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

• Oils and Fats

Ralph W. Planck, Abstractor
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Loss of weight during oil-seed processing. F. Wittka. *Olearia* 9, 55–64(1955). The losses in weight occurring during oilseed processing are practically constant in all oil-mills (antiquated or ultra-modern) and cannot result, therefore, from the methods of handling the seeds. Data are given to show that the weight changes cannot be accounted for on the basis of errors in weighing or analysis or losses or decomposition of fatty materials or carbohydrates. The most widely accepted theory used to account for the phenomenon is that water is formed and lost through an inter-molecular reaction of the proteins in the seeds. In support of this theory it is shown that seeds rich in protein such as peanuts (30% protein) and castor beans (20% protein) suffer about five times more loss in weight during processing than low protein content seeds such as olives (7% protein).

Wool scouring products and lanolin. The current point of view on this question. J. Vallee. *Revue Francaise des Corps Gras.* 2, 323–336(1955). The commercial applications of lanolin and lanolin by-products as well as methods of recovering and refining crude wool fats and lanolin are reviewed. The 134 references cited are numbered to supplement and bring up to date the bibliography from a previous review on wool wax by D. T. C. Gillespie in the Journal of the Textile Institute, February, 1948.

Preparation of acetoglycerides. M. T. Mellier. *Oleagineux* 10, 335–336(1955). Hydrogenated or distilled methyl esters prepared from palm oil were reacted with four times the theoretical quantity of triacetin required to form the diacetoglycerides in the presence of sodium or sodium methoxide as the catalyst. Xylene was used as the solvent in the sodium catalyzed reactions while no solvent was used in the sodium methoxide procedures. When the reaction was completed the xylene solutions were water washed to remove the resulting methyl acetate, the solvent stripped and the excess triacetin and unreacted methyl esters removed by vacuum distillation. In the sodium methoxide procedure the methyl acetate was distilled off and the triacetin and unreacted methyl esters removed as before. In all cases mixtures of diacetoglycerides (60–70%) and monoacetoglycerides (30–40%) were obtained. Possible commercial uses of the products are discussed.

Note on the economic refining and decolorization of acidic oils. M. Loury. *Revue Francaise des Corps Gras* 2, 150–158(1955). Very impure acidic oils resulting from the acidification of the foots obtained in the alkali refining of soya, linseed, corn, and rapeseed oils were studied in order to determine whether a more economical method than low pressure distillation could be found to purify and decolorize them for use in the manufacture of soft soaps. Preliminary purification involved the removal of metallic impurities. Phosphoric acid was found to be superior to sulfuric, hydrochloric, nitric, acetic, and oxalic acids or acid salts for this purpose. Furthermore, the use of phosphoric acid resulted in the ready flocculation and separation of the mucilages in the oil. Nitric acid afforded good decolorization but the soaps obtained were hard presumably because of elaidinization during the treatment. Classical oxidizing agents such as potassium permanganate, bichromate, chlorate, and hypochlorite were used in the presence of mineral acids but the results were not very satisfactory. The use of potassium perchlorate and hydrochloric acid gave considerably better results but the use of such a mixture on a commercial scale would not be without hazard. Benzoyl peroxide gave much better decolorization than did hydrogen peroxide or the peroxides of sodium, magnesium, or urea. Ammonium and potassium persulfate gave good decolorization. When soaps were decolorized with the peroxides the clarity of the soaps was reduced considerably by the presence of gas bubbles. Sodium chlorite was found to be superior to chlorine dioxide since it did not require special equipment for processing, gave more constant results and was less sensitive to operating conditions. The best procedure found from all these tests involved the room temperature separation of mucilages by stirring a mixture of oil with 0.2 to 0.5% of 60° Bé phosphoric acid diluted with three volumes of water followed by centrifuging and filtration with the aid of clay. The resulting product was decolorized with 0.2 to 1.0% of sodium chlorite.

Upgrading of methyl esters—a by-product of carotene extraction from palm oil. J. Jorand. *Oleagineux* 10, 99–105, 193–196, 264–274(1955). Standard methods of converting the methyl esters from palm oil processing into valuable commercial products by means of saponification, glycerolysis, hydrogenation to give saturated compounds, and reduction of the esters to alcohols are discussed. Conversions of the methyl esters into amides, hydroxy acids, acetostearins, and aceto-oleins are considered briefly. 65 references.

Epoxidation and hydroxylation of unsaturated derivatives. P. Blaizot. *Oleagineux* 10, 311–317(1955). Methods for preparing epoxides and hydroxy compounds from unsaturated fatty acids and vegetable oils are reviewed. Commercial uses of such derivatives are discussed.

Tall oils. II. Urea adduct of tall oil. Taro Matsumoto and Toshitake Tamura(Nihon Univ., Tokyo). *J. Japan Oil Chemists' Soc.* 4, 23–5(1955). Japanese tall oil (containing 40% fatty acids) reacted with urea gave urea adducts consisting of most of fatty acids leaving nonadducts containing much resin acids and a lesser amount of fatty acids (a part of linoleic acid, oxidized, and polymerized acids). When 1 part of tall oil was treated with 4 parts urea, 12 methanol, and 10 benzene for washing, 27% of urea adducts consisting of 90% fatty acids, 4% resin acids, and 6% unsaponifiable matter, and 73% of nonadducts consisting of 21% fatty acids, 63% resin acids, and 16% unsaponifiable matter were obtained. Partially hydrogenated tall oil, methyl ester, and Na salt of tall oil were also treated with urea and similar results were obtained.

The color and flavor of fats and oils. Yataro Obata(Hokkaido Univ., Sapporo). *J. Japan Oil Chemists' Soc.* 4, 115–24(1955). A review with 113 references.

Wool fat. Eiichi Kawahara. *J. Japan Oil Chemists' Soc.* 4, 134–42(1955). A lecture on wool fat and lanolin.

Volatile substances formed by the decomposition of peroxides of methyl esters of highly unsaturated acids. Yoshiyuki Toyama and Katsuhito Suzuki(Nagoya Univ.). *J. Chem. Soc. Japan, Ind. Chem. Sect.* 58, 52–4(1955). The methyl esters of a fraction of highly unsaturated acids of sardine oil were oxidized at 0–25° by oxygen absorption. The oxidized product was decomposed by heating at 90–100° in nitrogen. The volatile acids thus obtained were identified by paper chromatography of hydroxamic acids to be formic, acetic, and propionic acids. The volatile carbonyl compounds were precipitated as 2,4-dinitrophenylhydrazones and were identified by their m.p., N content, and absorption spectra to be *n*-butyraldehyde, *n*-hexanal, mixture of lower saturated aldehydes, crotonaldehyde, 2-pentenal, and 2-hexenal.

Plasticizers from fatty oils. II. Plasticizers from coconut-oil lower fatty alcohols, sperm alcohols, phthalic acid, and aliphatic dibasic acids. Koichi Murai, Giichi Akazome, Naraichi Tsujisaka, and Mahisa Sakurai(Nihon Yushi Co., Osaka). *J. Oil Chemists' Soc., Japan* 3, 200–3(1954). Phthalic acid esters were synthesized and examined as plasticizers for polyvinyl chloride by similar technique described in Part I. The esters synthesized included di-*n*-octyl phthalate (DOP), di-*n*-decyl phthalate, di-*n*-lauryl phthalate, butyl decyl phthalate, methyl oleyl phthalate, di-(2-ethylhexyl)phthalate, di-(*sec*-octyl) phthalate, di-isooctyl)phthalate, di-(3,5,5-trimethylhexyl) phthalate, di-(diethyleneglycolmonoethylether) phthalate, butyl cetyl phthalate, and methyl cetyl phthalate. Among them the last 2 were more or less nonmiscible with polyvinyl chloride, but the others were all miscible. Most of them were comparable with DOP in mechanical properties of the film consisting of 2 parts of polyvinyl chloride and 1 part of plasticizers. They were superior also in stability in lower temperatures. Another group of plasticizers synthesized included di-(2-ethylhexyl) malonate, di-(2-ethylhexyl) succinate, di-(2-ethylhexyl) adipate, di-(2-ethylhexyl) azelate, di-(2-ethylhexyl) sebacate, di-(2-ethylhexyl) maleate, di-(*sec*-octyl) adipate, di-(3,5,5-trimethylhexyl) azelate, and dibenzyl adipate. Among them all were miscible with polyvinyl chloride except the last 2. The azelates were excellent plasticizers.

Twenty-stage molecular distillation unit. F. W. Melpolder, T. A. Washall, and J. A. Alexander(Atlantic Refining Co., Philadelphia, Pa.). *Anal. Chem.* **27**, 974–77(1955). A 20-stage countercurrent molecular still has been developed for the distillation of high boiling samples. The use of the still was expected to permit a more complete analysis of heavy petroleum products. The still, with a capacity of 1500 ml., consisted of one large and 19 small still pots connected in series. The unit can be operated as an equilibrium-type still for samples less than 260 ml. and as a batch distillation unit for larger volumes. Using a test mixture of Octoil [bis(2-ethylhexyl)phthalate] and Octoil S [bis(2-ethylhexyl)sebacate], and efficiency of 0.8 theoretical plate per stage was found. Automatic safety controls allow the still to operate unattended.

Effect on flavor of using substitute fats in dry whole milk. C. T. Herald and Stuart Patton(Dept. of Dairy Science, Penn. Agr. Exp. Station, University Park). *J. Dairy Science* **38**, 640–44 (1955). The findings of others that vacuum- or gas-packed dry whole milk develops a stale flavor, different from oxidized flavor, during early storage were confirmed. This off-flavor produced a substantial drop in the flavor score of both air- and vacuum-packed dry whole milks during the first month of storage. Such a flavor was not detected in any dry milks containing substitute fats. With the notable exception of coconut fat the substitute fats made dry milks with poor (oxidized) flavor qualities. Vacuum-packed dry milks made with coconut fat, either hydrogenated or unhydrogenated, exhibited good flavor after 6 months' storage at room temperature.

Vegetable oil refining. K. J. Bradley and F. H. Smith(The Sharples Corp., Philadelphia, Pa.). *Ind. Eng. Chem.* **47**, 868–875(1955). Newer techniques of oil extraction not only extracted more oil but also extracted worse oil containing more of the undesirable components. Oils extracted by modern methods may contain demulsifiers, reducing the amount of free fatty acid shown in the cup test and the refiner's spread at the same time. Other oil changes were also due to developing technology of extraction.

The fat from the spermophile, Citellus citellus. G. Rankov and A. Popov(Bulgarian Acad. Sci., Sofia). *Compt. rend. acad. bulgare sci.* **7**(1), 9–12(1954) (in German). The body fat is liquid at room temperature, f.p. 3–4°, n_D^{26} 1.4620, acid no. 3.5, sapon. no. 196.5, I no. 69.4, CNS no. 65.0, acetyl no. 2.5, Reichert-Meissl no. 4.8, Polenske no. 1.6, and contains oleic acid 67.4, linoleic acid 4.9, palmitic and stearic acids 22.8, glycerol 4.5, and unsaponifiable matter 0.4%. Cooling to 10–15° causes separation of saturated glycerides and leaves nearly pure triolein. (*C. A.* **49**, 5861)

Physical properties of cake as affected by method of butter manufacture and addition of an emulsifying agent. F. E. Hunt and M. E. Green(Ohio State Univ., Columbus). *Food Tech.* **9**, 241–6(1955). Batters and cakes made with butter produced by continuous or conventional churn processes possessed similar physical properties. Addition of 3.5% of emulsifier (40% mono-, 50% di-glyceride, derived from vegetable oils) to the butters improved dispersion of fat throughout batter and cake.

Investigations on croton oil. E. Cherbuliez, P. Boymond, and A. Ineichen(Univ. Geneva, Switzerland). *Bull. Galenica* **16**, 37–44(1953)(in French). Croton oil was separated into 2 fractions, one a vesicant nonpurgative resin, the other a purgative nonvesicant oil. This can be accomplished either by extraction with dilute MeOH or with glycol, or by chromatographic adsorption on alumina. The active constituent of the oil fraction has not yet been separated from the glycerides accompanying it. (*C. A.* **49**, 7191)

Gerber fat determination. I. Influence of temperature and acid concentration on the fat determination in cream. F. Kiermeier and G. Pirner(Chem. u. Phys. Inst. Suddeutschen Versuch- u. Forschungsanstalt Milchwirtschaft, Weihenstiphan). *Z. Lebensm.-Untersuch. u.-Forsch.* **100**, 135–43(1955). Data regarding the effect of various temperatures and various acid concentrations on the determination of butter fat in cream by the Gerber method are tabulated and graphically presented. Results are compared with those of the Roese-Gottlieb method. The findings indicate that use of a digestion temperature of 65° and 69% H_2SO_4 as proposed by others is most suitable. (*C. A.* **49**, 7145–6)

Detection of hydrogenated dolphin oil in butter by means of paper chromatography. E. Bottini and F. Campanello(Sta. chim. agrar. sper., Torino, Italy). *Ann. sper. agrar.*(Rome) **9**, 11–20(1955)(English summary). Hydrogenated dolphin oil contains isovaleric acid 7.78%, whereas butter is practically free of it. For the detection of hydrogenated dolphin oil, isolate the steam volatile acids, i.e., butyric, caproic, and isovaleric, and dissolve them in H_2O to give about a 1% solution. For ascending unidimensional chromatography use Whatman No. 1 paper strips, 36.5 cm. long, 3 cm. wide, which have been treated with AcOH 1% in H_2O. Apply 4–5 cu. mm. of the solution of the acids 2.5 cm. from the end of a strip. Then develop the strips for 14 hrs. at 17–19° with BuOH which was saturated with 1.5 *N* NH_4OH. The presence of isovaleric, butyric, and caproic acids is shown with a solution of 60 mg. bromophenol blue and 200 mg. citric acid in 100 cc. H_2O. The spots are clearly separated. As little as 3% hydrogenated dolphin oil in butter can be detected. (*C. A.* **49**, 7144)

The phenol reaction of Kunkel and Ahrens. Its application in clinical biochemistry. J. A. Berger(Univ. Clermont-Ferrand). *Trav. soc. pharm. Montpellier* **14**(3), 156–62(1954). Turbidity produced in serums by addition of phenol has been used by Kunkel, *et al.* (*C. A.* **44**, 8404) and others as a measure of total serum lipides. Berger applied the test to 10 normal serums and to serums from patients with cirrhosis of the liver, biliary obstruction, cancer of the liver, lipoidal nephrosis, endocrine imbalance, etc. Values were elevated in all instances except those with terminal cirrhosis and certain rheumatic disorders. The phenol test, in conjunction with electrophoresis, is suggested as a valuable adjunct in studying lipoproteins. (*C. A.* **49**, 7112)

The chemistry and biology of sebum. II. G. Miescher, H. Lincke, and P. Rinderknecht(Dermatol. Universitäts-klinik, Zurich, Switzerland). *Dermatologica* **109**, 65–74(1954)(in German). The fatty acids were isolated from sebum and methylated in ether solution with diazomethane. The methyl esters were separated into 20 fractions by vacuum distillation. Aliquots of the fractions were hydrogenated. The bactericidal activity of each of the fractions and its hydrogenated form was compared on *Streptococcus hemolyticus, Escherichia coli,* and *Staphylococcus.* Most of the fatty acids (35–40%) possessed 16 C atoms, and 50% were unsaturated. Fatty acids with less than 14 C were only 6% of the mixture, and 80% of those with 12 C were unsaturated. Those with 14 and 15 C composed 22–27% of the acids and 25–30% were unsaturated. With all 3 bacteria fatty acids of 12–13 C killed in 2 min., and hydrogenation had no effect. Fatty acids of 14–16 C killed *streptococci* and *staphylococci* in 10–60 min.; after hydrogenation 3–6 hrs. were required. These longer fatty acids killed *E. coli* in 20 to 180 min. Hydrogenation had no effect on killing time. (*C. A.* **49**, 7087)

Chemical mechanism of the enzymic hydrolysis of natural oils and fats. I. Influence of the degree of unsaturation of the substrate on the rate of hydrolysis by pancreatic juice in vitro. Study on the degree of unsaturation of the liberated fat acids. G. Clement and J. Clement-Champougny(Univ. Paris). *Bull. soc. chim. biol.* **36**, 1319–28(1954). Experiments with diverse fats and oils showed that the saturated fat acids were liberated by pancreatic lipase faster than the unsaturated acids. The degree of unsaturation had no influence on the rate of liberation of the unsaturated acids. (*C. A.* **49**, 7016)

Assay method for lipoxidase in animal tissue. D. H. J. Boyd and G. A. Adams(Natl. Research Labs., Ottawa). *Can. J. Biochem. and Physiol.* **33**, 191–8(1955). The fact that catalytic oxidation of linoleate emulsions at pH 9.0 by heme pigments is inhibited by KCN, while lipoxidase activity is relatively unaffected, is the basis for an assay for lipoxidase in animal tissues which eliminates the interference of heme compounds. Application to beef and pork adipose tissue, bacon, rat liver, spleen, kidney, heart, brain, and lung tissue suggested that lipoxidase was not present in these tissues and that the linoleate oxidation was catalyzed by the heme pigments in the extracts. (*C. A.* **49**, 7037)

Human hair fat. Sheng-Lieh Liu(Natl. Taiwan Univ., Formosa). *J. Chinese Chem. Soc.*(Taiwan) Ser. **II**, **1**, 71–89(1954) (in English). Hair from boys, girls, men, and women gave, on extraction with Et_2O or C_6H_6, hair fat in 1.0–2.3, 3.3, 1.2–2.4, and 2.9–3.0% yield, respectively. The hair fat from men contained cholesterol, 6-hexadecenoic, myristic, palmitic, stearic, oleic, ricinoleic, and jimmoarachidic acids. The last is a new acid, $C_{20}H_{40}O_2$, m. 69–70° (from Me_2CO), *p*-chlorophenacyl ester, m. 82–4°. Ricinoleic acid must be contamination from pomade. The hair fat from women contained 6-hexadecenoic, myristic, palmitic, stearic, oleic acids and esters of low molecular weight acids. b_6 71–115°. $[\alpha]_D + 5.7°$. (*C. A.* **49**. 7087)

Report on foreign fats in dairy products. Sterol acetate test. J. H. Cannon (Food & Drug Admin., Dept. Health, Education & Welfare, St. Louis, Mo.). *J. Assoc. Off. Agr. Chemists* **38**, 338–47(1955). A collaborative study was made of a suggested method for detecting vegetable fats in animal fats used on the isolation and characterization of steryl acetates. Addition of a known amount of cholesterol to the fat before analysis was found to yield a bulky precipitate which was easy to filter and insured complete precipitation of small quantities of phytosterol digitonides. The method permitted detection of as little as 10% hydrogenated cottonseed oil in butterfat but more detailed instructions regarding microtechniques will be needed.

Report on foreign fats in dairy products. A critical review of the Reichert-Meissl and Polenske determinations. S. D. Fine (Food & Drug Admin., Dept. Health, Education & Welfare, Denver, Colo.). *J. Assoc. Off. Agr. Chemists* **38**, 319–38(1955). Reichert-Meissl and Polenske determinations were made on butterfat and palm kernel oil by the A.O.A.C. methods 26.26 and 26.27 and by modifications of these methods, utilizing glass joint apparatus, an electric heating mantle, and 6-mesh carborundum as the anti-bump agent. Effects of varying times of distillation and varying amounts of the glycerol-soda reagent were also evaluated. Either type of apparatus may be used for the Reichert-Meissl determination, but for Polenske analyses the apparatus must be specified. Gas heating is preferred to heating by an electric mantle because the latter may cause charring of the floating acids during distillation. Carborundum is superior to pumice as an anti-bumping agent. Further study of the effects of distillation pressure and methods of extracting butterfat are recommended.

Report on crude fat in feeds. H. H. Hoffman(Florida Dept. Agr., Tallahassee, Fla.). *J. Assoc. Off. Agr. Chemists* **38**, 225–8(1955). As a result of a collaborative comparison of a four-hour high-heat method and the official A.O.A.C. method for determining fat in feeds, the referee recommends adoption of the 4 hr. method.

Variation in fat constants of genuine Canadian milk fat. R. R. Riel(Chem. Div., Science Service, Canada Dept. Agr., Ottawa, Canada). *J. Assoc. Off. Agr. Chemists* **38**, 494–503(1955). Butter samples were obtained monthly for one year from 29 factories in Canada so chosen as to represent cream and water supplies of different qualities and to provide a cross section of dairy producing areas. The average values and 95% fiducial limits were, respectively: Reichert-Meissl 27.8 (25.1–30.5), Polenske 2.0 (1.4–2.6) and refractive index 1.45419 (1.45326–1.45512). In general, these ranges were appreciably narrower than had been reported in the literature. The Reichert-Meissl values decreased from June to November and then increased from November to April. The Polenske values were highest during June and July. The refractive indices were high in summer and low in winter. There were significant differences between months and between provinces. Low but significant correlations were found between Reichert-Meissl and Polenske values and between Reichert-Meissl values and refractive indices.

Report on the determination of fat in meat products. E. S. Windham(Veterinary Div., Army Med. Service Grad. School, Walter Reed Army Med. Center, Washington, D. C.). *J. Assoc. Off. Agr. Chemists* **38**, 210-17(1955). Data from a collaborative study of four modifications of the ether extraction method for determining fat in meat products are summarized. Use of petroleum ether as the alternate fat solvent is recommended. A screen test, similar to the Babcock test, is described and found to merit further study.

Process for producing vitamin compositions. R. P. Dunmire. *U. S. 2,709,149.* Before solidification, an anhydrous and liquefied combination of vitamins and hydrogenated oil is subjected to a colloidal grinding action in an inert atmosphere.

Apparatus for removing wool grease from wool wash. P. Bugard. *U. S. 2,709,523.* Description.

Tin pot oil composition. W. O. Cook(U. S. Steel Corp.). *U. S. 2,710,272.* The composition consists of a mineral oil having a flash point greater than 500°F., at least 5% by wt. of a fatty oil (palm, castor, tallow, hydrogenated corn, cottonseed, coconut, or fish oil) and at least 0.25% by wt. of stannous chloride.

Dehydration of castor oil. R. J. Carter, J. S. Gourlay and J. K. Lovell(Imperial Chemical Indus., Ltd.). *U. S. 2,711,416.* In a continuous process, castor oil and a dehydration catalyst flow into a vessel where they are vigorously mixed and heated at 260 to 375°C. The rate of flow through the reaction vessel is adjusted so that the volume of liquid in the vessel remains constant, and the ratio of reaction mixture to added castor oil remains between 0.5:1 and 10.0:1.

• Biology and Nutrition

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

Studies in food chemistry of Chenopodium album. XI. Lipides. Ryozi Sakai. *Kumamoto Pharmac. Bull.* No. **1**, 77–84(1954) (in English). The lipides of the leaf of this plant consisted of glycerides (saturated fatty acids [palmitic and carnaubic acids] 13% and unsaturated [oleic and linolenic] 87%) and minor amounts of sitosterol, nonacosane, oleyl alcohol, waxes (C_{24-34} fatty acids and C_{28-32} alcohols with montanic acid and cluytyl alcohol). The feeding test with rats indicated that this was not nutritionally good source of fats.

The sterol in the baleen of Balaenoptera musculus. Yoshiro Abe and Osamu Iwata(Keiô Univ., Tokyo). *J. Oil Chemists' Soc., Japan* **3**, 219–20(1954). The baleens of blue whale (moisture 15.22, crude protein 75.06, crude fat 2.56, and ash 4.80%) yielded ether extracts with iodine no. 73.5, saponification no. 107.9, acid no. 72.1. This lipide contained about 20% sterol, of which cholesterol was the main component. The fatty acids (iodine no. 77.6, neutralization no. 154.8) contained 16.9% solid acids (iodine no. 18.9 and neutralization no. 193.0) and 82.2% liquid acids (iodine no. 89.7 and neutralization no. 147.9); thus it seemed to consist mainly of monoethenoid acids.

Preparation of some vitamin A urethanes. Toshio Agawa, Yasuyuki Ebata, and Saburo Komori(Osaki Univ.). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **58**, 106–7(1955). Natural or synthetic vitamin A was converted to urethanes by reaction with isocyanate of β-naphthyl, biphenyl, or phenylazophenyl. The urethanes were solid powder and were easily incorporated in multi-vitamin nutritional drug. Ultraviolet absorption spectra of the urethanes were examined.

Neutral fat absorption in the rat. The alleged effect of choline and the changes in the intestinal lymph. R. R. Tasker(Banting & Best Dept. of Med. Research, Univ. of Toronto, Toronto, Ontario). *Can. J. Biochem. & Physiol.* **33**, 361–67(1955). The intestinal absorption of olive oil was studied in the rat by cannulating the intestinal lymph trunk. After a 1 ml. test meal, the rate of flow of lymph as well as the concentration of lymph phospholipids and total lipids rose sharply, returning to fasting levels in about 20 hours. The total lipids rose and fell more sharply than the phospholipids; the concentration of lymphatic proteins remained unchanged. Roughly two-thirds of the fat meal was recovered from the lymph. The addition of 10 mgm. choline chloride to the test meal had no appreciable effect on any of the factors studied and in particular did not alter the rate of lymphatic absorption of olive oil from the intestine significantly.

Studies of the mechanism of vitamin E action. III. In vitro copolymerization of oxidized fats with protein. A. L. Tappel (Dept. Food Tech., Univ. of Calif., Davis, Calif.). *Arch. Biochem. & Biophys.* **54**, 266–280(1955). Yellow-brown copolymers having properties similar to the pigments characteristic of vitamin E deficiency and *in vivo* unsaturated fat oxidation are readily formed by the oxidation of unsaturated fats in the presence of proteins. Hemoglobin is probably the most important catalyst for *in vivo* copolymer formation. Phenolic antioxidants inhibit polymer formation by inhibition of unsaturated fat oxidation. The *in vivo* changes in catalytic and structural proteins due to vitamin E deficiency may result directly from the reaction of unsaturated fat oxidation products with protein. The explanation that the vitamin E group functions principally as an unsaturated fat antioxidant is supported.

Effects of acetates and other short-chain fatty acids on yeast metabolism. F. E. Samson, A. M. Katz, and D. L. Harris (Dept. Physiology, Univ. of Chicago, Chicago, Ill.). *Arch. Biochem. & Biophys.* **54**, 406–423(1955). The inhibition by short-chain fatty acids of several metabolic reactions in yeast and cell-free yeast extracts is demonstrated. Some properties of these inhibitions are shown and their similarity to the binding of short-chain fatty acids to proteins is discussed.

The demonstration of acetyl phosphatide (plasmalogen) in the depot fat of fowl treated with diethylstilbestrol. W. P. McKinley, H. Grice, and M. R. E. Connell(Dept. National Health & Welfare, Food and Drug Lab., Ottawa, Ontario). *Can. J. Biochem. & Physiol.* **33**, 317–322(1955). The abdominal depot fat from young cockerels, male castrate fowl, or male turkeys which have been treated with diethylstilbestrol, or from hens in egg production, contains a material which responds to the Feulgen plasmalogen test. After treatment with mercuric chloride under specified conditions, fat from such birds reacts with fuchsin-sulphurous acid to give a purple colored product. The material responsible is considered to be plasmalogen. Fat from corresponding regions of non-laying hens does not give the reaction when performed under the specified conditions. A technique based on these findings is described and has been used to distinguish chickens or turkeys which have been treated with estrogen from birds which have not been thus treated.

Lipoxidase and the oxygen absorption of homogenates from corn seedlings. G. Fritz and H. Beevers(Dept. Biological Sciences, Purdue Univ., Lafayette, Ind.). *Arch. Biochem. & Biophys.* **55**, 436–446(1955). Homogenates from 2¼-day corn seedlings absorbed oxygen most rapidly at pH 5.0 and a second smaller maximum occurred at pH 7.2. The homogenates could be separated into two fractions, one of which contained lipoxidase and the other contained substrates for lipoxidase. Several lines of evidence led to the conclusion that the lipoxidase-substrate system accounts for the major portion of the oxygen absorption of the homogenate at pH 5.0 but at pH 7.2, other enzymes systems must contribute to the oxygen absorption.

The relationship of carbohydrate metabolism to protein metabolism. IV. The effect of substituting fat for dietary carbohydrate. W. S. T. Thomson and H. N. Munro(Dept. of Biochem., Univ. Glasgow, Scotland). *J. Nutrition* **56**, 139–149(1955). When the fat was exchanged isocalorically for carbohydrate in the diet of the rat, urinary nitrogen output increased for a few days and then returned to its former level. The transitory nature of the response may account for the failure of some investigators to observe any difference in nitrogen balance between groups of rats receiving equicaloric diets of differing fat and carbohydrate content.

Fatty liver of portal type: the effects of choline, methionine, and vitamin B_{12}. M. E. Shils, Rosalie de Giovanni and W. B. Stewart(College of Physicians and Surgeons, Columbia Univ., New York, N. Y.). *J. Nutrition* **56**, 95–106(1955). Choline and vitamin B_{12} failed to prevent accumulation of excess hepatic lipid in the portal areas of rats fed diets containing either corn meal, cassava, or rice as the only source of protein. Determination of iodine number and cholesterol content revealed no significant differences between hepatic lipids deposited in the portal areas on corn diets or central areas on a choline-deficient diet with casein as the source of protein.

Studies of the New Hampshire chicken embryo. V. Lipides of whole plasma and of plasma lipoproteins. O. A. Schjeide(Atomic Energy Project, School of Med., Univ. of Calif., Los Angeles). *J. Biol. Chem.* **214**, 315–321(1955). The plasma lipoproteins of chicken embryos in various stages of development were divided into three groups on the basis of their flotation in aqueous media of different densities. Amounts of sterol ester, triglyceride, unesterified sterol, and phospholipide associated with each of those fractions were determined by means of a chromatographic procedure. In whole plasma, phospholipide was present in relatively large amounts throughout development, but decreased to a measurable degree between the 10th and 18th days of incubation and then increased. A sharp rise in sterol ester began at the 15th days of incubation, with a correlating decrease in triglyceride.

Detection of coronary atherosclerosis in the living animal by the ergonovine stress test. S. H. Rinzler, Janet Travell, Dorothy Karp(Dept. of Pharmacology, Cornell Univ. Med. College, New York). *Science* **121**, 900–02(1955). Data in the cholesterol-fed rabbit show marked correlation of positivity of the ergonovine stress test with occlusive atherosclerosis of the small coronary arteries and myocardial damage. It is suggested that the ergonovine stress test may provide a new experimental procedure for the study of coronary atherosclerosis in the living animal.

The digestion in vitro of triglycerides by pancreatic lipase. F. H. Mattson and L. W. Beck(Research Div., The Procter and Gamble Co., Cincinnati, Ohio). *J. Biol. Chem.* **214**, 115–25 (1955). The nature of the products and some of the factors influencing the hydrolysis of triglycerides by pancreatic lipase *in vitro* have been studied. It was found that when 2-oleoyl dipalmitin was used as a substrate, the diglyceride formed was oleoyl palmitin and the monoglyceride was monoolein. Thus, the course of hydrolysis of triglycerides *in vitro* appeared to be the same as that *in vivo*, namely, a series of directed stepwise reactions from triglyceride to 1,2-diglyceride to 2-monoglyceride. The 1-monoglyceride was the result of isomerization of the 2-monoglyceride.

Lipide and protein composition of four fractions accounting for total serum lipoproteins. L. A. Hillyard, C. Entenman, H. Feinberg, and I. L. Chaikoff(Dept. of Physiol., Univ. of Calif. School of Med., Berkeley). *J. Biol. Chem.* **214**, 79–90(1955). Serum was separated, by the ultracentrifuge flotation technique, into four fractions so as to account for total serum lipoproteins. Each fraction was analyzed for protein, phospholipide, free and esterified cholesterol, and triglyceride. The concentrations of the various lipoprotein fractions varied considerably among the five species studied. However, in four species, dog, rat, rabbit, and chicken, the range of variation in the concentrations of each lipoprotein fraction was quite small. Humans differed from these animals in showing considerable variation in the levels of the lipoprotein fractions in serum. The composition of each lipoprotein fraction with respect to protein and the various lipides was similar for the sera of the five species. The identity of the four lipoprotein fractions was discussed.

Maternal diet and other factors affecting the lipid content of livers of very young rats. P. A. Hedin and M. O. Schultze Dept. of Agr. Biochem., Univ. of Minn., Inst. Agr., St. Paul). *J. Nutrition* **56**, 129–38(1955). Within six hours after birth of rats, there was an increase in the absolute amount and in the concentration of lipids in the liver. This increase continued until in about 40 hours it reached a level of about 40% of the dry weight, compared to about 15% at birth. The increase in liver lipids was contingent upon consumption of milk by the young. The inclusion of vitamin B_{12} in the maternal ration and to a lesser extent of choline and of methionine decreased the extent of the rise in liver lipids significantly but did not prevent it. During the first 24 hours after birth there was a decrease in the fresh weight of the liver due to a loss of moisture and of crude protein, but a simultaneous increase in the absolute amount of liver lipids.

Dietary effects on lipogenesis in adipose tissue. F. X. Hausberger and S. W. Milstein(Dept. of Anatomy and Biochem., Jefferson Med. College, Philadelphia, Pa.). *J. Biol. Chem.* **214**, 483–88(1955). Utilization of radioglucose by adipose tissue *in vitro* has been investigated under various nutritional conditions. Fasting or feeding of a high fat diet abolished lipogenesis and greatly diminished glucose oxidation. Pretreatment with insulin has little stimulating effect on glucose utilization in adipose tissue of rats fed a high fat diet. The rate of lipogenesis from available carbohydrates seemed to be regulated not only by the carbohydrate content of the diet; glucose utilization increased as the carbohydrate content increased or the fat content decreased. The lipogenic activity of the adipose tissue was found to be superior to that of the liver of the same animals.

Observations on the protective effect of linseed oil meal and some extracts against chronic selenium poisoning in rats. A. W. Halverson, C. M. Hendrick, and O. E. Olson(South Dakota State College, College Station). *J. Nutrition* **56**, 51–59(1955). In rat studies the protective effect of linseed oil meal against selenium poisoning has been demonstrated under several conditions. The inclusion of 6 or 12% casein in the diets did not alter or mask the protective effect of the meal and meals prepared by different methods were all found active. The protective principle was effective against inorganic (selenite) selenium as well as against the form occurring in toxic corn.

Carotene in the ration of dairy cattle. I. The influence of long periods of suboptimal carotene intake on the carotene and vitamin A values of the blood, liver, and milk fat of dairy cows. J. H. Byers, P. H. Weswig, J. F. Bone, and I. R. Jones (Depts. of Dairy Husbandry, Agr. Chem., and Vet. Med., Oregon State College, Corvallis). *J. Dairy Sci.* **38**, 657–663(1955). Blood plasma, liver, and milk fat analyses for carotene and vitamin A in Jersey and Holstein cows on normal and suboptimal carotene rations were compared. Suboptimal carotene rations fed prenatally and over long periods of time after birth resulted in low liver vitamin A and carotene values, which failed to respond to carotene supplementation as high as 330 γ per kilogram of body weight. Repeated injections every 5 days of either 250,000 or 1,250,000 I.U. of vitamin A ester failed to result in any appreciable increase of liver vitamin A or carotene in cows on a suboptimal carotene ration.

• Waxes

R. L. Broadhead, Abstractor

Dibasic acid glycerides of Japan wax. Yoshiyuki Toyama and Hiroshi Hirai. *Research Rept. Nagoya Ind. Sci. Research Inst.* No. **7**, 46–8(1954). Japan wax with acid no. 33.4 was refined with *N* KOH in EtOH to give a product m. 56°, sapon. no. 210.1, I no. 3.8, acid no. 9.6, unsaponifiable matter 0.76%, and dibasic acid content 3.6%. Chromatography of its solution in benzene on active white clay and repeated recrystallization from petroleum ether and Me_2CO produced 2 fractions, (a) m. 55°, sapon. no. 224.4, acid no. 90.5, unsaponifiable matter 1.9%, and dibasic acid 37.7%, and (b) m. 51°, sapon. no. 221.4, dibasic acid 26.8%, and (time of dropping) 1386 sec. (in comparison with neutralized Japan wax 366, hydrogenated fish oil 356, and hydrogenated cottonseed oil 377). Comparison of these data with those calculated showed that (a) corresponded to a glyceride consisting of 2 glycerol groups, 1 mole dibasic acid (C_{20}-$H_{40}[CO_2H]_2$), 3 or 2 moles palmitic acid, and 1 or 2 free OH, and that (b) also was composed of 2 glycerol group compounds. (*C. A.* **49**, 6627)

Sugar-cane wax. II. Bleaching of crude sugar-cane wax. B. N. Joshi, V. V. Mahaskar, and A. B. Kulkarni (Natl. Chem. Lab., Poona). *J. Sci. Ind. Research* (India) **13B**, 812–14 (1954). A number of agents were tried to bleach the dark, sticky wax extracted from the press mead of sugar factories. A mixture of $K_2Cr_2O_7$ and H_2SO_4 gave products of light color and high acid value. (*C. A.* **49**, 6635)

Waxes considered as systems of fusible components. R. M. Casanueva and A. Mingarro. *Quimica e industria* (Bilbao) **1**, 14–19 (1954). The physical chemistry of waxes and their mixtures is discussed. (*C. A.* **49**, 7269)

Spanish moss and some aspects of its commercial possibilities. R. B. Bennett. *Eng. Progr. Univ. Florida* **8**, No. 12, 11 pp. (1954). A pale yellow carnauba-like wax was extracted from the scales of *Tillandsia usneoides* and deposited by concentration of the CCl_4 solution. Substances of pharmaceutical value remained in the mother liquor and were recovered by standard methods. One recrystallization from $CHCl_3$ raised the m.p. of the wax from 74° to 80°. Pre-extraction of the plant reduced the retting time from the 6–9 months required by older methods, to a convenient 10 days, with the production of fiber of better quality. (*C. A.* **49**, 6628)

Sugar-cane wax. I. Purification and properties. Y. P. Kapil and S. Mukherjee. *Proc. Sugar Technol. Assoc. India* **21**, Pt. 2. 117–23 (1952). The literature is reviewed. It is advantageous to remove inorganic matter from the crude wax (by heating with HCl) before extracting with EtOH, since the acid releases the fatty matter from combination with inorganic matter. The use of other solvents and of various bleaching methods is examined. Bleaching with $KClO_3$ and H_2SO_4 shows the best promise; trials with varying proportions of these reagents are reported. The m.p., sp. gr., color, ash %, sapon. value, and I no. are given for the products at various stages. (*C. A.* **49**, 6628)

• Drying Oils

Raymond Paschke, Abstractor

Analytical study of polymerized linseed oil. H. Vaillant. *Rev. franc. corps gras* **2**, 21–7 (1955); *Ibid.* 159–65 (1955). A review. 92 references. (*C. A.* **49**, 7867)

Allyl esters of (hydroxymethyl) melamine and their application in air-drying alkyd lacquers and enamels. G. Widmer (Ciba Akt.-Ges., Basel, Switz.). *Schweiz. Arch. angew. Wiss. w. Tech.* **20**, 345–64 (1954). The products improve gloss, hardness, durability, and chemical resistance but increase the drying time and decrease the flexibility. (*C. A.* **49**, 7262)

The mechanism of the drying of oils. Further progress from studies of autoxidation. J. H. Skellon (Acton Technical College, England). *Paint Manuf.* **25**, 186 (1955). Considerable progress in our knowledge of the chemistry of drying oils and their component acids has been made during the last few years by investigations on the catalytic autoxidation of unsaturated fatty acids and esters with gaseous oxygen. In this paper the advances are summarized, together with a brief review of current mechanisms put forward in explanation of such autoxidation and the bearing of this work on the problem of oxidation polymerization in drying of oils is discussed.

The action of boron trifluoride on linseed oil. J. Petit and J. Cazes. *Peintures, pigments, vernis* **30**, 823–9 (1954). BF_3 passed into linseed oil at room temperature produces gelation because of high local concentrations. A BF_3-N mixture, which avoids this difficulty, was used throughout the described work. The rate of stand-oil formation increases with temperature; however, at a critical level depending on the BF_3 concentration (170° with 1.2%), a strongly exothermic reaction and gelation take place. As the concentration of BF_3 is raised from 1.1 to 2.1%, the optimum temperature is lowered from 150 to 95°; the required heating period increases from 30 to 60 minutes. Carbon dioxide, used in place of N, inhibits the polymerization. The hexane eluate (86% fraction) of an Al_2O_3 adsorbate has a lower rate of polymerization, the ethanol eluate (14% fraction) a higher rate than the original oil. The stand oils obtained have a maximum acid value of 5 and a saponification value of 190. Their drying properties (with Co siccative) are superior to those of thermal polymers. An analysis by fractionation of the ethyl esters showed that catalytic stand oils have a higher percentage of monomeric acids than a thermal product of similar viscosity; however, their trimer:dimer ratio is higher and accounts for the cross-linking tendency. The reddish color of the polymer (which disappears on the drying film) is attributed to chromophoric groups formed by dehydration of peroxy acids and polyhydroxy acids. The distillable acids have a higher melting point than those from thermal polymers. This points to cis-trans or double bond shift isomerization. The latter would lead to increased conjugation and explain the high rate of polymerization. (*C. A.* **49**, 4303)

How water-resistant are alkyd resins? W. R. R. Parks (Can. Industries Ltd.). *Can. Paint Varnish Mag.* **29** (5), 30 (1955). This article examines graphically the results of various air dry alkyd resin formulations. The water resistance and speed of air dry improves as the molecular weight of the resin increases. With formulations containing over 50% oil, the water resistance increases with aging of the film. Pentaerythritol esters have better soap and water resistance than comparable glycerine esters.

The use of 2,2,6,6-tetramethylolcyclohexanol (TMC) in alkyd resins and related coating vehicles. T. H. G. Michael (Howard & Sons Ltd., Cornwall, Ont., Canada). *Off. Dig. Paint Varnish Production Clubs* **27**, (364), 273 (1955). The use of TMC in linseed fatty acid esters increased the viscosity and shortened the drying time. The use of TMC in soy alkyds results in resins generally similar to those containing pentaerythritol alone, but having improved water and alkali resistance. The viscosities of soy alkyd resin solutions containing TMC are generally lower than those of similar resins without this alcohol. Synthetic drying oils and rosin esters may be prepared which have advantages over similar compounds made with other polyhydric alcohols. The use of TMC in alkyds appears to retard skinning.

Reactive hydrocarbon/drying oil adducts. C. W. A. Mundy (Younghusband, Barnes & Company, Ltd., London). *Oil Colour Chemists' Assoc. J.* **38**, 219–32 (1955). The general drying oil picture is given. A process is described by which hydrocarbons in the gas phase are passed through hot drying oils. Hydrocarbons used include butadiene, isoprene, piperylene, cyclopentadiene, dicyclopentadiene, methyl cyclopentadiene, styrene, α-methyl styrene, vinyl toluene, azulene, and divinyl benzene. A commercial dimer from an 80/20 mixture of cyclopentadiene and methyl cyclopentadiene is said to be of high potential use. Plant design is discussed. Film properties and applications are described.

Recent advances in drying oils. J. H. Greaves (Younghusband, Barnes & Co., Ltd., England). *Paint Manuf.* **25**, 183 (1955). During the last few years, some of the most important of the advances in the drying oil field have been in the utilization of various chemicals being made available, by the development of the petroleum chemical industry. The general position has given rise to sustained and forceful interest in styrene, cyclopentadiene and other unsaturated hydrocarbons. These and other aspects of drying oil research are considered in this article in which the author suggests that these compounds together with radiation chemistry may perhaps give rise to the most important and interesting developments in the immediate future.

New vehicles for printing inks; the styrenated alkyd resins. D. J. I. Davies, *Paper & Print* **27**, 401 (1954). Styrenated alkyl resins as ink vehicles impart 2 significant properties to the ink: quicker set-up time, and improved resistance to water and chemicals. Styrenation also eliminates defects associated with alkyd resins; these defects include a tendency to emulsify with litho damping solutions, bad application properties leading to poor transfer characteristics or "flying" due to stringiness between rollers and incompatibility with standard varnishes and pigment pastes. (*C. A.* **49**, 7261)

Novel properties of polyamide alkyd gels. N. G. Contros (T. F. Washburn Co., Chicago). *Am. Paint J.* **39** (36), 72 (1955). Small amounts of polyamide resin imparts thixotropic properties to alkyd paints. The gelled paint is ready to use, even after long storage periods, without the need of mixing. The shearing action of the brush or roller will spread the paint, and breakdown the thixotropic structure sufficiently to allow the paint to flow. The paint then re-gels to prevent excessive flow or sagging. The polyamide resins used are those from polyamines and dimerized fatty acids.

Graphical analysis of styrenated linseed oils. C. Boelhouwer, Tjoa Soe Tjoan, and H. I. Waterman (Tech. Univ., Delft, Holland). *Anal. Chim. Acta* **11**, 74–8 (1954) (in English). A graphical method for the analysis of styrenated linseed oils prepared by reaction of linseed oil with gaseous styrene is described. The method allows determination of the percentage of styrene from *n* and *d*. (*C. A.* **49**, 7261)

The mechanism of stand oil formation. J. Berger. *Peintures, pigments, vernis* **30**, 1019–22(1954). The polymerization of linseed oil and semi-drying oils is postulated to take place in two steps, involving the migration of double bonds to conjugate positions followed by an intermolecular Diels-Alder condensation. The isomerization, as the slow reaction, is the rate-determining step. Thus, the thermal stand oil formation can be considered a first-order reaction. The stand oil formation of tung and oiticica oil is characterized by a monomolecular reaction at 180–200° and by a second-order reaction at higher temperatures. The former may be explained by a slow intramolecular cyclization, resulting in the loss of 1 of the 3 conjugated double bonds in series, followed by a faster Diels-Alder condensation. The bimolecular reaction is assumed to be an immediate Diels-Alder condensation; subsequent isomerization could lead to new conjugated systems. In this manner there could be formed condensed cyclic compounds and cross-linked polymers which can plausibly explain the mechanical and chemical stability of films prepared from high-temperature stand oils. (*C. A.* **49**, 7261)

Drying oils—a dark outlook. Anon. *Chem. Eng. News* **33**, 2774 (1955). The discouraging outlook for drying oils is due largely to their replacement with synthetic raw materials in the manufacture of protective coatings and non-paint products. The decline will be offset in part by the expansion in total markets. Soybean oil consumption is likely to increase at the expense of linseed oil. More fundamental research on drying oils is urged.

Varnish. Michele Martino. *Ital. 475,221.* Prepare (a) a linseed stand oil by cooking 30–50 parts linseed oil at 300–5° for 12–24 hours under CO_2; (b) a casein solution containing H_2O 20–30, casein 5–10, and 28° Bé. NH_3 1–2 parts; and (c) 0.2–2 parts of a methylcellulose solution (I) in 2–5 parts H_2O. Pour (a) at 110° slowly into (b) and then mix in (c). Finally, add 0.3–0.5% of a drying oil containing Pb 18, Co 1.2, and Mn 2.5% in turpentine oil and some naphthenic acid. Pigments can also be added. (*C. A.* **49**, 4304)

• Detergents

Lenore Petschaft Africk, Abstractor

The soiling characteristics of textile fibers. I. A. S. Weatherburn and C. H. Bayley (National Research Council of Canada, Ottawa). *Textile Research J.* **25**, 549–58(1955). Methods are described for measuring the comparative soiling tendencies of textile fibers. It is shown that reflectance readings on solid fibers measure an over-all effect, part of which can be attributed to the weight and particle-size distribution of the retained soil, and part to the optical properties of the fibers themselves. It is suggested that the "effective soil content," which is defined as the weight of soil retained multiplied by the specific absorbance (of light) of that soil, is a more significant criterion of soiling than is either the weight of soil retained or the decrease in reflectance produced by the soil. Relative values for the effective soil content can be calculated from reflectance readings through use of Kubelka-Munk equation. The soil retention of the fibers studied increased in the following order: cotton, acetate, viscose rayon, nylon (variable, depending on soiling conditions), wool. The same order was maintained when the time of contact with the soil varied from 5 to 80 min. The soil retention of all the fibers increased with decreasing moisture content of the yarn. The presence of even small amounts of oily material in the yarn increased substantially the amount of soil retained.

Adsorption and the deposition of carbon on cotton from solutions of sodium dodecyl sulfate. R. D. Vold and A. K. Phansalkar (Univ. of S. California, Los Angeles). *Rec. trav. chim.* **74**, 41–51(1955)(in English). The deposition of C on cotton from solutions of sodium dodecyl sulfate (I) of varying concentrations was determined, together with the adsorption isotherms of I on both cotton and C, and the aggregate size of the C in the suspensions. An optimum concentration for protection against deposition of C was found far below the critical micelle concentration (c.m.c.), and not correlating with either the presumed values of the ζ-potential or with the extent of surface covered by adsorbed detergent. No explanation is found for the inflection in the isotherm of I on C at the c.m.c. and for the subsequent occurrence of a maximum in the isotherm. (*C. A.* **49**, 7324)

Evaluation of laundering agents and techniques used in the decontamination of cotton clothing. A. P. Talboys and E. C. Spratt (Johns Hopkins Univ., Baltimore, Md.). *U. S. Atomic Energy Comm.*, **NYO-4990**, 110 pp.(1954). Insoluble radioactive dusts, which are mechanically occluded on the fabric, are removed by soap solutions. Soluble salts of alkaline earths or heavy metals, which deposited on fabric from solution, react with soap to form metallic precipitates which accumulate on the fabric. Rinse waters cause cross contamination. Complexing agents (I) effectively remove strongly attached metallic ions. Nonionic and anionic detergents (II) are not as good but are improved by certain builders. For particulate dirt and grease removal, use of a mixture of I and II seems to be the best solution. High wash temperature is advantageous with soap but not with synthetics. Cationics are not very successful. Nonmetallic isotopes are easily removed from cotton by alkaline solutions or hot water alone. High temperature (170°F.) and very high concentration of I (3–6%) combined with II give maximum removal of metallic ions, so does light loading of the wash wheel. A decontaminating agent in the "break" minimizes cross contamination and reduces total running time. Starch does not aid and silicone water repellents are detrimental to decontamination. Partial substitution of water-immiscible Stoddard solvent for water in the bulk phase of the wash bath does not detract from the decontaminating ability of those agents which react with the cloth from the water phase. This procedure reduces the volume of radioactive waste to a minimum. The rinses must be all water, for complete removal. An index of decontaminating efficiency is expressed as

$$\frac{10 \times \%\ \text{removed by agent} - \%\ \text{removed by water}}{100 - \%\ \text{removed by water}}$$

An index of 10 indicates maximum efficiency; a negative index shows water is more efficient. Calgon and Versene are most efficient, "C. T. Cleaner" and "Radiacwash" are also very effective. Data for the removal of Sr^{89}, Y^{91}, Ce^{141}, Fe^{59}, and P^{32} by several detergents, citric acid, etc., are tabulated. (*C. A.* **49**, 7270)

A new apparatus for the measurement of detergency. V. Tabakoff. *Rev. franc. corps gras* **2**, 95–9(1955). To evaluate the washing effect of detergents without the benefit of mechanical means such as balls, etc., a vacuum recipient of the thermos type is used and placed on an appropriate shaking device. Five square pieces (5 x 5 cm.) of soiled cloth are put in the recipient containing the warmed cleaning solution, agitated for 15 min. at 70°, rinsed twice with, respectively, hot and cold water and after drying examined with a Beckman spectrophotometer. Two successive runs with a solution of soap and 3 different detergents composed of alkylaryls mixed with builders gave detergency values which differed only by 0–2.1°. Treatment times from 5 to 30 min. with a 0.5% solution increase the detergency from 21.4 to 37.3. Concentrations of 0.2–3% of the same alkylaryl solution furnished values between 10.8 (3%) and 27.9, the latter is the optimal value reached at 0.5%. Recommendations are made in order to counterbalance irregularities observed with the soiled cloth of the Federal Lab. of St. Gall. (*C. A.* **49**, 6629)

Detection of surface-active agents containing polyoxyethylene or polyoxypropylene group by pyrolysis with phosphoric acid. M. J. Rosin (Brooklyn College, Brooklyn, N. Y.). *Anal. Chem.* **27**, 787–90(1955). The present test depends upon the thermal decomposition of the polyoxyethylene linkage in the presence of phosphoric acid to yield acetaldehyde, which produces a blue color with sodium nitroprusside and diethanolamine. The polyoxypropylene group, under the same conditions, yields propionaldehyde and its polymers, which produce orange colors. Positive results are obtained in the presence of the ester, alkylaryl, sulfide, sulfonate, sulfate, amino, amido, and phosphate groups. The only compounds which give positive results in the absence of the polyoxyethylene or polyoxypropylene groups are glycerides which, under the conditions of the test, decompose to acrolein, which also gives a blue color with sodium nitroprusside and diethanolamine.

Evaluation of effects of surfactants in fertilizer manufacture. F. A. Retzke, G. F. Sachsel, and R. B. Filbert, Jr. (Battelle Memorial Inst., Columbus, Ohio). *J. Agr. Food Chem.* **3**, 496–9 (1955). Simple tests for solubility, stability, and foaming of surfactants in sulfuric acid and ammonium hydroxide, and similar tests for effects on surface tension of surface acid, were found to be of doubtful value for screening surfactants. The effect of surfactants on ultimate phosphorus pentoxide conversion was negligible. Bag-storage tests with 3-12-12 having surfactant added at various stages of production showed a slight and somewhat inconsistent benefit with some surfactant treatments.

Adsorption of soap on the skin. A. G. Ramsay and K. K. Jones (Northwestern Univ., Med. School, Chicago, Ill). *Brit. J. Dermatol.* **67**, 1–4(1955). Samples of skin fat were obtained

1–3 hrs. after the last of 3 washings daily with either water, soap and water, or alcohol, with rinsing and drying after each wash. The fat was determined by the monolayer method and the skin-fat factor (γ fatty substance/spread, in sq. in.) was calculated. The factor for the soap-and-water wash was significantly lower than for the water or alcohol washes. Skin pH fell from 7.75 to 5.0 in 25 minutes after washing with pure Na oleate, and the skin-fat sample taken after such a wash was the same as that of oleic acid. It is probable that soap is absorbed on the skin and hydrolyzed by the skin acidity. (*C. A.* **49**, 7614)

A re-evaluation of the spectral change method of determining critical micelle concentration. P. Mukerjee and K. J. Mysels U. of Southern Calif., Los Angeles). *J. Am. Chem. Soc.*, **77**, 2937–45(1955). The critical micelle concentration (CMC) is most frequently determined these days by spectral change methods involving color changes of dyes, particularly of pinacyanol, as the detergent concentration changes. A critical examination of this method as applied especially to sodium lauryl sulfate (NaLS) is presented. It is shown that the color change involves the formation of a dye-detergent salt which is highly insoluble but forms a coarse and quite stable suspension in the presence of somewhat more than stoichiometric amounts of detergent. For pinacyanol this salt is red. The presence of the insoluble salt induces the formation of mixed blue micelles at concentrations substantially below the CMC of NaLS itself. The complete solubilization of the dye-detergent salt and therefore the apparent CMC determined by this method depends on a number of factors such as the concentration of dye, the absolute value of the CMC and the temperature. As a result large errors in both absolute and relative values of CMC's are being introduced by the use of this method. The composition of induced mixed micelles and their transition to normal micelles are briefly discussed.

Precipitation of sodium dodecyl sulfate from aqueous solution by the addition of sodium chloride. R. Matalon. *Mem. services chim. etat*(Paris) **38**(2), 135–8(1953). The addition of inorganic salts to aqueous solutions of alkyl sulfates produces an increase in the viscosity of the system followed by precipitation. The precipitation of alkyl sulfate is preceded by a lengthening of the micelle followed by dehydration leading finally to crystallization. (*C. A.* **49**, 7331)

The action of oxidative detergents on cotton fabrics. H. Krassig. *Melliand Textilber.* **36**, 55–8(1955). Degree of polymerization (D.P.) values are measured at intervals during the course of washing operations. A linear relationship is found between D.P. value and the logarithm of the dry tensile strength or the folding endurance. Based on experimental data it is decided that detergents containing bleaching agents should not contain more than 15% Na perborate (or its equivalent). Stabilization of the detergent is found to have a marked effect on its action. (*C. A.* **49**, 7874)

An all-purpose detergent bar. D. Brooks. *Perfumery Essent. Oil Record.* **46**, 123–5(1955). A good all-purpose detergent bar must have good detergency on skin, fabrics, and hard surfaces in all kinds of water, good soap-like lathering qualities in all types of water, mildness on the skin, little or no tendency toward softening, crystallizing, and decomposition under ordinary use and storage conditions, pleasing appearance and odor, and the ability to be produced in standard soap-making equipment. Problems involved in manufacture and formulation to obtain a bar with these characteristics are discussed.

Versatility of nonionic detergents. H. E. Bramston Cook(Oronite Chem. Co., New York). *Soap and Chem. Specialties* **31**(5), 47–9(1955). The nonionic detergents have many applications in such fields as textiles, detergents, pulp and paper, paints, metals, agriculture, leather, cosmetics, mining, etc. They are very versatile compounds because the water solubilizing hydrophile portion of the molecule can be varied at will so that almost any hydrophobe can be balanced to a surfactant by adding the proper amount of hydrophile. They have such valuable properties as stability, physiological innocuousness, and inverse solubility in water.

Test methods for evaluating liquid detergents for hand dishwashing. Anon. *Soap and Chem. Specialties* **31**(5), 54–7, 241–3 (1955). A survey was made of various types of dishwashing test methods used by various laboratories to evaluate liquid detergents. Cooperative work was then done by several laboratories to find an efficient test to duplicate practical dishwashing conditions and determine foam producing and foam stability properties. Further work is continuing.

Soaps and cleansers—packaging. Anon. *Modern Packaging* **28** (10), 106–112, 227–8, 230(1955). Review of the growth of soaps and detergents and the various types of packaging used for different types of soap products.

An improved technique for the decolorization of oils and soaps by sodium chlorite activated by tin chlorides. C. Paquot and Madame M. T. Paquot. *Revue Francaise des Corps Gras* **2**, 217–221(1955). A stirred aqueous mixture of the soap or oil to be decolorized is heated to 80°C. and 0.5 to 1.5% of sodium chlorite is added as a 20% aqueous solution. About 0.5% of solid stannous chloride, or 0.5% of stannic chloride as a 25% aqueous solution is added immediately and the mixture is stirred for 10 to 15 minutes. Soap mixtures then are salted out by the addition of sodium chloride while the decolorized oil mixtures are centrifuged and washed. If the decolorized oil is to be used in soap manufacture, the water-oil mixture is saponified directly without any separation or purification. The use of tin salts, particularly stannous chloride, as activators provides an important improvement in the usual sodium chlorite decolorization of soaps and oils since rapid, good decolorization and deodorization without color reversion is obtained. Furthermore, tin salts protect the soaps against autoxidation and reduce the amount of corrosion when iron processing equipment is used.

Chlorinated petroleum. VI. Synthesis of detergents from chlorinated kerosene. Taiseki Kunugi and Hirohisa Kudo(Univ. Tokyo). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **58**, 23–5(1955). There are no reports on the condensation of unfractionated chlorinated kerosene with aromatic hydrocarbons. Dichloro compounds were supposed to give diaryl kerosene (e.g., Flett, U. S. Patent 2,233,408). It was found that a considerable amount of monoaryl kerosene was formed from dichloro compound. In preparing monoalkyl aryl compound by condensing chlorinated kerosene with aromatic hydrocarbon in the presence of $AlCl_3$ or a mixture of $AlCl_3$ and $Al(OH)_3$, 30–60% of dichloro compound contained in chlorinated kerosene gave chloroalkyl compound, whose Cl atoms were unstable and were easily removed together with H (as HCl) by moisture, to form unsaturated alkyl aryl compound. Na alkylmethylnaphthalenesulfonates showed the highest detergency at C numbers 10–14, while they showed the highest penetrating power at C numbers 11–12.

The corrosion of metals in the aqueous solutions of surface-active agents. II. Jiro Mikumo and Toru Kusano. *Research Rept. Nagoya Ind. Sci. Research Inst.* **7**, 49–50(1954). Corrosion of Al pieces by surface-active agents was examined at 35° by measuring weight change of the Al pieces. Corrosion was completely inhibited with anionic and nonionic agents, but it occurred with 0.1% cationic agents in smaller degree than with water. When 1% cationic agents were used, oleyloxymethyltriethylammonium chloride slightly increased the weight of Al pieces, while cetylpyridinium chloride slightly decreased the weight of Al pieces. Addition of 0.1% Na_2SO_4 retarded the corrosive effect of cationic agents, while addition of 0.1% Na_2CO_3 promoted it considerably.

Preparation and structure of dodecylbenzene. Teruzo Asahara and Yukio Takagi(Univ. Tokyo). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **58**, 147–53(1955). Dodecylbenzene was prepared by alkylating benzene with 1-dodecene in the presence of $AlCl_3$ singly or in admixture with $CHCl_3$, $ClCH{:}CCl_2$, or CCl_4. The best result was obtained with $AlCl_3$–CCl_4. Pure *prim-* and *sec-*dodecylbenzenes were synthesized by Fittig-Würtz and Grignard reactions, respectively. Comparison of infrared absorption spectra showed that the dodecylbenzene obtained by alkylating 1-dodecene contained larger amounts of 2- and 3-phenyl dodecane and small amounts of 4- and 5-phenyldodecane. 5-Phenyldodecane was identified also by mass spectrophotometry.

Long-chain urea compounds in detergent compositions. J. Ross (Colgate-Palmolive Co.). *U. S. 2,708,183.* Synthetic detergent compositions such as anionic organic sulfate and sulfonates when mixed with a substituted urea such as dodecyl urea have improved detergent and foaming properties.

Detergent composition. D. Stewart(Scottish Oils Ltd.). *U. S. 2,708,185.* A detergent composition suitable for the removal of oily materials from the hands comprises sulfating a shale oil distillation fraction boiling within the range of 270°C.–360°C. with strong sulfuric acid in an amount constituting 10–20% by volume of said distillation fraction, neutralizing the product with an alkali metal base to produce alkali metal alkyl sulfates of low solubility in water and admixing the alkali metal alkyl sulfates with kieselghur as a filler.

Process for preparing all-purpose detergent compositions. Colgate-Palmolive-Peet Co. *Brit. 723,925.* Non-curd-forming soap-detergent mixture is obtained by forming a liquid mixture of a soap-forming fatty glyceride material and a soap-compatible anionic or non-ionic synthetic detergent and adding an aqueous alkali to saponify the glyceride and solidifying the mixture.