concentrations at various temperatures are given below in pounds per square inch.

Concentration of Alcoholic Solution in Percentage	Pressure, psig					
	Temperatures °C.					
	50	60	70	80	90	95
95.4	2	4	8	15	17	20
98.0	2	4	8	15	18	
99.9	2	4	10	15		

It is seen therefore that the pressure in the vessel increases with the temperature. However all the three concentrations have practically the same gauge readings. Since their boiling points differ very slightly, the different concentrations produce variations in vapor pressure too small to be recorded by the pressure gauge.

The data obtained show that the maximum pressure to be used even with 95.4% alcohol is about 20 p.s.i.g.

Summary

Solubilities of corn, linseed, and tung oils in aqueous alcoholic solutions at various temperatures have been determined by a direct and simple method. The solubility curves for the three oils in aqueous alcoholic solutions are presented.

The critical solution temperature *versus* alcohol composition data have been plotted for the three oils. It is observed that the critical solution temperature increases with the water content of the alcohol and that the relationship is linear in each case. Similar results were obtained for cottonseed, peanut, sesame, and soybean oils previously (1).

The pressure in the system, increases with temperature; the maximum is approximately 20 p.s.i.g.

REFERENCES

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

• Oils and Fats

S. S. Chang, Abstractor
Sini'tiro Kawamura, Abstractor
Dorothy M. Rathmann, Abstractor

Isolation and characterization of some products associated with oxidized flavor. R. R. Riel(Chemistry Division, Science Service, Ottawa), and H. H. Sommer. *J. Dairy Sci.* **38**, 1215-1224 (1955). The limited oxidation of milk phospholipids yielded material which reproduced the typical oxidized flavor in milk. Isolation and characterization of the major oxidized flavor compounds showed that they are predominantly carbonyl compounds. Five different carbonyl compounds were evidenced by chromatography. The empirical formulae calculated for three compounds were $C_{15}H_{26}O_3$, $C_{11}H_{22}O$, $C_{22}H_{38}N_5O_2$ (as bis-hydrazone) and $C_{10}H_{18}N_2O$ (as monohydrazone). There was indication that the C_{15} was a di-unsaturated ketone without conjugation. The C_{11} was presumably undecanal.

Determination of fat in cocoa products. J. Kleinert(Lindt & Sprungli, A.-G., Kilchberg /ZH, Switz.). *Rev. intern. chocolat.* **10**, 302–12(1955). Methods are reviewed for the determination of fat in cocoa products. Cocoa kernels, cocoa powder, bitter milk, and gianduja chocolate were analyzed by the standard international method, the percolation method, the centrifuge method, and the Leithe-Heintz refractometer method and the results compared. Leithe's method was modified and improved by introducing a constant. (*C. A.* **49**, 16260)

The detection of substitute fats in ice cream. M. Keeney(Univ. of Maryland, College Park). *Rept. Proc. Ann. Conv. Intern. Assoc. Ice Cream Manufrs., Production and Lab. Council* **49**, 46–9(1953). The behavior of fat in a mixture of ethyl alcohol (55 volumes) and *iso*-propyl alcohol(45 volumes) at 25–26°F. is used to determine character of the isolated fat. (*C. A.* **49**, 15111)

Detection of foreign animal fat in chicken fat. Cl. Franzke (Humboldt Univ., Berlin). *Z. Lebensm.-Untersuch. u. Forsch.* **102**, 81–4(1955). Methods of detection of beef, pork, or mutton fat in chicken fat are investigated for means of determining adulteration of the fat and adulteration of chicken meat. Determinations of amount of fatty acid polybromides insoluble in tetrabromostearic acid saturated petroleum ether in each fat gave: chicken fat 26.2–34.5, beef fat 3.9–4.6, and pork fat 2.6–5.2. Another means of distinguishing the fats is to measure the extinction of the alkali-isomerized fatty acids at 233 mμ. These ressults on 6 samples each of the above fats, respectively, were: 110.5, 18.9–24.4, and 34.6–47.0. (*C. A.* **49**, 16253)

Fundamentals of total fat and milk fat determinations in baked goods of low fat content(e.g. milk bread). E. Hoffmann. *Deut. Lebensm. Rundschau* **51**, 158–61(1955). The author cautions against prolonged ether extraction, suggests decomposition of the dried meal with 1.5–2% HCl, and refers to the use of refractive index as a measure of adulteration if values of the extracted fat read 53.0 or more scale graduations. (*C. A.* **49**, 16249)

Rapid determination of oil in fish meal. G. M. Dreosti and R. P. van der Merwe(Fishing Ind. Research Inst., Cape Town, S. Africa). *Fishing Ind. Research Inst., Progr. Rept. No.* **18** (1955). A refractometric method for determining oil in avacados was adapted to fish meal. The oil is completely extracted from the meal by monochloronaphthalene and the amount of oil in the extract is found by measuring the refractive index of the solution. The results obtained from analyses of 35 meals showed that the refractometric method was more reproducible than the Soxhlet method. (*C. A.* **49**, 16254)

Antioxidants from biological sources for preventing rancidity in fats. E. S. Tatarenko, A. E. Sobol, and Z. N. Novikova (Ukr. Research Inst. Food Ind. Sci., Kharkov). *Mikrobiologiya* **24**, 217–22(1955). The fungus *Naumoviella oleaginosa* can accumulate up to 52% lipoids (calculated on dry weight); its optimum conditions are temperature 25–6°C., pH 5–6, 0.2–1% KH_2PO_4 in the nutrient medium. *N. humicola* and a *Mortierella* species are nearly as active in storing lipoids, which contain 1–18% unsaponifiables of which one component at a concentration of 0.01% increases the rancidity resistance of edible fats 3.5-fold. (*C. A.* **49**, 16253)

The structure of the crystal form B of stearic acid. E. V. Sydow(Univ. Uppsala, Sweden). *Acta Cryst.* **8**, 557–60(1955). Form *B* of stearic acid is monoclinic with $a = 5.591$, $b = 7.404$, $c = 49.38$ A., and $\beta = 117°22'$. The cell contains 4 molecules. The packing of the hydrocarbon chains is of the common orthorhombic type. The hydrocarbon chains are deformed near the carboxylic groups. (*C. A.* **49**, 15353)

Fatty acid oxidation by Penicillium roqueforti. R. L. Girolami and S. G. Knight(Univ. of Wisconsin, Madison). *Appl. Microbiol.* **3**, 264–7(1955). In the presence of phosphate and magnesium and at low substrate concentration, fatty acids containing 2–12 carbon atoms were oxidized by a suspension of the cells of *P. roqueforti*(a strain used in the manufacture of bleu cheese). A methyl ketone containing one less carbon atom than the fatty acid substrate was found when caprylate was oxidized and identified as 2-heptanone. Acetone was found from oxidation of butyrate, 2-butanone from valerate, 2 pentanone from caproate, 2-hexanone from caprylate, and presumably 2-octanone from pelargonate. (*C. A.* **49**, 14882)

Stability of β-glycerophosphoric acid in natural fats. C. Urakami and H. Kuwahata(Osaka City Univ.). *Repts. Sci. Living Osaka City Univ.* **1**(3), 1–4(1953). β-Glycerophosphoric acid dissolved in butter seemed to undergo some migration to its α isomer within 2 hours (*C. A.* **49**, 15261)

Isomerization of ricinoleic acid with sulfur. G. Rankov and A. Ivochev(Bulgarian Acad. Sci., Sofia). *Compt. rend. acad. bulgare sci.* **7**(1), 25–8(1954). Heating ricinoleic acid with 1% sulfur for 3 hours at 220–30°C., saponifying the viscous product, acidifying with mineral acid, dissolving the solid in ethyl ether, washing until neutral, drying with sodium sulfate, evaporating and recrystallizing from petroleum ether gave 15.2% ricinelaidic acid, melting point, 50.5–51°C., n_D^{70} 1.4540. (*C. A.* **49**, 15732)

Methanolysis of monoglyceride during urea adduct formation. F. Aylward and P. D. S. Wood(Dept. of Chem. and Food Tech., Borough Polytechnic, London S. E. 1). *Chem. and Ind.* **1955**, 1479. It was concluded that the slow crystallization of the urea inclusion compound of methyl stearate, in preference to that of glyceryl monostearate, over 17 hours had resulted in the disturbance of the equilibrium between glyceryl monostearate with methanol and methyl stearate with glycerol. The methyl stearate was removed from the solution as an insoluble urea adduct.

Deacidification of sardine oil by molecular distillation. D. M. García. *Rev. cienc. apl.* **9**, 130–2(1955). Molecular distillation of sardine oil(acid number 18.9, free fatty acids 9.5%, iodine number [Hanus] 171.7) and collection of 14 fractions at 30-minute intervals of increasing temperatures from 100 to 230°C. gave a yield curve with maximum of free fatty acids in the distillate at 140°C. and an almost neutral final oil containing 0.33% acids. The iodine number of the fractions increased from 102.1 to 278.5, then decreased to 149.3, showing removal of the more highly unsaturated acids and increase in glyceride content of the distillate. Similar experiments with collection at 15- and 20-minute intervals showed greater separation of the unsaturated acids with 2 and 3 maximums in the yield curve, respectively. (*C. A.* **49**, 15263)

Tobacco seed oil. V. Balu and M. N. K. Murthi(Central Food Tech. Research Inst., Mysore, India). *The Oils and Oilseeds Jour.* **8**(3), 14–5(1955). The tobacco seeds contain 35–37% oil which resembles peanut oil in consistency and colour but has a characteristic odor. The oil extracted by pressure or with the aid of solvents is greenish or brownish yellow, bitter to taste, and has the odor of tobacco. Multiple extraction of the seeds with hot water eliminates the nicotine and bitter substances. The tobacco oil has specific gravity(25/25°) 0.9216, refractive index at 25° 1.4684–1.4720, viscocity(Poises) 0.5, iodine value 125–154, acid value 0.12, saponification value 186–191, saturated acids 16.05%, oleic acid 25.15%, and linoleic acid 55.8%. Tobacco seed oil is used as a drying oil, as a deterrent to small insects and white ants, and for culinary purposes. The tobacco seed oil cake contains about 3.5% nitrogen.

Comparison of tests for oxidative rancidity in edible oils. O. E. Nikkilä and R. R. Linko(Central Lab. Tukkukauppojen Oy, Turku). *Suomen Kemistilehti* **28B**(3), 113–16(1955). The course of autoxidation in refined soybean oil with and without added antioxidant and in refined rapeseed oil was followed by determination of the peroxide and carbonyl contents. An induction phase, an accelerated oxidation phase, and a delaying oxidation phase were observed. The length of the induction period was a measure of the stability of the oil. In the first two phases, the peroxide values increased more rapidly than the carbonyl content; in the third phase, the carbonyl content remained higher. Refined oil had a greater tendency to oxidize than crude oil or oil containing antioxidant. The peroxide value could be used to detect the start of the accelerated phase. A close correlation between carbonyl value and rancid flavor was observed. (*C. A.* **49**, 15113)

The decarboxylation of higher fatty acids for tracer work. R. Blomstrand(Univ. Lund, Sweden). *Acta Chem. Scand.* **8**, 1487–8(1954). A simplified procedure is given for the decarboxylation of higher fatty acids by the Schmidt reaction. (*C. A.* **49**, 14636)

Separation of saturated and monounsaturated fatty acids through hydroxylation. Sune Bergström and Karin Pääbo (Univ. Lund, Sweden). *Acta Chem. Scand.* **8**, 1486–7(1954). Saturated acids and oleic acid are separated by hydroxylation followed by chromatographic separation of the products. The hydroxylation was done with the aid of 30% hydrogen peroxide. Silicic acid(2 parts) and Hyflo-Supercel(1 part) were used as absorbent for the chromatographic separation. The unsubstituted esters were eluted with ethylene dichloride and the dihydroxy esters eluted with ethylene dichloride containing 0.75% of methyl alcohol. (*C. A.* **49**, 14636)

Extension of food storage life by irradiation. B. E. Proctor, J. T. R. Nickerson, J. J. Licciardello, S. A. Goldblith and E. E. Lockhart(Dept. Food Tech., Mass. Inst. of Tech., Cambridge, Mass.). *Food Tech.* **9**, 523–27(1955). Certain meat and vegetable products were treated with high voltage cathode rays to extend the storage period at refrigerator temperature above freezing. Organoleptic evaluation indicated that some foods treated in this manner may be held for periods lasting from several weeks to several months without significant change of acceptability. Fresh pork sausage links irradiated at a level of 1 × 10^6 rep did not deteriorate bacteriologically but developed rancidity during a storage period of 17 weeks at 36–40°F. Packaging in saran with vacuum prevented rancidity better than packaging in cellophane.

Tuna big soy oil market. *Soybean Digest* **16**(2), 19(1955). The use of soybean oil in domestic canning of tuna is reviewed briefly.

Structure of stearate monolayers in the region Le-G. J. P. Ryan and J. W. Shepard(Central Res. Dept., Minnesota Mining & Manufacturing Co., St. Paul 1, Minn.). *J. Phys. Chem.* **59**, 1181–2(1955). Calcium stearate tagged with C^{14} was deposited on aluminum slides at a low film pressure(42 Å^2 mol area) and about 30°C. Autoradiographs of the film established the presence of islands of liquid expanded phase surrounded by areas of gaseous phase, thus showing that the Le-G region is a two-phase region. Autoradiograph of the condensed monolayer is also shown.

Modified lanolin. L. I. Conrad and K. Motiuk(American Cholesterol Products, Inc.). *U. S. 2,725,334.* Lanolin is chemically modified, especially for pharmaceutical and cosmetic use, by acylation of 40 to 100% of the hydroxyl groups in lanolin with acetic anhydride, propionic anhydride, ricinoleic acid or benzoic anhydride. The excess reagent is washed out and by-products are removed by distillation in vacuo. The product is practically colorless and completely soluble(up to 10%) in mineral oil at 25°C. without the addition of a stabilizer.

Fat processing apparatus. C. A. S. Thorstensson-Rydberg(P. J. Andersson & Co., Akt.). *U. S. 2,726,069.* A mixing apparatus for fats is described.

Frozen pie crust dough and method of preparation. Billie H. Armstrong. *U. S. 2,726,156.* A preparative method is described for making rolls of thin sheets of pie crust containing 63 lbs. of soft flour, 31.5 lbs. of hard flour, 39 lbs. of shortening, 3.75 lbs. of salt and 18 lbs. of water.

Hard butter and process therefor. W. M. Cochran and R. F. McGee(The Glidden Co.). *U. S. 2,726,158.* A product having an iodine value below 20 is prepared by heating a mixture of simple fatty acid glycerides below 250°F. in the presence of a small amount (less than 1%) of a low-temperature rearrangement catalyst. The glycerides have the following fatty acid content: C_6, 0–10; C_8, 0–10; C_{10}, 0–10; C_{6+8+10}, 0–10; $C_{20+\text{higher}}$, 0–8. The remainder consists of $C_{12\text{ to }18}$ acids in which the saturated acid distribution is (as %): C_{12+14}, 37.5–80; C_{16}, 5–28; and C_{18}, 15–47.5.

Process for preventing vaselation of unhydrogenated vegetable shortening. W. H. Newby and H. L. Guidry(Cotton Products Co., Inc.). *U. S. 2,726,159.* The peroxide value is reduced to zero by heating the oil in vacuo. After the oil has cooled to at least 350°F., a small amount of propyl gallate and citric acid is added. These additives are dissolved by injecting steam at reduced pressures.

Heat storage material. V. J. Schaefer(General Electric Co.). *U. S. 2,726,211.* The heat storage material is a mixture of 5 to 15% by wt. of diphenyl ether, 30 to 50% of oleic acid, and the remainder stearic acid.

Cottonseed oil extraction process. E. A. Gastrock, H. L. E. Vix, E. L. D'Aquin, J. L. Spadaro and A. V. Graci, Jr.(U.S.A., Secy. Agr.). *U. S. 2,726,253.* Cottonseed flakes less than 0.016 in. thick and containing less than 3% hulls are cooked so that during the early stages the moisture is 14 to 26% and the final moisture is 6 to 12%. The time of cooking is between 30 and 70 min. during which the temperature is gradually increased from an initial level of 170 to 210 to a final level of about 235°F. Flakes are crisped by cooling to about 130°F. under such conditions that the moisture drops to 2 to 4%. Flake thickness is reduced to 0.008 to 0.012 in. The resultant flakes are extracted repeatedly with solvent.

Purification of phosphatides. C. R. Scholfield and H. J. Dutton (U.S.A., Secy. Agr.). *U. S. 2,727,046.* Sugars, such as sucrose, raffinose and stachyose, are removed from phosphatides by extracting a hydrocarbon solution of the crude vegetable phosphatide with an aqueous alcohol. The preferred alcohols are 60–75% methanol, 40–65% ethanol and 30–50% 2-propanol.

Method of stabilizing the color of dehydrated castor oil. J. V. Hunn(The Sherwin-Williams Co.). *U. S. 2,727,047.* Castor oil which has been dehydrated with an acidic catalyst is treated with a basic material having the formula *MX* wherein *M* is an alkaline earth metal, aluminum or zinc and *X* is oxide, hydroxide, carbonate or an organic carboxylate weaker than the dehydration catalyst at 400°F.

Process for the alcoholysis of oils, fats, and waxes. F. F. A. Braconier and J. M. J. Hermesse(Soc. Belge de l'Azote et des Prod. Chim. du Marly). *U. S. 2,727,049.* The oil, fat or wax is dissolved in an excess of an aliphatic, monohydric alcohol. The mixture is passed over a fixed bed of zinc silicate at approximately the critical pressure of the alcohol.

FATTY ACID DERIVATIVES

The synthesis of long chain α,ω-dicarboxylic acids. A. H. Frazer, and J. C. Shivers(Pioneering Research Div., Textile Fibres Dept., E. I. duPont de Nemours & Co.). *J. Am. Chem. Soc.* **77**, 5595–5597(1955). A series of polymethyleneketo -α,ω-dicarboxylic acids and polymethylene -α,ω-dicarboxylic acids were prepared. The polymethyleneketo -α,ω-dicarboxylic acids were prepared from sebacyl chloride utilizing the ketene polymerization synthesis. The polymethylene -α,ω-dicarboxylic acids were prepared from the above keto acids by Clemmensen reduction. The properties of these acids are discussed.

Fractionation and stabilization of fatty acid cyclohexyl esters by means of thiourea. H. Schlenk, J. A. Tillotson, and B. G. Lamp(Hormel Institute, U. of Minn., Austin, Minn.). *J. Am. Chem. Soc.* **77**, 5437(1955). Previous work showed that fatty acids can be separated from mixtures by fractional inclusion in urea. Experiments showing segregation and protection by thiourea inclusion are reported here. The results show the strong resemblance of thiourea to urea. Mixtures of molecules of equal chain length can be fractionated by means of thiourea according to their degree of unsaturation. As with urea, the more saturated components react preferentially.

Peroxides. III. Structure of aliphatic peracids in solution and in the solid state. An infrared, X-ray diffraction and molecular weight study. D. Swern, L. P. Witnauer, C. R. Eddy, and W. E. Parker(Eastern Regional Research Lab.). *J. Am. Chem. Soc.* **77**, 5537–5541(1955). Infrared absorption spectra have been obtained on long-chain aliphatic peracids in solution(C_8–C_{16}) and in the solid state(C_{14}–C_{16}) and X-ray diffraction patterns have been obtained on the solid peracids(C_9–C_{16}). Infrared studies show that in solution the peracids exist exclusively as intramolecularly chelated monomers containing a five-membered ring. In the solid state the peracids, like the corresponding *n*-aliphatic acids and alcohols, occur as dimers in which two of the monomer units are linked through intermolecular hydrogen bonds.

Fatty acid amides. VII. Addition of hydrogen cyanide to unsaturated acids. Preparation of formamido acids, amino acid sulfates and amino acids. E. T. Roe and D. Swern(Eastern Regional Research Lab.). *J. Am. Chem. Soc.* **77**, 5408-5411(1955). Liquid hydrogen cyanide has been added to the double bonds of oleic, 10-hendecenoic and ricinoleic acid in 85–95% sulfuric acid to give good yields of formamidostearic, formamidohendecanoic and hydroxyformamidostearic acids, respectively. The first two are rapidly hydrolyzed by refluxing with aqueous sulfuric acid to give the corresponding amino acid sulfates in high yield. These can be converted to the free amino acids by neutralization.

Epoxy esters as plasticizers and stabilizers for vinyl chloride polymers. L. P. Witnauer, H. B. Knight, W. E. Palm, R. E. Koos, W. C. Ault, and D. Swern(Eastern Regional Research Lab., Philadelphia 18, Pa.). *Ind. & Eng. Chem.* **47**, 2304–2311 (1955). Fats and most compounds derived from them by simple reactions have relatively low vapor pressures and limited solubility in and extractability with water, characteristics which are highly desirable in plasticizers. The poor compatibility of these compounds with synthetic resins in general and poly(vinyl chloride) in particular has seriously restricted their use in the plasticizer field. The compatibility of long-chain compounds with poly(vinyl chloride) can be increased by the introduction of the three-membered oxirane ring into the molecule.

Effect of fatty quaternary ammonium salts on physical properties of certain soils. F. X. Grossi and J. L. Woolsey(Union Starch and Refining Co., Granite City, Illinois). *Ind. Eng. Chem.* **47**, 2253–2258(1955). The apparent limit to the quantity of water adsorbable by a Putman silt loam treated with 0.1% dimethyldioctadecylammonium chloride(DDAC) is directly responsible for its hydraulic stability.

Thiocyano fatty acid esters of cyanohydrins of methyl alkyl ketones and insecticidal compositions containing them. Cilag Ltd. *Brit. 718,780.* A synthesis for thiocyano fatty acid esters of cyanohydrins of methyl alkyl ketones with an over-all yield of 80% was given. (*C. A.* 49, 15949)

Branched-chain fatty acids. XXXII. Synthesis and Isomerization of α,γ-dialkyl-α-β-unsaturated esters. J. Cason and K. L. Rinehart, Jr.(Chemical Lab. of the Univ. of Calif.). *J. Org. Chem.* 20(11), 1591–606(1955). In order to carry out equilibration studies between Δ^2- and Δ^3-isomers, there have been synthesized three 2-methyl-4-alkyl-2-alkenoic acids and the corresponding esters. A 3-alkenoic acid and ester were also prepared in reasonably pure condition. 2,4-Dimethyl-2-tetradecenoic acid showed an infrared absorption band at 10.08 μ, as have other 2,4-dimethyl-2-alkenoic acids; however, the two other similar acids containing a group larger than methyl at the 4-position showed no band at 10.08 μ, but exhibited instead a band at about 9.9 μ. The ultraviolet spectra of mixtures were used to determine isomer content, by reference to spectral data obtained on the pair of pure α,β- and β,γ-unsaturated acids. In acid media, the α,β-unsaturated ester does not equilibrate at a significant rate with the non-conjugated isomer, while the unsaturated ester goes slowly to γ-lactone. Esterification of the β,γ-unsaturated acid under mild conditions gives an excellent yield of the corresponding ester. In alkaline media, the conjugated and non-conjugated esters do equilibrate, but sufficiently slowly to allow normal saponification of esters without change in isomer composition.

Rust inhibitor for aqueous systems. D. T. Jones(The Atlantic Refining Co.). *U. S. 2,726,215.* Corrosion of metals in contact with aqueous solutions is inhibited by adding to the solutions an alkali- or alkaline earth-metal salt of sebacic or azelaic acids.

Catalytic hydrogenation of epoxidized olefinic compounds. C. H. Mack and W. G. Bickford(U. S. A., Secy. Agr.). *U. S. 2,727,048.* Epoxidized ethylenic acids or esters containing at least four carbon atoms are dissolved in a C_{2-5} liquid alkanoic acid or anhydride and hydrogenated in the presence of a palladium-carbon catalyst.

• Biology and Nutrition

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

Intestinal absorption of fat, fatty acid, and fat-soluble dye into thoracic duct lymph in unanesthetized rats. W. J. Simmonds(Kanematsu Memoria. Inst. Pathol., Sydney). *Australian J. Exptl. Biol. Med. Sci.* 33, 25–32(1955). Olive oil and oleic acid in doses of 0.5 ml. containing dissolved Sudan IV were fed to unanesthetized rats with cannulated abdominal thoracic ducts. The findings that the pathway for absorbed oleic acid is the same as that for olive oil are incompatible with the partition hypothesis of Frazer that ingested oleic acid is largely absorbed into the portal blood stream rather than the thoracic duct lymph. (*C. A.* 49, 16099)

Fecal and plasma lipides. A study of 2 normal human adults taking (1) a diet free of lipide and (2) a diet containing triolein as the only lipide. E. E. Wollaeger, W. O. Lundberg, J. R. Chipault, and H. L. Mason(Mayo Clinic, Rochester, Minn.). *Gastroenterology* 24, 422–36(1953). The fecal and plasma lipides of 2 normal adult males were measured during 4 successive periods in which the following diets were given, resp.: (1) general mixed diet, (2) lipide-free diet, (3) same as diet 2 except that triolein was substituted for some of the carbohydrate, and (4) general mixed diet. The findings indicated that a large portion of the fecal fatty acids of these 2 subjects when taking a general mixed diet was derived from unabsorbed food fat. It appears that triolein in the amount and in the manner given could not be digested and absorbed with the same degree of efficiency as an equal or greater amount of fat in the general mixed diet. (*C. A.* 49, 16098)

Fat absorption studies in children. I. Effect of heat-treatment of milk on fat retention by premature infants. L. Söderhjelm (Univ. Uppsala, Sweden). *Acta Paediat.* 41, 207–21(1952). A total of 98 fat balance studies of 3–7 days' duration was made on 32 premature infants weighing 960–2220 g. The fat content of the diet was supplied by breast milk, raw, frozen, or heated at various temperatures for different intervals, or by cow milk, pasteurized or subjected to heating at various temperatures for different periods. Premature infants retain breast-milk fat to a remarkably high degree even though the breast milk has been frozen or subjected to various heat treatments; they do not retain fat from cow milk as efficiently. The nature of the heat-treatment of cow milk did not influence the degree of retention. (*C. A.* **49**, 14929)

II. Influence of propylene glycol, lecithin, choline, Aureomycin, and low fat diet on fat retention in children. *Ibid.*, 316–24. No differences in fat retention were observed following the administration of propylene glycol in a vitamin preparation, lecithin, choline or Aureomycin. Even with low fat diets there is a positive retention, indicating little if any endogenous fat excretion in the stool. Only in disorders associated with steatorrhea was the fat balance negative when patients were on a low-fat diet. (*C. A.* **49**, 14929)

III. Fat-tolerance tests. *Ibid.*, 325–33. The methods used in fat-tolerance tests in children are briefly reviewed. Determination of the total fat in serum by the turbidity method of Kunkel, *et al.*(*C. A.* **44**, 8404) is simple and may be used as a screening test when poor fat absorption is suspected. (*C. A.* **49**, 14929)

Nutrition and atherosclerosis. G. V. Mann and F. J. Stare. *Natl. Acad. Sci., Natl. Research Council, Publ.* **338**, *Symposium on Atherosclerosis, 169–78, discussion 178–80*(1954). The kinds and amounts of lipides present in serum are related to diet on the one hand and to atherosclerosis on the other, but the associations are imperfect. The limitations of methods of quantitation, both chemical and morphological, serve to conceal the true associations. The dietary neutral fat and total caloric supply appear to be interacting variables of importance in both human and experimental atherosclerosis. The vitamins and the so-called lipotropic agents do not appear to play a role in the development of atherosclerosis. (*C. A.* **49**, 16103)

Determination of blood fats. G. Guarini(Univ. Rome). *Med. sper.* **25**, 7–23(1954). The methods of Bang-Condorelli(*Tecnica microchimica*, published by Idelson, Naples), Monasterio (*C. A.* **49**, 9082), Kunkel, *et al.*(*C. A.* **44**, 8404) and Bloor (*C. A.* **22**, 2181) are comparatively evaluated. (*C. A.* **49**, 14867)

Total cholesterol determination in blood. A. Vialard-Goudou, N. T. Lau and Henri Plagnol. *Ann. biol. clin.* **13**, 285–91 (1955). A simple and rapid (30 minutes) method of cholesterol determination in 0.1 ml. serum is given. The method has been checked against existing methods of cholesterol determination by Krieger and Schoenheimer and Sperry and the results are very satisfactory. (*C. A.* **49**, 14860)

Determination of blood cholesterol. Evangeline Papageorge (Emory Univ. Emory, Ga.). *Am. J. Med. Technol.* **21**, 94–100 (1955). A spectrophotometric method using cold 20:1 acetic anhydride: sulfuric acid as reagent for the analysis of cholesterol in blood was given. (*C. A.* **49**, 16040)

Lipoproteins in the arterial wall. W. H. Batchelor(Natl. Acad. Sci.). *Natl. Research Council, Publ.* **338**, *Symposium on Atherosclerosis, 212–15, discussion 215–6*(1954). The lipoproteins isolated from atheromatous aortic segments exhibit high solubility under conditions such that the lipoproteins of normal plasma appear quite insoluble. This suggests that a significant part of the abnormal lipide accumulation in atheromatous arteries may be present as a water soluble complex. (*C. A.* **49**, 16124)

Fluorometric determination of 0.1 to 10 micrograms of cholesterol. R. W. Albers and O. H. Lowry(Dept. of Pharmacology, Wash. Univ. School of Medicine, St. Louis, Mo.). *Anal. Chem.* **27**, 1829–1831(1955). A fluorometric method was described for the measurement of as little as 0.1 γ of cholesterol in animal tissues. The simplicity of the procedure and the stability of the fluorescence facilitates the measurement of a large number of samples. The effect on the reaction of other substances likely to be present in lipide extracts of animal tissues has been studied. No substances have been encountered which seriously affected the results. Free and esterified cholesterol produced nearly the same final fluorescence on an equimolar basis.

Chromatographic identification of bound glutamic acid in the phosphatide fraction from liver. L. O. Pilgeram(Dept. of Physiology, U. Ill. College of Medicine, Chicago, Ill.) and D. M. Greenberg. *J. Biol. Chem.* **216**, 465–469(1955). An analysis of the evidence presented indicates the existence of glutamic acid complex which is lipide in nature. If glutamic acid is a *real* component of the phospholipide molecule, we are then confronted with the presence of a new type of phospholipide. The presence of glutamic acid in a phospholipide could be explained within the confines of known phosphatidic structures if one considers glutamic acid as being present in the lipide as a phosphatidic peptide, e.g., a peptide of serine and glutamic acid.

Starches, sugars, and related factors affecting liver fat and nitrogen balances in adult rats fed low levels of amino acids. Madelyn Womack and Mary W. Marshall(Human Nutrition Research Branch, Ag. Research Service, U. S. Dept. of Ag., Washington, D. C.). *J. Nutrition* **57**, 193–202(1955). Liver fat was reduced and negative nitrogen balances were decreased in adult protein-depleted rats fed extra threonine, corn, rice or wheat starch, or corn dextrin, when compared with the levels found for animals fed diets containing sucrose and low levels of amino acids. The results were not influenced by the type of carbohydrate fed during protein depletion.

Studies on the alkaline hydrolysis of lecithin: synthesis of cyclic 1,2-glycerophosphate. T. Ukita, N. A. Bates, and H. E. Carter(U. Illinois, Urbana). *J. Biol. Chem.* **216**, 867–874 (1955). Cyclic 1,2-glycerophosphate has been synthesized and characterized as the crystalline barium salt. Hydrolysis of lecithin in alkaline methanol yields as the main product the methyl ester of glycerophosphoric acid. No evidence was obtained for the presence of the cyclic phosphate ester in the hydrolysis products. The instability of the synthetic cyclic glycerophosphate in alkaline solutions makes it appear unlikely that the cyclic ester will be found in alkaline hydrolysates of lecithin.

Studies on naturally occurring α-glycerol ethers. M. L. Karnovsky and Anne F. Brumm(Harvard Med. School, Boston, Mass.). *J. Biol. Chem.* **216**, 689–701(1955). A method has been devised for the colorimetric determination of α-glycerol ethers in the unsaponifiable fractions of fats, and a number of different fats have been analyzed by this method. The starfish has been used as an experimental animal. Although glycerol carbon was incorporated into both glycerol and fatty alcohol moieties of α-glycerol ethers, acetate carbon appeared only in the fatty alcohol moiety.

The effect of fat level of the diet on general nutrition. H. J. Deuel, Jr., Charlotte Martin, and Roslyn Alfin-Slater(Dept. of Biochem. and Nutrition, U. of Southern Calif., Los Angeles, Calif.). *J. Nutrition* **57**, 297–302(1955). The relative biopotencies of linoleate and of linolenate for supplying the essential fatty acid requirement in pregnancy and lactation have been compared in the rat. Linolenate was found to be less effective than linoleate at all levels studied.

Effect of irradiation of meat fats. M. Scribney, U. J. Lewis, and B. S. Schweigert(Div. of Biochem. and Nutrition, American Meat Foundation). *J. Agr. & Food Chem.* **3**, 958–960 (1955). Studies on chemical changes in meats during irradiation were directed to meat fats. Off-odors produced during irradiation of certain meats at sterilization levels did not arise directly from chemical changes in the meat fats. Oxidative changes(peroxide, carbonyl, and free fatty acid formation) were not marked during irradiation or subsequent storage, if the presence of oxygen was minimized. Accelerated peroxide formation occurred during storage of irradiated fats as compared to nonirradiated controls when oxygen-permeable packages were used.

Studies on encephalomalacia in the chick. 3. The influence of feeding or injecting various tocopherols and other antioxidants on the incidence of encephalomalacia. R. H. Bunnell, L. D. Matterson, E. P. Singsen, L. M. Potter, Anna Kozeff, and E. L. Jungherr(Storrs Ag. Experiment Station, Univ. of Conn., Storrs, Conn.). *Poultry Sci.* **34**, 1068–1074(1955). A group of antioxidants were tested for their ability to prevent encephalomalacia in the chick, and several were found to be as effective as diphenyl-*p*-phenylenediamine(DPPD). Effective antioxidants were 2,6-ditertiary butyl-4-methoxy phenol(BHT); dibutyl and diamyl hydroquinones; di-sec-butyl-*p*-phenylenediamine; and 1,2-dihydro-2,2,4-trimethyl-6-ethoxyquinoline (Santoquin).

4. The influence of oil in fish meal, oils from various species of fish, and animal fats on the incidence of encephalomalacia. *Ibid.*, 1075–1079(1955). The effectiveness of a fish oil in causing encephalomalacia is correlated with its iodine number, which reflects the degree of unsaturation of the oil. The addition of from 0.5% to 1.0% of a highly unsaturated fish oil to a vitamin E-low diet is sufficient to cause encephalomalacia in vitamin E-deficient chicks. The fat in the samples of meat and bone scrap and unstabilized yellow grease fed in these experiments did not tend to cause encephalomalacia.

The effect of incorporating diphenyl-p-phenylenediamine (DPPD) into a ration containing various levels of vitamin A from fish oils. L. D. Matterson, R. H. Bunnell, Lois Stinson, E. P. Singsen, and L. M. Potter(Dept. of Poultry Sci., Storrs

Ag. Experiment Station, Univ. of Conn., Storrs, Conn.). *Poultry Sci.* 34, 1080–1084(1955). In a study in which vitamin A from fish oils was fed at various dietary levels, both with and without the antioxidant diphenyl-*p*-phenylenediamine(DPPD), it was found that maximum growth response was obtained with 33% less vitamin A in the ration in the presence of DPPD than in its absence.

Storage of vitamin A in chick livers as a criterion of stability, availability, and dietary level. R. H. Harms, B. L. Reid, and J. R. Couch(Texas A. and M. College System, College Station, Texas). *Poultry Sci.* 34, 1125–1133(1955). Fish oil and a stabilized vitamin A concentrate containing approximately the same amount of vitamin A on a per gram basis were tested under practical conditions with regard to the effect on chick growth and the storage of the vitamin in the liver. Experiments of both four-week and ten-week duration were used. The vitamin A content of the livers from chicks fed stabilized vitamin A concentrates was significantly increased over that of those fed fish oil as the source of the vitamin.

Supplementary vitamin A and choline in the diet of the growing chick. A. A. Camp, H. T. Cartrite, J. H. Quisenberry, and J. R. Couch(Texas Ag. Experiment Station, Gonzales, Texas). *Poultry Sci.* 34, 1134–1138(1955). The substitution of 2,000 I.U. dry stabilized vitamin A per pound of feed for 2.5% dehydrated alfalfa meal, equivalent to 2,000 I.U. vitamin A activity, in a high energy type broiler ration resulted in a significant increase in growth and an improvement in feed efficiency. The addition of 400 mg. of choline chloride per pound of diet likewise produced an increase in the average weight of the chick. An indication was obtained to the effect that choline can contribute to the utilization of carotene furnished by dehydrated alfalfa meal.

Photometric determination of fatty acid ester groups in phospholipids. M. M. Rapport and N. Alonzo(New York State Dept. of Health, New York, N. Y.). *J. Biol. Chem.* 217, 193–198 (1955). A photometric micromethod to determine carboxylic acid ester grouping in phospholipides was described. This method, which was based on hydroxylaminolysis followed by measurement of the liberated hydroxamic acid, was applied to twelve preparations of phospholipides of natural and synthetic origin including lecithin, phosphatidyl serine, phosphatidyl ethanolamine, cardiolipin, and lysolecithin. The results show the method to be very useful for characterization of small quantities of substances in these classes.

The estimation of the fatty acid composition of bacterial lipides. K. Hofmann, C. Y. Hsiao, D. B. Henis, and C. Panos (Univ. of Pittsburgh, School of Medicine, Pittsburgh, Pa.). *J. Biol. Chem.* 217, 49–60(1955). A method was described for the determination of certain fatty acids in small samples of lipides. The method involves (1) the hydroxylation of the fatty acid mixture with performic acid and (2) a separation of the resulting mixture of hydroxylated fatty acids by reversed phase chromatography on rubber columns.

Study of the role of essential fatty acids in liver metabolism. P. G. Tulpule and J. N. Williams, Jr.(College of Ag., Univ. of Wis., Madison, Wis.). *J. Biol. Chem.* 217, 229–234(1955). The effect of essential fatty acids (EFA) and vitamin B_6 deficiencies on certain rat liver enzymes have been studied. Vitamin B_6 appears to be necessary for the proper utilization of linoleate in maintaining the activity of those enzymes affected by EFA deficiency. A marked decrease in the ratio of phosphate esterified to oxygen consumed was observed for the oxidation of both reduced DPN and reduced cytochrome *c* in EFA deficiency. Quantitative consideration of these studies indicates that the main site of action of EFA is the phosphate esterification system, coupled with the oxidation of reduced cytochrome *c*.

The influence of vitamin E deficiency on the metabolism of sodium formate-C_{14} and glycine-1-C_{14} by the rabbit. J. S. Dinning, J. T. Sime, and P. L. Day(School of Medicine, Univ. of Arkansas, Little Rock, Arkansas). *J. Biol. Chem.* 217, 205–211 (1955). Control and vitamin E-deficient rabbits were injected with sodium formate-C_{14} or glycine-1-C_{14}. The deficient animals incorporated much more formate into nucleic acids and protein than did the controls. There was an increased incorporation of formate into both ribonucleic acid and desoxy-ribonucleic acid of skeletal muscle and bone marrow as a result of vitamin E deficiency. The vitamin E-deficient rabbits incorporated less glycine-1-C_{14} into nucleic acids and protein than did the controls. The concentration of free glycine in tissues and the oxidation of formate to CO_2 were not consistently affected by vitamin E deficiency. The deficient animals oxidized more glycine-1-C_{14} than did controls.

Identification of phosphatidal choline as the major constituent of beef heart lecithin. M. M. Rapport and N. Alonzo(New York State Dept. of Health, New York, N. Y.) *J. Biol. Chem.* 217, 199–204(1955). Preparations of beef heart lecithin, free of amino nitrogen and containing 1 mole of nitrogen, choline, and glycerol per gm. atom of phosphorus, were found to yield an average of 0.51 mole of fatty aldehyde as *p*-nitrophenylhydrazone. This corresponds to a minimum of 61 per cent phosphatidal choline based on the content of ester groups in these preparations. Elementary analysis and ester group content show the aldehyde-containing phospholipide to have two fatty chains, one of which is linked as a carboxylic acid ester. In the Schiff test, phosphatidal choline is exceedingly reactive, and the quantitative results obtained with both aldehyde reactions were found to correspond satisfactorily.

A survey of the pigments of a number of chromogenic marine bacteria, with special reference to the carotenoids. Doris P. Courington and T. W. Goodwin(Dept. Marine Microbiol., Scripps Inst. Oceanography, La Jolla, Calif. and Dept. Biochem., Univ. Liverpool, England). *J. Bacteriology* 70, 568–71 (1955). Chromatographic adsorption analysis of the carotenoids extracted from chromogenic marine bacteria showed that the predominant pigments are polyhydroxyxanthophylls; carotenes were rarely found. High pressures had no effect on carotenoid synthesis. The xanthophylls from several *Micrococcus* species have not been observed in other genera and were not identified. *Flavobacterium marinotypicum* contained sarcinene and sarcinaxanthin. *Pseudomonas xanthochrus* and *P. aestumarina*, and *Vibrio adaptatus* produced cryptoxanthin and zeaxanthin. *V. algosus* produced two distinctly different carotenoids, neither of which was positively identified. *Serratia marinorubra* produced prodigiosin. The pigments isolated from numerous other marine bacteria are described briefly.

Physical and chemical composition studies of the lipoproteins of fasting and heparinized human sera. F. T. Lindgren, A. V. Nichols, and N. K. Freeman(Donner Lab. of Med. Physics, Dept. of Physics, Univ. of California, Berkeley). *J. Phys. Chem.* 59, 930–8(1955). Twelve hour fasting serum samples were obtained from three normal individuals, one individual exhibiting clinical states of xanthoma tuberosum and one with xanthoma tendinosum. Each serum sample was separated into four ultracentrifugal lipoprotein fractions: density less than 1.006 g./ml.(S_f 20–400); density between 1.006 and 1.063 g./ml.(S_f 0–20 plus HDL_1); density between 1.063 and 1.200 g./ml.(HDL_2 and HDL_3); and residue. Lipides extracted from these fractions were separated by chromatography over silicic acid into (I) cholesteryl esters, (II) glycerides, unesterified fatty acid and unesterified cholesterol, and (III) phospholipides. Quantitative analysis was based on infrared absorption spectra: at 5.8 μ for glyceride, cholesteryl ester and phospholipides, at 5.9 μ for unesterified fatty acid, and at 9.5 μ for cholesterol. Phospholipide content was highest in the major high density lipoprotein group; phospholipide was the predominant lipide in this group. Cholesteryl ester contents decreased in the order S_f 0–20, high density lipoprotein, S_f 20–400. Cholesteryl ester was the predominant lipide in the S_f 0–20 group. Unesterified cholesterol content was about twice as high in the S_f 0–20 as in the other two groups. Glyceride was the major lipide in the S_f 20–400 class; this class also had the highest glyceride content. Unesterified fatty acid content was highest in the major high density lipoprotein. The lipoprotein residue contained 1/3–2/3 of the total serum unesterified fatty acids. Lipide compositions of the lipoprotein fractions were relatively constant. The narrow band S_f 4–8 lipoproteins showed no significant differences in lipide content when compared to the broad S_f 0–20 lipoproteins. After intravenous heparin injection, the lipide compositions of the lipoproteins showed a shift of about 1/5 of the total serum lipides into association with proteins present in the ultracentrifugal residue, a sharp drop in total serum glycerides accompanied by an increase in total unesterified fatty acid, a marked lowering in the size of the S_f 20–400 class and an increase of S_f 0–20. There were no significant changes in the total serum cholesterol and cholesteryl esters. *In vitro* studies involving incubation of S_f 20–400 lipoproteins with "active fractions" obtained from heparinized plasma showed comparable lipoprotein transformations to those occurring *in vivo*. The relative instability of the serum lipoproteins is discussed briefly.

Escherichia aurescens (Parr) comb. nov., a pigmented species. J. E. Malligo, L. W. Parr, and Mary L. Robbins(Dept. Bacteriology, Hygiene & Preventive Medicine, Geo. Washington Univ., Washington, D. C.). *J. Bacteriology* 70, 498–500(1955). The physiological and serological characteristics are described for six coliform organisms which produce golden-brown to red carotenoid pigments. Although these chromogens are in many respects indistinguishable from *E. coli*, their ability to produce this characteristic pigment warrants their recognition as a distinct species.

Treating vegetable oil-bearing materials to obtain meals of improved nutritive value. W. H. King, F. H. Thurber, and A. M. Altschul(U. S. A., Secy. Agr.). *U. S. 2,726,155.* Soybean and cottonseed meats are adjusted to 20 to 50% moisture and pH 4 to 9.5, and then are dried at 60 to 225°F. for 20 to 40 min. until the moisture is reduced to 7 to 13%. Temperature during the first 10 to 20 min. of the drying period is kept below 200°F.

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• Drying Oils and Paints

Raymond Paschke, Abstractor

Isocyanate resins for coatings. Part I. Anon. *Paint Varnish Production* 45(12), 25(1955). A comprehensive review covering the preparation and manufacture of isocyanates, their properties, and many chemical reactions involved.

Part II. *Ibid.*(13), 25(1955). A discussion of the polyurethans and many applications of isocyanate polymers. 363 references.

The acceleration of oil drying by organic peroxides. L. Bartosik. *Farbe u. Lack* **61**, 368–71(1955). The drying rate of oil-varnish-impregnated cotton cambric is followed by measuring the 1-min. test voltage (at which no current leakage occurs for 1 min.) of the material, known to be at its highest when the O_2 absorption of the oil component of the varnish has reached its maximum. Air-blowing of the varnish raised the viscosity and lengthened the incubation period before drying (cf. Meier and Ohm, *C. A.* **47**, 5133). The drying of oil-varnish films at 120° was also followed by determination of their weight increase at 20-min. intervals. The addition of 1.5% cyclohexanone peroxide produced an initial weight increase similar to that of the varnish alone, but after 60 minutes a new weight increase occurred. When 1.5% dicyclohexyl peroxide was used, an initial weight loss of 0.8% was followed by a weight gain after 25 minutes and a second gain after 60 minutes. Similar behavior was obtained with tert-butyl hydroperoxide and methyl ethyl ketone peroxide. When 0.03% Mn, 0.02% Co, or 0.28% Pb (as naphthenates) were also added, the varnish-peroxide compounds lost weight before recovering it again. Only benzoyl peroxide was not decomposed by the driers at room temperature. The weight losses were found to be due to the loss of acrolein, fatty aldehyde, and fatty acids (which could be collected on a sharply cooled glass plate above a drying film). The peroxides also accelerated skinning tendencies of the varnishes, except benzoyl peroxide and skinning increased in the order Mn, Pb, and Co. Those peroxides which were activated by Co accelerated the rate of surface drying but delayed through drying. Peroxides were not able to replace the action of atmospheric O. (*C. A.* **49**, 15258)

Void volume and oil absorption. G. E. Bessey and K. A. Lammiman(Res. Council Brit. Whiting Fedu.). *Oil Colour Chemists' Assoc. J.* **38**, 694(1955). An apparatus and method are described for measuring rapidly the proportion of voids in a compressed powder under known pressure, the absolute density of the material being known. It is shown that for whiting the void volume so measured is equivalent to the "true" oil absorption as previously defined by the authors, and it is suggested that this technique of testing might be applicable to other pigments.

Vinyl resins in varnish. E. Cernia and F. Coniglio. *Materie plastiche* 21, 556–60(1955). (*C. A.* **49**, 14340)

Fire retardant paints: I (Water emulsion paint systems). R. C. Crippen, *et al. Off. Dig. Paint Varnish Production Clubs* 27(370), 779(1955).

The protection of structural steel. Principles of protective painting. G. Dechaux(Societe des Peintures Astral-Celluco, Paris). *Chemistry and Industry* **1955**, 1535. A review covering corrosion of painted structures, formulation of anticorrosive paints, and the appraisal of the efficiency of anticorrosive paints.

Current and future trends in the paint industry. A. Errico. *Paint Varnish Production* 45(13), 31(1955). An optimistic report by the editor.

Utilization of new polyvinyl acetate emulsions in paints. D. D. Howell(Celanese Corp.). *Am. Paint J.* 40(12), 34(1955). Advantages are discussed.

Film-formers based on semi-drying oils. A. A. Ivanova. *Zhur. Priklad. Khim.* **28**, 718–28(1955). Cottonseed oil(raw, oxidized, and dehydrated) was examined as a film-former. Heating the oil results in decline of the Ac number, O content, and content of hydroxy acids, indicating that dehydration is a possible reaction; the heating was run 2 hrs. at 250°. Metallic acetates were found to be effective catalysts for oxidation of cottonseed oil, taken in 0.5% concentration; salts of Mn, Pb, Cr, and Co were examined; the acetates were effective catalysts in the hydroxylation of the oil but also aid dehydration and polymerization. The highest Ac number(31.35) was attained on heating to 150–60° for 5 hrs. but a specimen was obtained(without a catalyst) which had an Ac number of 62.2, this being obtained after 30 hrs. at 150°. This material, however, added much more O than could be accounted for by the HO group content. The highest content of O was attained by means of Cr acetate catalyst, less with Pb, and least with Co or Mn, but the highest content of HO groups was obtained with Mn salts. The oxidation thus increased the content of HO and carbonyl groups. Oxidation and subsequent dehydration increased the rate of drying the oil with improved mechanical character of the films. A film-forming oil similar in properties to linseed oil was obtained by oxidation in the presence of 7.5% pentaerythritol with Pb-Mn resinate and rosin, followed by dehydration in the presence of $NaHSO_4$. Oxidation and dehydration of sunflower oil give a film-forming oil usable without the addition of pentaerythritol. (*C. A.* **49**, 14339)

The treatment of alkali-refined linseed oil with activated fuller's earth. C. W. H. King and G. H. Hutchinson(John M. Hamilton and Co. Ltd., Hull, Eng.). *Oil Colour Chemists' Assoc. J.* 38, 673(1955). Treatment of alkali-refined linseed oil with activated fuller's earth, out of contact with air, has the dual effect of removing colour and reducing the peroxide value of the oil. The palest closed-pot stand oils and alkyds are produced from adequately earth-treated alkali-refined linseed oil, the removal of colour by the activated fuller's earth augmenting the further colour reduction which occurs during the early stages of heat-treatment. Peroxide value determinations have been used to indicate the degree of autoxidation of the oil, and it is shown that an increased peroxide value is detrimental when the oils are used for alkyd manufacture. This is manifested in the alkyds by considerable darkening and accelerated bodying rate during processing. A simple heat-treatment test is inadequate alone to determine the suitability of an alkali-refined oil for alkyd manufacture, and a peroxide value determination in addition is a surer guide.

Formation of oleoglycerophthalate resins. L. Levasseur. *Peintures, pigments, vernis* 30, 44–51(1954). Alkyd resins, modified with linseed oil in various proportions, were prepared. (*C. A.* **49**, 13664)

Catalytic phenolic finishes for air-dry and low-temperature conversion. K. V. McCullough(Bakelite Co.). *Paint Varnish Production* 45(13), 34(1955).

Graft and block copolymers as building blocks in the coatings field. H. F. Mark(Polytechnic Inst. of Brooklyn, Brooklyn, New York). *Off. Dig. Federation Paint Varnish Production Clubs* 27(370), 771(1955). A report on some advances in the synthesis of polymeric materials and on new methods for the characterization and aftertreatment of coated surfaces.

The effect of electrolyte content of pigments on the swelling of films. K. Meier and G. Schulz(Tech. Univ., Berlin). *Farbe u. Lack* **61**, 22–5(1955). The highest electrolyte contents (as $10^{-3}N$ KCl) were shown by Zn yellow(10.4), Zn green(9), caput mortuum(16.7), Martins yellow(20), and gypsum(20.3), probably because of the intrinsic water solubility of these pigments. The lowest values ($10^{-3}N$ KCl) were those of PB_3O_4 (0.12), PbO(0.15), and Ti white S 1314(0.09). Values of 0.2 $\times 10^{-3}N$ KCl have definite effect on swelling. Further experiments showed that some pigments are able to impart resistance to swelling (e.g. the purified pigments Pb cyanamide, Fe oxide red, caput mortuum, and common or purified blanc fixe), while others increased swelling (e.g. the pigments above unpurified, but also ZnO, Pb white, lithopone, or Zn white, regardless of purification. (*C. A.* **49**, 14337)

Commercial cottonseed-tung drying oil. I. T. Osnos and M. S. Il'ina. *Masloboino-Zhirovaya Prom.* 20(4), 12–15(1955). A drying oil with good film-forming power for use in red-ocher and ZnO paints is prepared by heating to desired viscosity at 200–20° an oil base containing 70% of cottonseed oil which has been air oxidized at 140–5°, dehydrated and polymerized at 260° + 30% of oxidized tung oil. (*C. A.* **49**, 14338)

A method for identification used in drying oils. S. R. Ramschandran and R. S. Prayag. *Paintindia* 5(7), 33(1955). Driers when employed in conjunction with drying oils having conjugated double bonds produce characteristic pattern effects on paper. These effects vary both with the oil and the type of drier used. A method on this technique is described.

Protection of structural steel. The preservation of steel on gas works (Great Britain). L. A. Ravald(North Thames Gas Board, London). *Chemistry and Industry* **1955**, 1526.

Increasing the iodine number of semidrying and drying oils by means of interesterification. R. Rigamonti and Lidia Carillo (Polytec., Turin, Italy). *Olearia* **9**, 5–12(1955). Experiments are carried out with a grape-seed oil to attempt to increase the I no. of the liquid oil and to obtain a solid portion usable as edible fat, by treatment at 4–18° for several days with 0.1% NaOMe catalyst(29% solution in MeOH), and with NaOH (50% aqueous solution). The best results are obtained with aqueous NaOH(0.1% to a maximum of 0.3%), added freshly in small portions each day or more frequently. The I no. is increased by 20 units, yield 80%. The I no. of linseed oil is increased by 15 units by the same treatment. (*C. A.* **49**, 14340)

New tests for surface coatings. E. Rossman(Doerner-Inst., Munich, Ger.). *Fette u. Seifen Anstrichmittel* **56**, 21–3(1954). An apparatus for measuring drying time contains a rough thread placed without load on the wet film. The thickness of wet fresh films may be measured with a serrated disk. A simple method for measuring adhesive strength is described. (*C. A.* **49**, 14340)

Pentaerythritol in synthetic oils and resins for paints. F. Schlenker(Chemische Werke Albert, Wiesbaden-Biebrick, Ger.). *Fette-Seifen-Anstrichnittel* **57**, 87–90(1955). The use of higher alcohols instead of glycerol in oils and resins leads to products having improved drying characteristics and better gloss, heat resistance, and chemical resistance. Pentaerythritol is preferable to reduced sugars since it leads to light-colored products and reacts faster. (*C. A.* **49**, 15255)

New organic pigments, their preparation and use. M. Schmid. *Deut. Farben-Z.* **9**, 252–5(1955). The new Cromophtal pigments are di- or polyarylides of azocarboxylic acids (e.g. derivatives of 2,3-hydroxynaphthoic acid) which are prepared as intermediates. They have high molecular weight, no reactive or solubilizing groups, and are insoluble in organic solvents or plasticizers, nontoxic, stable to light, vulcanization, and elevated temperatures, and have good electric properties, Typical chemical structures are shown. (*C. A.* **49**, 14337)

Non-drying alkyds from tallow acids. R. F. Schwartz and G. A. Lutz(Battelle Memorial Institute). *Paint Varnish Production* **45**(12), 35(1955). Non-drying alkyds are used widely in nitrocellulose lacquers and in baking enamels with urea or melamine resins. Formulations are given.

The preparation of vinyl acetate-vinyl stearate copolymers. R. F. Schwartz, *et al. Off. Dig. Federation Paint Varnish Production Clubs* **27**(370), 783(1955).

Construction of nomograms. L. R. Seaborne(Sutton Coldfield, Eng.). *Oil Colour Chemists' Assoc. J.* **38**, 709(1955). Methods of constructing nomograms are described and examples of interest to the paint and varnish industry are used to illustrate various types.

Comparative evaporation rates of paint solvents. E. G. Shur, *et al.*(New York Club). *Off. Dig. Federation Paint Varnish Production Clubs* **27**(370), 813(1955).

The effect of modifiers on chemical resistance of vinyl films. J. M. Stanton, *et al. Off. Dig. Federation Paint Varnish Production Clubs* **27**(370), 828(1955).

Chemical analysis of coating materials and coatings. W. Toeldte. *Deut. Farben-Z.* **9**, 249–52(1955). Useful tests, supplementary to those commonly performed are described. (*C. A.* **49**, 14338)

Physical studies of paint systems applied to southern yellow pine. R. Tooke, Jr.(Georgia Inst. Technol.). *Off. Dig. Federation Paint Varnish Production Clubs* **27**(370), 838(1955). Primers appear to be the more critical factor in two-coat paint systems. Reactive pigmentation is essential in primers, and it may consist of lead, zinc or lead and zinc in proper amounts. White lead in oil has not been exceeded as a primer formulation. Resins have not appeared to be helpful in primer vehicles. In top coats, it appears desirable to retard chalking somewhat with some semi-chalking anatase or rutile titanium dioxide pigmentation. Resistance to cracking also appears to be enhanced by such substitution. Leaded zinc oxide seems to have particular merit as a reactive pigmentation. A high acid number in vehicles is not necessarily detrimental. Chemically modified oils may be undesirable. It has been demonstrated that a good two-coat special primer-top coat system is generally superior to application of three coats of unreduced top coat paint. Over an extended exposure period, a brushed paint job is likely to be superior to a sprayed job. The most significant general conclusion developed from the current test program is that well-designed paints properly applied are capable of giving four or more years' satisfactory service on southern yellow pine.

The determination of cyclopentadiene and maleic anhydride. P. Unger(Brit. Sci. Instruments Res. Assoc., Chislehurst, Kent). *The Analyst* **80**, 820(1955). Carbic acid, the product of hydrolysis of the adduct of cyclopentadiene and maleic anhydride, reacts quantitatively and rapidly with potassium bromate-bromide in acid solution to form the dibromo derivative. Advantage is taken of this property to determine cyclopentadiene or maleic anhydride by means of each other. Dicyclopentadiene interferes only very slightly in the determination of cyclopentadiene. In the determination of maleic anhydride, maleic acid and saturated acids and anhydrides are without effect. The use of a large excess of the cyclopentadiene reagent gives slightly high results. A determination can in each case be carried out in 30 to 40 minutes and apart from the above-mentioned factors is accurate to better than ± 0.3 per cent.

Oxidation rate of linseed oil under the influence of catalysts and temperatures. I. H. Uyehara(Occidental College, Los Angeles, Calif.). *Off. Dig. Federation Paint Varnish Production Clubs* **27**(370), 794(1955). The purpose of this study was to determine the oxidation rate of linseed oil containing cobalt, manganese, and lead catalysts through a temperature range of 25.0°C. to 85.0°C. at atmospheric pressure. Absorption of oxygen by linseed oil with various percentages of metallic naphthenate driers and in the presence of petroleum ether solvent was followed by measurements of volume differences in an oxygen buret. Graphic data, plotted as oxygen absorbed versus time, illustrate the effect of temperature upon rate for each of the driers. The relative effectiveness of these driers in terms of oxygen intake at particular temperatures is shown. A hypothesis regarding the mechanism of oxidative polymerization is presented. Calculations and literature results suggest that carbon atoms alpha to the double bonds act as activated points at which oxygen attacks to form a hydroperoxide. Subsequently cross links form the dried oil. A first order graph, from which specific rate constants are taken, indicates that two consecutive reactions are occurring.

Analytical studies on synthetic drying oils. K. Wekua and J. Bergmann. *Farbe u. Lack* **61**, 324–30(1955). It is concluded that the synthetic oils show promise, and the possibility of their common production is discussed. (*C. A.* **49**, 15258)

Production of pentadecanedioic acid. R. V. Lenieux(National Research Council, Canada). *U. S. 2,717,266.* This patent covers the production of pentadecanedioic acid, its esters and salts, the method which comprises treating an ester of 15,16-dihydroxyhexadecanoic acid in acetic acid solution with an oxidizing agent from the group consisting of lead tetraacetate, lead tetraoxide and sodium bismuthate to form an aldehyde, and treating the aldehyde with an aqueous alkaline solution of hydrogen peroxide to form pentadecanedioic acid.

Process for polymerizing blown fatty oils or materials containing blown fatty oil acid radicals. M. W. Kiebler, A. Zier, and E. B. Euchner(Glidden Co.). *U. S. 2,717,882.* This patent covers the process of treating material containing at least one saturated fatty acid radical which comprises: blowing the material until oxygen has been added to the unsaturated radical; then treating the blown material with a small amount of aqueous fluoboric acid solution as catalyst at least until the blown material has been polymerized sufficiently to exhibit polymerization characteristics, the treatment with aqueous catalyst solution being effected at temperatures between about room temperature and about 250°F. The aqueous catalyst solution is one in which the concentration of fluoboric acid is between about 4.8% and 70% by weight, and in which the aqueous remainder is selected from the group consisting of water and mixtures of water with water-miscible polar organic solvents. The latter at least partially deactivate the fluoboric acid of the catalyst solution.

Tall oil separation by urea extraction. E. K. Drechsel(American Cyanamid Company). *U. S. 2,717,890.* This patent covers a process for separating unsaponifiables from the fatty acid fraction of tall oil, comprising mixing tall oil with a concentrated aqueous solution of urea until a crystalline complex of urea and fatty acids separates out, filtering off the complex and washing the complex with water to remove substantially all of the urea from the complex and recovering therefrom the fatty acid fraction substantially completely free of unsaponifiable materials, the step comprising steam distilling and fatty acid fraction under acid condition in order to remove substantially all traces of urea, thereby improving the color and color stability of the fatty acid fraction.

Anticorrosion agents consisting of the monamides of dimerized fatty acids. A. G. Rocchini (Gulf Research and Development Company, Pittsburgh). *U. S. 2,718,503.* This patent covers a mineral oil composition comprising a major amount of a mineral oil and a minor amount, sufficient to impart corrosion inhibiting properties to the composition, of a monoamide of an amine having from 1 to 2 hydrocarbon N-substituents at least one of which contains at least 6 carbon atoms and a dimer of an unsaturated fatty acid having from 6 to 22 carbon atoms and containing from 2 to 3 ethylenic linkages per molecule.

Reaction product of organopolysiloxane polyhydric alcohol, drying oil acid, and phenol-aldehyde resin. L. A. Rauner (Dow Chemical Corporation). *U. S. 2,718,507.*

Organosilicon paint resins. L. A. Rauner (Dow Chemical Corporation). *U. S. 2,718,508.* This patent covers a resinous composition composed of from 25 to 35 per cent by weight of an organosilicon composition containing from 0.8 to 2 silicon bonded alkoxy groups of less than 5 carbon atoms per silicon atom, from 20 to 30 per cent by weight of an unsaturated fatty acid of from 12 to 20 carbon atoms, said acid having an iodine number of at least 125, from 12 to 18 per cent by weight glycerine, and from 25 to 40 per cent by weight phthalic anhydride.

Urea-formaldehyde condensation syrups for paints and varnishes and process for making them. P. A. Talet (Societe Nobel Francaise, Paris, France. *U. S. 2,718,510.* This patent covers condensation syrup for varnishes and paints having a high viscosity and being compatible with hydrocarbon solvents. The condensation syrup is obtained by refluxing butylated urea-formaldehyde condensation syrup containing an excess of butyl alcohol with pentaerythrite and maleic acid, the combined amount of pentaerythrite and maleic acid not exceeding 1.5% of the butylated urea-formaldehyde condensation syrup.

Ammonia treatment of synthetic drying oils to increase viscosity. J. L. Ernst and J. L. Betts, Jr. (Esso Research and Engineering Company). *U. S. 2,719,163.* This patent covers a process for improving a synthetic drying oil which comprises, preparing a polymer drying oil of a conjugated diolefin hydrocarbon with sodium as a catalyst in the presence of a diluent to a viscosity below that ultimately desired, then subsequently heating the oil to a temperature below 200° in the presence of 0.01–2.5% of an anhydride selected from the group consisting of maleic, chloromaleic and citraconic and 0.2 to 1.0 mole of ammonia per mole of anhydride.

Modification of drying oils. H. S. Bloch (Universal Oil Products Co.). *U. S. 2,719,164.* This patent covers a process for modifying an unsaturated fatty acid compound containing conjugated olefinic unsaturation selected from the group consisting of the fatty acids and the fatty acid esters derived from a natural glyceride drying oil which comprises reacting the compound in the absence of added catalyst with an aliphatic monoolefinic hydrocarbon containing from 2 to 4 carbon atoms at a temperature of from about 50° to about 300°.

Camouflage paints. C. H. Wastle and D. B. Williams (Sternson Labs. Ltd.). *Can. 497,085.* Building and other objects are effectively camouflaged by use of a paint which reflects infrared rays and applying thereto a paint which is transparent to infrared rays. (*C. A.* **49**, 16461)

Polymerization of vinyl aromatic hydrocarbon and dehydrated castor oil. J. S. Gourley and J. S. Wakely (Imperial Chemical Industries). *British 727,965.* A low-viscosity (1.5 poises at 25°) dehydrated castor oil is polymerized with styrene in an oil: hydrocarbon weight ratio of 1.5 to yield film-forming polymers. The latter can be used in the further synthesis of alkyd resins suitable for coating compounds yielding a tough, hard film. (*C. A.* **49**, 15262)

Reaction products of silicon halides with fats and oils. S. Yamada and H. Yoshioka. *Japan 5388 ('54).* Tung oil (10 g.) and 2 g. $HSiCl_3$ are heated in a sealed tube for 20 hrs. at 100°. The product is washed with water and filtered to give an oil with a $SiCl_3$ group which is hydrolyzed to $Si(OH)_3$. The product gives a film on a glass plate which dries easily and is strong and water-resistant. Additional compounds of $HMeSiCl_2$, H_2SiBr_2, $H_2EtSiCl$, HMe_2SiCl, and $HSiCl_3$ with unsaturated oils and their hydrolysis products are also described. (*C. A.* **49**, 14343)

Improvement of drying and semidrying oils. K. Arimune. *Japan 5390 ('54).* A mixture of soybean oil 100, NaOH 15, and water 100 parts is heated for 1 hr. at 250°. The product is decomposed with HCl to give a fatty acid containing 36.7% conjugated double bonds. A mixture of fatty acid and soybean oil 100 parts with 0.1% Co abietate is heated for 4 hrs. at 150° while blowing in air to give a drying oil, a film prepared with this oil dried in 18 min. at 100°. Its water repellency was better than that of linseed oil. (*C. A.* **49**, 14342)

• Detergents

Lenore Petschaft Africk, Abstractor

The analysis of polyethylene glycols and their derivatives. E. G. Brown. *Manuf. Chemist* **26**, 441–2 (1955). Qualitative and quantitative methods are reviewed for the detection and determination of polyethylene glycols and their derivatives. 19 references.

Maintaining nonionic concentration. B. F. Davis, K. E. Wattman and H. C. Speel (Aquaness Corp., Houston, Texas). *Soap Chemical Specialties* **31**(12), 73, 75, 77 (1955). A method for quantitative determination of nonionic surface active agents in aqueous solution is described. Phenol is shown to be a valuable reagent for titration in water or brine solutions even when the hydrophobic group is not known. Simplicity and excellent reproducibility among various operators make it equally useful in the field and the laboratory.

Foams and foam destruction. D. G. Dervichian (Pasteur-Inst., Paris). *Z. Elektrochem.* **59**, 290–6 (1955). Materials which are able to spread on a solution, form a gaseous surface film, and are insoluble make the best antifoams for that solution. The relation between the physical nature of adsorbed surface films and molecular structure form a basis for the choice of both foaming agents and antifoams. (*C. A.* **49**, 15264)

New neutral soap developed in Belgium. E. Fromont (Laboratoires Ed. Fromont, Brussels, Belgium). *Perfumery, Essent. Oil Record* **46**, 384–6 (1955). An entirely new soap product has been marketed under the trade nome of Neutrogene soap. An aqueous 10% solution of this brand shows a very low ionization and a pH in the neighborhood of 7.5 compared with most soaps which have a pH of 9+. An outstanding property of this soap is that it will neutralize alkaline media having a pH superior to its own and equally neutralize acid media, without undergoing decomposition. The Fromont soap will in no way react with the amino acids. They will even withdraw alkaline compounds from the skin and restore its original health. Its principal components are triethanolamine and glycerin.

The microbial deterioration of soaps. (Preliminary publication). J. Hollo and J. Gorog. *Yearbook Inst. Agr. Chem. Technol. Univ. Tech. Sci., Budapest, Hung.* **1953**, III–**1954**, VIII, 181–3. Dark-brown and black stains observed on soaps after unusually hot and humid weather were traced to microorganisms, which can be grown on a soap-glue medium. They are spherical-shaped aerobic bacteria thriving well on air at 90% relative humidity but are adversely affected by light. The discoloration is inhibited by S-containing compounds as 0.1% Na dithionite or 0.2% $Na_2S_2O_7$. The discoloration was observed only on soaps made with fats and oils containing traces of Fe. (*C. A.* **49**, 14352)

The perfuming of soaps and synthetic detergents. E. D. Kilmer (Lever Brothers, Edgewater, N. J.). *Soap, Perfumery, Cosmetics* **28**, 1265–7 (1955). A luxury soap perfume, if properly formulated, will completely mask any fatty or soap odors inherent in the base. It should be diffusive and be continually emitted from an exposed bar, it should leave a mildly distinctive sweetness on the skin in addition to providing a pleasant scent during bathing, and it should not accelerate soap rancidity. Methods of obtaining these objectives are described.

The primary alkyl sulfates and their significance as raw materials for modern detergents for use in hot and boiling solutions. K. Lindner. *Seifen-Ole-Fette-Wachse* **81**, 83–6, 107–9 (1955). A review with 11 references. (*C. A.* **49**, 14352)

Technical developments in soapmaking. G. Maroc. *Rev. franc. corps gras* **2**, 496–510 (1955). Some recent processes concerned with continuous bleaching of fats (Bamag, Votator) obviating frames in the cooling of soap milling, etc., are discussed. (*C. A.* **49**, 14352)

Bleaching of fats and soap. J. Rasch. *Seifen-Ole-Fette-Wachse* **81**, 51–2 (1955). A lecture on the bleaching of fats and soaps by means of 0.5–1.5% $NaClO_2$ solutions in acid or alkaline medium. (*C. A.* **49**, 14352)

A study of the soiling of natural and manufactured fibers from aqueous systems. R. B. Smith *et al. Am. Dyestuff Reptr.* **44**, 815–26(1955). A test method has been developed for evaluating the aqueous soiling characteristics of selected fabrics both as to their ability to take up soil and to retain it during a washing operation. A vacuum-cleaner-dust soil and a synthetic soil were applied to the fabrics by spraying, padding, and long liquor immersion, respectively. In general the synthetic soil applied by a spraying method gave the heaviest soiling, which was the most difficult to remove by a washing procedure. The synthetic soil applied by an immersion method gave the next heaviest soiling, while the synthetic soil applied by padding gave the lowest amount of adherent soil. The vacuum-cleaner-dust soil generally gave slightly heavier soiling when applied by a long liquor immersion method as compared with the padding method of application. The type of fiber and the physical construction of the fabric and surface treatments influenced the amount of soil retained through any soiling treatment, and also, the tendency of the soil to adhere to the fabric during washing. Spun yarns in general picked up more soil than the filament yarns, and held the soil to a greater degree during washing. The data likewise indicated that the wash tests can be made in either the Terg-O-Tometer or Launder-Ometer with satisfactory results, although similar washing showed that the Launder-Ometer removed more soil. Approximately the same results were obtained in Terg-O-Tometer wash tests with either a built synthetic detergent or a neutral soap.

A laboratory-scale tumbler-type washing machine. D. G. Stevenson(Atomic Weapons Research Establishment, Aldermaston, Berks, Engl.). *J. Textile Inst. Trans.* **46**, T677–83(1955). The machine described in this paper appears to give results closely approximating those obtained in a full-size commercial machine in the following aspects: type of agitation, loading factor, liquid-liquor load ratio and soil removal efficiency. In addition, any type of load may be used, such as chopped fiber, heavy or light fabrics, etc. Estimates of redeposition may be carried out simultaneously with the wash. Wide variation in all factors is possible, and, with the aid of a laboratory hydro-extractor, commercial multi-wash processes at various temperatures can be duplicated.

Rapid determination of total fatty acid in unbuilt soap products. H. L. Webster and A. Robertson(Thos. Hedley & Co., Ltd., Newcastle upon Tyne, Engl.). *Analyst* **80**, 616–19(1955). Add an excess of standard $CaCl_2$ solution to a weighed sample of soap in solution, heat, filter off the Ca soap, and determine excess Ca in filtrate by titration with ethylenediaminetetraacetate solution with murexide(ground mixture of 0.2 g. ammonium purpurate and 100 g. NaCl) as indicator. The method can be used for built soaps, but there is little saving of time in that case. (*C. A.* **49**, 15261)

Synergistic phenomena in fatty alcohol sulfates. R. Wemelle. *Industrie chimique* **42**, 73–6, 105–7, 137–40(1955). The wetting powers of various fatty alcohol sulfates and their mixtures were determined by means of the Draves wetting test. The sulfates of C_{10} through C_{18} alcohols were tested. The pure alcohols indicated an alternation of properties depending upon whether an even or an odd number of C atoms was in the chain. Those of odd-numbered chains were the better wetting agents. Binary mixtures of even chains or odd-chain close homologues showed in general 3 points of singularity when plotted as a function of the molar concentration of the constituents; a minimum wetting time occurred at the 1:1 mixture, and maximum occurred near the 2:1 and 1:2 mixtures for the odd chains, and at the 1:3 or 3:1 mixtures for the even chains. The maximum or minimum were not lower or higher than the wetting time of either pure constituent but were higher or lower than the mixtures immediately adjacent. Combinations of even chains were less active than combinations of odd chains. When odd and even chains were combined, 5 points of singularity were found in the composition-wetting time curve, 2 wetting time minimum(showing synergism) and 3 maximum(showing antisynergism); the 1:1 point was a point of antisynergism(whereby wetting properties were poorer than those of the neighboring mixtures). Synergism (or antisynergism) was also found to occur in ternary mixtures, and ternary plots showed 0–3 regions of singularity depending upon the combination of even or odd chains and the properties of the pure compounds. For example, the C_{13}, C_{14}, C_{12} plot showed 2 regions of synergism in the area where C_{12} was at low concentration and one area of antisynergism in the region of high C_{12} concentration. The synergism was not as marked as in the case of the binary system. Quaternary systems were studied and plotted as tetrahedral solids. Synergism in these cases was less marked than in the ternary systems. (*C. A.* **49**, 14353)

Perfuming shampoo bases. C. F. Wight(Van Amerigen-Haebler, Inc., N. Y.). *Soap Chem. Specialties* **31**(11), 49–9, 203 (1955). The problems involved in perfuming various types of shampoo bases are discussed. However the perfumes may be utilized, whether as masking agents or to add fragrance, the materials used must be carefully selected to insure that no problems of coloration, discoloration or clouding arise during shelf-life.

The thermodynamics of monolayer penetration at constant area. B. A. Pethica(Dept. Pharmacology, Medical School, Birmingham 15). *Trans. Faraday Soc.* **51**, 1402–11(1955). Monolayer films of cholesterol on water or 0.145 *M* sodium chloride buffered with boric acid and borax to pH 7 were prepared. The surface pressure was adjusted so the film was in the liquid condensed region. A solution of a surface active compound was then injected under the monolayer and the rate of penetration was determined by measuring changes in surface pressures. For dodecyl compounds having different ionic head groups, the penetration was in the descending order, SO_4^-, SO_3^-, NH_3^+, COO^- and NMe_3^+. The use of Gibbs' adsorption isotherm as applied to the penetration of long-chain ionic molecules into an insoluble monolayer held at constant area at the air/water interface is discussed particularly in terms of the interaction of cholesterol monolayers with sodium dodecyl sulfate.

Improvements in detergent compositions. A. D. Scott(Unilever Ltd.). *Brit. 732,868.* A detergent composition containing an organic ionic soapless detergent can have increased persistency of the lather given by aqueous solutions by the addition of not more than 20% by weight of the detergent of a compound having the general formula RCOArOZ where RCO is an acyl group derived from a fatty acid and contains in all between 6 and 10 carbon atoms, Ar represents a benzene or naphthalene nucleus, and Z is a hydrogen atom or the grouping R′OH where R′ is an alkylene radical, a dialkylene ether radical or a polyalkylene polyether radical which contains no more than 15 carbon atoms in all nor more than 5 in any one uninterrupted chain of carbon atoms, and not more than 4 oxygen atoms.

Process of producing tertiary phosphoric acid esters of partial carboxylic acid esters of polyhydric alcohols. Metallgesellschaft Aktiengesellschaft. *Brit. 736,448.* Surface-active tertiary phosphoric acid esters of partial carboxylic acid esters of polyhydric alcohols are described in which the previously formed tertiary phosphoric acid esters of polyhydric alcohols are further esterified with one or more carboxylic acids or anhydrides of the same.

Improved dishwashing composition. Albright & Wilson, Ltd. *Brit. 737,299.* A dishwashing composition which will not water spot and will not stain plastic dishes comprises from 80 to 20 parts by weight of sodium tripolyphosphate in admixture with from 20 to 80 parts by weight of hydrated chlorinated trisodium phosphate.

Alkyl aryl sulfonate detergent solutions. F. Neil Baumgartner (Esso Research & Eng. Co.). *U. S. 2,723,240.* An especially effective aqueous detergent solution consists essentially of water and 0.4% of the sodium salt of a monosulfonated benzene to one position of which is attached the third carbon atom of a straight chain alkyl radical containing 11 to 12 carbon atoms such as 3-phenyldodecane.

Process for sulfonating detergent alkylates. E. D. Gilbert and W. J. Moran, J. K. Petry(Allied Chemical & Dye Corp.). *U. S. 2,723,990.* Salt-free sulfonated detergent alkylates are prepared wherein alkyl substituted mononuclear aromatic compounds, having alkyl side chains containing predominantly from 8 to 20 carbon atoms inclusive, are diluted and mixed with a minor proportion of concentrated sulfuric acid and thereafter are directly sulfonated with a gaseous mixture of sulfur trioxide and an inert gaseous diluent.

Method of improving and simplifying the cold milling of soap and product obtained thereby. D. E. Marshall(Micro Processing Equipment Co., Inc.,). *U. S. 2,724,702.* A greatly improved bar of toilet soap with an unprecedented highly desirable waxy texture is obtained if the base materials from which it is formed or pressed consists essentially of a mixture of fatty-acid potash soap and fatty-acid soda soap in proportions of between 5% and 30% potash soaps, and between 95% and 70% soda soap, which mixture has been subjected in the solid state and at a temperature below the crystalline reversion point of the soap, to a mechanically produced internal shearing action great enough to convert the mixture to an ultramicrocrystalline state.