60. Vold, R. D., Reivere, R., and McBain, J. W., J. Am. Chem. Soc., *63*, 1293-6 (1941).
61. Vold, R. D., Rosevear, F. B., and Ferguson, R. H., Oil & Soap, *16*, 48-51 (1939).
62. Vold, R. D., and Vold, M. J., J. Am. Chem. Soc., *61*, 808-16 (1939).
63. Vold, R. D., and Vold, M. J., in Alexander's *Colloid Chemistry*, vol. V, pp. 266-80, espec. Figure 5, Reinhold Publ. Corp., N. Y. (1944).
64. Vold, R. D., and Vold, M. J., J. Phys. & Colloid Chem., *52*, 1424-44 (1948).

[Received June 21, 1954]

CORRECTION

T. P. Hilditch reports that in his Letter to the Editor, appearing in the October 1954 issue of the Journal of the American Oil Chemists' Society, page 433, there were two errors. Lines 11-12 in column 2 should read: "the GS_2U glycerides form a smooth curve." Lines 21-22 should read "but monosaturated glycerides never more than 45-50%."

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

• Oils and Fats

Ralph W. Planck, Abstractor
Dorothy M. Rathmann, Abstractor
Sin'itiro Kawamura, Abstractor

Chemical composition of cerebral arteries. The concentration of lipids and minerals compared with those in the internal carotid. R. C. Buck, J. C. Paterson, and R. J. Rossiter(Dept. Biochem., Univ. Western Ontario, London, Ontario). *Can. J. Biochem. and Physiology* 32, 539(1954). The concentration of total cholesterol, total phospholipid, nonlipid phosphorus, calcium, and fat-free dry residue was determined in the internal carotid and cerebral arteries obtained at autopsy from a series of 14 male subjects ranging in age from 40 to 85 yr. By the method of rank correlation it was found that for both vessels the concentration of total, free, and ester cholesterol was significantly correlated with both age and severity of the atherosclerosis. Ester cholesterol expressed as a percentage of total cholesterol was also significantly correlated with age and the severity of the disease process.

Doedorizing vegetable oils. Anon. *Chem. Eng.* 61(10), 256 (1954). A discussion of U. S. Patent 2,674,609 is given. In this process oil is deodorized at 20-60 microns pressure and 190°-250°F. for 10-48 minutes.

X-ray diffraction and electron microscope studies on the brain lipide strandin. J. B. Finean(Dept. Biology, Mass. Inst. Tech., Cambridge, Mass.). *Arch. Biochem, Biophys.* 52, 38(1954). The electron micrographs of thin layers of strandin show a fairly regular rectangular arrangement of particles measuring approximately 60 x 100 x 100 A., the smallest dimension corresponding to the thickness of the layers. X-ray diagrams of thick crystalline plates show intense low-angle diffractions in three mutually perpendicular directions which correspond roughly to these dimensions. The diffraction spacings of different strandin preparations vary somewhat, and the effects of alcohol, and more particularly of water, suggest that strandin may be a complex or series of complexes in which some of the association of components is more physical than chemical.

A system of characterization of common organic acids. R. T. Wendland and D. H. Wheeler(North Dakota State College, Fargo, N. D.). *Anal. Chem.* 26, 1469(1954). Organic acids containing carbon, hydrogen, and oxygen only can be divided into four well-defined classes based on common physical properties and simple chemical tests. Identification of the drying oil acids calls for ultraviolet absorption studies, or chemical processes of bromination, hydroxylation, and isomerization. Practical significance of the work lies in the increased ease of identification of a large number of compounds encountered frequently in research and industrial operations.

Product control at Colgate-Palmolive Ltd. *Canadian Chemical Processing*, 38, No. 10, 96(1954). A description is given of the new $1,500,000 control laboratory at Colgate-Palmolive in Canada.

Vegetable oils. III. Mallotus philippinensis Muell. Arg. seed oil. R. C. Calderwood and F. D. Gunstone(The University, Glasgow). *J. Sci. Food Agr.* 5, 382-7(1954). Characteristics of kamala-seed (*Mallotus philippinensis* Muell. Agr.) oil are tabulated and compared with previously reported values. Low temperature fractional crystallization, spectrophotometric examination before and after alkali-isomerization, hydrogenation, acetylation, methylation, and fractional distillation yielded data which show that the mixed acids of kamala-seed oil consist of palmitic 18, oleic 28, linoleic 18, and kamlolenic acid 36%. Because the oil polymerizes when heated with acetic anhydride, acetyl values were determined on the mixed hydrogenated esters. The isolation of α-kamlolenic acid and isomerization to β-kamlolenic acid by ultraviolet irradiation of a benzene solution containing iodine are described. α-Kamlolenic acid had m.p. 72°-5°C., and absorption maxima at 262, 271 and 282 mμ. β-Kamlolenic acid had m.p. 85°-7°C. and absorption maxima at 259, 269 and 280 mμ. Repeated recrystallization of β-kamlolenic acid lowered the $E^{1\%}_{1cm.}$, presumably by oxidation. Ozonolysis of methyl α-kamlolenate yielded methyl 8-formyloctanoate, confirming previous reports that α-kamlolenic acid is an 18-hydroxyoctadeca-9:11:13-trienoic acid. During the isomerization of α- to β-kamlolenic acid, one or more *cis* bonds change to *trans* bonds. The relationship of kamala-seed oil to other oils from plants of the Euphorbiacae family, and the possibilities of using kamala-seed oil as a drying oil are discussed briefly.

Soybeans and products futures markets. J. S. Schonberg(Uhlmann Grain Co., Chicago, Ill.). *Soybean Digest* 14(11), 48-51 (1954). Futures contract markets for soybeans, oil and meal are discussed.

Loss of fat during souring of cream. J. E. Roe and H. Edelson (Food and Drug Admin., Dept. of Health, Education and Welfare, Kansas City 6, Mo.) and W. E. Polzen. *J. Assoc. Off. Agr. Chemists* 37, 849-56(1954). Analyses of 24 samples of coffee cream (18% fat) and 26 samples of whipping cream (30% fat) during souring at room temperature showed that loss of fat is not measurable by the Babcock method over a 4-day storage period. Losses are detectable by the Roese-Gottlieb method, but over a 7-day period amount to only about 0.1% of the total per cent of fat per day.

Report on ether extract in fish. H. M. Risley(Food and Drug Admin., Dept. of Health, Education and Welfare, Seattle 4, Wash.). *J. Assoc. Off. Agr. Chemists* 37, 605-7(1954). Results of a committee test of a suggested rapid method for the determination of fat in canned salmon are summarized. A modification in the drying method and extension of the work to other species of fresh, frozen and canned fish are recommended.

Surplus butter disposal and soybean oil. S. Riepma(National Assoc. Margarine Manufacturers). *Soybean Digest* 14(11), 72, 74, 76(1954). Possible methods of disposing of Commodity Credit Corporation-held surpluses of fats and fat products are discussed in terms of effects on normal food fat markets.

World fat and oil supplies. P. E. Quintus(Fats and Oils Div., Foreign Agricultural Service). *Soybean Digest* 14(11), 46-7 (1954). World production and distribution of fats and oils are reviewed. Although per capita supplies are now probably ahead of the prewar levels, total supplies do not appear excessive. Distribution problems create local imbalances. U. S. has substantial reserves for export.

Report on eggs and egg products. F. J. McNall(Food and Drug Admin., Dept. of Health, Education and Welfare, Cincinnati 2, Ohio). *J. Assoc. Off. Agr. Chemists* 37, 818(1954). Several

minor changes in the method for determining sterols are described.

What will happen to soybean prices? F. A. Kutish(Iowa State College). *Soybean Digest* 14(11), 24, 26(1954). Markets and sales of soybeans, oil and meal in 1953 are reviewed, and prospects for 1954-5 are discussed.

Report on nutritional adjuncts. O. L. Kline(Food and Drug Admin., Dept. of Health, Education and Welfare, Washington 25, D. C.). *J. Assoc. Off. Agr. Chemists* 37, 739-41(1954). Committee work on the development of methods for the determination of xanthophylls, vitamin A and other vitamins in mixed feeds and foods are reviewed.

Report on fats, oils and waxes. G. Kirsten(Food and Drug Admin., Dept. of Health, Education and Welfare, New York 14, N. Y.). *J. Assoc. Off. Agr. Chemists* 37, 827-8(1954). The referee reviews briefly results of (1) a study of spectrophotometric method for the determination of polyunsaturated acids in fats and oils, and (2) a collaborative study of methods for determining butylated hydroxyanisole, nordihydroguaiaretic acid, and propyl gallate.

Report on spectrophotometric methods for oils and fats. D. Firestone(Food and Drug Admin., Dept. of Health, Education and Welfare, New York 14, N. Y.). *J. Assoc. Off. Agr. Chemists* 37, 833-42(1954). Results of determining polyunsaturated acids in numerous vegetable and animal oils and fats by a proposed ultraviolet spectrophotometric method are summarized. Both the ethylene glycol and glycerol isomerization reagents have similar and reproducible results. The method provides a rapid means for the determination of soybean oil in admixture with oils containing little or no linolenic acid and for the detection of adulteration of ground beef, pork or lamb with horse meat. The method merits study as a means of distinguishing animal from vegetable fats.

Report on antioxidants in oils, fats and waxes. S. Kahan(Food and Drug Admin., Dept. of Health, Education and Welfare, New York 14, N. Y.). *J. Assoc. Off. Agr. Chemists* 37, 828-33 (1954). Methods are given for the determination of propyl gallate, butylated hydroxyanisole and nordihydroguaiaretic acid in oils, fats and waxes. Collaborative testing indicates that when only one antioxidant is present the methods are fairly reliable and accurate. The methods require further modification to increase the accuracy and reliability of separating and identifying two or more antioxidants in a mixture.

Report on nuts and nut products. A. M. Henry(Food and Drug Admin. Dept. of Health, Education and Welfare, Atlanta 3, Ga.). *J. Assoc. Off. Agr. Chemists* 37, 845-8(1954). It is recommended that first action methods for moisture, crude fat, crude protein, crude fiber, and ash in nuts and nut products be made official.

Interdependence of the cotton and soybean industries. W. R. Blake(National Cotton Council of America). *Soybean Digest* 14(11), 40-3, 45(1954). The effects of present government price support and acreage control programs on soybeans and cottonseeds are reviewed in terms of availability of these oilseeds, utilization for production of oil and meal, consumption of oils, export of oils and oilseeds, and development of new markets. The need is emphasized for continuing the type of cooperation between soybean and cottonseed industries which was successful in removing restrictions on sales of margarine.

Orderly disposal of CCC-held edible oils. J. E. Thigpen(Oils and Peanut Div., Commodity Stabilization Service, U. S. Dept. Agr.). *Soybean Digest* 14(11), 70-1(1954). Government-held stocks of cottonseed oil are not excessive in relation to annual U. S. consumption and are relatively small compared to world consumption. The following suggestions are made for handling this oil: protect against deterioration by exchange of old oil for new oil (including soybean oil), endeavor to increase U. S. sales of cottonseed oil while exporting greater quantities of crude cottonseed and soybean oils at prices and quantities in keeping with normal business practices.

Extraction of liquid from liquid-bearing material. G. W. MacIlwaine. *U. S. 2,689,857.* Oil is separated from vegetable seeds or whole livers by impregnating the solid with a quantity of solvent no greater than that which would just result in gravity draining of the impregnated material. The mixture is then pressed to extrude the oil taken up by the solvent.

Stabilization of edible material. J. A. Chenicek(Universal Oil Products Co.). *U. S. 2,690,396.* Edible material is stabilized by the addition of an inhibitor consisting of a 2-*tert*-alkyl-4-alkoxylphenol and lecithin.

Stabilization of edible material. J. A. Chenicek(Universal Oil Products Co.). *U. S. 2,690,397.* Material subject to oxidative deterioration is stabilized by treatment with an aqueous dispersion of a 2-*tert*-alkyl-4-alkoxyphenol, an edible oil and a nontoxic emulsifying agent.

Textile composition. C. Schlatter(American Viscose Corporation). *U. S. 2,690,427.* A composition for conditioning textiles contains a lubricant and an emulsifier. The lubricant is an alkoxyalkyl ester of a C_{12-30} fatty acid in which the alkoxyalkyl group contains between 2 and 15 carbon atoms and the ratio of alkoxyalkyl group carbons to fatty acid carbons is no greater than 1:2. The emulsifier is an ethylene oxide condensation product of a triester of an inner ether of hexitol with a C_{14-18} saturated fatty acid in which the condensate contains 12 to 20 moles of ethylene oxide per mol of triester.

Preparation of fatty amines. M. M. Renfrew and D. T. Warner(General Mills, Inc.). *U. S. 2,690,456.* A process for the preparation of fatty amines consists in hydrogenating C_{8-22} fatty nitriles in the presence of a nickel catalyst, 0.5 to 10% of a lower aliphatic alcohol and ammonia (0.25 to 0.5 mol per mol of nitrile) at 110° to 170°C. and pressures of at least 150 p.s.i.

Edible shortening agent. H. T. Iveson, S. B. Radlove and P. L. Julian(The Glidden Co.). *U. S. 2,690,971.* A mixture containing 1 mol of glyceride, 1 mol of C_{12-20} fatty acids (at least 50% by weight palmitic acid) and 0.5 to 1 mol of C_{2-6} monohydroxymonocarboxylic acid is converted to a shortening agent by refluxing at about 185°C. in vacuo in order to remove water, sparging with carbon dioxide at about 185°C. in vacuo until the acid number of the mixture is less than 8.1, and finally washing free of water soluble materials. The product is a composition of matter having a saponification value between 204 and 242, containing at least 16% by weight monoglycerides and not more than a small amount of triglycerides. The product contains 2 to 4 moles of esterifiable hydroxyls per 2 moles of glyceride, and is thought to be formed by esterification of 1 to 2 moles of fatty acid with glycerol and 1 to 2 moles of the monohydroxy acid with 2 moles of glyceride.

Preparation of acetal esters. J. L. Harvey(Atlas Powder Co.). *U. S. 2,691,026.* Higher fatty acid esters of an acetal are prepared by the reaction, in the presence of an acidic catalyst, of a saturated unsubstituted aliphatic polyol containing at least 3 hydroxyl groups with a higher fatty acid and an aldehyde or ketone.

Fat soluble vitamin-containing products. A. Bavley, W. A. Lazier and A. E. Timreck(Chas. Pfizer and Co., Inc.). *U. S. 2,691,619.* The product consists of beadlets prepared by dispersing a fat soluble vitamin in a matrix of gelatin containing a water soluble synthetic vinyl resin (polyvinyl alcohol or polyvinylpyrrolidone).

Monoglyceride synthesis. K. F. Mattil and R. J. Sims(Swift and Co.). *U. S. 2,691,664.* A mixture having a high monoglyceride content is obtained by reacting a triglyceride with glycerol in a homogeneous solution in a tertiary aromatic nitrogenous base.

Method and apparatus for deodorizing oils. A. E. Bailey(by mesne assignments to National Cylinder Gas Co.). *U. S. 2,691,665.* An apparatus is described for the continuous deodorization of fats and oils by steam in vacuo.

Scouring of wool and recovery of wool grease from wool scouring liquor. S. Cabot and G. Cohen(Pacific Mills). *U. S. 2,692,184.* Raw wool is scoured with a hot aqueous solution of detergent and alkali. The liquor is withdrawn and treated with a sufficient quantity of alkali metal or ammonium salt of a mineral acid or an organic acid containing fewer than 3 carbon atoms to build soaps but not to precipitate proteins, detergents or soaps. The mixture is heated until the color darkens and a spot test on filter paper shows a clear ring with a dark center. The mixture is allowed to settle for at least 4 hours in order to remove hardness due to lime and heavy metal salts. Finally, the liquor is centrifuged to separate the wool grease.

Process for improving unsaturated fatty acids or their derivatives. J. J. A. Blekkingh(Lever Brothers Co.). *U. S. 2,692,886.* The unsaturated fatty acid or derivative is heated in an inert atmosphere at temperatures no higher than 140°C. and in the presence of a catalyst. The catalyst is prepared by reduction of a compound of cobalt or nickel and contains some silicate of the metal and a small amount of sulfur.

Synthetic lubricants from polyhydroxystearic acids. L. E. Gast, C. B. Croston, W. J. Schneider, and H. M. Teeter(Northern Utilization Research Branch, Agricultural Research Service,

U.S.D.A., Peoria, Ill.). *Ind. Eng. Chem.* **46**, 2205-08(1954). A number of compounds prepared have low pour points and other desirable properties as lubricants. However, it has not proved possible to obtain compounds having viscosities of 9,000 cs. or less at −65°F. This difficulty may be attributed to a fundamental structural obstacle—namely, the fixed linear chain of 18 carbon atoms present in the original fatty acids. Thus, it was found that addition to this chain of necessary groups to secure low pour points resulted in undesired increases in viscosity. On the other hand, in cases where a low pour point could be obtained by introduction of small substituents, the viscosity index was excessively low.

Chemical research on the composition of the sulfur containing oils of rapeseed. E. Andre and P. Delaveau. *Oleagineux* **9**, 591-600(1954). Three different isothiocyanates were isolated from the essence obtained by steam distillation of rapeseed press cake. Crotonyl isothiocyanate, which previously was thought to be the sole constituent, formed 65-75% of the essence depending on the source of the press cake while the two newly identified constituents phenylethylisothiocyanate and an "angelylisothiocyanate" amounted to 4-5% and 10-12%, respectively, of the oil. The structure of the latter compound has yet to be established definitely.

The continuous extraction of coconut oil with ethyl alcohol. José S. Gutierrez(Univ. Philippines, Laguna). *Philippine Agr.* **34**, 133-43(1951). No truly continuous system was evolved of the 5 devised. Difficulties encountered in the oil-miscella separator operating at 18-20° were caused by condensation of moisture in the separator, precipitation of reducing sugar, and unavailability of fairly large amounts of cooking liquid. A semicontinuous extraction with 71% efficiency was attained with one system. Continuous use of the solvent decreased its extraction efficiency and nonoil substances (sugars) built up in the miscella. A higher percentage of extraction was obtained from oven-dried samples than from sun-dried samples. (*C. A.* **48**, 7319-20)

Trace elements and changes in fats. G. Gorbach(Tech. Hochschule, Graz, Austria). *Fette u. Seifen* **55**, 541-4(1953). Methods are described for the determination of traces of metals in fats, using a specially developed capillary colorimeter and a capillary photometer. (*C. A.* **48**, 8559)

Analytical constants of the fixed oil from the seed of Pyrularia pubera. Rose Goldfield, Joseph A. Bianculli, and Robert W. Sager (Univ. of Pittsburgh, Pa.). *Am. J. Pharm.* **126**, 62-4 (1954). Preliminary pharmacological investigation on rats showed no apparent pharmacological effect of the oil when administered by gastric intubation or intravenously. Analytical constants of the fixed oil obtained by the solvent extraction of the decorticated seeds of *P. pubera* were determined in the usual manner and the results are: saponification no. 189.8; iodine value 102.9; acid value 9.0; Reichert-Meissl no. 0.1; Polenske no. 0.1; d_{25}^{25} 0.9240; n^{20} 1.4781; unsaponifiable residue 0.74%; acetyl value 27.7; titer test of the fatty acids 9.9°; thiocyanogen no. 73.6. (*C. A.* **48**, 8481)

Detergents from cotton-seed oil. II. Pilot plant production and analysis of fatty alcohols produced from cotton-seed oil. Bahi-El-Din Aly Gebril(Univ. of Alexandria, Egypt). *Oil and Soap* [Egypt] **1954**(3), 38-40. Fatty alcohols are produced by hydrogenating the oil at high temperature and pressure. With 5% Cu-Cr oxide as catalyst and an initial pressure of 150 kg./cm.^{2}, there was obtained after 4 hrs. at 330°C. a yield of 95.6% of fatty alcohol having an iodine value (Hanus) of 1.02. With 10% of a Cd modified Cu-Cr oxide catalyst (other conditions unchanged) there was produced in 96.4% yield a fatty alcohol having an iodine value of 41.7. Operational details for the process as well as analytical calculations are given.

Determination of peroxides in fats by the titanium method. Cecylia Furmanek and Kazimierz Monikowski(Woj. Stacja Sanitarno-Epidem. Odd. Badania Zywnosci i Przedm. Uzytku, Lódz, Poland). *Roczniki Państwowego Zakladu Hig.* **1953**, 447-57. The method for the determination of peroxides by means of Ti^{++++} is based on the formation of pertitanic acid under the influence of H_2O_2. The H_2O_2 is formed during the decomposition of certain organic peroxides in rancid fats. $Ti(SO_4)_2$ was employed as the reagent, forming in the presence of H_2O_2 the yellow colored H_4TiO_5, which was determined colorimetrically on a Pulfrich photometer with an S-42 filter. The reaction is dependent on the ability of acidified water to hydrolyze certain peroxides to H_2O_2. Some of the vegetable oils do not give this reaction. (*C. A.* **48**, 8559)

A simple rapid procedure for the determination of the bromine number by using bromine vapors. F. Fritz. *Deut. Farben Z.* **8**, 94(1954). The substance to be tested is placed on perforated strips (20 x 7 cm.) of filter paper. Add dropwise 0.12-0.15 g. of oil sample, weigh, hang from a glass rod within a beaker or jar filled with Br vapor, hold for 0.5-0.75 hr. in a dark place, heat to 40° for 15 min., and reweigh to determine the gain due to Br uptake. Viscous oils are applied to the filter paper in Et_2O solution, and solvent is allowed to evaporate before testing. (*C. A.* **48**, 7321)

Oxidation changes of lard with various methods of production. N. S. Drozdov and N. P. Materanskaya. *Myasnaya Ind. S.S.S.R.* **25**(1), 54-6(1954). The deterioration change occuring in lards processed (rendered) by the horizontal vacuum autoclave method was compared with those of lards rendered by the Anufrieva centrifuge machine. (Cf. *C.A.* **48**, 4859). The maximum temperature attained in both methods was 80°. Free fatty acids, epihydrin aldehyde, peroxide value, iodine value, and epoxide development are graphically presented. Minimum hydrolysis of the fat occurs with centrifuge rendering. (*C. A.* **48**, 8441)

A new adulteration of olive oil. Bartolomeo Doro(Lab. chim. provinciale, Trieste). *Boll. lab. chim. provinciali* (Bologna) **4**, 97-9(1953). The adulterant is olein prepared from the fat of slaughtered animals. No general method is now available by which this adulteration of vegetable oils, especially olive oil, can be proved. Very gross adulteration of olive oil with this liquid fat affects the *n* and the iodine value, but even this can be concealed by the addition of a 3rd oil if properly chosen. It is suggested that the seed oils be required to be characterized in some way as is sesame oil, and that strict laws be enacted to govern the sale of these oils for human consumption. (*C. A.* **48**, 8561-2)

Recent work on the composition and the processing of cottonseed in India. C. R. Desikan and K. S. Murti(Oil Technol. Inst., Anantapur, India). *Oils & Oilseeds J.* **6**(9), 12-15(1954). Analyses of 110 cottonseed samples from 10 Indian states gave: oil 13.1-24.5%, lint 1.1-17.9%, protein 17.0-25.0%, H_2O 2.1-12.0%. Up to now only 5% of the Indian cottonseed crop (1.1 million tons per year) has been processed for oil, most of the remainder being fed as whole seed to cattle. Most Indian mills are inefficient, producing in low yield a cottonseed oil that is difficult to refine. A few mills have acquired efficient American equipment and trained technologists. Government research laboratories are studying the extraction and refining of the oil, the nutritive value of the meal, and the utilization of the foots.

Degradation products of nim oil. *Indian 48,529.* (Council of Scientific and Industrial Research.) Oil of nim *(Melia azadirachta)* was heated alone and also with $ZnCl_2$ yielding products suitable for solvents. Properties of various fractions are reported.

Groundnut milk. *Indian 47,902.* (Council of Scientific and Industrial Research.) Groundnut (peanut) kernels are converted to paste in a triple-roll mill. The paste is mixed with water and finished through the mill, then stirred with about 5 times as much water as the original weight of the kernels and filtered. The milk obtained is treated with saturated lime water to pH 6.6-6.8. Steam is then bubbled through the milk for 45-60 min. The milk is cooled to about 113°F. For every 100 lb. of milk, 117 g. tribasic Ca phosphate and 51 g. Na. citrate are added to fortify it with Ca and to increase its keeping qualities. The milk is then fortified with vitamins A, D, and B_2. Additional water is then added to give 8-9 lb. of milk/lb. of kernels. Sugar and flavor are added as desired. The milk thus obtained is passed through a homogenizer to break up the fat globules colloidally and to disperse the added salts. Peanuts processed as described yield a fortified and stabilized milk which has about the same proximate composition as cow milk. It can be used to prepare curd, buttermilk, and lactic cheese. (*C. A.* **48**, 8445)

Fatty acids from nim oil. *Indian 46,713.* (Council of Scientific and Industrial Research.) Oil of nim *(Melia azadirachta* or *Melia indica)* (1 kg.) is boiled with NaOH solution (18 g. dissolved in 300 cc. H_2O), and when the saponification is complete 900 cc. of 50% HCl is added to the hot hydrolyzate with constant stirring. The mixture of fatty acids, such as oleic acid, stearic acid, and palmitic acid, separates as an oily layer, and the acidic aqueous layer is drained off. The mixture of fatty acids is kept at 90-100°, and is washed with boiling H_2O in the amount of 1 l. each time with stirring. When the aqueous washing is free from mineral acid, it is allowed to settle overnight to solidify to a pasty mass. After draining off the residual aqueous portion the mixture of fatty acids is heated to 50-75°, and 2 l. of 50-80% alcohol is added. The

clear solution obtained is allowed to cool at 0°. After 4-8 hrs. the whole mass is filtered, and again the mother liquor cooled for 8-10 hrs., to obtain a mixture of solid fatty acids in a yield of 26% on the weight of the oil. The final mother liquor is diluted. When the mixture of liquid fatty acids floats as an oily layer, it is separated and dried. The yield is 63% on the weight of the oil. (*C. A.* **48**, 7322)

Refining the oil of nim. *Indian 48,539.* (Council of Scientific and Industrial Research.) The oil of nim *(Melia azadirachta)* is first solvent extracted and then subjected to steam distillation or distillation in the presence of alcohol vapor. The distilled oil is then washed with 5-10% alkali, treated with active earth or C, and filtered. (*C. A.* **48**, 7322)

Continuous hydrolysis of fats. K. Burrow(Thos. Hedley & Co., Ltd., Newcastle-upon-Tyne, England). *Trans. Inst. Chem. Engrs.*(London), **31**, 250-64(1953). The historical development of fat splitting and fatty-acid distillation is discussed, and a commercial plant for the production of fatty acids for soap-making is described. (*C. A.* **48**, 8559)

The dielectric properties of some long-chain fatty acids and their methyl esters in the microwave region. T. J. Buchanan (Middlesex Hospital Med. School, London). *J. Chem. Phys.* **22**, 578-84(1954). Microwave measurements were made on stearic, palmitic, lauric, and capric acids, on Me and Et stearates, and on Me and Et palmitates in the solid and liquid states between 1 and 50 cm. The loss was small in the solid state, and there was no absorption peak in the wave-length range covered; in the liquid state the loss was greater with evidence of a small absorption peak near 3 cm. The Me esters showed an absorption peak in the microwave region in both the solid and liquid states. Resonance absorption occurred at a frequency of approximately 6000 Mc./sec. for the liquid Me esters. The Et esters showed a relaxation loss of the same order as the relaxation loss of the Me esters but they showed no signs of resonance absorption loss. Hoffman's model (*C. A.* **46**, 10731) of long-chain molecules was in qualitative agreement with measured dielectric behavior. (*C. A.* **48**, 7951)

Preparation of monounsaturated fatty acids by partial hydrogenation of polyunsaturated fatty acid esters. C. Boelhouwer, Ong Tian Lie, and H. I. Waterman(Delft Inst. Technol., Netherlands). *Research Correspondence*, Suppl. to *Research*(London) 6, 41S-2(1953). Migration of double bonds during partial hydrogenation of fatty acid esters with Ni catalyst is strongly pronounced in a direction away from the CO_2H group. The presumed 10-octadecenoic acid isolated from partially hydrogenated sunflowerseed oil was shown by ozonolysis and partition chromatography of the resulting dicarboxylic acids to contain only 30% of the 10-isomer; the remainder consisted mostly of the 9-, 11-, and 12-octadecenoic acids. (*C. A.* **48**, 9323)

Latest developments in oil extraction. T. J. Barlow. *Oil and Soap*(Egypt) **1954**(3), 44-5. Recent improvements in oil extraction machinery and processes are reviewed. Hydraulic presses working at extra high pressures (6500 psi.) left only 4.55% oil in cottonseed cake. Centrifuging oil directly as it comes from the press removes foots and reduces free fatty acid formation. Screw presses of increased capacity (50 tons of seed per day) have been developed. Solvent-extraction has been adopted by one firm in Egypt but the method offers few advantages in Egypt because of government control and seed allocation. The pre-press method is more adaptable to seeds of varying quality than is the direct extraction process.

Particulars of sales tax in various states of India. *Oils & Oilseeds J.* **7**(2), 18-9, 21-4(1954). Tax regulations affecting oilseeds, oils, presscakes, vanaspati, soap and paints are presented in tabular form for 20 Indian states. Listed for each state are the exempted oils and oil products.

How European countries fared during 1953. Anon. *Oils & Oilseeds J.* **7**(2), 4-7(1954). Reports on production and trade for oils and oilseeds are given for 9 European countries during 1953. Government controls have been reduced in France and Great Britain, but subsidies and/or controls influence production and trade in most European countries.

Final agmark designations and definitions of quality for vegetable oils. *Oils and Oilseeds J.* **6**(12), 18-9(1954). Indian standards have been announced for mustard oil (grade 1, edible), and (grade 2, edible), niger seed oil (grade 1, edible), and safflower oil (grade 1, edible).

Vegetable oil project of Ceylon. H. V. Parekh. *Oils and Oilseeds J.* **6**(11), 12-13(1954). The Government of Ceylon is starting a vegetable oil project composed of several plants for the continuous solvent extraction of poonac (pressed copra cake containing about 10% oil), for the batch extraction of copra and other native oil seeds, and for the production of glycerine, distilled fatty acids, lauryl alcohol, refined and deodorized oils, and cattle and poultry feeds. Deoiled poonac is an excellent high-protein cattle feed.

Critical temperatures of solution of ghee and hydrogenated oils (Vanaspati). P. T. Bhide and J. G. Kane(Univ. Bombay). *Indian J. Dairy Sci.* **5**, 183-7(1952). Critical temperatures of solution were determined for genuine ghee and for Vanaspati by heating the sample with an equal volume of a mixture of 2 parts EtOH and 1 part isoamyl alcohol by volume and noting the temperature at which turbidity appears on cooling. The average value for Vanaspati being about 25° higher than that for ghee, gross adulteration of ghee with Vanaspati is readily detected. Positive Baudouin test and n greater than 1.4555 confirm adulteration. Several samples of bazaar ghee were found to be so adulterated. (*C. A.* **48**, 2941)

Keeping quality of ghee. I. Effect of nature of milk, method of preparation, temperature of melting, and antioxidants. K. R. Lalitha and N. N. Dastur(Indian Dairy Research Inst., Bangalore). *Indian J. Dairy Sci.* **6**, 147-68(1953). High temperature and exposure to diffuse light caused rapid development of tallowiness. Butterfat prepared at 40°, 65°, and 115° kept well provided care was taken properly to remove moisture and other impurities. Samples prepared at 40° increased in peroxide content slower than samples prepared at 115°, though free fatty acid content was a little higher in the 40° samples. Ghee showed a perceptible off-flavor by the time the peroxide value was 1.0. Small amounts of free fatty acids in ghee (1.5% oleic) did not affect its keeping quality, but in high acid ghee, oxidative spoilage was rapid. Ethyl gallate at 0.02% was very effective in checking oxidative spoilage but had no effect on the development of free fatty acids. (*C. A.* **48**, 2941)

The composition of milks. A compilation of the comparative composition and properties of human, cow, and goat milk, colostrum, and transitional milk. Icie G. Macy, Harriet J. Kelly, and Ralph E. Sloan. *Natl. Research Council Natl. Acad. Sci.* (U.S.) Publ. No. **254**, 70 pp.(1953).

Copper content of butter. Per Swartling. *Svenska Mejeritidn.* **26**, 223-8(1954). The natural Cu content of butter is 0.03-0.04 mg./kg. A higher Cu content may depend on Cu-containing water, giving a deposit of Cu on the churn during cleaning, which afterwards is incorporated into the butter. This is avoided by using stainless-steel boilers or by deacidifying the raw water. (*C. A.* **48**, 9574)

Treatment of winter cream at different temperatures with regard to the butter aroma. Per Swartling and Sture Johansson (Statens Mejeriförsök, Alnarp, Sweden). *Svenska Mejeritidn.* **46**, 309-12, 315-6(1954). The Alnarp method for winter cream was investigated. After 1½ hrs. at 8°, the inoculated cream was kept at 19° until 58° Thörner (1°T. = 0.009% lactic acid) was obtained. Thereafter, in one series the cream was kept at 16° overnight, chilled to 13° and churned, whereas in another series the cream was chilled immediately to 12° and churned the next day at 13°. The 8-19-12 method gave a butter with better flavor and taste with higher keeping qualities and with higher biacetyl content, 2.1 mg./kg., than the 8-19-16 method, 1.8 mg./kg. (*C. A.* **48**, 9573)

Relation between proteins and fatty substances of milk. A. Antoine. *Bull. inst. agron. et stas. recherches Gembloux* **20**, 5-8 (1952). A positive correlation exists between the protein content and the fat content in the milk of land animals. (*C. A.* **48**, 9573)

Relations between proteins and fat content of milk. P. de Munter. *Bull. Inst. a gron. et stas. recherches Gembloux* **21**, 29-39 (1953). A statistical analysis of the data presented by several authors concerning the relationship between the protein and fat content of the milk of cows is given. (*C. A.* **48**, 9573)

Chemical changes in cottonseed oil on heating to various temperatures. J. G. Chalmers(Glasgow Roy. Cancer Hosp., Scotland). *Acta Unio Intern. contra Cancrum* **7**, 595-8(1951). Heated at atmospheric pressure in the presence of catalytic Fe, cottonseed oil distilled at 334-72°. Palmitic acid was isolated from the distillate. Heating the oil at 340° under reflux produced some palmitone, characterized as the oxime, m. 59°. (*C. A.* **48**, 9557)

A technical approach to improvement of the vegetable oil industry [of Egypt]. L. W. Bass and G. C. Sweeney, Jr. (Arthur D. Little, Inc., Cambridge, Mass.). *Oil and Soap*(Egypt) **1954** (1), 43-4. A survey of opportunities of improved industrializa-

tion in Egypt is yielding data which should aid in improving the Egyptian vegetable oil industry.

The continuous DeLaval short-mix refining process for fats and fatty oils. I. B. Braae. *Oil and Soap*(Egypt) **1954**(2), 40-43. The DeLaval Short-Mix refining process offers advantages of economy, low losses, and speed over the caustic and soda ash continuous refining processes. The DLSM process uses hermetic, centrifugal separators designed for this process. Disks in the separator bowls increase path length for the oil and the efficiency of separation. Blocking of the bowl of the soapstock separator is prevented by keeping the entering liquid and the contents of the separator under positive pressure.

II. Description of the short-mix refining plant. *Ibid.* **1954**(3), 33-37. Degumming, neutralization, re-refining, and water-washing are carried out successively, using centrifugation after each step to remove gums, soaps, and water. Comparison of straight-caustic and short-mix refining indicates the latter process is quicker and produces lower oil losses.

Preparation and constitution of copper-chromite catalyst. Anon. *Oil and Soap*(Egypt) **1954**(2), 38-39. Addition of Cu nitrate solution to ammonium dichromate solution containing ammonia yields a precipitate which is approximately $Cu(OH)NH_4CrO$. Roasting at 500° for 2 hrs. produces a black crystalline catalyst composed of equimolar ratios of CuCrO and CuO. Although neither CuCrO nor CuO is effective as a hydrogenation catalyst the mixture is effective. Modifications such as those containing Ba, Ca, and Mg, are mentioned.

Production and utilization of sesame. Anon. *Oils & Oilseeds J.* **6**(11), 14-15(1954). Various statistics on production of sesame seed and oil, chiefly for India, are given. For 1950-51, production in India was 433,000 tons of seed, 130,000 tons of oil. Seeds contain 47.00-50.15% oil depending on variety. The oil is used for cooking, margarine, shortening, soap, and toilet preparations.

Prospects for solvent extraction process in Hyderabad State. M. S. Kumarswamy. *Oils & Oilseeds J.* **6**(9), 16-18(1954). Hyderabad State is a large producer of peanuts, castor, sesame, linseed, niger, kardi, cottonseed, and various minor oilseeds. Alcohol, produced locally by the fermentation of molasses, is available in quantity at moderate cost. Solvent plants could be financed by existing large mills and by coalitions of the smaller mills. De-oiled cake can be marketed for cattle feed and fertilizer. Solvent extraction plants should be installed even if government assistance is needed.

Oils and oilseeds. Their importance to Andhra State. V. S. Krishnamurti(Madras Oils & Seeds Assoc.). *Oils & Oilseeds J.* **6**(5), 11-14(1953). Statistics are presented for the production of peanuts, castor, and sesame in various districts of Andhra State and Residuary Madras State and for exports of peanuts and peanut oil from Madras State. Local uses for major and minor oils are discussed.

Ethanolysis of vegetable oils using sodium hydroxide as a catalyst. I. Effect of ethanol and catalyst concentration and soap formation. Dipti Kalyan Chowdhury and B. K. Mukherji(Univ. Coll. of Sci. & Technol., Calcutta). *J. Indian Chem. Soc.* **31**, 116-24(1954). The optimum concentration of ethanol was 2 equiv./equiv. of oil. With this ethanol concentration and at 30°, the optimum concentration of NaOH was 0.5% for coconut, castor, mohua, and sesame oils and 0.75% for linseed, tung and mustard oils. Coconut ethanolyzes rapidly because of its low molecular weight and castor because of its hydroxyl group. When other conditions are the same, the rate of ethanolysis is roughly inversely proportional to the iodine value of the oil. Allyl isothiocyanate inhibits ethanolysis.

II. Effect of temperature and moisture. *Ibid.* 125-8. By carrying out the reaction at 30°, 50°, and 70°, using a 2:1 ratio of alcohol to oil and 0.25% NaOH based on the weight of the oil, it was observed that (a) the optimum temperature for ethanolysis is in the region of 30° for coconut and castor oils, 50° for mohua and sesame oils, and 70° for linseed, tung, and mustard oils; (b) the amount of NaOH removed by soap formation increases with temperature and is also influenced by the nature of the oils; (c) moisture inhibits the reaction and promotes soap formation. Its effect is most pronounced at 50°.

III. Composition of the reaction products obtained at different stages. *Ibid.* 129-31. Ethanolysis studies (50°, 2 equivalents ethanol/equivalent oil, 0.25% NaOH on oil basis) showed that ethanolysis is a stepwise reaction producing mono- and diglycerides as intermediate products along with glycerol and ethyl ester. Tung and castor oil, which are largely simple triglycerides, yielded comparatively high concentrations of diglycerides, thus suggesting that the "simple" or "mixed" nature of a triglyceride influences its ethanolysis.

Drum drier for oil seeds. V. V. Zhitkov(Oil-Fat Trust Saratov). *Masloboĭno-Zhirovaya Prom.* **19**(1), 12-14(1954). Description with diagrams of a horizontal drum drier and seed cleaner. The capacity is 150 tons of sunflower seeds per day, from which 6% moisture is removed. The machine can be used to dry soybeans, mustard, flax, hemp, rape, and castor seeds. (*C. A.* **48**, 7319)

Refining of rapeseed oil. A. M. Zharskii and T. E. Romanova (Kharkov Fat Combine). *Masloboĭno-Zhirovaya Prom.* **19**(2), 35-6(1954). Methods are described for steaming and salting for degumming, alkali refining, bleaching with active earth, active C, and gumbrin, and hydrogenation with use of Ni formate catalyst. (*C. A.* **48**, 8562)

Inhibition of the autoxidation of fish oils. K. K. Shu(Natl. Taiwan Univ., Taipei, Formosa). *Formosan Sci.* **7**, 1-6(1953). A review with 22 references. (*C. A.* **48**, 7321)

Chemical examination of the seed oil of Jatropha glandulifera, Roxb. M. C. Sheth and C. M. Desai(M. T. B. College, Surat). *J. Indian Chem. Soc.* **31**, 407-9(1954). Extraction of seeds of *Jatropha glamdulifera* with CCl_4 gave a 20% yield of an oil having the following constants: d^{29} 0.9066, n^{30} 1.477, B.R. reading (40°) 58.8, saponification value 195.2, acetyl value 16.8, iodine value (Wijs) 117.8, acid value (as oleic) 5.6, unsaponifiable matter 1.75%, Reichert-Meissl value 1.65, Polenske value 0.88. The mixed acids obtained from this oil (92.2% yield oil basis) gave: iodine value 122.4, saponification equivalent 277.5, acetyl value 0. The solid and liquid acids were separated and converted to methyl esters. The esters were distilled and the fractions tested for iodine value, thiocyanogen value, and saponification equivalent. The oil contained the following acids: myristic 2.4, palmitic 14.5, stearic 6.0, oleic 34.2, and linoleic acid 43.0%.

Problems concerning improvement in quality of cottonseed oil. A. G. Sergeev. *Masloboĭno-Zhirovaya Prom.* **19**(2), 5-8(1954). A cooker for detoxifying and preparing cottonseed for oil extraction is illustrated and discussed. (*C. A.* **48**, 8561)

Production of fatty acids and their nitrogen derivatives. M. K. Schwitzer(Armour Co., London). *Rev. franc. corps gras* **1**, 5-15 (1954). Review on splitting of fats, distillation of fat acids, crystallization, fractional distillation, and preparation of amides, nitriles, etc. (*C. A.* **48**, 8560)

Vegetable-oil refining. Bhawanishankar Vamanrao Samsi. *Indian 49,358.* Soap or soap stock (224 lbs.) is added to 20 tons of vegetable oil. The free-fatty-acid content of the oil is 0.5% before treating with NaOH, KOH, or Na_2CO_3 solution. The soap or soapstock can also be added during the treatment. (*C. A.* **48**, 7322)

Toward question of the nature of specific coloring of raw cottonseed oil. V. P. Rzhekhin. *Masloboĭno-Zhirovaya Prom.* **19** (2), 8-12(1954). In an attempt to elucidate the systems involved in the formation of color in cottonseed oil, the relationship between the gossypol and phospholipide content, temperature, exposure to air, intensity, and the type of color developed was investigated. The color intensity of the unheated samples of cottonseed oil, containing 0.2-1.2% of gossypol, varied but slightly. The color of these and pure gossypol alone, after 2 hrs. at 135 and 60-160°, varied directly with the heat-treatment and with the amount of gossypol present. At 145°, color intensity reached its peak at the end of 2 hrs. Air, and especially when 2% of phospholipide were added to cottonseed oil containing various amounts of gossypol, caused an appreciable increase in color. The color developed was ordinarily cherry-red, becoming dark brown in the presence of phospholipides. R. concluded that an intense browning of I was caused not by gossypol itself, but by the by-products of its transmutation (loss of free aldehyde and acids groups), condensation, and interaction with phospholipides, and that these processes are accelerated by air. Either the gain or loss in the coloring ability of gossypol which occurs during the heat-treatment of cottonseed oil was thought to be associated with changes in the functional groups of gossypol or the formation of a new compound. (*C. A.* **48**, 8561)

Carbohydrate and fat contents of fishes. T. S. Ramaswamy (Univ. Madras). *J. Madras Univ.* **23B**, 232-8(1953). A survey with 43 references. (*C. A.* **48**, 8441)

Some unsaturated fatty acids for pharmaceutical purposes (vitagen F, undecylenic acids, and their alkanolamine salts). A. Raoul Poggi and Giorgio Serchi(Univ. Cagliari, Italy). *Chimica*(Milan) **8**, 315-23(1953). The complex unsaturated

fatty acids having the physiological activity of the vitamin F form the so-called Vitagen F which contains linoleic acid and its isomers, dilinoleic acid, linolenic acid, elaidolinolenic acid and its isomers, undecylenic acids and their polymers. The action of Vitagen F is discussed, and the methods of examination of its constituents are reviewed.

Experimental part. A. R. Poggi, G. Serchi, Georgio Albertazzi, and Ilaria Cao. *Ibid.* 345-51. Vitagen F is obtained by saponifying linseed oil and separating the fatty acids by means of their Ca or Ba salts. Linoleic and linolenic acids are separated by the Et esters or by Zn salts. Vitagen F can be obtained even more directly by direct distillation (at 16 mm.) of the fatty acids. The mono-, di-, and triethanolamine salts of the various fractions obtained in the fractional distillation were prepared, and the products were examined chromatographically; the results are tabulated. (*C. A.* **48**, 8478-9)

Research on margarine in butter. J. Pien, J. M. Désirant, and B. LeFèbvre. *Lait* **34**, 11-22(1954). The method of detecting the presence of margarine added to butter is based on the required addition in margarine as a tracer of 2 g. of potato or rice starch per kg. of the margarine. However, some butters known not to contain added margarine sometimes show the presence of starch. Starch in the butter probably originated from feed which in some manner came to contaminate the milk. Thus erroneous conclusions sometimes resulted, based on detection of starch in the butter. However, the amount of starch in butter containing even as little as 1% of tracer-containing margarine was so much more than encountered in any butter showing starch reaction but known not to contain margarine that this quantitative difference served as a method of detecting added margarine in butter. (*C. A.* **48**, 8440)

Determination of acid numbers in dark cottonseed oils by the use of bromothymol blue indicator. F. S. Omel'chenko. *Maslobo˘ino-Zhirovaya Prom.* **19**(2), 27-8(1954). Acid numbers of dark cottonseed oil, as determined by (*a*) the salt method in which a 10-g. sample in 50-60 ml. of 15% solution of NaCl is titrated with 0.25 *N* KOH solution, with phenolphthalein as indicator, and (*b*) by the alcohol-ether method, with bromothymol blue alone, or (*c*) same as *b* but with both indicators were compared. Acid numbers as determined by *a* were somewhat lower than those determined by *b* and *c*, respectively. The end point was determined readily by appearance of a blue color or red-violet when *b* and *c* were used, respectively. The advantages of the alcohol-ether method are discussed. (*C. A.* **48**, 8561)

Clarification of the sperm-whale-oil by-products with hydrogen peroxide. S. A. Moldavskaya and E. S. Dmitrieva. *Maslobo˘ino-Zhirovaya Prom.* **19**(2), 14-6(1954). Bleaching of hydrolyzed sperm-whale oil with H_2O_2, and the subsequent separation of the fatty acids and spermaceti, used in the manufacture of cosmetics, is described. A mixture made of 2.5 tons of whale oil and an equal part of water is heated to boiling and then treated with 40% solution of NaOH in an amount 0.1-0.2% greater than needed to neutralize the mixture. This mixture at 80-85° is treated with 25-30% solution of H_2O_2 at the rate of 1.4-1.5% H_2O_2 to the weight of whale oil, then grained, settled, etc. Good results were obtained also when 0.1-0.2% $NaHCO_3$ was added to mixture prior to its treatment with H_2O_2. (*C. A.* **48**, 8563)

Urea complexes of fatty acids. Effect of urea concentration on the formation of fatty acid complexes in a diluted solvent medium. K. Ananth Narayan and B. S. Kulkarni(Osmania Univ., Hyberabad). *J. Sci. Ind. Research*(India) **13B**, 75-6 (1954). Urea was added in increasing amounts to a solution of 10 g. safflower fatty acids in 100 cc. of 80% alcohol. Selective fractionation occurred and increasing the amount of urea increased the yield of adduct to a maximum at 50 g. urea in the system. (*C. A.* **48**, 8559-60)

Unsaturation of fat acids and liver necrosis. J. M. Martin (Inst. biol. med. exptl., Buenos Aires). *Rev. soc. argentina biol.* **29**, 229-31(1953). Liver necrosis was produced in rats by feeding a diet containing much bakers yeast. Addition of olive oil (Iodine value 79-94) to a diet aggravated the necrotic effect much more than the less unsaturated fat, butter (Iodine value 30-40). (*C. A.* **48**, 8348)

Determination of chlorides in edible fats by the electroconductivity of their water extracts. O. B. Krayanskii and F. I. Palienko. *Maslobo˘ino-Zhirovaya Prom.* **19**(2), 28-30(1954). A description with diagrams of an apparatus for measuring the conductance of water extracts of fats as a means of determining their salt content. A comparison of data, obtained by conductance and argentimetric methods, revealed that the first method is as accurate at the other. The former gave slightly higher readings owing to the presence of other ions in milk. (*C. A.* **48**, 8441)

Thermal behavior of mixtures of cacao butter and Tween 61. V. Kerrlitz, U. Gallo, and G. Ventura. *Boll. chim. farm.* **93**, 83-7(1954). Mixtures containing 5-10% Tween 61 give plastic material that emulsifies with H_2O, but the consistency at a temperature above 20° does not permit use for preparation of suppositories. (*C. A.* **48**, 8562)

Studies on the storage behavior of mustard and groundnut oils in galvanized iron containers. M. Kantharaj Urs, M. R. Sahasrabudhe, D. S. Bhatia, and C. P. Natarajan(Central Food Technol. Research Inst., Mysore). *Bull. Central Food Research Inst., Mysore* **3**(1), 17-18(1953). The amount and effect of Zn dissolved during storage in galvanized containers is reported. Peroxide-free refined peanut oil (H_2O content 0.21%), crude peanut oil (H_2O content 0.31%), and mustard oil (H_2O content 0.33%) were stored in Zn, Sn, and glass containers at 26-28°, 37°, and 45-50° for 36 weeks. Solutions of Zn increased proportionally to temperature and time. Zn soaps form and are separated by chilling. At higher temperatures peroxide formation is accelerated by both Zn and Sn. Organoleptic evaluation indicated that mustard oil should not be stored in galvanized containers. Stored peanut oils, if refined after storage, are suitable for edible use. (*C. A.* **48**, 7320-1)

Ultraviolet absorption characteristics of some Indian shark-liver oils. G. G. Kamath and N. G. Magar(Inst. Sci., Bombay). *Indian J. Med. Research* **41**, 339-47(1953). The absorption spectra of 10 samples of liver oils from 6 different species of sharks found near the Bombay coast were studied in the ultraviolet range with alcohol and hexane as solvents. Liver oils with high vitamin A content showed characteristic absorption spectra similar to vitamin A dissolved in cotton oil. (*C. A.* **48**, 8484)

Identification of polymerized train oils. E. Hugel. *Fette u. Seifen* **55**, 544-5(1953). The method described by Jakobsen (cf. *Tids. Kjemi, Bergvesen Met.* **6**, 52[1944]) was found most useful. It is unnecessary to determine the solubility temperature. Insolubility in PrOH between 5° and 20° is indicative of polymerized train oil. (*C. A.* **48**, 8562)

• Biology and Nutrition

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

Xanthophyll determination in dehydrated alfalfa meal. E. M. Bickoff, A. L. Livingston, G. F. Bailey, and C. R. Thompson (Western Utilization Res. Branch, Agr. Res. Service, U. S. Dept. Agr., Albany 6, Calif.). *J. Assoc. Off. Agr. Chemists* **37**, 894-902(1954). Two alternate methods for the determination of xanthophyll in dehydrated alfalfa are described and data are tabulated. The pigments are extracted either by soaking alfalfa meal for 16 hr. in a 21:9:0.5 mixture of hexane, acetone and water at room temperature, or by rehydrating the meal and extracting rapidly with acetone in a blendor. In either case, the pigments are transferred to hexane, and the solution is chromatographed on a column of magnesium oxide. Carotene is eluted with a 9:1 mixture of hexane and acetone, after which xanthophyll is eluted with a 9:1 mixture of hexane and alcohol. Pigment concentrations in the eluates are determined colorimetrically or spectrophotometrically. Spectral absorption curves of the carotene and xanthophyll fractions are discussed in terms of the probable composition of the pigment mixtures.

Report on vitamin A in mixed feeds. M. L. Cooley(General Mills, Inc., Minneapolis, Minn.). *J. Assoc. Off. Agr. Chemists* **37**, 742-8(1954). Results of collaborative study of a proposed method for determining vitamin A in mixed feeds are summarized. A saponification procedure is recommended so the method can be extended to the determination of total vitamin A activity in mixtures containing free vitamin A or esters, carotene, and/or gelatinized and pectinized dry vitamin A products.

Report on the determination of vitamin A in margarine. K. Morgareidge(Food Research Labs., Inc., 48-14 Thirty-third St., Long Island City, N. Y.). *J. Assoc. Off. Agr. Chemists* **37**, 748-53(1954). Results of a collaborative test of a chromatographic method for determination of vitamin A in mar-

garine based on the use of a specially prepared alumina show distinct advantages over previously proposed procedures. The need for further study is indicated.

Report on carotene. F. W. Quackenbush(Agricultural Experiment Station, Purdue Univ., Lafayette, Ind.). *J. Assoc. Off. Agr. Chemists* **37**, 753-5(1954). Results of a two-day workshop on carotene analysis are summarized. Major sources of disagreement between laboratories using standard methods of carotene analysis are variability in adsorbents, poor standardization of instruments, and instability of carotene standards.

A chromatographic-spectrophotometric method for determination of vitamin A in margarine. L. Rosner and Henrietta Kan (Lab. or Vitamin Tech., Chicago, Ill.). *J. Assoc. Off. Agr. Chemists* **37**, 887-94(1954). Margarine is saponified and the unsaponifiables are extracted with ether. The ether is removed. A solution of the residue in petroleum ether is passed through a column of alkali-treated alumina. Vitamin A is eluted with increasing concentrations of ether in petroleum ether, and determined spectrophotometrically. In the case of margarines containing either FDC dyes or carotene, these coloring materials precede vitamin A down the column and make a convenient indicator. By the described procedure, spectrophotometric adsorption is due substantially only to vitamin A, the curves approach those of true vitamin A, and recovery of vitamin A and/or carotene is good.

Standardization of alumina adsorbents for vitamin A chromatography. J. B. Wilkie and S. W. Jones(Food and Drug Admin., Dept. of Health, Education and Welfare, Washington 25, D. C.). *J. Assoc. Off. Agr. Chemists* **37**, 880-7(1954). A method is described for estimating the adsorptive power of alumina by means of retention of dye F D & C Yellow No. 4. Results with several grades of alumina are tabulated. Methods of changing the activity of the adsorbent by heating or treatment with water are outlined. Optimum control of elution of vitamin A can be attained by quantitative evaluation of the particle size and adsorptive activity of the alumina. A dye retention of 20 to 50% indicates an adequate working range of activity.

Report on xanthophylls in mixed feeds. C. R. Thomson(Western Utilization Research Branch, Agricultural Research Service, U. S. Dept. Agr., Albany 6, Calif.). *J. Assoc. Off. Agr. Chemists* **37**, 756-7(1954). The problems involved in devising a suitable procedure for estimating xanthophylls in mixed feeds are briefly reviewed. Chromatography on a column of magnesia appears to be the most promising method.

Mycological formation of fat. I. Media conducive to formation of fat from sucrose by Aspergillus nidulans, Penicillium javanicum and Penicillium spinulosum. A. M. Gad and T. K. Walker(Div. of Industrial Biochem., Faculty of Technology, Univ. of Manchester). *J. Sci. Food Agr.* **5**, 339-43(1954). Fat production by the molds *A. nidulans, P. javanicum* and *P. spinulosum* were studied on media containing sucrose. *A. nidulans* was the most effective producer of fat, yielding 13.2 g. fat from 100 g. sucrose as compared with 5.1 g. fat produced by *P. spinulosum* and 7.9 g. by *P. javanicum*. *A. nidulans* requires a medium rich in phosphate and magnesium. Moderate concentrations of these ions were more favorable for fat production by *P. javanicum*, and best results from *P. spinulosum* were obtained on media low in magnesium and phosphate. Corn steep liquor added to the media stimulated growth and fat synthesis by *P. spinulosum*. This effect was not due to phosphate in the corn steep liquor.

Fat metabolism in higher plants. II. Oxidation of palmitate by a peanut particulate system. T. E. Humphreys, E. H. Newcomb, Ann H. Bokman, and P. K. Stumpf(Dept. of Plant Biochem., Univ. Calif, Berkeley). *J. Biol. Chem.* **210**, 941-48 (1954). Microsomal particles from germinating peanut cotyledons oxidized palmitic acid to CO_2. When either 1-, 2-, 3-, or 11-C^{14}-labeled palmitic acid was used as the substrate, $C^{14}O_2$ was produced. No cofactor requirements were demonstrable for the oxidation of palmitic acid-1-C^{14}, while DPN was specifically required for CO_2 production from internally labeled palmitate. Synthetic palmityl CoA was found to be inactive as a substrate for this enzyme system, and evidence was presented to indicate that the TCA cycle was not responsible for CO_2 production from palmitate oxidation.

The utilization of carotene by hypothyroid rats. Lotte Arnrich and Agnes F. Morgan(Dept. of Home Econ., Univ. of California, Berkeley). *J. Nutrition* **54**, 107-19(1954). The conversion of carotene to vitamin A and the distribution of vitamin A was studied in young growing or mature rats made hypothyroid with thiouracil. It was concluded that body weight and growth rather than basal metabolic rate governed the utilization of vitamin A and that neither absorption, transformation nor utilization of carotene was affected directly by thyroid activity.

Blood levels of absorbed labeled fat and cyclomicronemia. W. W. Burr, Jr., Carolyn Dunkelberg, J. C. McPherson, and H. C. Tidwell(Dept. of Biochem., Southwestern Medical School, The Univ. of Texas, Dallas). *J. Biol. Chem.* **210**, 531-37(1954). The technique, significance, and practicality of chylomicron counting for following the appearance in the blood of absorbed dietary fat have been investigated by employing a standardized procedure for the counts and comparing them with the blood levels of absorbed fat containing palmitic acid-1-C^{14}. More than 90% of the total activity of the blood after the ingestion of the labeled fat was found to be present in the blood lipides. The changes in the absorbed fat, as measured by the activities of the blood lipides, were reflected in the chylomicron counts on the blood samples collected at various intervals after the fat ingestion. The similarity of the curves from the determinations by these two methods, as well as the fairly constant ratio of the areas under the curves, suggested that the same function was being measured. Thus, the chylomicron counts and the areas under the curves from them might be used as a satisfactory relative measure of the changing blood levels of absorbed fat, not total fat, and as a possible means of following the active process of fat absorption.

Effect of certain transition group elements on hepatic synthesis of cholesterol in the rat. G. L. Curran(Research Lab., Mary Imogene Bassett Hospital, Cooperstown, New York). *J. Biol. Chem.* **210**, 765-70(1954). The effect of certain transition elements on the incorporation of C^{14}-carboxyl-labeled acetate into cholesterol by rat liver has been investigated. Cr and Mn were found to increase the incorporation, and V and Fe to decrease it.

The relation of glucose oxidation to lipogenesis in mammary tissue. P. F. Hirsch, H. Baruch, and I. L. Chaikoff(Dept. of Physiology, Univ. of California School of Med., Berkeley). *J. Biol. Chem.* **210**, 785-797(1954). The incorporation of C^{14} from glucose, fructose, and glycerol (all evenly labeled with C^{14}), from pyruvate-2-C^{14}, and from acetate-1-C^{14} into fatty acids and CO_2 by slices prepared from rat mammary gland was studied. In addition the liver and mammary gland of the lactating rat were compared with regard to their utilization of glucose-C^{14} and acetate-C^{14}. The fatty acid-C^{14} recoveries from acetate-1-C^{14} were directly related to the amount of glucose oxidized by mammary gland slices. When employed as sole substrates in the medium, glucose and pyruvate served as excellent precursors of fatty acids in mammary tissue. Fructose and acetate were less readily converted to fat under these conditions. The addition of glucose to the medium increased the conversion of the C^{14} of pyruvate-2-C^{14} to fatty acids. The increase in glucose oxidation that results from the addition of glucose to the medium shifted the metabolism of the C_2 intermediate, derived from pyruvate and acetate, from an oxidative fat to one involving synthesis. Added glycerol was poorly utilized by mammary gland; this finding was discussed in connection with the action of glucose on fat synthesis. Evidence suggested that added acetate partially inhibited the utilization of pyruvate by mammary gland and that added pyruvate partially inhibited glucose utilization.

Antioxidant studies concerned with the metabolism of carotene and vitamin A. E. G. High, H. C. Smith, Jr., H. H. Taylor, and S. S. Wilson(Biochem. Research, Prairie View Agr. and Mech. College, Prairie View, Texas). *J. Biol. Chem.* **210**, 681-86(1954). Vitamin A-deficient albino rats were supplemented daily for 21 to 25 days with the antioxidant plus either a moderate amount of carotene or of vitamin A in cottonseed oil. Control rats received either the carotene or vitamin A alone in oil. Large amounts (10 mg. per day) of 2,5-ditertiary butylhydroquinone, octylhydroquinone, and ditertiary butyl-4-hydroxyanisole decreased vitamin A deposition from carotene-fed rats. However, large amounts (10 mg. per day) of α-tocopheryl acetate, monotertiary butylhydroquinone, and octylhydroquinone were without effect on the utilization of preformed vitamin A and did not interfere with the absorption of carotene in the alimentary tract. On the other hand, they protected carotene markedly against oxidative decomposition *in vitro*. This study afforded further evidence that the mode of action of both vitamin E and these antioxidants was concerned with their antioxidant activity and that in large amounts they might suppress the oxidative processes which were probably involved in the enzymatic conversion of carotene to vitamin A.

The effect of method of administration on the absorption and storage of vitamin A by dairy calves. N. L. Jacobson, R. S.

Allen, J. T. Blake and P. G. Homeyer(Iowa Agricultural Experiment Station, Ames). *J. Nutrition* 54, 143-53(1954). A natural ester vitamin A concentrate was fed by various methods to young dairy calves, previously depleted of vitamin A reserves, to determine relative efficiency of absorption and storage of vitamin A. Vitamin A in oil and vitamin A in oil plus an emulsifying agent (Tween 80) were administered in milk by nipple feeder and by capsule. Vitamin A absorption and storage, as measured by blood plasma vitamin A levels and by depletion time subsequent to vitamin A supplementation, were much greater from an aqueous dispersion than from an oily solution. There was an indication that administration of vitamin A in milk by nipple feeder resulted in more efficient utilization than administration by capsule. The point of deposition of a vitamin A supplement in the stomach of the dairy calf apparently had a greater effect upon the rate of absorption than upon efficiency of utilization of this vitamin.

Some factors affecting the action of benzoyl peroxide in the bleaching of milk and cream for blue cheese manufacture. S. Kuramoto and J. J. Jezeski(Dept. of Dairy Husbandry, Univ. of Minnesota, St. Paul). *J. Dairy Sci.* 37, 1241-46(1954). Milk for blue cheese manufacture may be bleached with benzoyl peroxide under conditions that will prevent the development of highly undesirable flavors. Using 50% carotenoid loss as an end point, cream treated at 125° and 145°F. with 0.0009% benzoyl peroxide for 90 to 120 minutes was sufficiently bleached, without the formation of objectionable oxidized and tallowy flavors. More efficient carotenoid decolorization could be effected by using cream with a higher fat content. Regardless of the original carotenoid level of raw cream, similar proportions of carotenoids were destroyed when a given concentration of benzoyl peroxide was used.

Histological differentiation of fatty livers produced by threonine or choline deficiency. H. Nino-Herrera, A. E. Harper, and C. A. Elvehjem(Dept. of Biochem., College of Ag., Univ. of Wisconsin, Madison). *J. Nutrition* 53, 469-80(1954). Histological studies have been made on the livers of rats fed various low-casein diets in an attempt to correlate alterations in fat deposition with structural changes in the liver tissues. The fatty infiltration and occasional necrosis observed in the livers of rats fed a 9% casein-sucrose diet containing choline were not apparent when diets containing additional protein, threonine, or threonine and glycine were fed. The livers of rats fed diets in which the sucrose was replaced by either glucose or dextrin also appeared structurally normal. The fatty infiltration in the livers of rats fed the basal diet was less severe than that observed when choline was omitted from the diet. The occasional necrosis and the network-like distribution of fatty cells also make it possible to differentiate this condition from the diffuse fatty infiltration that occurs in choline-deficient rats.

Dietary constituents which may influence the use of food cholesterol. II. Protein, L-cystine and DL-methionine intake in adolescent rats. Ruth Okey and Marian M. Lyman (Dept. of Home Econ., Univ. of California, Berkeley). *J. Nutrition* 53, 601-11 (1954). A three-week cholesterol feeding experiment with adolescent rats was reported. It was planned to measure the effect, on liver cholesterol storage, of adding 15% egg albumin to a diet already adequate for good growth. Five groups of rats were used. One group was given only the basal diet(B). Each of the other groups received, respectively, the basal diet plus 15% extra egg albumin(HP), B plus DL-methionine(BM), B plus L-cystine(BC), B plus DL-methionine and L-cystine (BCM). The amounts of the amino acids were equivalent to those furnished by the extra egg albumin. Each group consisted of 10 males and 11 females. Males given the extra egg albumin had significantly smaller amounts of liver cholesterol than did those fed the basal diet. Females had consistently lower liver cholesterol values than did males, but showed no significant decrease with increased protein intake. DL-methionine tended to decrease liver cholesterol storage, and L-cystine, to increase it. Differences were significant for females only, and were related to weight gain. Sex differences in response to both protein and cholesterol were so marked as to make separate evaluation of data for males and females imperative.

Collagen formation in vitamin A-deficient rats. W. V. Robertson and V. Cross(Dept. of Biochem., College of Medicine, Univ. of Vermont, Burlington). *J. Nutrition* 54, 81-86(1954). The growth of new repair tissue in rats has been stimulated by the subcutaneous injection of Irish moss extractive. The collagen concentration of this tissue was the same in normal rats, in vitamin A-deficient rats and in vitamin A-deficient rats given ascorbic acid. The results did not support the view that scurvy accompanies avitaminosis-A in the rat.

Effect of source of dietary protein on the unsaturated fatty acids in the carcass fat of the rat. S. B. Tove, F. H. Smith, C. T. Young, and F. W. Sherwood(Dept. of Animal Industry, North Carolina Agricultural Experiment Station, Raleigh). *J. Nutrition* 54, 49-57(1954). The unsaturated fatty acid composition of the dietary fat was the primary factor affecting the fatty acid composition of the depot fat of the rat. Replacement of the purified protein in the diet of rats with either ether-extracted soybean meal or ether-extracted cottonseed meal resulted in an increase in the level of diethenoid acids and a decrease in the level of monoethenoid acids in the carcass fat. These effects apparently were not the result of residual plant oils in the meals. Evidence presented indicated that soybean and cottonseed meals contained factor (or factors?) capable of altering the metabolism of unsaturated fatty acids in the rat.

Effect of dietary amino acid balance on fat deposition in the livers of rats fed low protein diets. M. E. Winje, A. E. Harper, D. A. Benton, R. E. Boldt, and C. A. Elvehjem(Dept. of Biochem., Univ. of Wisconsin, Madison). *J. Nutrition* 54, 155-66(1954). Fat which accumulated in the livers of rats fed low protein diets containing pork, beef, or egg albumin was reduced when the level of the dietary protein was increased. Supplementation of these diets with gelatin or fibrin or with threonine and glycine lowered the amount of liver fat. Lysine in the presence of additional histidine and threonine further decreased the amount of fat in the livers of rats fed low protein diets containing egg albumin. Excessive deposition of liver fat was not observed when low protein diets containing fibrin were fed. It was suggested that the maintenance of normal fat deposition in the livers of rats fed low protein diets containing choline depends upon the presence of a specific ratio of amino acids in the diet.

Spectrophotometric determination of vitamin D in presence of vitamin A. D. T. Ewing, T. D. Schlabach, M. J. Powell, J. W. Vaitkus, and O. D. Bird(Kedzie Chemical Lab., Michigan State College, East Lansing.). *Anal. Chem.* 26, 1406(1954). The proposed method utilizes a two-step chromatographic process for the separation of vitamin D from the other nonsaponifiable oil components. The vitamin D is ultimately determined by utilizing its absorption maximum at 265 millimicrons as a measure of the amount present. The method has been successfully applied to samples of irradiated ergosterol in corn oil, crystalline vitamin D_2 and vitamin A acetate in corn oil, irradiated ergosterol and vitamin A palmitate in corn oil, some fish liver oils, and some miscellaneous samples.

The effect of essential fatty acid deficiency on the distribution of endogenous cholesterol in the plasma and liver of the rat. Roslyn B. Alfin-Slater, Lilla Aftergood, A. F. Wells and H. J. Deuel, Jr.(Dept. Biochem. and Nutrition, School of Med., Univ. So. California, Los Angeles.). *Arch. Biochem, Biophys.* 52, 180(1954). When rats were maintained on fat-low diets over a prolonged period, the cholesterol content of the liver and adrenal glands was found to be increased and that of the plasma decreased over that of control rats receiving a diet containing 12.5% of cottonseed oil. The increased cholesterol concentration in the liver of rats on fat-low diets was found to be confined almost exclusively to the ester fraction.

Effect of vitamin E on carbohydrate metabolism of rat diaphragm. Doris E. Gray and H. A. De Luca(Dept. of Physiology, Univ. of Hong Kong, Hong Kong). *Can. J. Biochem. and Physiology* 32, 491(1954). A study was made of the carbohydrate metabolism of diaphragm isolated from rats maintained on diets containing deficient, sufficient, or excessive quantities of vitamin E, respectively. No effect was observed on glycogen formation, glucose uptake, lactic acid accumulation, or oxygen consumption as a result of differences in vitamin E intake. The data suggested that diaphragms from rats receiving a diet deficient in vitamin E may have slightly decreased capacity to form pyruvic acid or else a slightly increased ability to utilize it. The addition of insulin to the incubation medium counteracted this effect of the vitamin lack.

Lecithinase systems in sugar beet, spinach, cabbage, and carrot. M. Kates(Div. of Applied Biology, Nat. Res. Council, Ottawa, Canada). *Can. J. Biochem. and Physiology* 32, 571(1954). Lecithinase activity of aqueous extracts of sugar beet, spinach, or cabbage leaves, and of carrot root was found to be associated entirely with the plastid fractions separated by high-speed centrifugation. The supernatant cell sap-cytoplasm fractions were not only inactive but actually inhibitory. The rate of enzymatic liberation of choline from lecithin by all plastid fractions was found to be greatly increased by saturation with

diethyl ether. Under optimum conditions, liberation of choline from lecithin by each of the plastid fractions was rapid and was accompanied by a much slower liberation of inorganic and water-soluble organic phosphate; liberation of phosphates was much greater with spinach than with the other species. Thermal inactivation and fluoride inhibition of the enzyme systems were also studied.

Decrease of esterified fatty acids in serum after insulin administration. W. Appel and K. J. Hansen(Univ. Kiel, Germany). *Klin. Wochschr.* 31, 861-2(1953). The decrease was observed 30 minutes after injection of 0.05 units of insulin/kg. body weight and reached a maximum 90 minutes after injection. Blood sugar and cholesterol esters were not affected and the lipide P fell only slightly. (*C. A.* 48, 2911)

Fat content of the crystalline lens in cataract. Ugo Dorello (Univ. Pisa, Italy). *Giorn. ital, oftalmol.* 6, 136-51(1953). Histochemical (staining with Sudan III and hematoxylin) investigations of 50 crystalline lenses with cataract showed the constant presence of numerous fat droplets. No connection was found between the distribution of the droplets and the clinical type of cataract. (*C. A.* 48, 2894)

Feeding water-miscible vitamin A to dairy cattle. K. M. Narayan, C. P. Anantakrishnan, and K. C. Sen(Indian Dairy Research Inst., Bangalore). *Current Sci.* (India) 23, 90-1(1954). Feeding water-miscible vitamin A to dairy cattle increases the vitamin A content of the milk fat, but not that of the skim milk. (*C. A.* 48, 9573)

Absorption of saturated and unsaturated fatty acids of various chain length in Vella's ansa of depancreatized dogs. S. Pontemoli and T. Montini(Univ. Genoa). *Boll. soc. ital. biol. sper.* 29, 1481-3(1953). Dogs deprived of the pancreas were tested for absorption of the methyl esters of the following acids, capric, caprylic, lauric, myristic, palmitic, stearic, and oleic. Also tested was coconut oil as such and after methylation of the acids liberated by saponification. Tabulated results show that absorption of the saturated fatty acids is reduced more than that for the unsaturated acids; and while absorption is greatly reduced for the acids above C-10, such is not the case for those below. There is greater absorption of the methylated acids of coconut oil than for the oil itself. (*C. A.* 48, 9520)

Modification of chemical structure of fatty acids during intestinal absorption. S. Pontremoli and T. Montini(Univ. Genoa). *Boll. soc. ital. biol. sper.* 29, 1480-1(1953). By using Gautelet's method, the thoracic ducts of 6 male dogs were fistulated. After a flank incision, the upper part of the duodenum was extricated and tied just below the pyloric section. A 30% methyl palmitate emulsion (45-50 ml.) was introduced, thus saturating the abdominal wall. Materials with iodine numbers ranging from 54 to 49 were recovered from the thoracic-duct fistula. The tabulated results show that a saturated fatty acid will be desaturated during its passage across enteric mucosa. (*C. A.* 48, 9504)

The effect of fat absorption on the interaction of chyle and plasma in the rat. G. H. Jeffries(William Dunn School Pathol., Oxford, England). *Quart. J. Expt. Physiol.* 39, 77-81(1954). During the absorption of olive oil in the rat there is a transient development of clearing activity in the plasma. This activity is destroyed by incubation at 37° for 2 hrs. In rats given a fat-free diet there is a complete absence of plasma clearing activity. (*C. A.* 48, 9504)

Fatty acids essential in nutrition. Paulo Orlando Pereira E. Santos(Estação agron. nacl., Sacavem, Portugal). *Agronomia Lusitana* 15, 193-242(1953). The essentiality of linoleic, linolenic, and arachidonic acids in animal and human nutrition is discussed. The percentages of these acids, determined spectrophotometrically in the most common Portuguese dietary fats was: palm oil 9.96, 0.19, —; peanut oil 20.18, 0.19, —; sesame oil 39.03, 0.29, —; coconut oil 1.81, —, —; olive oil 7.66, 0.36, —; butter 2.19, 1.14, 1.35; lard 7.93, 0.39, 0.58; margarine 3.36, 0.15, —. These data, referred to the average daily consumption of fats in Portugal, showed that only 3.164 g. essential fatty acids are available per person. (*C. A.* 48, 8349)

Stability of added vitamin A acetate in groundnut oil. B. R. Roy(Calcutta Univ.). *J. Sci Ind. Research* 13B, 496-9(1954). The stability of vitamin A acetate in crude and refined peanut (groundnut) oil has been studied. Straight hardened peanut oil retains the maximum amount of vitamin A both at 37.5° and 60°C., refined oil retaining the least. Ethyl gallate affords some protection to vitamin A acetate in all samples. Vitamin A acetate promotes instability of the oils which, however, is counteracted to some extent by ethyl gallate. Rancidity (smell) is not appreciably promoted by vitamin A acetate. Both crude and hydrogenated sesame oil stabilize vitamin A in hydrogenated peanut oil. [*Oils & Oilseeds J.* 7(2), 8(1954)]

Incorporation of elaidic acid into phosphatides of different cellular structures of hepatic tissue. Marianne Lévy and Jacqueline Legrand(Sorbonne, Paris). *Arch. sci. physiol.* 7, 311-319 (1953). From 28 to 43% of elaidic acid is incorporated into neutral fatty acids and cholesterol esters of all the particulate fractions prepared from livers of rats fed trielaidin. From 12-18% incorporation was observed in the phosphatide fractions of the same cellular structures. (*C. A.* 48, 7161)

Estimation of the quality of soybean-oil meal with laboratory methods and in chick-growth experiments. A. Frölich. *Kgl. Lantbruksakad. Tidskr.* 92, 367-78(1953). A new method for estimating the quality of soybean oil meal has been developed, founded on the varying ability of soybean-oil meal to absorb or destroy phenolphthalein under prescribed conditions. To soybean meal (400 mg.) in a centrifuge tube is added 10 ml. of 0.1*M* citric acid solution and 0.4 ml. of 1% phenolphthalein solution. After shaking for 1 hr. and centrifuging, 1 ml. of supernatant was treated with 10 ml. of water and 4 drops of of 2*N* NaOH. The colored solution was read in a spectrophotometer at 5500 A. Underheated meals gave low transmission values while overheated meals gave high transmission values. Feeding trials with chicks showed good correlation with the laboratory findings. (*C. A.* 48, 7138)

Mechanism of pancreatic lipolysis of glycerides. Bengt Borgström(Univ. Lund, Sweden). *Biochim. et Biophys. Acta* 13, 491-504(1954). Exchange between fatty acids in the 1- and 3-positions occurs in the hydrolysis of long-chain fatty acids by rat pancreatic juice, and equilibrium is attained rapidly. Exchange is at least partially due to resynthesis of glyceride ester bonds during hydrolysis, shown by incorporation of labeled oleic acid into 1,2-diolein to give the triglyceride. Resynthesis due to the action of pancreatic juice does not occur with glycerol and fatty acids. Pancreatic hydrolysis proceeds through the 1,2-diglyceride to the 1- and 2-monoglycerides, primarily the latter. Addition of Ca ions accelerates the rate of hydrolysis of triglycerides at acid and alkaline pH values and decreases the rate of resynthesis of glyceride ester bonds. Different fatty acids are built into glycerides during hydrolysis at different rates, decanoic acid to the same extent as oleic acid, dihydroxystearic acid to lesser extent and $C_3H_7SO_2H$ practically not at all with olive oil substrate. (*C. A.* 48, 8369-70)

A phosphatide splitting enzyme in cereals. L. Acker and G. Ernst(Inst. Lebensmittelchem., Frankfurt/Main, Germany). *Biochem. Z.* 325, 253-7(1954). Various cereals (wheat, oats, barley) contain chiefly in the germ an enzyme which splits choline from phosphatides. Its activity increases during germination. Its optimum activity is at pH 5.8-6.4 and at 20-25°. (*C. A.* 48, 8338-9)

Plasma lipides and diabetic atherosclerosis. Angelo Iannaccone and Kakob Mollerström(Wenner-Gren Inst., Stockholm). *Acta Med. Scand.* 148, 417-24(1954). No significant difference was observed in plasma total lipides, cholesterol, lipide P or cholesterol/lipide P ratio between diabetics with and without atherosclerosis. It appears that age is a more important factor than the duration of the diabetes in the development of atherosclerosis. (*C. A.* 48, 8389)

• Drying Oils

Raymond Paschke, Abstractor

Insecticidal lacquers. N. G. Shreeve(Metallurgical Chemists Ltd., England). *Paint Manuf.* 24, 349(1954). The use of lacquers containing insecticides for the control of insect pests is a recent development. The author describes these compounds, their composition, application and use together with a short history of their development. The scope for the employment of this material for the hygienic protection of surfaces and similar purposes, seems to be considerable.

Fume control in the paint and varnish industry. C. W. Selheimer, et al. *Off. Dig. Federation Paint Varnish Production Clubs* 27(355), 572-807(1954). A group of papers covering work done the past five years at the Illinois Institute of Technology under the sponsorship of the Chicago Paint and Varnish Production Club, the Federation of Paint and Varnish Production Clubs, and the Chicago Paint, Varnish and Lacquer Association. Part 1—Fume analysis and process design calculations by C. W. Selheimer and H. Bauman. Part 2—Analysis of fumes by selective adsorption (Chromatography) by C. W. Sel-

heimer, W. Muttera, F. Zavasnik and R. Novak. Part 3—Activated carbon for removal of unpleasant odors from gas streams by C. W. Selheimer, R. Cotter, M. Luftglass and A. J. Smith, III. Part 4—Use of activated carbon to adsorb fumes from paint and varnish industry cooking operations by C. W. Selheimer, R. Armani, and H. Jurczak. Parts 5 and 6—Oxidation of fumes from tall oil-glycerine esterification with ozone by C. W. Selheimer and C. H. Borchers. Esterification with ozone by C. W. Selheimer, J. P. Antolak, and J. Paskind. Part 7—Analysis of fume constituents by chromatography, with preliminary separation by fractional distillation by C. W. Selheimer, R. Lance, A. Weinberg, and D. Brown. Part 8—Catalytic combustion of fumes from tall oil-glycerine esterification, pilot plant size equipment by C. W. Selheimer, L. White, and G. Workman. Part 9—Evaluation of multi-wash collectors in suppression of paint industry fumes by C. W. Selheimer and C. H. Borchers. Part 10—Analysis of fumes leaving resin kettles and fume abatement equipment by C. W. Selheimer and R. Lance. Part 11—General bibliography by C. W. Selheimer, T. J. Daly, R. Vlerick, and C. H. Borchers.

Paint deterioration. A method of investigation. F. Pupil. *Paint Manuf.* **24**, 354(1954). Laboratory experiments based on observations of paint deterioration in use have been carried out to reproduce many conditions found to exist when paint is used for particular purposes. An account is given of some of these investigations and points out the adantages of the method over work with test panels exposed to the atmosphere in selected localities. In particular the opinion that these exposure tests can be interpreted to give conclusions on the value of the paints concerned for a wide range of uses is criticized.

Olefinic nature of anacardic acid from Indian cashew-nut shell liquid. V. J. Paul and L. M. Yeddanapalli(Loyola College, Madras). *Nature* **174**, 604(1954). Anacardic acid is shown to be a mixture of four acids. The saturated component (m.p. 91.5, 5%) is 1-hydroxy-2-carboxy-3-pentadecyl benzene. The monoolefin (m.p. 44-45°, 15%) is the 8-pentadecenyl benzene. The de-olefin (25-26°, 44%) 8,11-pentadecadienyl benzene. The triolefin is the 8,11,14-pentadecatrienyl benzene.

Conophor oil. G. T. Bray(Colonial Products Lab.). *Paint Manuf.* **24**(8), 258(1954). Conophor oil may be successfully substituted for linseed oil in the manufacture of paints and varnishes. Progress in experimental cultivation of the vine and results of examination of the oil produced are reviewed.

Vinyltoluene-oil copolymers and their use in flat wall paints. A. L. Cipriano and W. A. Henson(Dow Chemical Co.). *Off. Dig. Federation Paint Varnish Prod. Clubs* **26**(357), 951 (1954). Application and film properties of paints based on vinyltoluene-divinyltoluene-oil reveal the possibilities of improved brushing ease, good non-penetration and excellent viscosity-temperature stability. The details and refinements involved in this new vehicle field are still in the "growing up" stage.

Moisture resistance of paint films. E. J. Dunn, Jr.(Nat. Lead Co.). *Paint Ind. Mag.* **69**(9), 13(1954). Water appears to be one of the larger factors in the deterioration of paint films. Moisture resistant films, would in general, have: (1) a low thermal expansion and try to retain it throughout its life; (2) average high water vapor permeability; (3) low moisture sorption; (4) low swelling in water properties and the ability to be resilient and go back to its original film size; (5) low water solubilities; (6) the effects of osmosis should be minimized; (7) high adhesion in the presence of water; (8) the pigments should have a minimum amount of water soluble salts present and should resist the pick up of water or be as anhydrous as possible; and, (9) the vehicle should not be affected physically by water to any appreciable extent.

Interior and exterior resin-emulsion coatings. J. P. Davis (Goodyear Tire & Rubber Co.). *Paint Oil Chem. Rev.* **117**(21), 16(1954). A review of problems relating to these coatings.

More research in drying oils. Anon. *Paint Oil Chem. Rev.* **117** (21), 12(1954). A review of the papers concerning drying oils presented at the 28th Fall meeting of the American Oil Chemists' Society October 11-13 in Minneapolis.

Fungicides in paints. Anon. *Paint Manuf.* **24**, 345(1954). A test method which evaluates paint fungicides rapidly and provides reliable and reproducible results with small amounts of material has now been developed. In this article the reasons for selecting the particular test organism, culture medium and substrate are outlined, together with details of the experiments undertaken. A comparison with tropical exposure tests is also described and the results of trials with eightly compounds indicated.

House paints—an up-to-date review, Part III. Anon. *Paint Oil Chem. Rev.* **117**(14), 19(1954). This part covers the formulation of (1) white house paints, (2) tint bases, (3) dark colored house paints, (4) primers, and (5) one-coat house paints.

Part IV. *Ibid.* **117**(15), 16(1954). This part includes the formulation of alkyd and synthetic vehicle house paints, emulsion paints, and miscellaneous types. Also discussed are (1) the relation of wooden surface to house paint, (2) the application of house paint, (3) the testing of durability, and (4) the preparation of house paint.

Exterior paints based on acrylic emulsion. Report on preliminary outdoor exposure. Anon. *Paint Varnish Production* **44** (10), 23(1954). The coatings are easily applied, dry rapidly and have excellent sealing properties, long life, excellent color and color retention, high adhesion, smooth finish, water resistance, and minimum odor. Methods of preparation, dispersants, viscosity control agents, preservatives, additives, application, exterior exposure, and factors affecting performance are also discussed.

Processed oils for paints and coatings. B. Henderson. *Can. Chem. Processing* **38**, 26(1954). Chemically modified oils with a wide range of desirable qualities have created superior coatings. The trend toward wholly synthetic oils tailored to exact specifications is now well established as indicated by the processes described in the present article. The article discusses production of alkyd resins, solvent process, dehydrated castor oil, blown oils, high viscosity oil, thermally polymerized oils, decomposition products and styrenated oils.

• Waxes

R. L. Broadhead, Abstractor

Analysis of ester waxes by aminolysis. K. Thinius and E. Schroder(Int. Org. Chem. Ind., Magdeburg, Ger.). *Chem. Tech.* (Berlin) **5**, 611-15, 671-5(1953). A method for the aminolysis of mono- and dicarboxylic acid ester waxes is described. The procedure is suitable for the identification of both the acid and alcoholic components. The esters are boiled in monoethanolamine until the acid component separates as the corresponding bisoxyethylamide, a crystalline compound identifiable by its melting point. The alcoholic portion is separated by distillation or, if a water soluble alcohol by extraction with ether. The method was successful with esters of phthalic acid, terephthalic acid, oxalic acid, adipic, benzoic, palmitic and stearic acids, castor oil and linseed oil. (*C. A.* **48**, 11088)

Solvent extraction of wool wax. G. N. Bhat(Indian Inst. Sci., Bangalore). *Trans. Indian Inst. Chem. Engrs.* **5**, 19-25(1952-53). The mechanism of the extraction of wool wax with benzene, toluene, xylene, naphtha, and petroleum ether was studied. At a given set of operating conditions the amount extracted increased with increased extraction time but at a continually decreasing rate, until the rate leveled off at 45-60 min. It seems probable that the equilibrium concentration of the solution is governed by the wax content of the wool and that the process is principally controlled by diffusion through the liquid film of the solvent. (*C. A.* **48**, 9084)

• Detergents

Lenore Petchaft Africk, Abstractor

Building synthetic detergents. T. H. Vaughn, H. R. Suter, and M. G. Kramer(Wyandotte Chemicals Corp., Wyandotte, Mich.). *Ind. Eng. Chem.* **46**, 1934-7(1954). In general, builders for syndets have three functions—to improve the performance for general or specific uses, to improve the physical properties with respect to handling and storage characteristics, and to achieve favorable end use economy. The following classification of builders was presented and discussed. Inorganic builders consist of phosphates, silicates, carbonates, hydroxides, borates, neutral inorganic salts and clays. Organic builders include colloidal additives such as CMC, starches and proteins, sequestering agents, optical brighteners, foam extenders such as alkylolamides of fatty acids, solvents, and perfumes.

Determination of the soil-suspending power of detergent-active substances. H. Stupel. *Textile-Praxis* **9**, 264-8, 364-7(1954). In this review, the author discusses the definition of soil-suspending power, existing methods of determination and constant and variable experimental conditions, and describes experi-

ments in which suspensions or dispersions of artificial standard soils were diluted to 100 ml. with water at 20°C. and applied to test strips, the detergents being added carefully. The strips were washed for 60 minutes (when an equilibrium between fiber and wash-liquor takes place and the degree of greying reaches its maximum) in a mechanically agitated washing machine at 95°C., rinsed with water at 40°C., air-dried and ironed, and their whiteness degree was optically evaluated. Among the artificial soils examined, the pure carbon pigments were found the most satisfactory, the best results being obtained with Standard Micronex. The hardness formers of the water and, in addition to the permanent hardness, the calcium:magnesium ratio play an important role. The best soil-suspending values are obtained at pH 7. Fifty-one literature references are listed.

Analysis of synthetic anionic detergent compositions. R. House and J. L. Darragh(California Research Corp., Richmond, Calif.). *Anal. Chem.* **26**, 1492-97(1954). A system of analyzing synthetic anionic detergents is outlined covering determination of alkylaryl sulfonates and alkyl sulfates in presence of each other, determination of low molecular weight sulfonate additives, inorganic sulfates, builders and measurement of color. System is based on combination of various procedures for the above tests.

Detergent performance evaluation. Jay C. Harris, M. R. Sullivan, and L. E. Weeks(Montanto Chem. Co., Dayton, Ohio). *Ind. Eng. Chem.* **46**, 1942-7(1954). A method was devised for removal of graphite from cotton fabric so that a quantitative estimate could be made in comparison with reflectance values. The method has a ± 6.5% limit of accuracy based on the amount of graphite present. The Kubelka-Munk equation correlating reflectance to soil concentration on cotton fabric as proposed by Bacon and Smith has been experimentally reaffirmed. The K/S value for colloidal graphite on cotton fabric is shown to be essentially a linear function of graphite concentration. Equations relating reflectance to graphite concentration for washed and unwashed fabrics were developed; high correlation coefficients indicated the reliability of these equations.

Molecularly dehydrated sodium phosphates. B. C. Hafford (Westvaco Mineral Products Division, Food Machinery & Chem. Corp., Carteret, N. J.). *Ind. Eng. Chem.* **46**, 1938-42 (1954). The three most useful phosphates in the detergent industry are pentasodium triphosphate, tetrasodium pyrophosphate, and the various phosphate glasses. These materials serve as detergent builders by increasing the cleaning efficiency of organic surface active agents. Their ability to sequester alkaline earth metal ions and to deflocculate inorganic soils contribute to their usefulness. The corrosiveness of the phosphates can be inhibited and their tendency toward hydrolytic reversion in aqueous solution can be controlled.

Physical chemical studies related to the role of whiteness-retention additives in detergent action. W. Fong and W. H. Ward (U. S. Dept. of Agr., Albany, Calif.). *Textile Research J.* **44**, 881-9(1954). Physical chemical studies have been carried out related to the mode of action of whiteness-retention additives in decreasing the extent of soil redeposition during laundering. For this purpose the methods of electrophoresis, sedimentation, and adsorption analysis have been used. The tests showed that the ionic additives, CMC and gliadin (vegetable protein) differ from the nonionic additives, polyvinylalcohol and polyvinylpyrrolidone, in their specific effects on the surface charge of cotton, on the rate of sedimentation of carbon black, and in their adsorption on cotton, and it is concluded that their modes of action in preventing soid redeposition are different. The ionic additives apparently influence whiteness-retention action by their effect on the surface of the cotton, probably through increase in electrostatic repulsion between fabric and soil. On the other hand, the nonionic additives apparently act at the surface of the carbon test soil, possibly through reduction in van der Waals' attraction between fabric and soil.

Synthetic detergents. Household and industrial use. L. Flett (National Aniline Division, Allied Chemical & Dye Corp., New York, N. Y.). *Ind. Eng. Chem.* **46**, 1915-16(1954). The various properties of synthetic detergents for industrial and household applications are compared and reviewed.

Film drainage transition temperatures and phase relations in the system sodium lauryl sulfate, lauryl alcohol, and water. M. B. Epstein, A. Wilson, C. W. Jakob, L. I. Conroy, and J. Ross(Colgate-Palmolive Co., Jersey City, N. J.). *J. Phys. Chem.* **58**, 860-4(1954). A detailed examination has been made of drainage transition temperatures of films formed from solutions of varying concentration of sodium lauryl sulfate or sodium myristyl sulfate containing lauryl alcohol or myristyl alcohol. Some observations of the phases occurring in these solutions are described. Crystalline adducts of sodium alcohol sulfate and long chain alcohol has been isolated and analyzed. The relationship of film drainage transition temperatures to the composition of the solution is discussed.

Alkylbenzenes. H. E. Bramston-Cook and W. E. Elwell(Oronite Chemical Co., New York, N. Y.). *Ind. Eng. Chem.* **46**, 1922-4(1954). Propylene tetramer benzene-sulfonate is now the exclusive active material used in both domestic and industrial products. The utility of alkylbenzene sulfonates for surface active applications is dependent in large part on the nature of the alkyl group used. Such properties as detergency, solubility, and foam characteristics of the derived sulfonate depend on the molecular weight range and distribution in the alkyl group and secondly on chemical constitution. Other properties of importance such as sulfonatability, caking, color, and odor, are related principally to the chemical constitution of the alkyl group. Growth in sales in household package products is leveling off. Usage in liquid products is increasing. Growth in alkylbenzene-based detergents will also be affected by the increasing popularity of nonionics.

Surfactants in the textile industry. H. C. Borghetty(Rohm & Haas Co., Philadelphia, Pa.). *Am. Dyestuff Reptr.* **43**, 623-7 (1954). The requirements of surface-active agents for the majority of textile operations are discussed. Specific examples of the uses of surfactants include kier-boiling cotton, bleaching, continuous mercerizing of cotton yarns, continuous boil-off of rayon fabrics, wool scouring, and emulsifying agents for oils.

Antioxidant stabilizers in soaps. K. Bergwein. *Kosmetic-Parfum-Drogen-Rundschau* **2**, 49-51(1954). The possible causes for deterioration processes in soaps during storage are discussed. The undesired alterations are of oxidative nature and can be inhibited by the incorporation into the soaps of the so-called antioxidant stabilizers, e.g. $Na_2S_2O_3$ or other reducing compounds, examples of which are named. (*C. A.* **48**, 11089)

Detergent efficiency—interpretation of reflectance curves. O. C. Bacon and J. E. Smith(Du Pont, Wilmington, Del.). *Am. Dyestuff Reptr.* **43**, 619-22(1954). A method is described for obtaining, directly from reflectance data, the relative efficiencies of detergents for removing soil. The related problems of redeposition and soil suspending power are not covered in this paper. The method is based on the difference in mechanical work required to give the same results with various detergents, when all other washing conditions are held constant. As corollaries, the relative efficiencies of washing machines and the effect of temperature, water hardness and detergent builders may also be quickly obtained from reflectance data. The method should be applicable to tests involving any artificially soiled fabric, provided soil removal is measurable by reflectance changes and a combination of detergent action and mechanical action is required to remove the soil.

Investigations into detergency in kitchens and laundries. S. G. Burgess, D. Burns, and C. W. Tidy(London County Council, Engl.). *J. Roy. Sanit. Inst.* **74**, 157-76(1954). Synthetic detergents are superior to soap for hand washing of kitchen articles in London hard water. Alkali assists in the cleaning, but the pH should not exceed 10.2 for the handwashing process. To avoid tarnishing of cutlery by detergent solution, dry rapidly and place Al foil in the rinse water. Sterilization by hot-water rinsing at 170-90°F. is recommended. Soap and soda ash which are suitable for soft water lead to damage of fabrics in hard water. The use of synthetic detergents reduces damage of fabrics. Na metasilicate, synthetic detergent, and carboxymethylcellulose are recommended for hard-water washing of white work. (*C. A.* **48**, 10361)

Noncaking particulate detergent composition. W. T. Bailey (California Research Corp.). *U. S. 2,688,599.* A non-caking, free-flowing solid particulate detergent is prepared by adding 3 to 5% by weight of a sodium silicate in which the mole ratio of sodium oxide to silica ranges from above about 0.62 to as high as about 1.5 to a mixture of from 30 to 40 parts by weight of sodium C_{12}-C_{15} polypropylene phenyl sulfonate, from 10 to 30 parts by weight of sodium sulfate, and from 40 to 60 parts by weight of sodium tripolyphosphate.

Detergent compositions. D. E. Anderson and W. F. Wegst(Wyandotte Chemicals Corp.). *U. S. 2,689,225.* A dishwashing detergent which will inhibit the development of stains on plastic and china dinnerware consists of an alkaline detergent salt, an alkaline condensed phosphate salt and chlorinated trisodium phosphate.