

tetrabromide of m.p. 124°, gave almost theoretical pandiene values (83.1) but lower diene values (43.1), showing the presence of cis-structure. Its addition product with maleic anhydride was identical with that of the solid acid, and treatment of the liquid acid with a trace of iodine yielded a further crop of the solid isomer.

### Comparison and Discussion

Contrary to the distilled castor fatty acids, a dehydrated castor oil prepared with sodium bisulfate according to Ufer (12) gave no solid bromide with a melting point of 124° or thereabout. Thus 8,10-octadecadienoic acid seems to be a specific product formed upon dehydrating ricinoleic acid by distillation, indicating a much more complicated reaction than has so far been assumed. Differences in the behavior of dehydrated castor oil made catalytically on one hand and by the Scheiber process of distillation on the other have also been observed upon alkali isomerization (5).

Scheiber (8) states that he has found suberic acid before among the oxidation products of the distillate but had believed them to be due to secondary oxida-

tion of azelaic acid derived from 9,11-linoleic acid. To explain the present observation he suggests that dehydration may take place between the hydroxyl group and a hydrogen atom from the 8th carbon atom in the chain leading either first to an unstable pentene-ring or directly to an 8,12-biradical which is stabilized by a hydrogen shift from the 11th to the 12th carbon forming the diene system. The latter mechanism seems reasonable although experimental proof is lacking for the present.

### REFERENCES

1. Kofler, L., and Kofler, A., "Mikro-Methoden," Universitätsverlag Wagner G.m.b.H., Innsbruck, 1948.
2. Krafft, K., *Berichte* 21, 2730-7 (1888).
3. Mangold, C., *Monatshefte*, 15, 307-15 (1894).
4. von Mikusch, J. D., *J. Am. Chem. Soc.* 64, 1580-82 (1942).
5. von Mikusch, J. D., *J. Am. Oil Chem. Soc.* 28, 133-37 (1951); *Lack- und Farben-Chemie*, 3, No. 9/10, 167-76 (1949).
6. von Mikusch, J. D., *Angew. Chem.* 62, 475-80 (1950).
7. Scheiber, J., German Pat. 513,540 (1930); Brit. Pat. 306,452 (1929).
8. Scheiber, J., private communication, 1951.
9. Schmid, H., and Lehmann, A., *Helv. Chim. Acta*, 33, 1494-1502 (1950).
10. Smit, W. C., and Böeseke, J., *Rec. trav. chim.* 49, 539-51 (1930).
11. Smit, W. C., and Böeseke, J., *Rec. trav. chim.* 49, 686-90 (1930).
12. Ufer, H. (I. G. Farbenind. A.-G.) German Pat. 529,557 (1931). U. S. Pat. 1,892,258 (1932).

[Received November 20, 1951]

## ABSTRACTS

Don Whyte, Editor

### • Oils and Fats

R. A. Reiners, Abstractor

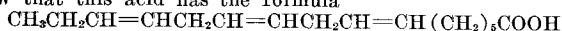
**Factors affecting flavor stability of soybean oil.** Anon. *Soybean Digest* 11(12), 16(1951). A list is given of the factors in processing and refining which favorably and unfavorably affect the flavor stability of soybean oil.

**Fat splitting tower at Swift & Co. has achieved efficiencies over 99%.** Anon. *Chem. Proc.* 15(1), 50(1952). A brief description.

**The component acids of the perinephric and interscapular fats of a rabbit.** G. Clement and M. L. Meara (Univ. Liverpool). *Biochem. J.* 49, 561(1951). The component fatty acids of perinephric fat are (mole %) lauric 0.5, myristic 6.5, palmitic 31.9, stearic 4.7, hexadecenoic 5.7, hexadecadienoic 0.2, hexadecatrienoic 0.3, oleic 30.4, linoleic 15.6, linolenic 3.1 and unsaturated C<sub>20-22</sub> 1.2. The interscapular fat has a similar composition but contains about 4% more oleic acid and 4% less linoleic acid. Both fats were broadly similar to those of other tame rodents.

**Human fecal lipids.** D. C. Edwards and R. P. Cook (Univ. College, Dundee). *Biochem. J.* 49, xli(1951). The lipids extracted from dried human feces contained 34% unsaponifiable matter (1/3 of which are sterols), 29% volatile fatty acids and 37% non-volatile fatty acids. The latter contain 25% petroleum ether (40-60°) insolubles, 47% solid acids and 29% liquid acids. Oleic acid is the main component of the liquid acids; the solid acids contain myristic, palmitic, stearic and higher acids.

**The constitution of hexadecatrienoic acid from the glycerides of rape (*Brassica napus* L.) leaf.** J. K. Heyes and F. B. Shorland (Dept. Sci. Ind. Res., Wellington, N. Z.). *Biochem. J.* 49, 503(1951). Oxidation with KMnO<sub>4</sub> in acetone of methyl hexadecatrienoate isolated from rape-leaf glycerides yielded pimelic, oxalic and propionic acids. This evidence in association with spectroscopic results before and after isomerization show that this acid has the formula



**The polymorphism of n-hexadecanol and n-octadecanol.** D. G. Klop and E. S. Lutton (Procter & Gamble Co.). *J. Am. Chem. Soc.* 73, 5593(1951). The polymorphism of n-hexadecanol and n-octadecanol has been studied by x-ray diffraction and thermal data. Three forms have been found. The  $\alpha$  form melts at the freezing point and exists as a meta stable form in a narrow temperature range near the m.p. In this temperature range

gradual transformation to the stable  $\beta$  form occurs. Cooling the  $\alpha$  form causes abrupt transformation to the sub- $\alpha$  form, which also changes gradually to  $\beta$  on aging. Only one m.p. has been found for each of the alcohols studied.

**Autoxidation of methyl esters of peanut oil fatty acids. The effects of incubation temperature and of added iron on infrared absorption spectra and on other changes.** H. W. Lemon, Elizabeth H. Kirby and Ruth M. Knapp (Ontario Res. Found., Toronto, Ont.). *Can. J. Tech.* 29, 523(1951). The infrared absorption spectra of methyl esters of peanut oil fatty acids showed changes principally in three regions during heating in air at 22°-100°. In the -OH stretching region (3730-3005 cm<sup>-1</sup>) a band developed during the early stages of autoxidation which was believed to be associated with the formation of hydroperoxides. Later two bands, probably associated with the decomposition of hydroperoxides to other compounds containing hydroxyl groups, appeared at higher wave numbers. Increased temperature of incubation accelerated the formation and decomposition of hydroperoxides, and the presence of iron stearate catalyzed only their decomposition.

**Procedure for the microestimation of nitrogenous phosphatide constituents.** Celia Levine and E. Chargaff (Columbia Univ., New York City). *J. Biol. Chem.* 192, 465(1951). The separation of chromatography on filter paper and the quantitative estimation of minute amounts (5-75  $\gamma$ ) of ethanolamine, serine and choline are described. Analysis of the phospholipids from beef brain indicated the presence of several novel nitrogenous compounds but they were not identified.

**The polymorphism of the disaturated triglycerides—OSS, OPP, POS and OSP.** E. S. Lutton (Procter and Gamble Co.). *J. Am. Chem. Soc.* 73, 5595(1951). Two groups of disaturated triglycerides have been studied, (1) the unsymmetrical diacid compounds—1-oleyldestearin (OSS) and 1-oleylidipalmitin (OPP) and (2) the triacid compounds—2-oleylpalmitylstearin (POS), 2-palmityleylstearin (OPS) and 2-stearyleylpalmitin. All 1-oleyl compounds are  $\beta'$ -3 stable from solvent; OSS and OPP also give  $\beta'$ -3 as stable form from melt; OPS gives sub- $\beta'$ -3; OPS gives  $\beta'$ -2. All 2-oleyl compounds (POS, SOS and POP) are  $\beta$ -3 stable from solvent and melt. OSS, OPP and SOS exhibit  $\alpha$ -3 forms at the lowest m.p., while POS, OPS and POP show  $\alpha$ -2, but OSP shows sub- $\alpha$ -2. The highly individualistic behavior should serve as a basis for identifying predominant disaturated components of many natural fats.

**Studies on degradation of fats by microorganisms. I. Preliminary investigations on enzyme systems involved in the spoilage of fats.** S. Mukherjee (Univ. Calcutta). *Arch. Biochem. Biophys.* 33, 364(1951). The first step in the rancidification of

fats by microorganism appears to be hydrolysis of glycerides into free fatty acids and glycerol by lipases; rapid oxidation of individual compounds by various oxidative enzymes follows. The peroxides formed by lipoxidase are decomposed by peroxidases.

**Synthesis of enantiomeric  $\alpha$ -cephalins.** E. Baer, J. Naurukas and Margaret Russell (Univ. Toronto, Toronto). *J. Am. Chem. Soc.* **74**, 152(1952). A method for the synthesis of fully saturated  $\alpha$ -cephalins of assured purity has been developed and applied to the preparation of 3 homologous  $\alpha$ -cephalins of the L-series, distearoyl-, dipalmitoyl- and dimyristoylcephalin. The x-ray diffraction patterns, infrared absorption spectra, solubility in various organic solvents and other physical data are reported for these pure compounds.

**Decolorization of vegetable oils by active earths.** V. A. Paleni (Litaerom S.p.A., Porto Marghera, Italy). *Olii minerali, grassi e saponi, colori e vernici* **24**, 56-8, 77-8(1947). Sulfured olive oil is used as an example to show that carotenes ( $\lambda$  435) are adsorbed with up to 3-4% earth, while the adsorption of chlorophyll ( $\lambda$  660) continues up to 7-8% clay. (*Chem. Abs.* **46**, 279)

**The seed fat of *Parinarium laurinum*.** Part III. Catalytic hydrogenation of methyl parinarate. J. P. Riley (Univ. Liverpool). *J. Chem. Soc.* **1951**, 2579. The primary reaction on hydrogenation of methyl parinarate at 100° in the presence of Raney nickel catalyst consists of simultaneous addition of 2 or 3 molecules of hydrogen yielding unconjugated methyl octadecadienoates and methyl octadecenoates, respectively. Only small amounts of conjugated materials are formed. The hydrogenation is extremely selective; very little methyl stearate is formed until all the more highly unsaturated esters have been converted into methyl octadecenoates.

**Continuous process of deacidification of olive oil with alcohol.** P. Rizzuti. *Olii minerali, grassi e saponi, colori e vernici* **24**, 78-82(1947). Aqueous alcohol separates fatty acids from fatty acid glycerides in sufficiently dilute solutions. A continuous process developed by Martinez Moreno is discussed in detail. (*Chem. Abs.* **46**, 281)

**Philippine copra development.** B. T. Rocca Jr. (Pacific Veg. Oil Corp., San Francisco). *Oil Oilseeds J.* **4**(3), 12(1951). The production of copra in the Philippines is described.

**A study of n-octadecenoic acids. IV. Further confirmation of the structure of octadecenoic acids.** C. B. Stewart, W. F. Huber and E. S. Lutton (Procter & Gamble Co.). *J. Am. Chem. Soc.* **73**, 5903(1951). The long spacings of the 2,4-dinitrophenylhydrazones of the aldehydes, formed by the degradation of octadecenoic acids, confirm the previously reported structures.

**A method for determining free fatty acids in milk fat.** Lydia B. Tucker and E. W. Bird (Iowa Agr. Exp. Station, Ames). *J. Dairy Sci.* **34**, 1170(1951). A modification of the Breazeale and Bird method is suggested in which a Skellysolve B-n-propanol mixture is substituted for petroleum ether and absolute methanolic KOH is substituted for absolute ethanolic KOH.

**The lipids of cell nuclei isolated from human brain cortex.** L. W. Tyrrel and L. Richter (Whitechurch Hosp., Cardiff). *Biochem. J.* **49**, li(1951). The lipid content of an adult human brain cortex and of the cell nuclei from it was determined and found to be, respectively: total cholesterol 5.3, 4.1; total phospholipins 19.7, 13.0; monoaminophospholipins 16.8, 10.9; sphingomyelins 2.9, 2.1; lecithins 5.8, 4.4; cephalins 11.6, 6.5; cerebrosides 4.8, 10.0%.

**Low cost still makes color stable fatty acids.** F. B. White (Foster Wheeler Corp). *Chem. Eng.* **59**, 163(1952). A two-stage continuous distillation system is described in which the light ends are removed before the fatty acids are distilled.

**Study of the crystalline adducts of urea with fatty acids.** I. Rebas and G. Gil. *Anales de fis. y. quim. (Madrid)* **47**(B), 639-648(1951). They compared the urea adducts of stearic, oleic, and adipic acids with those from 12-hydroxystearic, ricinoleic, and the following cork acids—felonic, felogenic, floionic and floionolic. The presence of a hydroxyl group in the center of the chain does not prevent the formation of urea adducts.

**Studies on the chemistry of cork. IX. Contribution to the Structure of the Felonic Acids.** I. Ribas and G. G. Carbera. *Anales de fis. y. quim. (Madrid)* **47**(B), 713-714(1951). The formula of felonic acid appears to correspond to that of an omega hydroxybehenic acid rather than a 22-hydroxytetraacosanoic acid. This was based on a study of urea adducts with the felonic acid and its acetylated derivative.

**Particle size and interfacial phenomenon in emulsions. II. Dependence of the drop radius on the emulsifier concentration and the interfacial tension.** Von L. Jurgen-holmann. *Kolloid Zeitschrift.* **124**(2), 77-82(1951). The particle size in emulsions from different components is dependent on the emulsifier

concentration in the interfacial liquid and is measured by the interfacial tension. It was shown that tension is not essential and that the dominating influence is the nature of the dispersing liquid.

**Desulfurization of carbon disulfide extracted oils before hydrogenation.** J. M. Moreno, F. R. Ayerbes, R. C. Galan and J. H. Lope. *Anales de fis. y. quim. (Madrid)* **47**(B), 743-750(1951). Solvent extracted olive oil was desulfurized by treating the oil with cupric or ferric oxides or activated silica and alumina gels. A comparison between these various desulfurizing agents was made by measuring the concentration of the sulfur and the rate of hydrogenation of the treated oils.

**The manufacture of aromatic butter.** N. Evenhuis, J. Lerk and H. Brower. *Neth. Milk and Dairy J.* **5**, 201-228(1951). It was shown that diacetyl in starters is formed from citric acid and not from lactose. The amount of citric acid present during the churning of cream must be carefully regulated in order to produce a butter with a high diacetyl content.

## PATENTS

**Process of producing coconut oil.** A. L. Sodergreen. *U. S.* **2,583,022**. Improvement in the process of producing coconut oil from whole coconuts is claimed which comprises: steaming the whole coconuts to sterilize the exterior of the coconut shell and to loosen the bond between the coconut shell and the meat, removing the meat from the shell, immediately subdividing the whole meat into chip-like particles having a uniform cross sectional thickness of substantially one-quarter of an inch, contacting the meat particles with air at a temperature of between 130° and 165°F. for a period of time sufficient to partially dry the particles, then contacting the particles with air at an elevated temperature not above 165°F. and for a period of time sufficient to reduce the moisture contained to below 5% by weight; immediately triturating the dry meat particles to form an oil slurry of coconut meal and separating the coconut oil from such slurry.

**Improvement of color and color stability of saturated fatty acids.** D. E. Terry and D. T. Warner (General Mills, Inc.). *U. S.* **2,583,028**. Process of treating higher saturated fatty acids is disclosed which comprises mixing a small quantity of boron trifluoride with the fatty acid, heating the mixture to a temperature within the approximate range of 70°-200° for a period of from 2 to 4 hours, thereafter washing the mixture with water to remove boron trifluoride, and distilling the residue to recover the fatty acid.

**Method of refining organic acid esters containing free acids.** L. L. Weil and P. Tusa (E. F. Drew & Co., Inc.). *U. S.* **2,583,193**. A method is disclosed of refining organic acid esters of acids having at least 8 carbon atoms and being capable of being distilled, said esters containing free organic acid which comprises adding to such an ester a salt of an acid which is volatile below temperatures at which the ester distills, the salt being soluble in the ester, the metal of the salt being adapted to form salts of the free acid which are non-volatile, dissolving the salt in the ester, subjecting the mixture to distillation whereby a reaction takes place forming the salt of the free acid and freeing the volatile acid, and collecting the distilled ester.

**Clear aqueous solutions of oleaginous compositions.** C. J. Kern, T. Antoshkiw and M. R. Maiese (American Home Products Corp.). *U. S.* **2,583,576**. The clear solution obtained by mixing a glyceride oil, sorbitan monooleate (ethylene oxide)<sub>20</sub>, glycerol and water is claimed.

**Stabilization of soybean oils with p-toluene sulfonic acid.** A. W. Schwab, C. D. Evans and J. C. Cowan (U.S.D.A.) *U. S.* **2,583,602**. Soybean oil containing p-toluene sulfonic acid as a stabilizer is claimed.

**Purifying oils.** Etablissements J. J. Carnaud & Forges de Basse-Indre. *British* **585,566**. Oil used for frying sardines, containing fatty substances extracted from the fish, is emulsified with water or with a slightly acid or alkaline aqueous solution, and is then mechanically separated into a purified oil phase, a stable emulsion containing fish fat, and any excess of water. (*Chem. Abs.* **46**, 195)

## • Biology and Nutrition

R. A. Reiners, Abstractor

The lack of correlation between the growth response of the fat-depleted rat to essential fatty acids and the tocopherol content of the diet. Lilla Anisfeld, S. M. Greenberg and H. J.

Deuel, Jr. (Univ. So. Calif., Los Angeles). *J. Nutrition* 45, 599(1951). No interrelationship between linoleate and tocopherol requirements could be demonstrated in either male or female rats, as indicated by the growth response of fat-depleted animals receiving a fat-free diet.

**Comparative utilization of carotene administered orally and parenterally.** J. G. Bieri and R. P. Sandman (Univ. Texas, Galveston). *Proc. Soc. Exp. Biol. Med.* 77, 617(1951). Carotene solubilized in water by the use of Tween 40 will support growth in vitamin A deficient rats when as little as 1.6  $\gamma$  is injected intramuscularly daily. For maximum growth, approximately 4-6 times as much carotene is required parenterally as orally. Aqueous carotene is also well utilized when given subcutaneously. Carotene dissolved in cottonseed oil and administered parenterally is essentially not utilizable.

**Biotin-like activity of positional and stereoisomers of octa-decenoic acids.** Amber L. S. Cheng, S. M. Greenberg, H. J. Deuel, Jr. and D. Melnick (Univ. So. Calif., Los Angeles). *J. Biol. Chem.* 192, 611(1951). The biotin-like activity of the octa-decenoic acids as revealed by tests with *Lactobacillus arabinosus* indicate that the *cis*-acids are about equally effective. Elaidic acid is about as active as oleic acid but the biotin-like activity of the *trans*-acids decreases in step-like fashion as the double bond approaches either end of the carbon chain. An equation has been given to permit calculation of the biotin-like activity of the fatty acids of limpid and hydrogenated oils from their fatty acid composition.

**Cholesterol metabolism in man.** R. P. Cook and D. C. Edwards (Univ. College, Dundee). *Biochem. J.* 49, xli(1951). Cholesterol in olive oil was administered to a human subject. About 20% of the amount given (10 g.) was absorbed. As in rats there was an increased excretion of fecal acids. No marked effect on plasma cholesterol was observed.

**Synthesis of milk fat from acetic acid by the perfused bovine udder.** H. T. Cowie, W. G. Duncombe, S. J. Folley, T. H. French, R. F. Glascock, L. Massart, G. J. Peeters and G. Popjak (Univ. Reading). *Biochem. J.* 49, 610(1951). Data confirm that the udder utilizes acetate labeled with carbon 14 as a substrate for the synthesis of milk fatty acids and of cholesterol. It was shown that short chain fatty acids could not be formed directly by degradation of long chain acids.

**Cause of the vitamin A activity shown by casein in the presence of lard.** P. Le Gallic (Ecole hautes-etudes, Paris). *Compt. rend. soc. biol.* 145, 479-82(1951). A diet containing casein and lard, but containing no vitamin A factor detectable by optical or chemical methods, exerts a vitamin A activity in rats provided the casein and lard are in proper ratio to each other. A ration containing 18% of casein and 21% of lard (with starch and supplements) maintains normal growth of young rats; with only 10% of lard it does not. Extraction of the casein with various organic solvents does not affect the vitamin A activity, but if the casein is subjected to enzymic hydrolysis before addition to the ration the vitamin A activity is destroyed. (*Chem. Abs.* 46, 170)

**Parenteral nutrition. XI. Studies with stable and unstable fat emulsions administered intravenously.** R. P. Geyer, D. M. Watkin, L. W. Matthews and F. J. Stare (Harvard Med. School). *Proc. Soc. Exp. Biol. Med.* 77, 872(1951). Intravenous injection of stable fat emulsions in rats caused moderate increase in total lipids of the spleen, liver and lungs; whereas a very marked increase was observed when unstable emulsions were given. Much of the increase due to the latter type of emulsion was caused by large extracellular fat globules. The removal of the excess fat in the tissues was found to be rapid in the case of stable emulsions and slower but definite in the case of unstable emulsions.

**The effect of fat level of the diet on general nutrition. VII. Comparison of the potency of arachidonic and linoleic acids in furnishing the requirement for essential fatty acids in the rat.** S. M. Greenberg, C. E. Calbert, H. J. Deuel, Jr. and J. B. Brown (Univ. So. Calif., Los Angeles). *J. Nutrition* 45, 521(1951). Methyl arachidonate has been shown to have 3.5 times the biopotency of linoleic acid when fed to fat-deficient rats; the ratio of the biopotency of arachidonate to that of linoleate when these acids were fed as a mixture was found to be 6.2:1. The requirement of the male rat for linoleate was shown to exceed 100 mg. daily. The gain in weight noted in an 8-week assay period was greater in rats receiving a cottonseed oil diet than in those on a fat-low regimen supplemented with as much as 100 mg. linoleic acid daily, 20 mg. methyl arachidonate per day or mixtures of these two compounds. The efficiency of utilization of calories was increased progressively with increasing dosages of essential fatty acids; however the highest efficiencies were obtained with a 30% fat diet.

**VIII. The essential fatty acid content of margarines, shortenings, butter and cottonseed oil as determined by a new biological assay method.** H. J. Deuel Jr., S. M. Greenberg, Lilla Anisfeld and D. Melnick (Univ. So. Calif., Los Angeles). *Ibid.* 535. A biological procedure for the determination of essential fatty acids has been established which depends upon the fact that the weight gain of male rats is directly proportional to the log of the dose of linoleate. Good agreement was obtained between the analyses for essential fatty acids by bioassay and by spectrophotometry in the case of margarine oils, butters, cottonseed oil and shortening prepared by selective hydrogenation. Shortening made by non-selective hydrogenation contained twice as much essential fatty acids by bioassay as by spectrophotometric analysis. The level of essential fatty acids in all samples of margarine was found to be higher than in butter fats. Non-selective hydrogenation of cottonseed oil yielded a product of 4 times the potency of the same oil selectively hydrogenated. The optimum level of linoleate required by fat-depleted male rats would seem to exceed 200 mg. per day. Apparently the requirement of essential fatty acids is increased with concomitant ingestion of fat.

**Feeding values of soy proteins.** A. G. Hogan (Univ. Missouri). *Soybean Digest* 12(3), 14(1951). A brief review.

**Oil cakes as articles of food.** A. Khan (H. B. Tech. Inst., Uttar Pradesh, Kanpur). *Oil Oilseeds J.* 4(4), 17(1951). A review on the value of oil cakes in cattle feeding.

**Adaption of *Bacillus subtilis* to fatty acids.** H. Laser (Univ. Cambridge). *Biochem. J.* 49, lxxvi(1951). Stearic, oleic, vaccenic and linoleic inhibited the growth of *B. subtilis*. At suitable concentrations recovery from inhibition occurred with time. Treatment with any one acid produces resistance against any of the others.

**Superior animal shortening turned out by new four-stage process.** I. C. Miller. *Food Eng.* 22(8), 88, 136(1951). A description and flow sheet of the plant used by E. Kahn Sons to produce shortening.

**Effect of soybean sterols in the diet on plasma and liver cholesterol in chicks.** D. W. Peterson (Univ. Calif., Berkeley). *Proc. Soc. Exp. Biol. Med.* 78, 193(1951). Evidence is presented that the addition to the chicks' diet of mixed soybean sterols and of purified sitosterols in the presence of cottonseed oil and cholesterol causes markedly lower plasma and liver levels of cholesterol than the addition to the diet of a mixture of cholesterol and cottonseed oil alone.

**Subcutaneous administration of combined fat emulsion with hyaluronidase.** B. G. P. Shafroff, H. C. Baron, J. Richt and J. H. Mulholland (N. Y. Univ. College Med.). *Proc. Soc. Exp. Biol. Med.* 77, 608(1951). A liter of 10% fat emulsion was injected subcutaneously into hyaluronidase treated areas in each of 22 patients. In the presence of hyaluronidase the emulsion was readily absorbed, in its absence the absorption was poor.

**Soybean oil meal in manufactured feeds.** C. K. Shuman (Glidden Co.). *Soybean Digest* 11(12), 10(1951). A review of recent developments.

**The digestibility of six tropical fats as determined on rats.** R. L. Squibb, H. T. Love and Miriam K. Wyld (Inst. Argo. Nac., Guatemala). *J. Nutrition* 44, 547(1951). The iodine number, saponification number, percentage free fatty acids and the digestibility coefficient for 6 partially refined fats are as follows: corozo (*Orbignya cohune* and species of genus *Scheelea*) 53, 230, 0.2, 97; morro (*Crescentia alata*) 85, 193, 0.2, 96; tambor (*Omphalea oleifera*) 103, 196, —, 94; sapayulo (*Calocarpum mammosum*) 62, 193, 0.3, 92; cacao volador (*Virola guatemalensis*) 16, 241, 0.6, 96; and unrefined acituno fat (*Simarouba glauca*) 56, 193, 14, 93.

**Conversion of C<sup>14</sup>-palmitic acid to glucose. I. Normal and diabetic rats.** E. H. Strisower, I. L. Chaikoff and E. O. Weinman (Univ. Calif., Berkeley). *J. Biol. Chem.* 192, 453(1951). Experiments with labeled palmitic acids show that less than 5% of the total glucose turned over per hour in normal rats and less than 10% in diabetic rats is derived from fatty acids. These values represent the lower limit of glucose synthesis from fat.

## • Detergents

Lenore Petchaft, Abstractor

**Some recent developments in soapmaking processes.** Anon. *Soap, Perfumery, Cosmetics* 24, 1221-3(1951). A review of the newer soap processes including the Monsavon, Sharples Centrifugal and Mazzoni methods. The Monsavon Process, by temperature control and quantitative pumping, merges oils and

fats with caustic soda, into an emulsion, which is afterwards fed into a washing tower in four sections, and produces neat soap under completely automatic control. The Sharples Process also produces a neat soap capable of being further processed into various products. Another process, the Niro Atomizer will produce a soap of a given fatty acid content by temperature control, and the resultant product may be processed either as a washing powder or one suitable for further processing into toilet soap or soap flakes. One of the most important new developments is the Mazzoni cooling or drying method which is a great time and labor saver.

**Qualitative and Quantitative analysis of synthetic detergents.** J. Balthazar. *Ing. chim.* 32, No. 182, 169-96; 33, No. 183, 3-16 (1951). Detergents are classified as anion, cation, and unionized compounds and qualitative tests are described for determining in which group a detergent belongs. Both qualitative and quantitative tests are described in detail for determining the character and composition of the detergent. Interpretation of results obtained in each test is explained by means of a sample analysis. A table is given outlining the various procedures for identification of the detergents. (*Chem. Abs.* 45, 10624)

**Determination of sodium carboxymethylcellulose in detergent mixtures by the anthrone method.** H. C. Black, Jr. (du Pont, Penns Grove, N. J.). *Anal. Chem.* 23, 1792-5 (1951). A method was needed for determination of sodium carboxymethylcellulose in household detergents. The green color formed by reaction of anthrone with carbohydrate materials in sulfuric acid solution provided the basis for the present method. Color intensity is measured with a spectrophotometer. Controlled heating is necessary for reproducible results. Color intensity varies inversely with degree of substitution of the carboxymethylcellulose. The accuracy is 2% relative, provided the degree of substitution is known. Other carbohydrates, carbohydrate derivatives, furfural, 5-hydroxymethylfurfural, and certain polyoxyethylene derivatives of fatty acids and phenols are the only known interfering substances. The method should be useful for determination of carboxymethylcellulose in other mixtures and, with appropriate modification, of other carbohydrates.

**Detergency of carbon-black suspension. III. In toluene.** F. H. Garner and A. R. W. Baddeley (Univ. of Birmingham, Engl.). *J. Inst. Petroleum* 37, 426-9 (1951). The rates of settling of C-black suspensions in toluene were compared after the addition of stearic, oleic, and linoleic acids, and Ca oleate and linoleate. The acids have practically no effect on the rate of settling, and are not significantly adsorbed on the carbon. The Ca soaps are adsorbed and the effect on the rates of settling is dependent on the amount adsorbed; the order found, in increasing effectiveness is Ca naphthenate, oleate, and linoleate. A commercial additive was found to be better than any of the Ca soap. (*Chem. Abs.* 46, 282)

**Ethylenediamine tetrasodiumacetate (EDTSA) used in detergency.** J. M. Jensen and G. A. Claybaugh (Michigan Agricultural Experiment Station). *J. Dairy Sci.* 34, 865-73 (1951). Ethylenediamine tetrasodium acetate was compared with condensed phosphate and alkaline salt detergents for washing quality against milk films that were air-dried, oven-dried and chlorine-treated. The EDTSA and condensed phosphate salts contributed practically equal detergency properties. Alkaline salt replacement for either condensed phosphate or EDTSA lowered film removal properties. Both salts in combination with wetting agent produced high detergency quality against air-dried films when the detergent solution contained 10% added whole milk. When the rinsing mediums included EDTSA, higher detergency was secured than when condensed phosphate salts were used.

**Titrimetric determination of ethylenediaminetetracetic acid.** F. W. Kerkow (Untersuchungslab. B.A.S.F., Ludwigshafen am Rhine, Ger.). *Z. anal. Chem.* 133, 281-2 (1951). The method of Biedermann and Schwarzenbach for titrating alkaline earth ions in a solution buffered to pH 10 with ethylenediaminetetracetic acid, H<sub>4</sub>Y, in the presence of Eriochromschwartz T as indicator, can be reversed and used for the determination of H<sub>4</sub>Y or one of its salts. To a solution containing about 0.0025 mole of the acid (about 1 g. of Trilon B) in 25 ml. of water, add 50 ml. of the NH<sub>3</sub> solution for buffering and 1 ml. of indicator solutions. Titrate with molar MgCl<sub>2</sub> or Mg(NO<sub>3</sub>)<sub>2</sub> solution until the indicator turns to red through violet. The presence of soap interferes but this can be prevented by making the solution acidic and extracting the fatty acids with ether. (*Chem. Abs.* 46, 64)

**The influence of rosin on the sudsing of soap.** M. Mysona and K. Rylko. *Przemysl. Chem.* 6(29), 254-61 (1950). Rosin makes

soap more soluble in water and decreases the amount of suds formed. It is more effective in tallow soaps than in coconut oil soaps. (*Chem. Abs.* 45, 10623)

**A new method of determination of wetting power.** G. Reutenauer, J. P. Sisley and Mme. S. Dupin (ITERG, Paris). *Am. Dyestuff Reprtr.* 41, 25-30 (1952). A study has been made of a new way of determining wetting power, known as the hydrometer method. It can be effectively carried out with either cotton skeins or strips of cotton fabric. The results accord well with those given by other wetting-test procedures. The precision of the hydrometer is superior to that of other methods. The results are expressed in a more scientific manner and are in direct proportion to the elimination of air from the fiber. The principal feature of this procedure is that it is possible to observe the operation of wetting as a function of time. In this way, a fundamental study of the action of surface-active agents on textile fibers is possible.

**Silicates in detergents.** E. A. Robinson (Diamond Alkali Co., Cleveland, Ohio). *Soap, Sanit. Chemicals* 28, No. 1, 34-6 (1952). It has been found that soluble silicates with a ratio of two or more parts of silica to one part of sodium oxide will inhibit or retard the corrosion of light metals, copper-zinc alloys, copper-nickel alloys, and vitreous enamels, by carbonates, orthophosphates, and polyphosphates which are found in newer detergent formulations and which are affecting washing machines.

**Evaluation of detergents. IV. A correlation of washing performance with dissolving and wetting ability.** C. Ruchhoff and F. I. Norris (Public Health Service, Cincinnati, Ohio). *Public Health Reports* 66, 655-67 (1951). A series of about 100 commercial detergents and detergent components were included in a study involving the application of the washing performance test and the determination of the various factors of detergency. The factors determined included pH, phenolphthalein, inactive and total alkalinity, surface tension, interfacial tension and emulsification with mineral oil, and sequestering ability. No correlation could be found between the values of any single detergency factor and washing performance. When the samples examined were separated into classes of detergents such as soap, alkaline detergents, surface active detergents, and combined detergents, correlations between a combination of factors and the washing performance test results were demonstrated. The detergency factors that were significant for evaluating dishwashing detergent performance for the various classes of detergents were as follows: soaps—phenolphthalein alkalinity, total alkalinity, and surface tension; alkaline detergents—pH, inactive alkalinity, and surface tension; surfactants—surface tension, interfacial tension, and emulsification with mineral oil; combined detergents—pH, total alkalinity, surface tension, interfacial tension, and emulsification with mineral oil. In general, however, decreasing pH and emulsifying power, increasing phenolphthalein, inactive and total alkalinity, surface and interfacial tension indicated decreasing soil removal ability.

**Progress in wetting and rewetting test methods.** L. Shapiro (Synthron, Inc., Warwick, L. I.). *Am. Dyestuff Reprtr.* 41, 16-24 (1952). For complete evaluation of wetting agents, a rate-of-wetting curve is important and the hydrometer method is simplest. Several hydrometer designs are discussed. Factors affecting correlation of hydrometer rate-of-wetting tests with other methods are discussed. Rewetting tests by the loaded tape method are described. Rewetting speeds improve with increasing immersion time and with increasing temperature of treating bath. Drying conditions are also important in the application of rewetting agents.

**Soap perfume fixatives.** P. I. Smith. *Am. Perfumer Essent. Oil Rev.* 59, No. 1, 67-8 (1952). A review of the requirements of an efficient soap perfume fixative. The additive must mix readily with all essential oils and aromatic chemicals. It should not contribute any marked odor to the perfume but enhance its fragrance. The fixative must not discolor, hydrolyze, or saponify. It should be available in a wide range of odor types, be economical and non-allergenic.

**Characteristic x-ray spectrometer patterns of the saturated sodium soaps.** R. D. Vold, J. D. Grandine, II, and H. Schott (Univ. of Southern Calif., Los Angeles, Calif.). *J. Phys. Chem.* 56, 128-36 (1952). It is confirmed that the sodium salts of the saturated fatty acids may exist in a large number of different states at room temperature, giving rise to x-ray diffraction patterns which differ discontinuously from modification to modification. Characteristic x-ray spectrometer patterns are presented to permit easy identification of these modifications. The formation of this multiplicity of forms apparently requires the presence of water during the processing of systems at higher

temperatures before cooling to room temperature. Evidence is presented tending to show that the zeta and epsilon modifications cannot be stoichiometric hydrates but are probably solid solutions.

#### PATENTS

**Germicidal detergent.** J. M. Lambert (General Aniline & Film Corp.). *U. S. 2,577,773*. A mixture of one of the usual organic anionic active detergents, an organic cationic active germicide and a nonionic detergent added to overcome the incompatibilities of the anionic and cationic detergents.

**Continuous process for neutralizing fatty acids.** V. Mills (Procter & Gamble Co.). *U. S. 2,578,366*. A process of neutralizing soapmaking fatty acids without the local overheating of portions of the reacting ingredients, to produce directly, without a drying step, a continuous stream of soap of uniform composition and having a moisture content substantially below that of kettle soap.

**Phosphate detergent composition in homogeneous liquid form.** S. Machlis and E. B. Michaels (Stamford Chemical Co.). *U. S. 2,581,677*. A homogeneous liquid composition having detergent properties and consisting of an aqueous medium containing an alkali metal phosphate such as tetrapotassium pyrophosphate, and a group of synergistic organic detergents such as a sulfonated higher fatty acid amide, an alkyl aryl sulfonate, sodium lauryl sulfate and sodium xylene sulfonate.

**Sheet form detergent.** H. Schumacher de Keysser. *British 656,865*. A new cleansing device comprising a naturally moisture-impervious synthetic sheet material having a detergent powder applied to one or both sides. Preferably the synthetic sheet material is "Cellophane," while the detergent may consist of a soap or detergent in powdered form.

## • Waxes

E. H. McMullen, Abstractor

**The constitution of wool wax.** E. V. Truter (Univ. Leeds). *Quart. Rev.* 5, 390(1951). An excellent review of recent work.

**Wax emulsions formulation by HLB.** R. W. Behrens and W. C. Griffin (Atlas Powder Co., Wilmington, Del.). *Soap Sanitary Chemicals* 27, No. 11, 128-9(1951). Although the prediction of emulsifier requirements of wax emulsion systems is not possible with the present state of knowledge, it is possible to classify waxes and oils by the HLB (hydrophile-lipophile balance) of the emulsion for given applications. The concept of HLB is designed to reduce the amount of trial and error in choosing emulsifying agents. (*Chem. Abs.* 46, 281)

**Wax emulsions.** A. Figliolino. *Paint Varn. Prod.* 41, No. 1, 14-15, 17, 31(1951). Formulations for typical wax emulsion polishes are given, illustrating the use of different emulsifying agents, waxes, and such additives as shellac, manila, gum and oxidized paraffin wax. (*Brit. Abs. BII*, September, 1951, 828)

**Resin and wax of Marrubium vulgare.** A. Bernardi (Univ. Urbino, Italy). *Boll. chim. farm.* 90, 269-71(1951). The dry leaves were extracted with acetone and the evaporation residue was extracted with ether from which on cooling marrubine is obtained. The mother liquor contains chlorophyll and waxy material. Evaporation gives a residue, partially soluble in ethanol. The alcohol extracted after treatment with charcoal gives on evaporation a brown mass consisting of marrubine, insoluble in ether, and a resin of which the physical data are given. The portion insoluble in cold alcohol gives on refluxing with alcohol a wax of which the physical and chemical characteristics were determined. (*Chem. Abs.* 45, 9898)

**Interfacial tensions in flotation. III. Tilting-plate method of determining contact angle and the wetting tension of aqueous solutions of frothers for paraffin wax.** Masayoshi Wada. *Science Repts. Research Insts. Tohoku Univ., Ser. A*, 102-26 (1950). The contact angles of Merck's paraffin wax, melting at 58°, were 114.5° for the advancing angle and 102.0° for the receding angle. The average wetting tension was calculated to be -22.2 dynes/cm. at 25°. The wettability of paraffin wax by aqueous solutions of isoamyl alcohol, *m*-cresol, *α*-terpineol, *d*-camphor, and a few commercial frothers was measured. The hysteresis in contact angle in these aqueous solutions was about 20°, being comparable with that of pure water. (*Chem. Abs.* 45, 10003)

**The hydrolysis of wool wax and related high molecular weight esters. II. Heterogeneous reaction: oil-in-water emulsions.** E. V. Truter. *J. Appl. Chem.* I, 454-6(1951). The aqueous alkaline hydrolysis of wool wax, *n*-octadecyl caprylate and palmitate and cholesteryl acetate and caprylate as oil-in-water emulsions stabilized by various agents, has been examined. It

is shown that the extent of the reaction in a given time is not related to the quality of the emulsion, but is probably limited by the rate of penetration of the interface.

**Production of water- and grease-proof papers, a review of the recent patent literature.** Oskar Bauer. *Allgem. Papier-Rundschau* 1951, 294-7, 402-7. A collective article dealing with the use of natural and synthetic resins, soaps, waxes, latex, cellulose derivatives, and proteins and with improvements in impregnation techniques. 77 references. (*Chem. Abs.* 45, 10582)

#### PATENTS

**Purification of beeswax.** L. E. Minor. *U. S. 2,555,499*. Beeswax is melted with hot water and carbon dioxide is blown through the mixture until it is neutral to litmus. One oz. of potassium hydroxide dissolved in aqueous ethanol may now be added, if desired, for each 100 lb. of crude beeswax. On standing the acids and rosins settle out. The beeswax is decanted, or the water and sediment are drawn off. The purified beeswax is highly plastic and suitable for honeycomb foundations. Such combs are not attacked by the wax moth. (*Chem. Abs.* 45, 9902)

**Separation of oil from wax.** W. V. Overbaugh (to Texas Co.). *U. S. 2,571,752*. In producing wax, oil is separated from relatively low-viscosity oil and wax concentrates by crystallization of wax and filtration in the presence of a solvent liquid. Wax concentrates usually contain 5-20% oil but may contain up to 50% oil, and have Saybolt viscosities of 38-60 seconds at 210°F. More viscous solvent oils having viscosities of 68-150 seconds are added before or after initial wax crystallization in amounts of 20-40% by volume of the wax concentrate. Advantage of solvent addition in wax crystallization is denser, more easily filterable crystals which are easily washed on a continuous-drum vacuum filter. (*Chem. Abs.* 46, 245)

**Separation of wool-grease fat acids.** T. Nozoe. *Japanese* 178,375. Wool grease is saponified with caustic alkali, the ether-petroleum ether-soluble portion is removed, and the soap in aqueous layer is decomposed with mineral acid. Hydroxy acids are removed by adsorption in acid clay or aluminum oxide, and the remaining fat acids are separated by fractionation. (*Chem. Abs.* 45, 9900)

**Bleaching of Japan wax.** T. Minami and C. Yoshimura. *Japanese* 178,637. The melted wax is emulsified with aqueous sodium hydroxide and hydrogen peroxide, coagulated by pouring into cold water, then exposed to ultraviolet light. (*Chem. Abs.* 45, 9902)

**Synthetic wax.** E. Ishida. *Japanese* 179,333 & 179,335. Condensation of the NH<sub>2</sub> group of ClC<sub>10</sub>H<sub>2</sub>NH<sub>2</sub>(I) with the CHO group of an aliphatic aldehyde (II) or with the Cl of chloroalkyl compounds (III) gives a noncombustible synthetic wax. They use 2,6-Cl<sub>2</sub>C<sub>10</sub>H<sub>8</sub> and urea for obtaining 2,6-Cl(H<sub>2</sub>NCONH)C<sub>10</sub>H<sub>8</sub> (IV). IV and II are condensed to a waxy product having high melting point. (*Chem. Abs.* 45, 9902)

**Bleaching plant waxes.** E. Eisenring. *Swiss* 271,936. Molten waxes are bleached under pressure with hydrogen peroxide in the presence of ethanol. (*Chem. Abs.* 45, 10626)

## • Drying Oils

Stuart A. Harrison, Abstractor

**Measuring adhesion of organic coatings.** F. M. Burt. *Organic Finishing* 12, No. 11, 14(1951). The adherometer which is an instrument for measuring the adhesion of films is described. The preparation of samples and method of testing are described.

**Styrenation and esterification of tall oil.** W. Bosch and R. B. Drubel. *Official Digest Federation of Paint and Varnish Production Clubs*, No.323, 894(1951). Two tall oil fractions, one low in rosin (3%) and one high in rosin (70%) were styrenated with a mixture of styrene and *α*-methyl styrene. It was found that while about 26% styrene could be incorporated into the low rosin acids, 50% or more of the polystyrene would go into the high rosin fraction. The styrenated acids were esterified with several polyols including glycerine, pentaerythritol, tri-pentaerythritol and mixtures of sorbitol and the pentaerythritols. Of these the tri-pentaerythritol esters were selected for further testing. Testing of the unpigmented films showed that the low rosin varnishes were too soft whereas the high rosin varnishes were too hard. A one to one mixture of the two gave a varnish having good film properties.

**Phenolic resins and their varnishes.** B. Golding. *Paint and Varnish Production* 41, No. 12, 12(1951). The preparation and

properties of acid and base catalyzed phenolic resins are described. The effect of pH on rate of dehydration and color of resin are discussed. Varnishes of 10-, 30-, and 50-gallon oil length were cooked with various phenolic resins and tung oil. The resins investigated were p-cresol, p-t-butylphenol, p-t-amylphenol, p-cyclohexylphenol, p-phenylphenol and 2,2 bis (p-hydroxyphenyl) propane. The acid condensed resins had the best oil solubility and gave the varnishes with the best alkali resistance.

**Chemical changes in films with aging.** R. E. Dunbar. *Official Digest Federation Paint and Varnish Production Clubs*, No. 323, 857 (1951). Films of clear and pigmented oils were aged under four different conditions of light and humidity. The four conditions were: 50% relative humidity—no light; 50% relative humidity and 25 foot candles of light; 100% relative humidity and 25 foot candles of light; 100% relative humidity and mercury arc light. The acid values, saponification values and degree of chalking of pigmented films were determined periodically during an aging period of 16 weeks. Though the results were somewhat erratic the following conclusions were drawn: (1) The paint pigments (TiO<sub>2</sub> 75%, ZnO 25%) provided almost complete protection against the harmful effects of ultra-violet light. (2) The breakdown of the films is ordinarily attended by an increase in acid value. (3) Films of esters of pure linoleic acid tended to yellow in the dark indicating that this effect is not exclusively due to linolenic esters. (4) High humidity did not tend to readily hydrolyze the alkyd resins. (5) The esters of pentaerythritol were more resistant to hydrolysis than those of dipentaerythritol. (6) The alkyd resin vehicles showed remarkable resistance to chalking.

**Recent developments in the surface coating industry.** F. Armitage and W. T. C. Hammond. *Chemistry and Industry* 49, 1082 (1951). Reviews the work done on coating materials in the past few years. This includes work on urethane oils and resins, styrene-butadiene copolymers, styrenated alkyds, and styrenated oils.

**Prediction of the storage stability properties of alkyd resin enamels.** R. L. Savage and M. C. Schroeder. *Official Digest Federation Paint and Varnish Production Clubs*, No. 323, 886 (1951). Two alkyd resins were prepared and samples taken from each at different acid values. The two resins were (1) a linseed, glycerol, phthalic anhydride alkyd and (2) a soybean, pentaerythritol, phthalic anhydride alkyd. These were pigmented by grinding in a ball mill and the pigmented vehicles stored in cans. The viscosity of the paints was determined at regular intervals during aging. The average molecular weight of the original clear alkyds was determined by the light scattering measurements. Conclusions: In general with a basic pigment the rate of increase of viscosity was directly proportional to the acid number and inversely proportional to the molecular weight of the resins. With neutral or acidic pigments the rate of increase of enamel viscosity was inversely proportional to acid number and directly proportional to molecular weight.

**The nature of the products obtained by refluxing styrene and drying oils in xylol solution. II. Additional data on the styrene-tung oil reaction.** H. Brunner and D. R. Tucker. *J. Applied Chem.* 1, No. 12, 563 (1951). Equal weights of styrene and tung oil were heated to 140° in xylene solution (without catalyst). After about 60 hours 40% of the styrene was "fixed" as copolymer, the remainder being unchanged monomer. There was no "free" polystyrene. The non-volatile product showed the following composition on analysis after saponification: (1) non-styrenated eleostearic groups 40%, (2) styrenated eleostearic groups (eleostearic/styrene 1:1 mole 40%), (3) styrenated eleostearic groups (eleostearic/styrene 1:8 moles 20%). The 1:1 mole material is believed to be a 1:4 Diels-Alder addition product. The 1:8 mole material is believed to be a regular copolymerization product.

**The process control of stand oils during cooling.** G. H. Hutchinson. *Paint Manuf.* 21, No. 12, 437 (1951). The modern processing of drying oils during heat bodying calls for accurate viscosity control. The relationship in bodying China wood oil or oiticica oil at a constant temperature results in a straight line when log viscosity is plotted against time. For dehydrated castor oil and linseed oil there is a straight line relation after a certain point in bodying has been reached. For the cooling period graphical integration has been applied successfully on a number of oils; however, it is not satisfactory for China wood oil—linseed oil mixtures. Examples of the method are given.

**Linseed.** E. S. Bunting. *Paint Manuf.* 21, No. 12, 444 (1951). Reviews briefly the history of linseed production, the important areas in the world where it is produced and their recent

production figures. Describes the cultivation and harvest of the seed. The uses of the oil are outlined.

**Fish oils in the paint industry.** G. T. Bray. *Paint Manuf.* 21, No. 12, 452 (1951). A general discussion of the kinds of fish used for fish oil production, the methods of processing and the properties of the oils are given.

**Refractive index measurements.** R. E. Dunbar. *Official Digest Federation Paint and Varnish Production Clubs*, No. 323, 861 (1951). Films of 23 different clear oils were made on very thin cellophane (0.00064 in thickness). The refractive index of these could be determined accurately in an Abbé refractometer. The change in index was followed during drying. The pattern of index change varied with type of oil, for example the linoleate esters showed a decrease followed later by an increase in index. The experimental data are tabulated.

## PATENTS

**Production of refined tall oil.** T. Hasselstrom and M. Stoll. *U. S. 2,575,013*. The color of tall oil is improved by using "Troluol," a petroleum hydrocarbon fraction boiling from 95°-120° during the recovery and washing of the tall oil. The hydrocarbon is added in the proportion of 2.5-1 to the tall oil soap prior to acidification. The soap is acidified with H<sub>2</sub>SO<sub>4</sub> and thoroughly washed with water.

**Interpolymerization.** P. O. Tawney. *U. S. 2,576,370*. Castor oil maleates are copolymerized with styrene and other polymerizable vinyl monomers in the presence of substantial quantities of saturated and unsaturated aldehydes. The addition of the aldehyde increases the yield of soluble copolymer. The products are suitable for use in coating, impregnating and laminating compositions.

**Tall oil—melamine reaction product and process.** P. C. Hamm. *U. S. 2,577,418*. Melamine is reacted with anhydrides of refined tall oil acids to form the N, N', N'' triacylmelamines. The product has been found useful in water repellent formulations for treating wood products.

**Coating composition comprising the reaction product of vinyl esters of tall oil acids with styrene and an isopropenyl compound, and the method of preparation.** P. E. Marling. *U. S. 2,577,509*. The vinyl esters of tall oil fatty acids (50 pts.) were heated to 520° F. for two hours with styrene (35 pts.), isopropenylbiphenyl (15 pts.), and benzoyl peroxide (2 pts.). The product thinned with mineral spirits gave clear films on drying which were superior in color, flexibility and water resistance to those made without the isopropenylbiphenyl.

**Alkyd resins.** P. Kass and Z. W. Wicks. *U. S. 2,577,770*. Pentaerythritol is dehydrated with an acid catalyst to give polypentaerythritols. The range of polypentaerythritol best suited for making drying oils were those having from 25-38% of hydroxyl groups. A typical example of the preparation of a drying oil is: a mixture of 483 parts of soyabean fatty acids and 100 parts of polypentaerythritol having 33% reactive hydroxyl is heated for two hours at 250-260° under carbon dioxide. After cooling to 200°, 21.3 parts of phthalic anhydride is added and the temperature raised to 230° for five hours. A light yellow oil having a viscosity of seven poises and an acid number of 9 is obtained.

**Drying oil composition.** J. P. West. *U. S. 2,578,214*. A mixture of polyolefinic hydrocarbons or unsaturated conjugate polymers are prepared by polymerizing C<sub>8</sub> and C<sub>12</sub> fractions of copolymer gasoline, using anhydrous hydrogen fluoride as catalyst. The sludge phase is hydrolyzed in ice water and distilled. Films of fractions of this oil combined with copolymer oil and drier, dry to a tack free flexible film in two days at room temperature.

**Process for modifying unsaturated hydrocarbon drying oils.** M. J. Murray. *U. S. 2,579,007*. The drying properties of unsaturated hydrocarbon oils are improved by contacting the oils with an activated silica at about 60° for 15 minutes. The original oil was the fraction boiling from 200-225° obtained on polymerizing a mixture of propylene and butylene with hydrogen fluoride.

**Synthetic oils.** W. A. Jordan and H. Witteoff. *U. S. 2,579,499*. Oils made using lead salts for esterification catalysts tend to be cloudy when cool due to the formation of insoluble lead compounds. These compounds are soluble, however, in the hot oil. Filtering the cold oil is difficult because of its high viscosity. It has been found that if small amounts of phthalic anhydride are added to the hot oil a precipitate forms which can be filtered off easily from the hot nonviscous oil. The oil then remains clear when cooled.