilet combination bar may be prepared by combining a major amount of anhydrous water-soluble higher fatty acid soaps, and a minor amount of mixed water-soluble synthetic detergents comprising a mixture of higher fatty acid monoglyceride monosulfates and higher fatty acid amide of aminomethane sulfonates uniformly dispersed throughout the soap.

Method of making soap. B. Winer. *U. S. 2,753,363.* A low moisture content soap may be made by reacting a fatty material composed predominantly of free fatty acids with an anhydrous alkali metal carbonate, preferably sodium carbonate, in an amount sufficient to saponify 30–80% by weight of the free fatty acid content, and then completing the saponification of the fatty material with an aqueous alkali metal hydroxide solution.

Oil-soluble surface active composition. G. E. Barker(Atlas Powder Co.). *U. S. 2,753,303.* A group of oil-soluble surface active agents which have been found very useful in the field of petroleum production and processing comprises the polyoxyethylene ethers of sorbitan tri-tall oil ester containing from 10 to 50 oxyethylene groups per molecule, and amine-ethylene oxide products.

Partially-acetylated polyvinyl alcohol as a soil-suspending agent. W. Fong and H. P. Lundgren(Secretary of Agriculture). *U. S. 2,755,252.* A process for removing soil from a textile material and minimizing the re-deposition of removed soil consists of washing the material with an aqueous medium containing a synthetic organic detergent from the class consisting of sulfates and sulfonates and a partially acetylated polyvinyl alcohol acetylated to the extent from about 10 to 15%, and having an average molecular weight from about 10,000 to about 20,000 as a soil suspending agent.

Bleaching of soap and soapstocks. F. O. James and A. Humphreys(Lever Brothers Co.). *U. S. 2,755,294.* An improved method of bleaching soap is claimed when the bleaching agent (sodium hypochlorite) is continuously fed into a stream of molten soap in either an open or closed system and rapidly and intimately mixed with the soap.

Detergent compositions. A. G. Peck(Peck's Products Co.). *U. S. 2,758,092.* The stability and volume of suds of an alkyl aryl sulfonate-containing aqueous detergent solution is increased in the presence of grease soil, by adding to the alkyl aryl sulfonates, approximately 10 to 50% by weight of an alkali metal N-oleoyl-N-methyl taurate.

Improvements in the stabilization of soap solutions. R. Matalon and J. Pickthall(Polak & Schwarz Ltd.). *Brit. 745,813.* Low pH aqueous soap solutions, which are cloudy at ordinary atmospheric temperatures, can be clarified and converted into clear stable colloidal solutions, by the addition of one or a mixture of two or more of the following: an alcohol or an aldehyde soluble in water at 20° to the extent of from 0.5 to 4% by weight or a phenol soluble in water at 20° to the extent of from 0.5 to 10% by weight.

Soap cooling equipment. Henry Simon, Ltd. *Brit. 758,635.* Liquid soap is cooled in apparatus which is economical and efficient in operation. The hot liquid soap is passed via pipes through a vessel, which is in a state of vacuum and into which a liquid cooling medium(water) is sprayed, so that the sprayed or atomized liquid is evaporated at a low temperature, consequent upon the partial vacuum in the vessel, and acts very effectively to extract heat from the pipe and from the soap.