Letter to the editor

IN the color test for sesame oil, commonly known as the Baudouin test, concentrated hydrochloric acid and furfural are used as reagents. This test is also often termed "modified Villavecchia test." This is however not correct. The facts[1] appear to be as follows: a) Camoin, in 1850, observed the formation of red color when sesame oil was shaken with concentrated hydrochloric acid and a little cane sugar; b) Baudouin, in 1878, investigated this test further but without changing the reagent; c) the test then came to be called the Baudouin test and not the Camoin test; d) Villavecchia and Fabris together, in 1893, modified the test by replacing cane sugar with furfural. Is it not therefore more appropriate to call this test either "Villavecchia-Fabris test, or if Baudouin's name is to be retained, "modified Baudouin test?"

A reference to more than a dozen American, continental, and English text books on fatty oils revealed that only three gave the correct title.

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July 29, 1953

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[1] Budowski, P., and Markley, K. S., Chem. Rev., *48*, 130 (1950).

ABSTRACTS . . . .

E. S. Lutton, Editor

• Oils and Fats

Ralph W. Planck, Abstractor
Dorothy M. Rathmann, Abstractor

Dielectric constant and absorption coefficients of tripalmitin. L. I. Bogdanov and N. N. Stepanenko. *Zhur. Fiz. Khim.* **26**, 1477-1479(1952). Measured values (in 64-m. wave length) of the real part of the dielectric constant ϵ', at —45, —30, —6, 5, 20, 55, 80, 120°, are $\epsilon' = 2.272$, 2.354, 2.402, 2.444, 2.544, 2,901, 2.954, 2.924; the absorption index $n_\kappa = 0$, 0.01, 0.02, 0.03, 0.04, 0.08, 0.07, 0.04; the total polarization P = 252, ..., 276, 286, 300, 352, 365, 373 cc. The orientational polarization $P_\mu =$ disappears in the low-temperature range up to 5°. At 20, 55, 80, 120°, P_μ calculated from ϵ' following Syrkin (*Chem. Abs.* **37**, 2628) is 35, 97, 113, 122 (the Debye-Onsager formula gives somewhat smaller figures), and calculated from the dipole moment (Stepanenko *et al., Chem. Abs.* **41**, 7178) 174, 159, 145, 130 cc. The abnormal temperature trend of the P_μ from ϵ' may be due to changes of relaxation time, and to the decrease of association with increasing temperature. Values of the critical wave length λ_s corresponding to the maximum of the imaginary part ϵ'' at 55, 60, 80, 90, 100, 120, are 23, 21, 17, 14, 12, 10 cm.; the relaxation times $\tau = 1.23$, 1.13, 0.91, 0.73, 0.61, 0.53×10^{-10} sec; the dipole moments $\mu = 2.28$, 2.38, 2.55, 2.64, 2.68, 2.81D.; the Kirkwood (*Chem. Abs.* **33**, 9064) parameter $M_\infty = 2.75$, 3.17, 3.46, 3.60, 3.70, 3.94×10^{-18}. The slow increase of λ_s and τ with increasing temperature (as compared with the sharp fall of the viscosity), and the increase of μ, may be linked with a decrease of association, which apparently disappears at 120°. The same factor may underlie the change of M_∞ with the temperature. (*Chem. Abs.* **47**, 6201-6202)

Experiments in oil-making. II. Harvest of 1951-952. V. Carrante, A. Strusi, and S. De Donno (Staz. agrar. sper., Bari, Italy). *Ann. sper. agrar.* (Rome) **7**, 241-288(1953) (English summary). The exhaustive study of production methods for olive oil is continued. In solvent extraction with $CHCl:CCl_2$ the amount of residual oil in the residue is 0.7%. It may be advantageous to produce oil with the Sculco apparatus and recover the balance with a solvent extractor. (*Chem. Abs.* **47**, 6676)

Amounts of fat acids with five double bonds in different animal fats. A. Chevallier, S. Manuel, C. Burg, and R. Wagner (Univ. Strasbourg, France). *Compt. rend. soc. biol.* **146**, 1133-5 (1952). Determinations were made by an untraviolet absorption method described elsewhere. The pentaene acid content in mg./g. total lipid were: for normal rat serum lipides 32, normal rat corpuscle lipides 40, entire body fat of normal rat 21, entire body fat of thyroxine-treated rat 40, entire body fat of normal guinea pig 6, and entire body fat of thyroxine-treated guinea pig, 11-12. (*Chem. Abs.* **47**, 6455-6)

X-ray diffraction studies on the polymorphism of phospholipides. J. B. Finean (Univ. Birmingham, Eng.). *Biochim. et Biophys. Acta* **10**, 371-84(1953). A study was made of the variations with temperature of the diffraction patterns of dipalmitoylcephalin, dimyristoylcephalin, erucoylstearoylcephalin, linoleoylpalmitoylcephalin, hydrolecithin, sphingomyelin, and acetal phospholipide. The long spacings of the phospholipides tend to decrease with rise in temperature. The decrease is associated with a tilting of the long axes of the molecules with respect to the plane of the bimolecular leaflet. In the case of the cephalins, tilting occurs in well-defined steps; this suggests the formation of distinct polymorphs. In the cases of lecithin and sphingomyelin, tilting is more continuous, but with these compounds also distinct polymorphic forms occur at certain stages of heating. The differences in behavior may be associated with differences in the nature of the end groups of the compounds. (*Chem. Abs.* **47**, 6470)

Kamala seeds (Mallotus phillippinensis) and its oil. S. C. Gupta (Natl. Chem. Lab., Poona). *Proc. Symposium Indian Oils Fats Natl. Chem. Lab. India, Poona* **1951**, 33-39. The seeds contain 40-50% Kamala-seed oil which was superior to tung oil in many coating applications. Properties: acid no. 6.4, sapon. no. 195, acetyl no. 15.7, Hehner no. 95.6, hexabromide no. 0.3, I no. (Wijs) 166.8, I no. (Woburn B) 175.8, diene no. 40.4, carbonyl value nil, Browne heat test 9 min., 30 sec. Two unsaturated isomeric acids with 3 double bonds, α- and β-kamolenic acids, were isolated. The isomerism is probably geometrical about one or more of the double bonds. The characteristics of the 2 acids are: C 73.2, 72.7%; H 10.27, 9.97%; m. 86-87°, 77-78°; neutralization equivalent 293.3, 293.12; and I no. (Woburn) 249.6, 248.6. (*Chem. Abs.* **47**, 6677)

The quality of cereals and their industrial uses. Factors affecting the suitability of oats for processing. J. B. Hutchinson (Research Assoc. of Brit. Flour-Millers, Cereals Research Sta., St. Albans, Herts). *Chem. and Ind.* **1953**(24), 578-581(June 13, 1953). Varietal and agronomic factors influence the % kernel and kernel weight. Sound oat kernels contain 5-11% oil, 3.1-10.2 (average 5.9) % free fatty acids, 1.7-3.8 (ave. 2.4) % N, and lipase which, unless inactivated by heat, produces much free fatty acid in undried oats, bitterness in oatmeal, and soapy flavor in oatcakes.

Utilization of mowrah oil. J. G. Kane (Dept. Chem. Technol., Matunga, Bombay). *Proc. Symposium Indian Oils Fats Natl. Chem. Lab. India, Poona* **1951**, 55-57. Preliminary report on the refining, hydrogenation, and solvent crystallization of mowrah oil for the manufacture of cacao-butter substitute. Oil hydrogenated to an I no. of 23 and m.p. of 57° contained 6% isoöleic, 71% saturated, and 23% oleic acids. With acetone and petroleum ether as the solvent, and a solvent-fat ratio of 4: 1 at 15°, a precipitate of 47% and a filtrate containing 53% oil were obtained. The latter with an I no. of 37 and a fairly sharp m.p. of 41.7° was similar to cacao butter in its physical behavior. (*Chem. Abs.* **47**, 6676)

Chromatographic determination of butyric acid and the detection of milk-fat adulteration. Mark Keeney (Univ. of Maryland, College Park). *Ice Cream Trade J.* **49**, 30-6, 106-8(1953). The variation in the butyric acid content of fat from mixed herd milk is narrow enough to permit the easy detection of more than 10% adulteration of milk fat with nonmilk fat. When data have been accumulated on the butyric acid content of milk fat from various sources, detection of as little as 5% adulteration should be possible. (*Chem. Abs.* **47**, 6567)

The refining of vegetable oils with special reference to groundnut oil. Krishna Gopal Mathur (Kusum Products Ltd., Calcutta). *Proc. Symposium Indian Oils Fats Natl. Chem. Lab. India, Poona* **1951**, 81-86. Review of Indian practice. The soap stock obtained is 4-4.5 times the free fatty acids present in the oil. The soap stock contains total fatty matter 50, H_2O 40, combined alkali 4.0, gums, phosphatides, salts, and other impurities 6.0%. Of the total fatty matter about half is neutral oil. (*Chem. Abs.* **47**, 6676)

A suggested modified Babcock procedure for testing half-and-half. R. B. Maxcy (G. J. Meyer Mfg. Co., Cudahy, Wis.). *Milk Dealer* **42**(4), 42-3, 52-4(1953). Half-and-half, a homogenized dairy product containing 8-13% of fat, gives difficulty in determining fat by the usual Babcock procedure because of charred fat. A modified test is described in which the usual Babcock equipment is used, the major changes being the use of the ice cream test bottle, the addition of 9 ml. of a saturated solution of trisodium citrate, and the addition of 2 ml. of propyl alcohol prior to addition of H_2SO_4. Results agree closely with results by Mojonnier procedure. (*Chem. Abs.* **47**, 6567-8)

Modified Babcock procedures for testing ice-cream mix. J. A. Meiser and P. S. Lucas (Michigan State Coll., East Lansing). *Can. Dairy Ice Cream J.* **31**(5), 39-40, 74(1952). The following modified Babcock methods for fat in ice cream were compared: Mojonnier glacial AcOH, Illinois, Minnesota, perchloric acid, Nebraska, Kniaseff, Pennsylvania State, and modified Pennsylvania State. All methods produced extreme variations that fell outside the proposed limit of accuracy of 0.2% if the Mojonnier modification is assumed to give the correct value. Further study of the best modification is needed. (*Chem. Abs.* **47**, 6568)

Utilization of neem oil (Melia indica). Chittaranjan Mitra (Natl. Chem. Lab., Poona). *Proc. Symposium Indian Oils Fats Natl. Chem. Lab. India, Poona* **1951**, 40-54. A review with 36 references. A chart is given showing the products obtained from neem seed. These are neem oil (margosa oil) consisting essentially of glycerides and about 2% of bitters which have medicinal uses. The bitters are extracted from the oil with alcohol. Neem oil can be utilized for the manufacture of oleic and stearic acids; it can also be refined, deodorized, and hydrogenated. Pyrolytic degradation yields 90-93% distillate below 300°. (*Chem. Abs.* **47**, 6677)

Catalyst in Vanaspati production. D. D. Nanavati (Palanpur Vegetable Products, Palanpur). *Proc. Symposium Indian Oils Fats Natl. Chem. Lab. India, Poona* **1951**, 169-174. Vanaspati (hydrogenated peanut oil) is one of the cooking media for the Indian people. The degree of hydrogenation and characteristics of texture and grain in Vanaspati depend upon the quality of the Ni catalyst used. Experiments to produce the best catalyst are described. The reduction was done in oil with 40 lb. Ni formate, 4 lb. Hyflo, and 160 lb. of peanut oil in a cylindrical jacketed vessel 2 ft. in diameter and 5 ft. high. The final temperature was 475°F. for 1 hr. Total time required to complete the batch was 8 hr. Total H_2 used was 3000 cu. ft. The Ni obtained was jet black in color and granular in texture. (*Chem. Abs.* **47**, 6676)

Wild sesame seed from northern Rhodesia. R. W. Pearman, W. D. Raymond, and J. A. Squires. *Colonial Plant and Animal Products* (London) **2**, 297-299(1951). Wild sesame seed, *Sesamum angolense*, contains about half the oil content of commercial sesame. This oil contained more sesamin than commercial oil. As the sesamin is a synergist in pyrethrum sprays this wild sesame oil may have industrial value. (*Chem. Abs.* **47**, 6677-8)

Chemical examination of the fatty oil from the seeds of Steculia urens. S. V. Puntambekar and P. C. Batra (Forest Research Inst., Dehra Dun). *Proc. Indian Acad. Sci.* **36A**, 284-288(1952). *S. urens* is a large tree commonly found in northern and central India as well as on the west coast. The seeds contain 43.3% pericarp and 56.7% kernel, the latter contain 25% of a nondrying oil, sp. gr. at 30° 0.9143, n^{30} 1.4587, acid no. 1.8, sapon. no. 195.8, ester no. 194.0, I no. 74.2, acetyl no. 45.0, Hehner no. 91.4, unsapon. 0.55%, and no optical rotation. The mixed fatty acids had neutralization no. 198.47, mean m.w. 282.1, ester no. 194.0, I no. 77.4, softening point 34.5°, and m.p. 38.5. The constituent-acid composition, as determined by the Pb salt-alcohol separation and distillation of the Me esters of the solid acids and the determination of the unsaturated acids by bromination and determination of Br in the product, is: myristic (saturated acids lower than palmitic) 4.65, palmitic 17.82, stearic 2.01, lignoceric 1.57, oleic 66.59, linoleic 2.42, and resin acids 4.95%; the unsaponified matter is sitosterol. (*Chem. Abs.* **47**, 6677)

Reversion of soybean oil. Paul I. Smith. *Am. Perfumer Essent. Oil Rev.* **61**, 72(1953). The removal of phosphatides before alkali refining is discussed. (*Chem. Abs.* **47**, 6678)

Dielectric polarization and dipole moment of linolenic acid in benzene and in dioxane. N. N. Stepanenko and L. I. Bogdanov. *Zhur. Fiz. Khim.* **26**, 1472-1476(1953). Measurements by the Drude-Coolidge method in 64-m. wave length gave for solutions of linolenic acid in dioxane, at 18°, mole fraction C 0.0116, 0.0058, 0.0029, 0.0014, dielectric constant $\epsilon = 2.342, 2.324, 2.314, 2.307$, polarization $P = 142.2, 146.5, 151.7, 157.1$, $P\omega = 165$, dipole moment $\mu = 1.73$D. In solutions in C_6H_6 C 0.0121, 0.0060, 0.0030, 0.0015, $\epsilon = 2.310, 2.296, 2.290, 2.286$, $P = 126.4, 130.0, 136.7, 146.6$, $P\omega = 153$, $\mu = 1.56$. By measurements of ϵ and of the absorption coefficient κ as a function of C, the relaxation time $\tau = (1/\omega)P_i/(P_r - P_a)$ (where $\omega =$ angular frequency, P_i and P_r, respectively, the imaginary and the real part of P, and $P_a =$ sum of atomic and electronic polarization) is 2.6×10^{-10} sec. which, from $(4\pi N/9)\ (\mu^2/RT) = P_i^2 + (P_r - P_a)^2/(P_r - P_a)$, gives, correctly, $\mu = 1.74$. The value of μ in C_6H_6 is evidently a mean between $\mu = 1.74$ of a single linolenic acid molecule, and μ close to 0 of associated dimeric molecules. On that basis, the degree of association β of linolenic acid in C_6H_6 at infinite dilution is 0.05. For other higher fatty acids, the values of μ in dioxane, in C_6H_6, and β, are: stearic acid, 1.66, 1.04, 0.43; oleic acid, 1.68, 1.42, 0.11; linoleic acid, 1.71, 1.51, 0.08. Consequently, the tendency to association of C_{18} acids decreases with increasing unsaturation. For 1, 2, and 4 volume % linolenic acid solutions in dioxane, $\beta = 0.03, 0.05, 0.08$. The dipole moment increases only slightly with increasing unsaturation; consequently, the double bond contributes very little to μ, which is practically determined by the CO_2H group. From the value of τ, the volume of a linolenic acid molecule in dioxane solution is 4×10^{-22} cc., i.e. less than the volume of saturated C_{18} acids. (*Chem. Abs.* **47**, 6201)

Constituents of date stones. Rolf Strohecker. *Deut. Lebensm. Rundschau* **47**, 36-7(1951). The constants of the fatty oil extracted by light petroleum were: acid no. 4.3-5.8, sapon. no. 205-210, I no. 51.6-53, SCN no. 43.5-45.4, unsapon. 0.73%, semi-micro butter no. (Grossfield) 18.5-18.8, hexabromide no. < 1, acetyl no. 17.5-18.3, n^{25} 1.4633, d^{20} 0.9174. The varnish-like EtOH extracts contained a red coloring matter resembling cacao red. (*Chem. Abs.* **47**, 6501)

Nickel and copper catalysts for the saturation of glycerides and fatty acids by hydrogenation. Part II. R. Sanchez Delgado. *Revista de Ciencia Aplicada* **7**, 39-50(1953). The advantages and disadvantages of catalysts made up exclusively of nickel and copper are discussed. The preparation, characteristics, and effectiveness in hydrogenation of the catalysts obtained by precipitation of soluble salts of nickel, copper, and aluminum with alkaline silicates and carbonates are described.

The action of ultrasonic waves on vegetable oils. F. Maffei. *Olearia* **7**, 79-81(1953). Some modifications of fluorescence and absorption caused by treating pure, pressed, discolored, and dehydrated olive oil samples with ultrasonic waves are discussed. The fluorescence and absorption intensity of the treated oils are compared to those of a Brectified market olive oil.

Study of the utilization of macauba oil. G. B. Martinenghi. *Olearia* **7**, 67-72(1953). This industrial oil has found limited use because of its odor and color. Typical samples of the oil were subjected to the usual refining methods, but the improvement in odor and color were so limited that such processing could not be justified economically. Hydrolytic splitting of the oil appears to offer the best approach to a wider usage of the oil. The creamy white fatty acids thus obtained are made up of 17% saturated acids (chiefly palmitic), 74.6% oleic acid, and 8.0% linoleic acid. Chemical and physical constants of the oil are listed.

Oil extracted from palm fibers by alcohol. M. T. Mellier. *Oleagineux* **8**, 371-374(1953). Ethanol appears to be superior to petroleum ether and trichlorethylene for extracting the residual oil from palm press cakes in that the oil is neutral and separates readily from this solvent on cooling to permit facile isolation of the oil by simple decantation. The oil thus obtained has a high carotene content and can be processed readily to give carotene concentrates. Methanol is much less efficient than absolute or 95% ethanol for extracting the oil and the solutions obtained by extracting the fibers with isopropanol and trimethyl carbinol did not permit separation of the oil by decantation.

Oxidation of fats and oils. C. E. H. Bawn. *Nature* **171**, 1057 (1953). At a recent symposium on Oxidation held by the Oil and Fats group of the Society of Chemical Industry at Cambridge four papers were presented on various phases of autoxidation. C. E. H. Bawn in the introductory address spoke on the theoretical aspects. C. H. Lea stated that his work indicated reversion to be due to poly-unsaturated fatty acids which on autoxidation gave rise to α,β-unsaturated aldehydes. Dr. Skellon discussed the catalysis of oxidation of monoethenoid fatty acids and their higher esters by metallic soaps. In his work he used oleic, pentroselinic, ricinoleic, erucic, and brassidic acids. L. A. O'Neill considered the drying of oil films and the manufacture of blown oils and linoleum gels in the light of their dependence upon formation of polymers by autoxidation.

Hydroxystearic acid I. The catalytic hydrogenation of the 9, 10-epoxystearates. C. H. Mack, and W. G. Bickford. *J. Organic Chem.*, **18**, 686-692(1953). A method for the catalytic hydrogenation of cis- and trans-9,10-epoxystearic acids and their methyl esters to their monohydroxyl derivatives was described. This method involved the use of a Parr hydrogenation apparatus at room temperature with the use of Palladium-carbon as catalyst and glacial acetic acid as solvent. Only one isomer, namely 10-hydroxystearic acid was formed during the course of the hydrogenation. A small amount of hydroxyacetoxy-stearic acid was obtained as a by-product. Hydrogenation of either the cis- or trans-isomer resulted in the formation of the same product, but the trans-isomers hydrogenated at a much slower rate.

Fluorinated esters. III. Diesters of carboxylic acids with fluorine-containing alcohols and glycols. R. Filler, J. V. Fenner, C. S. Stokes, J. F. O'Brien, and M. Hauptschein. *Jour. Am. Chem. Soc.* **75**, 2693(1953). The preparation of a series of new esters and diesters of carboxylic acids with 1,1-dihydroperfluoro alcohols, a fluorinated secondary alcohol, and an $\alpha,\alpha,\omega,\omega$-tetrahydroperfluoro diol, is described. Physical and chemical properties of these compounds and of several intermediates are presented.

A tracer study of the reaction of isocyanates with carboxylic acids. A. Fry. *Jour. Am. Chem. Soc.* **75**, 2686(1953). By the use of C^{14}-carboxyl labeled acids, the carbon dioxide evolved during the reaction of isocyanates with carboxylic acids has been shown to come from the isocyanate. In a similar manner, the carbon dioxide produced from the reaction of carbanilide with acetic anhydride has been shown to come from the carbanilide.

A study of n-octadecenoic acids. V. The polymorphism of some elaidyl and petroselaidyl triglycerides. J. E. Minor and E. S. Lutton. *Jour. Am. Chem. Soc.* **75**, 2685(1953). Phase behavior was studied for the triglycerides obtained by introducing (separately) elaidyl and petroselaidyl radicals into glycerol, 1-monopalmitin and -stearin, and 1,3-dipalmitin and -stearin-also for the triglycerides 2-palmityl- and 2-steary dielaidin. There was considerable similarity especially between corresponding elaidyl and petroselaidyl individuals. The familiar alpha, beta prime and beta double-chain-length forms of the C_{16}-C_{18} saturated triglycerides may be called typical for the present compounds, although beta prime forms were lacking for 5 of the 12 individuals. No triple-chain-length structures such as are common with mixed oleyl-saturated triglycerides appeared.

Hydroxystearic acid II. Infrared spectra and x-ray diffraction of 10 and 12-hydroxystearic acids and methyl esters, and of 9, 10-epoxystearic acids. R. T. O'Connor, C. H. Mack, E. F. Dupree, and W. G. Bickford. *J. Organic Chem.* **18**, 693-701(1953). The 12-hydroxystearic acid and its hydrazide invariably formed gels on attempted crystallizations from a wide variety of solvents, whereas the 10-hydroxystearic acid as well as its hydrazide formed well defined crystals from the same solvents. The O-H band in the region 2.7 to 3.0 μ which usually occurs prominently in the spectra of hydroxy acids was not exhibited by 10- and 12-hydroxystearic acid, indicating that the O-H is hydrogen bonded. Since successive dilution failed to reveal evidence of a free O-H bond, the hydrogen bonding was considered as being intramolecular.

New extraction process for vegetable oils at Toronto elevators. Anon. *Can. Chem. Process.* **37**(3), 28-9(1953). A brief description of 5000 bu/day Rotocel solvent extractor is given.

Laboratory control of vegetable oil production. Anon. *Can. Chem. Process.* **37**(3), 73-4(1953). A brief description of the work done at the laboratories of Toronto Elevators Ltd. is given.

Now, fatty alcohols from tallow. Anon. *Chem. Eng.* **60**(3), 118(1953). A brief description of a plant using the sodium reduction process is given.

Flexible way to remove odors. Anon. *Chem. Eng.* **60**(3), 120, 122-23(1953). The Votator semi-continuous deodorizer is described.

"Wet steam" upgrades fish oil. Anon. *Chem. Eng.* **60**(5), 122 (1953). Fish oils are polymerized at 200-250°F. under vacuum in the presence of a "special" type wet steam to make a highly digestible, permanently tasteless and odorless stable oil. Commercial plants are in operation in Europe.

Better solvent extraction. Anon. *Chem. Eng.* **60**(5), 124, 126-28(1953). The filtration-extraction process for cottonseed is described.

Resonance absorption in liquid methyl palmitate and methyl stearate in the microwave region. T. J. Buchanan (Middlesex Hosp. Med. School, London, W. 1). *Nature* **171**, 695-6(1953). Resonance absorption measurements were made at temperatures ranging from the melting points to 30-40° above them.

Desolventizing and toasting of trichloroethylene-extracted soybean oil meal. G. Burnet, Jr. *Iowa State College J. Sci.* **27**, 137-9(1953). Abstract of a thesis.

Branched chain fatty acids of mutton fat. R. P. Hansen, F. B. Shorland, and N. June Cooke (Dept. Sci. Ind. Res. Wellington, N. Z.). *Chemistry & Industry* **1953**, 516-17. The isolation from the external carcase fat of old ewes of a saturated branched-chain C_{17} fatty acid is reported. It is characterized by its low melting point (−8°) and its possession of two methyl side chains.

Changes in the lipid fraction of Valencia orange juice during pasteurization. C. W. Huskins and L. J. Swift (U. S. Citrus Products Station, Winter Haven, Florida). *Food Res.* **18**, 305-7(1953). A comparative analysis of the lipide from fresh and pasteurized orange juices shows little change in composition. It appears unlikely that changes in flavor and lipide composition, due to pasteurization, are closely related.

Trichloroethylene extraction of cottonseed. F. K. Liu. *Iowa State College J. Sci.* **27**, 212(1953). Trichloroethylene can be used as a solvent to extract cottonseed oil which will meet the commercial standard of quality.

The cholesterol content of marine animal oils commercially produced in Norway. W. Thuesen (Wilhelmsgate 5, Oslo). *Norwegian Whaling Gaz.* **42**(1), 25(1953). The cholesterol content of 15 different species of raw marine animals oils is given. The richest sources (up to 10.4%) were the liver oils of halibut, turbot, Greenland shark, and blue whales.

Two complex salts of choline and copper chloride and their activity as catalysts of fat oxidation. P. L. White, D. M. Hegsted, and J. Mayer (Harvard Med. School, Boston, Mass.). *J. Am. Chem. Soc.* **74**, 2352-54(1953). Two stable complex salts of choline and copper chloride have been prepared. Neither of these salts is stable in aqueous solvents but in "dry reaction" were found to be superior to $CuSO_4$ or $CuCl_2$ as catalysts for the oxidation of corn oil.

Determination of glycerol in fermentation solutions: a rapid chromatographic procedure. A. F. Williams (Imperial Chem. Ind., Ltd., Stevenston, Ayrshire). *Nature* **171**, 655(1953). Glycerol is separated chromatographically and determined volumetrically.

Progress on the application of filtration-extraction to the processing of soybeans. E. A. Gastrock, J. J. Spadaro and A. V. Graci, Jr. (Southern Regional Research Lab.). *Soybean Digest* **13**, No. 8, 16-17(1953). This new process for direct solvent extraction of oilseeds without prepressing derives its name from the fact that separation of oil in hexane solution (miscella) from extracted meal (marc) and countercurrent washing with hexane are done on a continuous, commercial, horizontal, rotary vacuum filter. It has been applied on a pilot plant scale to cottonseed, rice bran and soybeans. Optimum conditions for extraction of soybeans are described with emphasis on the rolling and cooking operations. The crude oil is of good quality and can be bleached to a light color.

The seed fat of the Kerguelen cabbage (Pringlea antiscorbutica). H. H. Hatt and A. Z. Szumer. *J. Sci. Food Agr.* **4**, 273-8(1953). Physical and chemical constants were determined for 4 samples of seed fat from Kerquelen cabbage, ar isolated *Cruciferae*. Typical sample had: n^{25}, 1.475; acid value, 9.6; sapon. no., 187; Wijs I no., 149.6; and unsapon. 1.7%; 9.1% glycerol, no hydroxy acids or lower fatty acids. Spectroscopic analysis showed 1.40% conjugated dienoic and no conjugated trienoic glycerides. After alkali isomerization, 20.1% diallylic and 30.3% triallylic glycerides were found spectroscopically. Analysis of the fatty acids was made by two methods: fractional crystallization of acids from acetone followed by distillation of derived methyl esters; amplified distillation of methyl esters of the saturated acids and of hydrogenated acids. The merits of these two methods are compared. They showed, respectively, palmitic and lower, 4.2, 4.5; stearic 1.1, 2.6; arachidic 0.8, 0.7; behenic 1.1, 0.5; hexadecenoic 4.1, 3.7; oleic 7.9, 14.4; *cis*-11-eicosenoic 13.8, 11.2; erucic 13.5, 11.5; linoleic 20.1, 20.4; linolenic 30.3, 28.6. Monoenoic acids were determined by oxidation with performic acid to yield dihydroxy acids. Melting point data for C_{18} to C_{22} dihydroxy acids are summarized.

Note on the protection of mild steel by films of lanolin. E. G. Stroud and J. E. Rhoades-Brown (Teddington, Middlesex). *J. Applied Chem.* **3**, 287-8(1953). A procedure is described for estimating the rate of outdoor corrosion of mild steel coated with temporary protectants. When lanolin is the protectant and is applied as a solution in either white spirit or mineral oil, the concentration of the solution must not be below 12.5% by weight. This is equivalent to 0.006 oz. of lanolin/sq. ft. from white spirit and 0.004 oz./sq. ft. from light mineral oil. Thinner films provide inadequate protection.

Sinitiro Kawamura, Abstractor

Alkali fusion of higher aliphatic ketones. III. The product of the alkali fusion of stearone. Kenjirô Takeshita (Kyushu Univ., Fukuoka). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **56**, 28-30(1953). Stearone was heated with NaOH at 250-355° for 14-26 hr. The products contained palmitic acid besides stearic acid. Higher olefine, $C_{52}H_{104}$, was not confirmed.

Hydrogenation of tung oil. I. Hydrogenation process. Tetsutarô Hashimoto (Govt. Chem. Ind. Research Inst., Tokyo). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **56**, 123-5(1953). The change of fatty acid composition on hydrogenation of tung oil was followed by ultraviolet absorption and chemical characteristics. Hydrogenation of eleostearic acid formed conjugated and nonconjugated diethylenic acids and monoethylenic acids. The increase of saturated acids was slight till conjugated acids disappeared. Conjugated acids were more easily hydrogenated than nonconjugated acids.

Hydrogenation of tung oil. II. Formation of vaccenic acid. Tetsutarô Hashimoto. *J. Chem. Soc. Japan, Ind. Chem. Sect.* **56**, 178-9(1953). Mixed fatty acids of hydrogenated tung oil, I no. 70.6 and SCN no. 64.2, yielded vaccenic acid, I no. 89.1, m.p. 38.6-39.0°, mol. wt. 283.1, after 6 recrystallizations after removing saturated acids by Hg salts fractionation. Vaccenic acid was identified as the trans form by the infrared absorption spectrum.

Rice oil. X. Separation of fatty acids of rice oil by urea adducts. 4. Separation of oleic acid and linoleic acid. Hiroshi Sakurai (Osaka Univ., Sakai). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **56**, 118-20(1953). When benzene was used in the 2-layer reaction of fatty acids and urea, the yields were lower but the separation was sharper. The original rice-oil fatty acids and those adducted to urea and those not adducted to urea contained, respectively, palmitic 1.40, 3.20, 0; oleic 54.09, 93.08, 23.94; linoleic 44.37, 3.71, 75.80; and linolenic 0.15, 0, 0.26%.

Rubber-seed oil. Tomotarô Tsuchiya and Osamu Okubo (Govt. Chem. Ind. Research Inst., Tokyo). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **56**, 113-14(1953). Seed oil of *Hevea brasiliensis*, d^{20} 0.9216, n^{20} 1.4746, acid no. 51.4, sapon. no. 195.8, I no. 134.7, unsapon. 0.91%, was separated into free fatty acids (n^{20} 1.4684, neutralization no. 200.9, I no. 152.4) and neutral glycerides (n^{20} 1.4704, acid no. 0.45, sapon. no. 190.7, I no. 128.6). Mixed fatty acids consisted of 22.11% solid acids, neutralization no. 203.7, I no. 60.3, m.p. 49-52°, and 77.89% liquid acids, neutralization no. 199.7, I no. 161.2. Solid precipitate formed during storage in the winter contained waxy ester, such as ceryl stearate, tristearin, and palmitodistearin.

Synthesis of ε-caprolactam by the Schmidt reaction. Masamoto Watanabe (Toyo Rayon Co., Nagoya). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **56**, 100-101(1953). Cyclohexanone with Na_3N, H_2O, and H_2SO_4 (4 times theoretical amount) at 40° gave ε-caprolactam in better yield than 80% of cyclohexanone.

Glycerides. IX. Rates of esterification of glycerol and glycol. Issei Nakamori (Kyushu Univ., Fukuoka). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **56**, 95-7(1953). In the esterification of glycol with acetic acid, the formation of diester was more difficult than in the esterification of glycerol. It was concluded that carboxyl group on the next carbon (in monoester) disturbed the esterification to produce diester. This would explain the difficulty of formation of α,β-diester in the esterification of glycerol.

Glycerides. X. Mechanism of the reaction between glycerol and stearic acid. Issei Nakamori (Kyushu Univ., Fukuoka). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **56**, 166-7(1953). This reaction was presumed to be a homogeneous reaction taking place in the acid layer. The esterification was influenced by the position and the acid radical present in the 3 OH groups of glycerol.

The discoloration of fatty oils. Kôsaku Suzuki (Tokyo Fisheries Coll.). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **56**, 20-21 (1953). The discoloration was observed for rancid olive oil various additives at 30°. Starch, NaCl, KNO_3 had no effect, $(NH_4)_2SO_4$ had slight effect, and NH_4Cl, NH_4NO_3, and $NaNO_2$ had considerable effect on the progress of discoloration. Acid no. and sapon. no. had no relation, I no. had a slight relation, and peroxide oxygen and reducing substance in oil had a close relation to discoloration.

Oiliness of lubricating oils. XV. Film strength of lubricating oils under static conditions. Toshio Sakurai, Akira Furusawa, and Tetsurô Baba (Tokyo Inst. Technol.). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **56**, 193-6(1953). Film strengths of saturated fatty acids, fatty acid diesters, and lauryl alcohol were compared.

Seed fats of Abelmoschus manihot and Perilla nankinensis. Tomotarô Tsuchiya and Takuji Endô (Govt. Chem. Ind. Research Inst., Tokyo). *J. Oil Chemists' Soc., Japan* **2**, 72-4 (1953). Seed fat of *Abelmoschus manihot* (10.82% of seed), d^{20} 0.9321, n^{20} 1.4750, acid no. 1.52, sapon. no. 191.5, I no. 105.9, unsapon. 2.11%, contained 19% saturated acids (chiefly C_{16}) and 81% liquid acids (linoleic and oleic with very small amount of linolenic acids). Seed fat of *Perilla nankinensis* (27.00% of seed), d^{20} 0.9343, n^{20} 1.4828, acid no. 2.12, sapon. no. 195.3, I no. 191.8, unsapon. 1.54%, contained 6% saturated acids (C_{16} and C_{18}) and 94% liquid acids.

The oil-hydrogenation industry. Seiichi Ueno (Kinki Univ., Osaka). *J. Oil Chemists' Soc., Japan* 2, 54-62(1953). A review on the industrial development in Japan, analyses of the product, conditions of the operations, mechanism, and catalysts for oil hydrogenation with 17 references.

Separation and identification of fatty acids. XVI. Paper chromatography of unsaturated higher fatty acids. Yoshiyuki Inoue and Manjirô Noda (Kyoto Univ.). *J. Agr. Chem. Soc. Japan* **27**, 50-3(1953). The same method was applied to unsaturated fatty acids as reported in Part XV (*ibid.* **26**, 634-8 (1952). The R_f values are given for crotonic, 10-undecenoic, oleic, elaidic, erucic, brassidic, ricinoleic, ricinelaidic, sterolic, behenolic, linoleic, linolenic, α-elaeostearic, and β-elaeostearic acids. The relation was discussed between the structure of fatty acids and R_f.

Fat-splitting and surface-active agents prepared from naphthalene, biphenyl, butanol, and sulfuric acid. Kazuo Fukuzumi, Shimpei Ozaki, and Yutaka Yamada (Nagoya Univ.). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **56**, 114-16(1953). The product from biphenyl : naphthalene (1:1) was superior to that from biphenyl : naphthalene (1:4) as the fat-splitting agent for soybean and coconut oil. This product was more powerful than dibutylnaphthalenesulfonate which was superior to commercial ''Kontakt''-splitting agent. The surface activity of this product was greater than that of Na dibutylnaphthalenesulfonate and Na tetrabutylnaphthalenesulfonate.

The catalytic action of activated clay. I. Condensation of cetyl alcohol with phenol. Seiichi Watanabe. *J. Oil Chemists' Soc., Japan* **2**, 21-4(1953). Cetyl alc. (100 g.) with 100 g. phenol and 30 g. activated clay heated 1 hr. at 180-185° gave 13 g. first distillate, boiling at 135-190° at 3 mm. Hg (supposedly cetane or an isomer), 95 g. second and main distillate, boiling at 190-240° at 3 mm. Hg (cetylphenols), and 24 g. distillation residue (probably a mixture of dicetylphenols).

II. Reaction of oleic acid derivatives with phenol and the utilization of the reaction products as plasticizer. *J. Oil Chemists' Soc., Japan* 2, 68-72(1953). Ethyl oleate *(100 g.)* with 100 g. phenol and 20 g. activated clay heated 3 hrs. at 130-135° gave 71.5 g. distillate at 175-240° at 3 mm. Hg, which gave redistillate at 245-250° at 3 mm. Hg, which was presumed to be ethyl hydroxyphenylstearate *(I)*. Oleonitrile (100 g.) with 100 g. phenol and 50 g. activated clay heated 1 hr. at 185° gave 50 g. distillate at 240-260°, presumably hydroxyphenylstearonitrile *(II)*. *I* and *II* were acetylated with acetyl chloride to give, respectively, crude ethyl acetoxyphenylstearate *(III)* and acetoxyphenylstearonitrile *(IV)*. These were compared as plasticizers for polyvinyl chloride with dioctyl phthalate *(V)*. As plasticizer *III* was inferior to, but *IV* was as good as *V*. A mixture of equal amounts of *III* and *V* was also as good as *V*.

PATENTS

Purification of glyceride oils. B. Clayton (Refining, Uninc.). *U. S. Reissue 23,680 of patent 2,412,251.* Process for alkali refining of vegetable and animal oils.

Antispattering margarin. M. Mattikow (Benj. Clayton; Refining, Uninc.). *U. S. 2,640,780.* To a margarin prepared from a margarin oil, H_2O and milk solids is added a small amount of the methanol-soluble fraction of oil-free vegetable phosphatides as an emulsifying and antispattering agent.

Treatment of tall oil. S. W. Gloyer and H. A. Vogel (Pittsburgh Plate Glass Co.). *U. S. 2,640,823.* Unsaponifiable matter is recovered from tall oil by first esterifying the free fatty acids with a lower alcohol and extracting the product with a polar solvent. The raffinate contains most of the fatty acid esters, unsaponifiables and a minor amount of rosin acids. The bulk of the esters are removed by distillation. The still residue is saponified with aqueous alcoholic alkali and unsaponifiable fraction is recovered by extraction. Sterols are isolated by crystallization of the unsaponifiable fraction from a lower monohydric alcohol.

Method of sulfurizing fats and fatty acids. H. S. Beretvas (Standard Oil Co.). *U. S. 2,644,825.* Products are obtained by treating unsaturated fats or fatty acids with sulfur chloride in the presence of 5 to 50% (V/V) H_2O at 40-250°F. in the absence of added H_2S.

Antioxidant salts and method of preparing the same. C. S. Robinson (The Morton Salt Co.). *U. S. 2,645,581.* For use in salting and stabilizing fatty foods against rancidity, crystalline common salt is coated with a thin layer of glyceryl monostearate having dissolved therein an effective amount of nordihydroguaiaretic acid and a synergist.

Stabilization of glyceride oils with oxydialkanoic acids. C. D. Evans, J. C. Cowan and A. W. Schwab (United States of America, Sec'y of Agr.). *U. S. 2,645,648.* A glyceride oil can be stabilized by the addition of oxydiacetic acid or oxydipropionic acid.

Production of oilseed flakes. A. L. Ayers and C. R. Scott (Phillips Petroleum Co.). *U. S. 2,645,650.* A process for extracting oil from seeds consists of grinding the seed, adjusting the moisture content to 12-20%, rolling to produce flakes, heating the flakes to 180-275°F. until the moisture content is 7-12%, and finally extracting by countercurrent treatment with an oil solvent.

Recovery of fatty acids. E. N. Mortenson (Swift & Co.). *U. S. 2,645,651.* Fat-containing material is treated with liquid H_2O at temperatures and pressures such that fatty acids are dissolved by the H_2O which is used in quantities sufficient to yield 1-3% solution. The clarified extract is cooled to precipitate fatty acids which are then separated.

Therapeutic fat product. L. N. Wachtel and C. E. Meyer (The Upjohn Co.). *U. S. 2,646,354.* A stable fat emulsion for oral feeding is obtained by dispersing a low melting, non-drying, edible vegetable oil as particles having an average diameter about 0.5 microns in a 15-25% solution of sugar in water containing a suspension stabilizer. The final emulsion consists of 35-45% (by wt.) of oil, 54-64% of sugar solution, and at least 1.2% of a mixture of phosphatide and polyethylene glycol ether. It is stable for at least 9 months at room temperature or for 6 weeks at 47°, is free flowing at room temperature, and can be diluted with an equal volume of H_2O or other bland liquid without separation.

Winterized vegetable oils and process of preparing the same. H. D. Royce (Southern Cotton Oil Co.). *U. S. 2,646,356.* The resistance of vegetable salad oil to clouding and solidification at freezing temperatures is increased by the addition of small amounts of zirconium or zirconyl soaps of saturated fatty acids.

Process of producing refined fats and oils. E. M. Frankel. *U. S. 2,646,438.* A purified oil is obtained by treating the miscella with sodium sulfite, removing the precipitated sludge, treating the oil with dilute caustic alkali, and finally deodorizing it.

Process of liquid-liquid fractionation of glyceride oils. S. W. Gloyer (Pittsburgh Plate Glass Co.). *U. S. 2,646,439.* An oil which is a mixture of highly saturated and unsaturated glycerides is partially fractionated by countercurrent extraction with a polar solvent which is only partially miscible with the oil and preferentially extracts the unsaturated glycerides. The extract is subjected to countercurrent extraction with naphtha at a lower temperature so that 97% of the oil in the polar solvent extract is transferred to the naphtha.

• Biology and Nutrition

F. A. Kummerow, Abstractor

Studies on vitamin B_6. Carcass composition of the vitamin B_6-deficient rat. J. L. Beare, J. R. Beaton, and E. W. McHenry. (University of Toronto). *J. Biol. Chem.* 202, 589(1953). Young rats not provided with vitamin B_6 and given the antivitamin, desoxypyridoxine, exhibited only a slight increase in carcass total crude fatty acids, a slight increase in carcass protein, and a slight decrease in carcass water when transferred from a stock diet to a high fat, purified diet for a period of 21 days. Inclusion of corn oil in the basal diet at either a 5 or 20% level did not prevent this phenomenon, though it appeared to prevent the development of a severe stage of acrodynia in the deficient animals.

Formation of tiglic and n-valeric acids by bacteria-free Ascaris lumbricoides. E. Bueding (Western Reserve University). *J. Biol. Chem.* 202, 505(1953). The isolation and identification of *n*-valeric and tiglic acids as metabolic products of bacteria-free *Ascaris* are reported.

The influence of α-tocopherol upon the utilization of carotene and vitamin A. J. W. Hebert and A. F. Morgan (University of California). *J. Nutrition* 50, 175(1953). The addition of 0.5 mg α-tocopherol daily to the diet of partially depleted rats receiving 35 to 129 µg. vitamin A daily for 14 to 28 days produced no significant change in the liver stores of vitamin A, except in one group on the lowest level of intake for 28 days. Above a 75 µg. daily intake of vitamin A, the liver storage was nearly quantitatively cumulative. Addition of 0.5 mg α-tocopherol supplement daily to the diet of similar rats given 24 to 174 µg. of carotene in oil daily for 14 to 28 days produced a significant increase in liver vitamin A when the total carotene intake was from 1,200 to 2,400 µg., or the daily intake from 87 to 174 µg. for 14 days. Above and below these levels no effect was found. No cumulative storage of vitamin A was found at any level of dosing. Carotene in aqueous solution (Tween 40) produced larger amounts of liver vitamin A than carotene in the oily medium, but tocopherol was ineffective or depressant under these conditions.

Influence of fats and fatty acids on the capillaries. J. Kramar and V. E. Levine (Creighton University, Omaha). *J. Nutrition* 50, 149(1953). The capillary resistance and capillary permeability of the immature albino rat were studied under various dietary conditions. When the animals were fed a synthetic diet practically devoid of fat and fatty acids, or a synthetic diet containing 5% methyl stearate, the capillary resistance began to decline about the 50th day of the experiment and dropped to pathologically low levels. The difference amounted to 35 to 65 cm Hg, depending on the initial level. If the same basic diet contained 5% corn oil, the capillary resistance remained normal. In testing for capillary resistance in the human being, a new factor influencing this phenomenon must be taken into consideration. This new factor involves dietary fat.

Low fat diet in treatment of multiple sclerosis. *Nutrition Reviews* 11, 171(1953). It was observed that the incidence of multiple sclerosis was higher in areas where fat consumption was higher. The effect of dietary restriction of fat in the treatment of the disease was studied by comparing the effect of a low fat diet with the course of the disease prior to treatment. The studies indicated that in the primary stages, a low fat diet seemed to produce improvement though not a cure. These results were not checked with adequate controls.

Thiamine-sparing effect of fat. *Nutrition Reviews* 11, 189 (1953). The thiamine pyrophosphate levels in liver, heart and cerebral tissues were examined and it was concluded that increased carbohydrate intake leads to increased disappearance of thiamine pyrophosphate.

Dietary constituents affecting plasma and liver cholesterol in cholesterol-fed chicks. D. W. Peterson, E. A. Shneour, N. F. Peek and H. W. Gaffey (University of California). *J. Nutrition* 50, 191(1953). Studies were made of the effects of a number of dietary additions on plasma and liver cholesterol levels of chicks fed a diet containing 1% cholesterol and 4% cottonseed oil. When the cottonseed oil was omitted from the diet, only a moderate cholesteremia occurred. Mixed soy sterols, mixed sitosterols, β-sitosterol, stigmasterol and ergosterol were effective inhibitors of the progressive rise of plasma cholesterol and of deposition of cholesterol in the liver. Esterification of the soy sterols with capric acid destroyed their ability to prevent an increase in plasma and liver cholesterol. Cholesteryl caprate, in contrast to free cholesterol, did not produce a marked hypercholesteremia, and relatively low liver levels of cholesterol were found when this substance was fed.

The oxidation of chicken fat tissue. H. J. Phillips and I. L. Williams (University of Nebraska). *Science* 117, 658(1953). The oxygen uptake of fresh chicken fat tissue was found to be much greater than that of extracted chicken fat, oleic acid, cod liver oil and wheat germ oil in a Warburg respirometer at 37°C. A cold acetone extract of the tissue also took up oxygen rapidly.

Dihydroxyacetone esters as precursors of triglycerides during intestinal absorption. Raymond Reiser and Mary Carr Williams (Texas A. and M.). *J. Biol. Chem.* 202, 815(1953). 1-palmitoxy-3-hydroxyacetone and monopalmitin, labeled with C^{14} in the carboxyl group of the palmitic acid and in carbon 3 of the alcohols were fed to rats, and the lipids of the thoracic duct lymph analyzed. Ingested monoglyceride, and the fatty acid esters of dihydroxyacetone appeared in the lymph as triglyceride.

The metabolism of adrenosterone in vivo. K. Savard, S. Burstein, H. Rosenkrantz, and I. Dorfman (Boston University School of Medicine). *J. Biol. Chem.* 202, 717(1953). 11 β-hydroxyandrosterone, 11-ketoandrosterone, etiocholane-3α, 11 β-diol-17-one, and etiocholan-3α-ol-11, 17-dione, resulting from the metabolism of adrenosterone *in vivo*, have been found in urine by paper chromatography. These results demonstrated the reduction *in vivo* of the steroid 11-keto group to the 11 β-hydroxy group. By a consideration of the relative quantities of the metabolic products isolated, it appeared that the 11-oxygen function favors the reduction of the 4,5 unsaturation (of steroid ring A) to the C-5 trans (androstane) configuration.

Surface-active agents and the time of their effect on chick growth with special reference to vitamin B_{12} and aureomycin interrelationships. J. M. Snyder, B. C. Johnson and H. M. Scott (University of Illinois). *Poultry Science* 32, 527 (1953). When an all-plant diet, to which had been added crystalline B_{12}, niacin, choline, riboflavin and pantothenic acid was supplemented with any one of a number of surface-active agents, chick growth was not improved over the basal at four weeks. Aureomycin consistently improved growth. In a factorially designed experiment where aureomycin, vitamin B_{12} and Ethomid C/15 were used to supplement a "stress" diet, deficient in vitamin B_{12} and high in soybean meal, it was found that all supplements stimulated chick growth. These differences were statistically significant at the conclusion of the test (nine weeks). No advantage resulted from adding the surfactant to the diet containing vitamin B_{12} and the antibiotic.

Metabolism of C^{14}-labeled glycerol and pyruvate by liver in vitro. Ching-Tseng Teng, M. L. Karnovsky, B. R. Landau, A. B. Hastings, and F. B. Nesbett (Harvard Medical School). *J. Biol. Chem.* 202, 705-716(1953). The metabolism of glycerol-1-C^{14} and pyruvate-2-C^{14} was studied in liver slices from fasting, normal rats. When glycerol and pyruvate were present together as substrates, less pyruvate was converted to glycogen and CO_2, but the pyruvate reduced to lactate was doubled. The lactate formed was degraded and the specific activities of the carbons determined. From these data the sources of the lactate carbons have been calculated. The significance of these interrelated metabolic reactions was discussed in terms of hydrogen transfer from glycerol to pyruvate.

Squalene as a precursor of cholesterol in liver. G. M. Tomkins, W. G. Dauben, H. Sheppard and I. L. Chaikoff (University of California). *J. Biol. Chem.* 202, 487(1953). It was shown that natural squalene is a cholesterol precursor while regenerated squalene is not. The latter was natural squalene which had been passed through the solid hexahydrochloride and differed from the naturally occurring material in the type of carbon-carbon double bonds.

Anticoagulant properties of unheated soybean meal in chick diets. S. L. Balloun and E. L. Johnson (Iowa State College, Ames). *Arch. Biochem. Biophys.* 42, 355-9(1953). Blood-clotting time of chicks was significantly increased by feeding diets containing unheated solvent-extracted soybean meal. The anticoagulant was heat labile.

Occurrence of vitamin E in cod and other fish-liver oils. F. Brown (Hannah Dairy Res. Inst., Kirkhill, Ayr). *Nature* 171, 790-91(1953). The tocopherol concentration of a number of fish livers was determined by paper chromatography.

Determination of vitamins A and E by paper chromatography. J. A. Brown (Eli Lilly and Co., Indianapolis, Ind.). *Anal. Chem.* 25, 774-77(1953). The vitamins are separated from each other and from impurities on impregnated paper strips in an acetonitrile-water chromatographic system. The substances are located on the strip by means of an automatic spectrophotometric arrangement, which provides a graph of band position vs. strip length. Quantitative results are obtained by measuring the zonal areas on the graph and comparing to standards.

Comparison of chemical analysis and bioassay as measures of vitamin A value: yellow corn meal. Elizabeth C. Callison, Lois F. Hallman, W. F. Martin and Elsa Orent-Keiles (Agri. Res. Admin., Washington, D. C.). *J. Nutrition* 50, 85-100(1953). It was found that the bioassay vitamin A value of corn meal extract agreed with the vitamin A potency calculated from chemical analysis when hydrated lime was employed as adsorbent to separate an inactive pigment and the partially active isomers of β-carotene from all-*trans*-β-carotene, all of which compounds remain together on MgO-Hy-flo Supercel adsorbent.

Distribution of acetic acid carbon in high fatty acids synthesized from acetic acid by the intact mouse. W. G. Dauben, E. Hoerger and J. W. Petersen (Univ. Calif., Berkeley). *J. Am. Chem. Soc.* 75, 2347-51(1953). Carboxyl-labeled acetate was injected into mice which were sacrificed in 4 hours and the resulting labeled fatty acids isolated. It was found that the first and third carbons of the 16 carbon acids were about equally labeled whereas in the 18 carbon series the carboxyl carbon atom was about 3 times that of the third carbon atom. A small amount of activity was found in the even numbered atoms. From further degradation of one of the acids, it appears that the tail end of the molecule was not equally labeled in this short experiment.

The estimation of vitamin E activity by paper chromatography. P. W. R. Eggitt and L. D. Ward (Spillers Ltd. Central Lab., Cambridge). *J. Sci. Food Agr.* 4, 176-79(1953). Improved techniques have been applied in the separation and estimation of the individual tocopherols. Recovery figures of 95% or better are consistently obtained when tested with mixtures of synthetic tocopherols.

Biological oxidation. I. The infrared studies on the lipoxidase-catalyzed oxidation of linoleic acid. N. A. Khan (Hormel Inst., Austin, Minn.). *Arch. Biochem. Biophys.* 44, 247-8(1953). Sodium linoleate and methyl linoleate were autoxidized below 0° with dispersed oxygen and the peroxides formed were quantitatively concentrated. The concentrate was reduced ($SnCl_2$) immediately and the infrared spectra of the reduced materials shown. Both products manifest almost identical types of adsorption at the same wave lengths, proving the presence of two major isomers: *cis-trans* conjugated and *trans-trans* conjugated.

Colorimetric method for the determination of fatty acids in blood by oxidation with dichromate. A. C. Kibrick and S. J. Skupp (New York Univ. College Med., New York). *Arch. Biochem. Biophys.* 44, 134-39(1953). A method is described for the colorimetric determination of fatty acids by oxidation of the petroleum ether extract in a household pressure cooker at 15 lb. pressure by a solution of potassium dichromate in 74% sulfuric acid.

The vitamin E activity of substances related to methylene blue. T. Moore, I. M. Sharman and R. J. Ward (Dunn Nutritional Lab., Univ. Cambridge). *Biochem J.* **54**, xvi, xvii(1953). Preliminary data indicate that vitamin E-like activity of methylene blue is not a general property shared by a wide range of redox dyestuffs and antioxidants.

Effect of temperature and antioxidants upon the lipoxidase-catalyzed oxidation of sodium linoleate. A. L. Tappel, W. O. Lundberg and P. D. Boyer (Hormel Inst., Austin, Minn.). *Arch. Biochem. Biophys.* **42**, 293-304(1953). The lipoxidase-catalyzed oxidation of aqueous sodium linoleate was found to have a low activation energy, 4300 cal./mole. The greatest inhibitory effect was obtained with NDGA and propyl gallate. α-Tocopherol was oxidized rapidly.

Semimicromethod for unsaturated fatty acids of blood serum. Hilda E. Wiese and A. E. Hansen (Univ. Texas, Galveston). *J. Biol. Chem.* **202**, 417-23(1953). A semimicro method is described for measuring 2, 3 and 4 double bond fatty acids in 3 ml. blood serum. The unsaturated fatty acids are determined by spectral analysis of the alkali conjugated acids.

Carbohydrate metabolism in "active" and "static" human obesity. Rachael Beaudoin, T. B. Van Ittalie, and J. Mayer. *J. Clin. Nutrition* **1**, 91-9(1952). Obesity of recent onset is defined as active; obesity of long duration is called static. One group of women in the active phase and one group in the static phase were studied in respect to their carbohydrate tolerance. A markedly increased carbohydrate tolerance was found in the active phase after ingestion of self-selected meals, and after test doses of dextrose. The significance of increased tolerance to carbohydrate as it relates to the regulation of food intake is discussed. (*Chem. Abs.* **47**, 6505)

The influence of heat-treatment and solvent upon the nutritive value of soybean-oil meal for swine. D. E. Becker, C. R. Adams, S. W. Terrill, and R. J. Meade (Univ. of Illinois, Urbana). *J. Animal Sci.* **12**, 107-16(1953). Soybean meals were prepared by hexane extraction-desolventized (I), hexane extraction - partially toasted (II), hexane extraction - regularly toasted (III), and trichloroethylene extraction - regularly toasted (IV). When fed to young pigs II, III, and IV were not significantly different but were superior to I. When fed to older pigs II was superior to both I and IV. Protein-efficiency test results indicated that all of the meals were significantly different in protein quality. (*Chem. Abs.* **47**, 6505)

The nutrition of the young Ayrshire calf. XII. Factors affecting the tocopherol reserves, muscle composition, and muscle histology of 4-day-old calves. K. L. Blaxter, F. Brown, and A. M. MacDonald (Hannah Dairy Research Inst., Kirkhill, Ayr, Scotland). *Brit. J. Nutrition* **7**, 105-23(1953). The tocopherol content of full-lactating milk rose markedly when the cows went to grass in the spring. Mangold feeding caused a temporary depression of the milk tocopherol content. The tocopherol content of blood serum of newly-calved cows varied from 42 to 1195 α/100 ml. The tocopherol content of colostrum declined markedly after parturition. The tocopherol content of the calves' blood serum at 4 days of age was correlated with the serum tocopherol of their dams. (*Chem. Abs.* **47**, 6510)

Fatty acid catabolism and the citric acid cycle. F. L. Breusch. *2nd Congr. intern. biochim., Chim. biol. III, Symposium sur le cycle tricarboxylique* (Paris) *1952*, **35**-41 (in German). A review tracing the knowledge of fatty acid oxidation from the early work leading to the concepts of β-oxidation, ω-oxidation, and alternate β-oxidation to the recent concepts arising from the findings of the tricarboxylic acid cycle and participation of coenzyme A therein. (*Chem. Abs.* **47**, 6473)

Recent contributions of physical methods to the knowledge of normal and pathologic lipide metabolism. André Chevallier (Fac. méd., Strasbourg, France) and Constant Burg. *Sem. hôp. Paris* **26**, 4-9(1950). A review with 50 references. (*Chem. Abs.* **47**, 6531)

Studies of cholesterol biosynthesis. I. A new chemical degradation of cholesterol. J. W. Cornforth, G. D. Hunter and G. Popják (Natl. Inst. for Medical Research, London, Eng.). *Biochem. J.* **54**, 590-7(1953). After opening ring B by oxidation, splitting off ring A by pyrolysis as 2-methylcyclohexanone, and further breaking down the latter, 14 of the C atoms of cholesterol were converted to CO_2 and C_2-C_5 acids.

II. Distribution of acetate carbon in the ring structure. *Ibid.* 597-601. $[^{14}C]$ Cholesterol synthesized by rat-liver slices from $[carboxy\text{-}^{14}C]$ acetate and $[\alpha\text{-}^{14}C]$ acetate has been degraded partially showing that C atoms 2, 4, 6, and 10 are derived from the carboxyl C and C atoms 1, 3, 5, and 19 from the methyl C of actate. These results furnish partial support to the theory that squalene is a precursor of cholesterol.

Fat and lipide metabolism in acute alimentary disturbances in infancy. W. Droese and H. Stolley. *Monatsschr. Kinderheilk.* **101**, 121-3(1953). A discussion pointing out the importance of phospholipides and unsaturated acids in nutrition of infants. (*Chem. Abs.* **47**, 6511)

Isolation of a glyceroinositophosphatidic acid from wheat germ. Marguerite Faure and Marie Josèphe Morelec-Coulon. *Compt. rend.* **236**, 1104-1106(1953). From a mixture of phosphatidic acids a crystalline acid containing 2 fatty acids, one glycerol, one phosphoric acid, and one inositol was isolated (fatty acid/P = 2.1, glycerol/P = 0.96, and glycerol/inostol = 1.05). It was assigned the structure of an α-phospho-inositol glyceride, with the fatty acid esters in the other 2 positions. (*Chem. Abs.* **47**, 6675-6)

The tocopherol (vitamin E) content of cow milk during a lactation period. Franz Kieferle, Alfred Seuss, and Elmar Schrandy (Chem. Inst. Süddeutsch. Vers. u. Forsch.-anstalt Milchw., Weihenstephan, Ger.). *Milchwissenschaft* **8**, 57-62 (1953). Tocopherol was determined by a modification of the method of Emmerie and Engel.

Sugar-containing lipides of human and bovine erythrocyte stroma. E. Klenk and K. Lauenstein (Univ. Cologne, Ger.). *Hoppe-Seyler's Z. physiol. Chem.* **291**, 249-58(1953). From human erythrocyte stroma a lipide rich in sugar was isolated. The lipide contains chondrosamine as the structural foundation and lacks neuraminic acid. From bovine erythrocyte stroma, a sugar-rich lipide was also isolated which differs in structure in only one respect from the human lipide. The lipide was split to give fatty acids, principally lignoceric acid 25, sphingosine 16, and sugars 56-7%. The sugar mixture contains glucose, galactose, and glucosamine. Small amounts of material, probably gangliosides, were also isolated. Specific differences are indicated in the chemical combination of the carbohydrate components of the blood-group substance lipides. (*Chem. Abs.* **47**, 6515)

Sugar-containing lipides of horse erythrocyte stroma. E. Klenk and H. Wolter (Univ. Cologne, Ger.). *Hoppe-Seyler's Z. physiol. Chem.* **291**, 259-65(1953). The occurrence of a gangliosidic glycolipide (hematoside) in the stroma of horse erythrocytes is confirmed. After separation of other glycolipides, the neuraminic acid content is increased from an original 10% to 20%. In addition to lignoceric acid a high molecular weight unsaturated acid, probably nervonic acid, galactose, and glucose were isolated and identified in the ganglioside. Another neuraminic acid-free glycolipide in horse blood stroma appears to be a lignoceric-(nervonyl)-sphingosine dihexoside containing glucose and galactose. (*Chem. Abs.* **47**, 6515)

Metabolism of neoplastic tissue. IV. A study of lipide synthesis in neoplastic tissue slices in vitro. Grace Medes, Alice Thomas, and Sidney Weinhouse. *Cancer Research* **13**, 27-9 (1953). Acetate and glucose C can be used for synthesis of the fatty-acid chain in neoplastic tissues. However, this process is probably too slow to supply the lipide needs of a rapidly growing tumor, and the tumor must therefore obtain its lipides preformed from the host. (*Chem. Abs.* **47**, 6530)

Behavior of the crystalline lens in rats subjected to a low-protein and high-fat diet. Giulio Morone. *Rass. ital. ottalmol.* **19**, 209-23(1950); *Am. J. Ophthalmol.* **34**, 319(1951). Rats fed on diets low in proteins and high in lipide-forming substances tended to develop, to a slight extent, subcapsular spots and clouding of the nucleus. (*Chem. Abs.* **47**, 6512)

An alternate approach to the problem of obesity. A. W. Pennington. *J. Clin. Nutrition* **1**, 100-6(1952). Causes of obesity are discussed. Evidence of a homeostatic regulation of the appetite and of fat storage suggest some other causes than over-feeding, such as psychic stress operating through the autonomic nervous system on the hypothalamus, and the lipophilia concept. Pyruvic acid formed in the breakdown of carbohydrate was found to inhibit the oxidation of fats, and to stimulate the synthesis of fatty acids from smaller elements. (*Chem. Abs.* **47**, 6505)

Changes in blood lipides in the pancreatectomized dog, with and without a dose of lipide in the circulation. Antonio Pittoni and Carlo R. Rossi. *Atti ist. veneto, Classe sci. mat. e nat.* **109**, 141-7 (1951). No differences were found between the changes of blood lipide level in normal dogs and in pancreatectomized animals maintained with insulin and lipocaic. In the latter animals injection of 8 ml./kg. of a 4% fat (butter) emulsion did not lead to hyperlipemia. (*Chem. Abs.* **47**, 6518)

Reduction of blood cholesterol in man. O. J. Pollak (Quincy City Hosp., Quincy, Mass.). *Circulation* **7**, 702-6(1953). Sitosterol is not resorbed by man and ingestion of it prevents intestinal resorption of cholesterol. (*Chem. Abs.* **47**, 6543)

Leucocytes. I. Fat fractions of intact cells and of isolated cell nuclei in normal and pathological conditions. E. Polli and G. Ratti (Univ. Med. Klinik, Milan). *Biochem. Z.* **323**, 546-64 (1953). The total fatty acid content of intact cells is not materially altered under normal or pathological conditions. Neutral fat seems to vary in amount both in normal and in leukemic cells. The I no. in human leucocytes is subject to very small variations. Likewise the lipide P varies little, but the cholesterol fraction, especially the esters, is subject to wider variations. In leukemia the cholesterol fraction is reduced by half. The total fatty acid content of normal nuclei is subject to little variation, while in leukemia (especially lymphatic leukemia) this is reduced to one-half. The same is true for the cholesterol (especially the cholesterol esters) and lipide P. The lipide of the nucleus seems to be associated chiefly with the nuclear membrane, although a small amount may be associated with the chromatin. (*Chem. Abs.* **47**, 6528)

Ultraviolet spectrographic studies on the bond between proteins and higher unsaturated fatty acids. E. Schauenstein and O. Gold (Univ. Graz, Austria). *Monatsh.* **84**, 209-11(1953). The formation of a complex of a protein with an unsaturated fatty acid can be spectrographically detected by the phenolic dissociation curve of the tyrosine groups of the protein. If higher conjugated fatty acids are employed no such change in the ultraviolet-absorption curve occurs. A "fibroinogen" with 14% tyrosine prepared according to Coleman and Howitt (*Chem. Abs.* **42**, 4216), and complexed with unsaturated fatty acids did not follow the above-mentioned absorption rule. It is, therefore, concluded that the tyrosine content of a protein is not the only condition for complex formation. Also stearic factors may play an important role. (*Chem. Abs.* **47**, 6456)

Lipolytic enzyme action. IV. Example of mathematical treatment of an enzymic process consisting of consecutive reactions. F. Schønheyder, K. Olesen, and K. Volqvartz (Aarhus Univ., Denmark). *Biochim. et Biophys. Acta* **9**, 76-91(1952) (in English). The hydrolysis of $(EtO_2CCH_2)_2CHCO_2Et$ (I), $EtO_2CCH_2CH(CO_2Et)CH_2OH$ (II), and $(HOCH_2)_2CHCO_2Et$ (III) by liver esterase extracted from dried rabbit-liver tissue, was followed at various substrate concentrations at pH 7.10 and 22° by means of a continuous titration technique. Mathematical treatment of the kinetics leads to a reaction scheme for the complete hydrolysis of I via II and III. (*Chem. Abs.* **47**, 6453)

A new method for the direct determination of serum cholesterol. Albert Zlatkis, Bennie Zak, and Albert J. Boyle (Wayne Univ., Detroit, Mich.). *J. Lab. Clin. Med.* **41**, 486-92(1953). The method consists of adding 2 ml. of a reagent (2 ml. of 10% $FeCl_3$ in glacial AcOH is diluted to 200 ml. with concentrated H_2SO_4) to 0.1 ml. of serum in 3 ml. of glacial AcOH. Full development of the color occurs in approximately 1 min. and remains stable over a period of several hours. The purple color is read at 560 mμ in a spectrophotometer, and the result is obtained from a standard curve. Equimolar concentrations of cholesterol and cholesterol ester yield color of equal intensity obviating saponification of the ester. The interference of bilirubin was studied and only very high concentrations were found to interfere with the determination. (*Chem. Abs.* **47**, 6487)

• Drying Oils

Raymond Paschke, Abstractor

Artists' paints, their manufacture, and the products. Paul Bliesener. *Seifen-Öle-Fette-Wachse* **78**, 199-202(1952). A review on the production and properties of oil paints, water colors, pastels, and colored chalks. (*Chem. Abs.* **47**, 6670)

The effect of oxidation on the light refraction of China wood oil. Felix Fritz. *Deut. Farben-Z* **7**, 90(1953). China wood oil, n^{16} 1.5187, blown with air at 16° for 15 hrs. and at 150° for 1.5 and 2 hrs. had n^{16} 1.5188, 1.5147, and 1.5127. Blown 6 and 18 hrs. at 16° in the presence of 0.5% Co linoleate it had n^{16} 1.5188 and 1.5187. Hence, no change occurs on blowing at room temperature. (*Chem. Abs.* **47**, 6671)

Drier levels versus tack-free time for tall oil vehicles. C. T. Fiscella and L. G. Zacharakis. *Am. Paint J.* **37**, No. 41, 60 (1953). Various drier combinations were studied on two maleic modified tall oil pentaerythritol esters extended with soya oil. Several combinations are recommended on the basis of the study.

Spectrophotometric micromethod for determining polyunsaturated fatty acids. S. F. Herb and R. W. Riemenschneider. *Anal. Chem.* **25**, 953(1953). A spectrophotometric method is described which requires 1 to 10 mg. of fat for determination of acids containing two or five double bonds. Results of analysis by the micromethod agreed with those obtained by macromethods.

Comparison of European and American finishes. E. S. Johnson. *Paint, Oil & Chem. Rev.* **116**, No. 14, 16(1953). European furniture finishes are made of the same basic materials used in the United States but the methods of application vary considerably. In Europe all operations are influenced by the existence of high material costs and low labor costs. In Europe the installation of conveyors and drying ovens is retarded because of government tax policies.

Safety in the protective coating industry. C. L. Jones. *Off. Dig. Federation Paint and Varnish Production Clubs* No. 342, 414(1953). A complete discussion of the accident prevention problem, with many specific examples of loss of life and property.

Drying oils for the paint industry. J. C. Konen. *Am. Paint J.* **37**, No. 44, 64(1953). A comprehensive review of drying oils including their history, characteristics, chemical and physical tests, types, production, refining, chemical modification, and trends. This is lecture V in the Third Ten-Year Practical Paint Course sponsored by the New England Production Club.

Experts study linseed and linseed oil. A. G. Mezerik. *Am. Paint J.* **37**, No. 43, 60(1953). This report results from a study made by three United Nations organizations on linseed and linseed oil in the world. No figures were obtained from Russia.

The processes of improvement of drying oils, with special consideration of isomerization. J. D. v. Mikusch. *Schweiz. Ver. Lack u Farben-Chem. u Tech., Bull.* No. 201 (1952). A review with 119 references. (*Chem. Abs.* **47**, 6151)

Reactions of oils and resins in varnish cooking. J. H. deWilde. *Finska Kemistsamfundets Medd.* **61**, 81-94(1952). (In English.) Reactions are discussed involving both the ester linkages and the double bonds. In the former case acid and alcohol radical interchange can occur. Ester interchange can reduce the mol. wt. of the large resin units and lead to lower viscosity and higher soly. than those of a simple blend of resin and oil (cf. Powers, *C.A.* **44**, 3721h and **36**, 4358^2). The reactions of phenolic resins with drying oils are discussed as a special case of the reactions between phenol alcs. and conjugated double-bond systems. A new rosin-based maleic resin which reacts with drying oils by ester interchange as well as with the double-bond system may permit a wider selection of drying oils in the prepn. of varnishes. (*Chem. Abs.* **47**, 6671)

Vegetable drying oils in floor coverings. George A. O'Hare. *Seifen-Öle-Fette-Wachse* **78**, 541-2(1952). A review of linoleum production. (*Chem. Abs.* **47**, 6672)

Vegetable oils in the manufacture of modified alkyd resins. Om Prakash. *Proc. Symposium Indian Oils Fats. Natl. Chem. Lab. India, Poona*, **1951**, 217-21. With castor oil as modifying agent light golden yellow colored resins giving hard and elastic films were obtained. With linseed oil the color of the resin was darker but the film-forming properties were satisfactory. With dehydrated castor oil gel formation occurred before the reaction was completed. Some expts. were tried with castor oil as the modifying agent without initial removal of the water of reaction with xylene, but the products obtained in these cases were not satisfactory. It was preferable to use a solvent to assist in the removal of the water, so as to decrease gelation and improve the properties of the resin. (*Chem. Abs.* **47**, 6672)

Drier effects on drying of oil films. S. A. Saletore, A. Hai, and V. R. Harawalkar (Central Labs. Sci. Ind. Research, Hyderabad). *Proc. Symposium Indian Oils Fats Natl. Chem. India, Poona* **1951**, 202-6. Conclusions: (1) Driers cut short the induction period, but do not otherwise greatly influence the absorption of O. (2) The residual breakdown products of oxidation are not negligible and their reactions have to be considered in film formation. (3) Driers play a significant part in reaction following absorption of O. (4) Some driers appear to accentuate the production of soft films which are formed at 96° in the absence of driers, indicating most likely the formation of linear growths; others catalyze the formation of hard films, possibly owing to cross-linked structures. (5) If quicker and better drying is to be achieved, other accelerators should be used than the known metallic driers which will catalyze reactions other than O absorption. (See *Chem. Abs.* **47**, 6671 for details.)

Testing traffic paints. Frank G. Smith. *Can. Paint Varnish* **27**, No. 6, 18(1953). The alkyd-type vehicle was superior in durability to the oleoresinous type. Reflectorized paints had approximately twice the life of the same paints unbeaded. Bleeding could be minimized by the use of low-boiling solvents.

How inks dry. Frederick A. Varron. *Interchem. Rev.* **12**, 3-22 (1953). R review with 16 references. (*Chem. Abs.* **47**, 6671)

Conjugated for speed. *Chemical Week* **72**, No. 25, 62(1953). A press release describing an isomerized safflower oil containing 22 to 24% diene conjugation.

New role for rare earths. *Chemical Week* **72**, No. 26, 38(1953). Rare earth metals are the newest driers and catalysts for paints and protective coatings. Cerium, lanthanum and zirconium are in commercial use. Review describes what they can do, how they were developed, where they can be used, and who is interested in them.

Soybean lecithin in the varnish industry. A. Girelli. *Ind. vernice (Milan)* **7**, 10-11(1953). A discussion of its use as a pigment-grinding aid. (*Chem. Abs.* **47**, 6672)

Sinitiro Kawamura, Abstractor

Interesterification of sardine oil. Yoshiyuki Toyama, Sadao Igarashi, and Tomoji Yamamoto (Nagoya Univ.). *J. Oil Chemists' Soc., Japan* **2**, 63-5(1953). In the low-temperature interesterification of sardine oil and dewaxed sardine oil (solid fat removed at 3°) with Na methylate suspended in xylene as the catalyst, 0.4% or less of catalyst was insufficient but reaction time longer than 11.5 hr. was not necessary with 0.5-1.45% catalyst. When the reaction temp. was gradually lowered to 4°, about 10% trisaturated glycerides formed, but the product still contained 10% saturated acids as mixed glycerides. There did not occur conjugation of unsaturated bonds in highly unsaturated fatty acids. Interesterified oil was comparable in drying property with linseed oil after dewaxing.

Interesterification of cuttle-fish oil and soybean oil. Yoshiyuki Toyama, Sadao Igarashi, and Tomoji Yamamoto (Nagoya Univ.). *J. Oil Chemists' Soc., Japan* **2**, 66-8(1953). The low-temperature (down to 7°) interesterification of cuttlefish oil with 0.6% Na methylate in xylene as the catalyst produced 3.6-4.7% trisaturated glycerides and drying oil (with saturated fatty acids less by 8.7-7.3% than the original oil) after dewaxing at 5°. The similar interesterification of soybean oil with 0.7% catalyst produced only 0.35% triunsaturated glycerides and drying oil with I no. 137.7 and 8.5% saturated fatty acids after dewaxing at 5°. Thus this method of interesterification is not suitable for obtaining drying oil from such oils as soybean oil with comparatively less saturated fatty acids.

PATENTS

Interpolymerization of polyolefinic esters of 2-alkenyl alcohols with monoölefinic hydrocarbons. Frank J. Carlin (to United States Rubber Company). *U. S. 2,626,945.* Polyolefinic esters of 2-alkenyl alcs., such as allyl acrylate and diallyl fumarate, are converted to soluble polymers without premature gelation by carrying out the polymerization in the presence of one or two copolymerizable monoölefinic aliphatic hydrocarbons, such as 1-pentene, cyclohexene, and styrene. The products are useful as baking enamels and nonflammable plastic objects capable of withstanding high temperatures. Details in *Chem. Abs.* **47**, 6673.

Hydrocarbon polymers. Herman Pines (to Universal Oil Products Company). *U. S. 2,632,777.* Nonaromatic polyolefinic cyclic polymers which are suitable as drying oils are obtained by heating to 30-150° nonaromatic polycyclic hydrocarbons with aliphatic polyolefins containing 3-12C atoms in the presence of 1.5-4.5 parts (by wt. of hydrocarbons) of an acid-type inorganic catalyst, preferably HF, and decompg. the sludge formed by loose bonding of the catalyst and the unsaturated polymerization product. Details in *Chem. Abs.* **47**, 6673.

Bodied phenolic varnish. Hyman Schwartzberg (to Glidden Company). *U. S. 2,636,017.* Phenolic polyalcs. prepd. from phenols and HCHO below 100°F. are bodied in the presence of a solvent and an acid catalyst to form thermosetting varnishes. Details in *Chem. Abs.* **47**, 6673.

Coating compositions. Council of Scientific and Industrial Research. *Indian 44,737.* Wrinkle-finish coating compns. are prepd. by allowing vegetable and (or) animal oil having conjugated double bonds to react with a natural or synthetic resin or an ester gum at 175-280°. Details in *Chem. Abs.* **47**, 6673.

• Waxes

R. L. Broadhead, Abstractor

Cellulose and waxy substances of "Coiron amarillo" (Stipa SPP.). Eliseo T. Huergo. *Anales direc. nacl. quim.* (Buenos Aires) **5**, No. 9, 13-15(1952). Cellulose (I) was isolated by twice boiling the culm for four hours in 4% NaOH solution, cooling, filtering, macerating, and washing the fibers with cold H_2O. The yellow I was bleached with NaOCl solution (4% active Cl); the yield was 24.2% of the weight of culm. I is a smooth, thin fiber of regular diameter and variable length, and shows rectangular cells with dentate edges, and loose hairs from epidermal cells. Extraction of the culm with toluene gave 2.3% of wax melting at 68-70°, sapon. no. 183, acid no. 50, I no. 68, and ester no. 133. (*Chem. Abs.* **47**, 5111)

Wax encyclopedia. Part II/6: Semi-solid systems. L. Ivanovszky. *Seifen-Ole-Fette-Wachse* **79**, 203-204, 235-236(1953). The solidification time, solvent binding, evaporation phenomena, syneresis, temperature stability and changes occurring on standing in wax-solvent semi-solid systems are discussed.

The utilization of Chlorowax 70 in paints and enamels. A. M. Vermorken (Keyser and Mackay, Brussels, Belg.). *Chim. peintures* **16**, 69-74(1953). A collection of formulations, largely of fire retardant and traffic paints, utilizing a chlorinated paraffin. (*Chem. Abs.* **47**, 5132)

PATENTS

Treatment of fruits and vegetables to inhibit deterioration. Henry C. Marks and Donn H. Horchler (to Wallace & Tiernan Products, Inc.). *U. S. 2,604,408.* Decay and similar deleterious effects caused by fungi and bacteria can be controlled by application of certain halogenated hydrocarbons (C_2H_2 and C_2H_4), the halogen being I^-, Br^-, or a combination of both. Compounds particularly useful include C_2Br_4, C_2I_2, and C_2I_4. The compound selected may be applied as a vapor, dust, spray, or wash. It may also be applied to the paper or other wrapping material or be incorporated in a wax which is used to coat the fruit or vegetable. (*Chem. Abs.* **47**, 5042a)

Amido-amide derivatives of dibasic acids. Herman B. Goldstein and Stanley T. Clary (to Sun Chemical Corp.). *U. S. 2,609,380-1.* New, organic, substantive, nonyellowing, water-dispersible textile-finishing agents are prepared. Disubstituted amido-amides of $(COOH)_2$ (I) or another dibasic carboxylic acid are prepared by treating fatty acid (lauric acid or higher) with a polyamine to form an amido-amine which is treated with a derivative of I. Thus, triple-pressed stearic acid (III) (276 parts) and 104 parts *N*-(hydroxyethyl)ethylenediamine(IV) are heated at 180° with removal of water until the acid value goes down to 5 mg. KOH/g. To this 67 parts diglycolic acid is added at 190° until reaction is complete. A dark-tan, brittle, wax-like material is obtained of acid value 25 mg. KOH/g. Other amido-amide derivatives are similarly obtained (1) from the reaction product of III and IV with phthalic anhydride (V), a light-colored, waxlike material, melting at 69°, of an amine value of 40-50 mg. KOH/g.; (2) from III, diethylenetriamine, and succinic acid; (3) from coconut fatty acids (VI), *N,N'*-bis(hydroxyethyl)-ethylenediamine, and V; (4) from III, IV, and I, a waxlike, light tan-colored material, melting at 75°; (5) from III, IV, and diethyl fumarate, a dark brown, hard, waxlike material; (6) from hydrogenated fish oil fatty acids, ethylenediamine, and sebacyl dichloride; (7) from VI, *N,N'*-diethylethylenediamine, and V, a light, tan-colored, waxlike material; (8) from caprylic acid, propylenediamine, and adipic acid dichloride at 85° in the presence of pyridine, a semi-waxlike, tan product; and (9) from III, bis(2-aminoethyl) ether, and tartaric acid. (*Chem. Abs.* **47**, 5128)

Solvent-soluble water-repellency composition. Larry Q. Green (to E. I. Du Pont de Nemours & Co.). *U. S. 2,628,170.* Textile fabrics can be made water-repellent by applying a solvent-soluble composition consisting of a paraffin wax or other hydrocarbon wax and an ortho ester of Ti incorporated into the wax-solvent mixture. The organic Ti compound has the general formula RO (R'O)(R"O)(R'"O)Ti, where R, R', R", R'" are monomeric organic radicals representing aliphatic, cycloaliphatic, araliphatic hydrocarbon radicals and halogen derivatives of these radicals. For example, 2.5 parts by weight of dibutyl dioctadecyl titanate and 57.5 parts of a paraffin wax, melting at 64° are added to 40 parts of Stoddard solvent. The mixture is heated at 65° until solution is complete. On cooling, the product is a light-yellow soft paste. One part of this paste, dissolved in 20 parts of Stoddard solvent, is applied to cotton jean cloth by immersion. The pick-up is adjusted to 3% total solids, corresponding to 0.125% titanate ester. The solvent is evaporated off; this gives the fabric a test rating of 90 or better. No curing is necessary. *U. S. 2,628,171.* Similar results are obtained, but some of the R's in the general formula represent alkyl radicals of not over 6 C atoms while the remaining R's represent radicals of a 2-(lower alkyl)-1,3-alkenediol, where the alkane radical has 4-24 C atoms while the lower alkyl radical has no more than 4 C atoms. Cf. *C.A.* 38, 4354^6. (*Chem. Abs.* **47**, 5131)

Rust-inhibiting composition. Knapel F. Schiermeier and Paul W. Jones (to Shell Development Co.). *U. S. 2,632,709.* Metallic surfaces can be protected against corrosion by coating them with a mixture of (a) a light hydrocarbon or aromatic solvent, (b) an oxidized waxy hydrocarbon, and (c) a small amount of an organic acid. A typical mixture is oxidized West Texas Ellenberger short residue 47.4, mineral spirits 52.1, and oleic acid 0.5 weight %. Materials of this type have been shown to protect polished steel specimens under salt spray and ultraviolet weathering tests. (*Chem. Abs.* **47**, 5676)

Plastic for recording apparatus. Dictaphone Corp. (Richard G. Rowe, inventor). *German 811,164.* A wax containing 4% of *N*-cyclohexyl-lactamide is described. (*Chem. Abs.* **47**, 5721)

• Detergents

Lenore Petchaft, Abstractor

A comparison of D.C.M.X. and hexachlorophene as soap germicides. J. W. Lord and E. Parker (J. Bibby & Sons, Ltd., Liverpool 3, Eng.). *Soap, Perfumery, Cosmetics* 26, 463-5(1953). In these tests D.C.M.X. has been used at a level of 2.5 per cent added to a toilet soap base at the milling stage. Toilet soap containing 2 per cent hexachlorophene has been used as a comparison and unmedicated toilet soap as a control. Both in vitro and in vivo experiments have been carried out, using various experimental techniques. The results of these tests showed that in vitro experiments and more significantly in vivo experiments, that as a soap germicide, D.C.M.X. is much inferior to hexachlorophene.

Foam stabilization by alkylolamides. H. H. Sanders and E. A. Knaggs (Ninol Laboratories, Chicago, Ill.). *Soap, Sanit. Chemicals* 29, No. 6, 45-8, 93(1953). The use of foam stabilizers for synthetic detergents is described. These are usually mono- or dialkylolamides. Dialkylolamides would be used in liquid detergents and in ribbon blenders. The monoalkylolamides are used in spray-dried detergents where they are intimately associated with alkyl aryl sulfonates and polyphosphates in the sprayed bead. A "dishpan" test for evaluating these stabilizers is described and illustrated. The influence of water hardness was emphasized. Another aspect is the mechanism of foam stabilizing action. From test results it would seem that the foam stabilizing action of the alkylolamides cannot be explained by mechanical strengthening of the bubbles, resistance to the spreading of oils, improved emulsification or reduced bubble size. It may be that the alkylolamides form an adsorbed layer at the film surface which improves foam stability.

Amphoteric surface-active agents for laundering and disinfecting. A. Schmitz. *Fette u. Seifen* **55**, 10-16(1953). A review with 43 references. (*Chem. Abs.* **47**, 5140)

Scouring tests on artificially soiled wool with various synthetic substances combined with anhydrous phosphates. H. Stupel. *Text.-Praxis.* 7, 723-5(1952). Tests on detergents for use on wool articles, as distinct from raw wool, have shown that products with longer main valency chains are most suitable. The influence of pH is not so pronounced as in the scouring of cellulose fibers. A considerable increase in scouring power is obtained from combinations with anhydrous phosphates, the concentration of which is chosen so as to give the correct pH value. Tripolyphosphate seems better than pyrophosphate, even if the difference in concentration, required to give the same pH value, is taken into account. Scouring effect is increased by small additions of fatty alcohol, but reduced if large quantities are present; the optimum concentrations for most detergents lie in the same range. An exception to this is the nonionic group of compounds, with which the scouring effect at first decreases on addition of fatty alcohols, but increases again to a maximum with excessive additions.

Excessive wettability. P. Winckler. *Industrie textile* **69**, 567-8 (1952). Excessive wettability of fabrics might be very disadvantageous in service. It occurs mainly when alkylaryl detergents are used. It can be overcome by (1) neutralizing the traces of anionic and cationic agents by cationic or anionic compounds, respectively, (2) eliminating the traces of fatty alcohol sulfonates by soaping, and (3) a slight hydrophobic treatment. (*Chem. Abs.* **47**, 4617)

Clarification of the soapstock from black cottonseed oil. I. Ya. Samarin (Gorki Oil-Fat Trust). *Masloboino Zhirovaya Prom.* 18(1), 30-31(1953). The stock is readily clarified by treatment with 30% H_2O_2. After treatment an organic layer is formed which is conventionally separated. (*Chem. Abs.* **47**, 5702)

Dipole moments of metal oleates. A. Gilmour, S. M. Nelson, and R. C. Pink. (Queen's University, Belfast). *Nature* **171**. 1075(1953). Previous measurements of the dipole moment of Zn oleate by Banerjee and Polit were believed in error since they considered that the solute was either molecularly dispersed or approaching molecular dispersion in the solvent (benzene), in the concentration range in which their polarization measurements were made. New values were obtained in a series of solvents (benzene, toluene, and *p*-xylene), and were the mean values for the different particle sizes found to be present by micellular weight determinations.

Soap for wool scouring. Dr. J. L. Boyle. *Soap, Sanit. Chemicals* 29, No. 7, 36-9(1953). Theoretical aspects which influence detergency requirements in wool scouring are reviewed.

Esters of nopol and their soap perfuming possibilities. Burton T. Bush (Dow Chemical Co., Midland, Mich.). *Soap, Sanit. Chemicals* 29, No. 7, 71(1953). The use of nopyl acetate in soap bar perfuming is discussed.

Actamer in liquid soaps. An evaluation of its cutaneous antiseptic properties in various liquid soaps. Richard R. Egan and Mary D. Reed (Gerson-Stewart Corp., Cleveland, Ohio). *Soap, Sanit. Chemicals* 29, No. 7, 42-4, 135(1953). A series of tests using the Cade modification of the Price basin technique were run to evaluate bithionol ("Actamer") in a variety of liquid soaps. The results indicate that "Actamer" effectively reduces skin bacteria rapidly and that this effect persists on the skin. No cases of skin irritation were found on the forty people involved in this test.

Laboratory laundering experiments with synthetic detergents and laundering compounds. III. Combinations of synthetic detergents and soap in the presence of complex sodium and potassium metaphosphates. H. Stupel (Seifenfabrik Hochdorf, Switz.). *Fette u. Seifen* **54**, 555-8(1952). In experiments carried out with 1:1 mixtures of soap (I) and salt-free synthetic detergents (II) in water of 12° (German) hardness, I showed higher detergency than I-II mixtures. The ability to disperse Ca soaps is of no importance under these conditions. K metaphosphate is more effective than Na metaphosphate. By adding phosphates, the detergency of a solution containing 2 g./l. of a 1: 1 I-II mixture can be increased to equal that of a solution of 6 g./l. soap. (*Chem. Abs.* **47**, 6681)

New industrial applications of synthetic surface-active agents. H. Stupel (Seifenfabrik Hochdorf, Switz.). *Seifen-Ole-Fette-Wachse* **78**, 212-14, 267-9(1952). Review on applications of surface-active agents for cleaning in industries such as those dealing with metals, mining, agriculture, foods, paper, leather, rubber, synthetic resins, paints, varnishes, adhesives, photography, pharmaceuticals, and chemicals. One hundred references. (*Chem. Abs.* **47**, 6680)

Sinitiro Kawamura, Abstractor

Application of higher fatty acid amide and its derivatives. V. Addition of electrolytes to the solution of sodium palmitic acid amide-N-methyl sulfonate. Tokuzô Yoshizaki. *J. Chem. Soc. Japan, Ind. Chem. Sect.* **56**, 85-6(1953). The effects of the addition of NaOH, Na_2CO_3, formaldehyde bisulfite compound, and HCl were studied on aqueous solution of Na palmitic acid amide-*N*-methyl sulfonate. The surface tension was lowered, interface tension against rice-oil fatty acids was lowered at suitable concentrations, and detergency power was increased with the addition of NaOH or Na_2CO_3, but was decreased with the addition of the other 2 electrolytes.

Utilization of arylalkanes. IV. Detergency of binary mixtures of several alkylbenzenesulfonates. Masaya Ogawa (Osaka Univ.). *J. Chem. Soc. Japan, Ind. Chem. Sect.* 56, 191-3(1953). Surface tension was measured on binary mixtures of octyl-, dodecyl-, hexadecyl-, p-dibutyl-, cyclohexyl-, and keryl-benzenesulfonates. Surface tension was measured also on the mixtures of dodecylbenzenesulfonate and one of Na_2SO_4, H_2SO_4, NaOH, and *p*-cresol.

Sulfation of oleyl alcohol. I. Masao Niino, Hikaru Konishi, Susumu Fujita, and Hiroshi Watanabe (Dai-ichi Kôgyô Seiyaku Co., Tokyo). *J. Oil Chemists' Soc., Japan* 2, 11-15(1953). Oleyl alcohol was converted to Na oleyl sulfate (I), Na octadecan-1-ol-10-sulfate (II), Na 10-hydroxyoctadecan-1-sulfate (III), and Na octodecan-1,10-disulfate (IV), and surface activity of the aq. solns. of I-IV was compared with Na lauryl sulfate (V) and Na cetyl sulfate (VI) as controls. Solubility in H_2O was in the decreasing order: **IV, II, I, V, III,** and **VI** (least soluble). Approximate critical concentration was at 25° and 45°, resp., **I,** 0.02-0.04, 0.02-0.04%; **III,** 0.1, 0.08-0.1%; **II,** 0.08-0.15, 0.08-0.1%; and **IV,** 0.15-0.2, 0.2%. In surface activity **IV** was inferior in lower concentrations and comparable with **V**; **II** and **III** were similar; **I** was superior to others at lower temp.; and **VI** was comparable with **I** at 45°.

PATENTS

Improvements in cakes of soap. Albert Auziere. *Brit. 687,527.* An apparatus is described by which publicity matter is inserted into transparent cakes of soap by means of a cutter blade which partially divides the cake of soap.

Improvements in the production of surface active agents. Andrew McLean and Edward Arthur Bassett (Anglo-Iranian Oil Co.). *Brit. 687,714.* An improved surface-active agent is prepared by admixing crude sulfonated hydrocarbon with water and a solvent which is inert to sulfuric acid under conditions employed and which consists essentially of one or more hydrocarbons, and/or halogenated hydrocarbons, to form two immiscible layers, the upper layer comprising solvent and sulfonated hydrocarbon and the lower layer comprising organic impurities and sulfuric acid, then separating the upper layer and removing solvent.

Manufacture of soap bars or tablets. Frederick Oliver James (Lever Brothers & Unilever Ltd.). *Brit. 688,466.* Hard, filled soap bars and tablets are prepared by rapidly chilling hot molten filled soap containing sodium aluminum silicate gel and plodding the resultant solidified soap.

Alkyl aryl sulfonate-carboxymethylcellulose-alkaline salt detergent composition. William Warren Triggs (Wyandotte Chemicals Corp.). *Brit. 688,752.* A ternary mixture with improved cotton detergency comprises sodium alkyl aryl sulfonate, water-soluble sodium carboxymethylcellulose, and an inorganic builder from the group anhydrous sodium carbonate, modified soda, sodium metasilicate, pentahydrate, etc.

Synthetic detergent compositions. William Warren Triggs (Wyandotte Chemicals Corp.). *Brit. 688,754.* An improved detergent is prepared from a water solution containing from 1-12% by weight of sodium carboxymethylcellulose and from 2.5-100 parts of sodium alkyl-benzenesulfonate (in either sulfate-free or containing form), heating the resultant mixture and then drying to a solid form.

Laundry detergent. Polysulphin Company, Ltd. *Brit. 689,171.* A laundry detergent which forms soap in situ on soiled goods is prepared by fusing a surface-active agent in a molten mass of fatty acid and stirring until the mass is homogeneous. On shaking with a large bulk of water, the detergent composition yields fine dispersions of the fatty acids which may be converted to soap during the washing process.

Bleaching soap. Lever Brothers & Unilever Ltd. *Brit. 690,207.* Improved hydrosulfite-treated soap is prepared by adding to the soap, before or after the hydrosulfite treatment, a small proportion of a water-soluble zinc compound to improve odor.

Method of making detergent packages. John A. Abbott, Jr. and Delbert F. Jurgensen, Jr. (American Machine & Foundry Co.). *U. S. 2,635,400.* A method is described for the preparation of packages containing finely divided granular detergent or soap suitable for use in a single washing operation consisting of the particles of the suitable detergent enclosed in a tubular wrapper of polyvinyl alcohol or other material that is readily disintegrated in water during the washing operation.

Surface active agents. John David Brandner (Atlas Powder Co.). *U. S. 2,636,038.* Detergents and wetting agents are prepared from the polyoxyalkylene ethers of hydroxy alkyl oxazoline compounds containing long chain hydrocarbon radicals.

Improvements in non-soapy detergents. Lever Brothers & Unilever Ltd. *Brit. 690,439.* The caking of sodium salts of alkyl aryl sulfonates due to their hygroscopicity is overcome by mixing the sodium salts with from 7.5-50% of the guanidine alkyl aryl sulfonates which have much lower water absorption.

Improvements relating to detergent compositions. American Cyanamid Co. *Brit. 690,821.* A detergent having improved wool detergency is prepared from a mixture of 98-50% by weight of a salt of an alkyl benzenesulfonic acid containing a single long alkyl radical of 10-16 carbon atoms and 2-50% of a water-soluble *guanidine salt such as guanidine carbonate.*

Nonsoap synthetic detergent in cake form. William Monroe Walters. *U. S. 2,643,299.* An easily molded, noncracking detergent bar is prepared by blending a mixture of sodium sulfate and alkylated benzene sulfonic acid with a least one but not more than ten parts per 100 parts of a glycol or glycol-ether.