TABLE 6.
Activity of Norconidendrin in Hydrogenated Oils

Antioxidant Type	Conc. %	Hydrogenated peanut oil[1] HO-406 W		Hydrogenated peanut oil[2] HO-406-R		Hydrogenated cottonseed oil[3] CO-60 C	
		AOM hrs.	Index	AOM hrs.	Index	AOM hrs.	Index
None	......	110	1.0	228	1.0	149	1.0
Norconidendrin	0.01	221	2.0	400	1.8	205	1.4
Norconidendrin	0.025	332	3.0	435	1.9	292	2.0
Nordihydroguaiaretic acid	0.01	236	2.1	476	2.1	260	1.7

[1] Iodine value 66.8. [2] Iodine value 67.4. [3] Iodine value 58.1.

and NDGA in a total concentration of 0.01 per cent is slightly more effective than either antioxidant alone in 0.01 per cent concentration. Combinations of the polyphenolic antioxidants and γ-tocopherol are more effective and combinations of the polyphenolic antioxidants and α-tocopherol are slightly less effective than the polyphenol alone.

Summary and Conclusions

The preparation of norconidendrin from western hemlock sulfite waste liquor has been described. Norconidendrin has been shown to possess antioxidant activity in both hydrogenated and unhydrogenated cottonseed and peanut oils, in a peanut oil essentially free of natural antioxidants, and in lard. Its activity in these products is comparable with that of other polyphenolic antioxidants. Norconidendrin, as well as the other polyphenols tested, exhibited greater antioxidant activity in the particular peanut oils used than in several other vegetable oils and still greater activity in substrates which contained only small amounts of natural antioxidants. The effectiveness of norconidendrin was found to be appreciably enhanced by the addition of acid-type synergists. It may be added either before or after deodorization with approximately equal effectiveness. When added before deodorization, it contributes no odor, color, or flavor to the finished oil.

Practical applications of norconidendrin in preserving food products should be postponed until toxicity studies have been conducted.

LITERATURE CITED

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Abstracts

Oils and Fats

Edited by
M. M. PISKUR and SARAH HICKS

PROCESSING CHICKEN FAT. Anon. *U. S. Egg, Poultry Mag. 53,* No. 8, 7-9, 29 (1947). The fat is heated to 180°, drawn off into a vacuum rendering tank where it is homogenized under pressure. The moisture is drawn off in 8-13 minutes and the fat is siphoned to 30-lb. cans to cool. It is packed in 13-oz. glass jars. It is claimed that a product of enhanced stability is obtained.

PROTEIN AND FAT PRODUCTION WITH YEAST ON SULFITE RESIDUES. E. Schmidt. *Die Chemie 59A,* 16-20 (1947).

BY-PRODUCTS OF PARAFFIN OXIDATION. L. Mannes. *Die Chemie 57,* 6-11 (1944). A review from 71 references.

THE EMULSIFIERS. Francine Appell. *Chim. & Ind. 57,* 241-9 (1947). This is a bibliography and review on the subject, containing diagrams of equipment and methods.

ADSORPTION IN FAT EMULSIONS. A. E. Sandelin. *Finska Kemistsamfundets Medd. 54,* 53-67 (1945). To throw light on the behavior of milk as an emulsion, butterfat was emulsified in aq. solns. of 7 emulsifying agents. Each emulsion was skimmed with a separator and the "cream" churned. Titrations showed that the fat globules carry more acid than alkali into the "cream" and "butter" from solutions of Na and K oleate, Na abietate, gum arabic, and saponin; this indicates hydrolytic adsorption with anions predominating in the protective layer. The reverse is true in solutions of Na caseinate and egg albumin. The titrimetric data, combined with microscopic determination of the total surface of the droplets lead to a thickness of 4.0-5.0 μ for the adsorbed layer in emulsions containing 0.05-0.1% Na oleate and 3.7-28.7% fat. Breaking of fat emulsions by agitation may be due to discharge of adsorbed ions by frictional electricity. If foam is formed, breaking is assisted by passage of the emulsifying agent into the foam. (*Chem. Abs. 41,* 3878.)

LEATHER TREATING AGENTS. H. Herfeld. *Die Chemie 58,* 69 (1945). Leather blacks, creams, fats, and impregnating agents are discussed.

ADSORPTION IN THE FAT FIELD. V. SEPARATION OF CIS-TRANS-ISOMERS. H. P. Kaufmann and W. Wolf. *Fette u. Seifen 50,* 519-21 (1943).

FAT CHEMISTRY PROCESSES AND THEIR ECONOMY. VI. MANUFACTURE OF GLYCERIDES AND OTHER ESTERS FROM FAT ACIDS. K. Linder. *Fette u. Seifen 50,* 396-8 (1943). Recent patented fat derivatives are reviewed.

SYNTHESIS OF ALIPHATIC COMPOUNDS. Th. A. Lennartz. *Die Chemie 59A,* 10-16 (1947). A portion of this review deals with fat acids and glycerides.

PHENOMENA OF TRANSESTERIFICATION BETWEEN TRIGLYCERIDES. II. TRIOLEIN-TRISTEARIN AND TRIOLEIN-DILAUROMYRISTIN TRANSESTERIFICATION IN THE PRESENCE OF SODIUM METHYLATE. M. Naudet and P.

Desnuelle (Faculté Sciences, Marseille). *Bull. soc. chim. 1946,* 595-8. Tristearin (I) and triolein (II) in equimolecular mixtures heated with NaOMe progressively exchange their aliphatic chains and tend toward equilibrium when the molar concentration of the 2 initial glycerides is proportional to the 3rd power of the molar concentration of saturated and unsaturated acids. Transesterifications were conducted on 8 g. of an equimolecular mixture of I and II with 1% NaOMe. The mixture was dissolved in ether, freed of salts by dilute HCl, and its composition determined. Plotting the molar concentration of mixed glycerides and trisaturated glycerides against time for reaction temperatures of 135°, 170°, and 205° showed that reaction was about twice as rapid at 205° as at 135° but that the equilibrium I 12.5%-mixed glycerides 75% is independent of temperature. Isomerization of the oleic chains increases with temperature but is independent of time. Optimum conditions for complete transesterification with minimum isomerization are 205° for 375 hours. In making similar studies on II-dilauromyristin systems it was impossible to determine the disaturated-monounsaturated glycerides in the transesterification mixture and the disappearance of trisaturated glycerides was the sole test of reaction. Under the same conditions as with the other system it was indicated that a mixture of glycerides, regardless of proportion or length of chain (C_{12}-C_{18}), would obey the same law of equilibrium. (*Chem. Abs. 41,* 3052.)

CONTINUOUS HYDROLYSIS OF FATS. H. D. Allen, W. A. Kline, E. A. Lawrence, C. J. Arrowsmith, and C. Marsel (Colgate-Palmolive-Peet Co., Jersey City, N. J.). *Chem. Eng. Progress 43,* 459-66 (1947). A process is presented for the continuous hydrolysis of fatty oils to form fatty acids and aqueous glycerol. Water and fatty oil are pumped countercurrent to each other in a vertical tower at 700 lb./sq. in. gage and 485° F. to give 96-99% hydrolysis of the triglyceride esters to fatty acids and yield aqueous glycerol of 10-25% concentration. Pilot-plant runs with various feed stocks and operating conditions are tabulated. Purification of the fatty acid by distillation at about 4 mm. Hg pressure and 445° F. in a flash still of cyclonic design with low pressure drop is also described including data from some typical pilot-plant runs.

ANALYSIS OF FAT ACID AMIDE COMPOUNDS. DETERMINATION OF THE FAT ACIDS AND BASIC CONSTITUENTS (AMIDE VALUE). S. Olsen. *Die Chemie 56,* 202-4 (1943). The amide value is described as the amount of KOH required to saponify one g. of fat acid amide. Procedure is given in detail.

RAPID METHOD FOR DETERMINING OIL CONTENT OF TUNG KERNELS. J. Hamilton and S. G. Gilbert (Agr. Res. Administration, Gainesville, Fla.). *Anal. Chem. 19,* 453-6 (1947). In a rapid method for determining oil in tung kernels, a flaked or ground sample is dispersed in a Waring Blendor type of disintegrator with a commercial hexane solvent. The solution of oil that results is separated from the kernel residue by allowing the sediment to settle in a volumetric flask. The oil in an aliquot of the supernatant liquid is weighed after evaporation of the solvent, and the percentage of oil is calculated on the basis of the total volume occupied by sediment and solution. On the basis of precision, accuracy, and rapidity, the method appears to have distinct advantages over the usual percolation procedures.

COMPOSITION OF BUFFALO MILK FAT. C. P. Anantakrishnan, V. R. Bhalerao, and T. M. Paul (Indian Dairy Res. Inst., Bangalore, India). *Arch. Biochem. 13,* 389-93 (1947). Buffaloes have been fed on a basal ration supplemented by (a) coconut oil, (b) cottonseed oil, (c) groundnut oil, (d) sesame oil, (e) hydrogenated coconut oil, and (f) hydrogenated groundnut oil. The milk fats from these animals have been analyzed by ester fractionation for the component acids. The characteristics of the supplement were reflected in the milk fat but not quantitatively. Ingestion of coconut oil and its hydrogenated product led to an increase in the corresponding glycerides with a slight diminution in the palmitic glycerides of the insuing milk fat. Ingestion of groundnut and sesame oils led to an increase in the oleoglycerides of the resulting milk fat. Palmitoglycerides have been lowered considerably in both cases. Cottonseed oil feeding led to a decrease in the amount of lower saturated glycerides and a considerable increase in the amounts of stearic and oleoglycerides. Unlike oleic acid, a high percentage of linoleic acid in the ration did not increase the amount of this constituent in the milk fat.

MICROSCOPIC TESTING OF THE WATER DISPERSION IN BUTTER, ESPECIALLY BUTTER PREPARED BY CENTRIFUGE (ALPHA) PROCESS. W. Mohr and E. Eysank. *Fette u. Seifen 51,* 267-72 (1944).

A STUDY OF THE ADSORPTION OF NORMAL, BRANCHED, AND UNSATURATED FAT ACIDS AND RELATED COMPOUNDS BY MEANS OF ADSORPTION ANALYSIS. S. Claesson (Univ. Upsala). *Rec. trav. chim. 65,* 571-5 (1946). Flowing chromatography was used as an analytical technic for investigating fat acid mixtures. A special silica prepared by heating Merck's product at 800° for 15 min. adsorbed all unbranched saturated fat acids from heptane to the same extent, regardless of molecular weight. Branched acids were adsorbed less than unbranched; unsaturated acids were adsorbed more than saturated. The same rules were valid for the Me esters. By displacement development, using the special silica, a mixture of fat acids can be separated into groups containing branched, normal, and unsaturated compounds, respectively, which thereafter can be analyzed for compounds of differing molecular weight, by using activated C, which will separate compounds according to chain length, as the adsorbent. (*Chem. Abs. 41,* 1907.)

APPLICATION OF THE "pH NOTION" IN ORGANIC SOLVENTS. J. P. Wolf (I.T.E.R.G.). *Inds. corps gras 3,* 177-81 (1947). The extension of the study of pH in solvents other than water is recommended because it adds 2 interesting principles: (a) it permits the study of products insoluble in H_2O, and (b) it permits the utilization of the variations in the strength of acids in various solvents. Examples of materials and choice of solvents, respectively, are: sulfonates, H_2O; for fat acids in cosmetic creams, EtOH; and polishing waxes, EtOH-acetone or EtOH-ether mixtures.

LIPIDS OF SOYBEAN OIL. K. H. Bauer and Y. Yen-Hou. *Fette u. Seifen 51,* 301-7 (1944). The unsaponifiable of the degermed Rhizoma is greatest, that of the ripe seed is least. The unsaponifiable of seeds, degermed Rhizoma, and degermed Kotyledones contain stigmasterol (I) α- and β-sitosterol (II) and hydrocarbons (III). The amount of I is low, but is greatest in degermed Kotyledone, II appears in greatest amounts in degermed Rhizoma. The III of the unsaponifiable is of unsaturated and liquid consistency in ripe seeds, solid and semisolid in degermed Rhizoma and Kotyledone. III is found in greatest amounts in ripe seeds.

FLAVOR REVERSION IN SOYBEAN OIL. C. Golumbic and B. F. Daubert (Univ. Pittsburgh). *Food Inds. 19,* 1075-7, 1174 (1947). Flavorless precursors of reversion compounds and trace substances may be responible for reversion. Light, heat, O_2, metals, bean quality and variety, and abusive treatment during processing affect flavor stability.

THE ANTIOXIDANT ACTION OF BIOLOGICAL MATERIAL IN CONNECTION WITH FAT SPOILAGE. W. Diemair, H. Ludwig, and K. Weiss. *Fette u. Seifen 50,* 349-54 (1943). Several natural materials and commercial antioxidants were investigated for stabilization of fats and Me linoleate under various conditions. Various oat flours and extracts were antioxidant. Strong antioxidants: vitamin D, lecithin (10 mg.); antioxidants: vitamin C, lecithin (0.28 mg.); weak antioxidant: xanthophyll; inactive: vitamin E, cholesterol, alanine; pro-oxidants: vitamin B_1, phytosterol; and strong pro-oxidants: β-carotene, chlorophyl, choline.

THE CHEMISTRY OF FAT SPOILAGE. XVII. MECHANISM OF AUTOXIDATION OF FOOD FATS. K. Täufel. *Fette u. Seifen 50,* 387-92 (1943). A review of the mechanisms involved. 60 references. XX. THE CHARACTERISTICS OF THE FAT ANTIOXIDANT COMPLEX FROM OATS. K. Täufel and H. Rothe. *Ibid. 51,* 100-2. It is suggested that the antioxidant is a native protein. Coagulation of this protein by heat destroys its protective activity. XXII. DETECTION OF QUINONE AND HYDROQUINONE IN FATTY OILS. K. Täufel and H. D. Gran. *Ibid.* 177-9. XXIII. SYSTEMATIC INVESTIGATION OF RETARDATION OF OXIDATION BY NITRO COMPOUNDS AND QUINONE. K. Täufel and E. Arens. *Ibid.* 307-9. The data on the antioxidant effect of the following on whale oil are graphically presented: α- and β-naphthoquinone, anthraquinone, phenanthrenequinone, chrysenequinone, quinhydrone, *p*-benzoquinone, nitrobenzol, and *m*-dinitrobenzol.

PROGRESS WITH THE "NEUTRAL RED-FAT TEST" OF SCHÖNBERG. Pante. *Z. Fleisch- u. Milchhyg. 54,* 71-2 (1944). A good correlation on over 500 samples is recorded between the neutral red indicator test for rancidity of Schönberg and organoleptic tests.

THE NEUTRAL RED-FAT TEST OF SCHÖNBERG AND ITS SUITABILITY FOR VETERINARY FOOD INSPECTION. B. Gebauer (Staatlichen Veterinär-Untersuchungsamt, Berlin). *Z. Fleisch- u. Milchhyg. 54,* 196-7 (1944); cf. above abs. The Schönberg method is considered suitable for testing fat and bacon for rancidity. The time for development of color should be about 15 mins., after which the color does not change. An unobjectionable fat yields a yellow to dark yellow reaction, orange to reddish-orange suggests beginning of decomposition, and a red reaction appears in rancid fats.

NEUTRAL RED-FAT TEST OF SCHÖNBERG. Westphal. *Z. Fleisch- u. Milchhyg. 54,* 201-4, 214-18 (1944); cf. above ab. The neutral red-fat test for rancidity was investigated. A yellow color in the test generally indicates an unobjectionable fat and a red color indicates rancidity, but no definite conclusion regarding the beginning or progress of rancidity from intermediate colors can be correlated with organoleptic tests.

VALUE OF THE NEUTRAL RED-FAT TEST FOR JUDGING THE RANCIDITY OF LARD AND BACON. F. Schönberg. *Z. Fleisch- u. Milchhyg. 54,* 221-2 (1944). S. answers the criticisms of Westphal (see above abs.). He contends that the test was submitted as a preliminary or a control procedure for lard or bacon; that the definitely good or bad can be identified and the intermediate or doubtful can be subjected to other tests, *i.e.,* for peroxides, aldehydes, etc.

THE STABILITY OF β-CAROTENE DISSOLVED IN FATS AND OILS. B. v. Euler and H. v. Euler (Univ. Upsala, Sweden). *Arkiv. Kemi, Mineral., Geol. B18,* No. 12, 8 pp. (1945). The stability of β-carotene was determined with the following oils and fats as diluents: cottonseed, peanut, mustard-seed, coconut, coconut + palm-seed, and sunflower oils, and hog and refined lards. Carotene in coconut oil (at 37°) was less stable at 21.4 mg. % than at lower concentrations. The stability of β-carotene in animal fats was less than in vegetable fats, owing partly to heating the solid sample, which accelerated oxidation of the carotene. In the oils examined, carotene was found to be most stable in those containing the most singly or doubly unsaturated acids, which probably consume most of the available O and thus protect the carotene. It is also possible that other constituents of the oils (such as traces of metals, especially Fe and Cu, or stearates and phospholipides) may act as catalysts and inhibitors. Biological experiments are now being made to supplement the colorimetric data. (*Chem. Abs. 41,* 2139.)

ACTION OF CUTTING OILS. G. P. Brewington (Lawrence Inst. Technol., Detroit, Mich.). *J. Applied Phys. 18,* 260 (1947). It is suggested that a relation exists between the physical properties of the oil and the cutting ratio (in machining Al and other metals). The interesting and highly promising results obtained with compounds containing —SH or Cl in a low state of valence at the end of a short-chain hydrocarbon, and MeOH and other alcohols on Al, and with dry HCl gas on steel indicate that studies of surface energy and rate of diffusion of the active agent should prove valuable. It is also suggested that other than conventional (sym.) shapes of cutting tools might be profitably investigated, in connection with standing waves, which might contribute to the early fatigue of the tool. (*Chem. Abs. 41,* 3284-5.)

CONTINUOUS PROCESS FOR LUBRICATING GREASES. H. G. Houlton (Girdler Corp., Louisville, Ky.), A. E. Calkins, and A. Beerbower. *Chem. Eng. Progress 43,* 399-404 (1947). A continuous process is described with particular reference to lime grease. The process is shown to be equally well adapted to soda and other greases where it is advantageous to manufacture soap as part of the grease-making procedure. The process has been in commercial operation for about 4 years in the manufacture of lime grease at 60 lb./min. or 86,000 lb./stream-day, and consists in first preparing a concentrated soap stock which is continuously blended with lube oil to produce a high yield grease, uniform in character and of a high quality. Material, labor, and floor-space savings over batch methods are sufficient to amortize the plant in about a year's time.

LUBRICATION PROPERTIES OF MOLECULAR LAYERS OF STEARIC ACID AND CALCIUM STEARATE ON METAL SUR-

FACES. J. N. Gregory and J. A. Spink (Univ., Melbourne, Australia). *Nature 159,* 403 (1947). From 1-21 molecular layers of Ca stearate and stearic acid were deposited on Pt, Cu, and stainless steel, from 0.0001 *M* $CaCO_3$ at pH 6. These layers contained 60% soap and 40% acid. The coefficient of friction *k* was determined at various temperatures on these surfaces. On Cu, there is an increase in *k* at the m.p. of stearic acid. The liquid acid reacts to form Cu stearate, and *k* falls to its original low value. The minimum number of layers required for lubrication varies with the metal: it is 1 for stainless steel, 3 for Cu, and 5 for Pt. Ca stearate does not lubricate Cu or Pt. (*Chem. Abs. 41,* 4693-4.)

STEARIC ACID FOR COMBATING FOAM FORMATION, ESPECIALLY IN THE KJELDAHL NITROGEN DETERMINATION. H. Hadorn (Eidg. Gesundheitsamt, Bern, Switz.). *Mitt. Gebiete Lebensm. Hyg. 38,* 46-7 (1947). Stearic asid has been used previously to prevent foam formation in distillations of protein hydrolyzates. Its effect is based on the formation of a monomolecular film on the surface of the water which decreases the surface tension. While a fraction of a mg. is sufficient to prevent foam formation in distillations, about 5-10 mg. are needed in the Kjeldahl N determination. (*Chem. Abs. 41,* 5053.)

SELECTIVITY OF HYDROGENATION IN A STERIC COURSE. H. A. Weidlich. *Die Chemie 58,* 30-4 (1945). The effect of structure on the course of hydrogenation is reviewed. 25 references.

CATALYTIC HYDROGENATION OF ORGANIC COMPOUNDS IN THE LIQUID PHASE. II. KINETICS OF HYDROGENATION OF OLEIC ACID. V. I. Gol'danskii and S. Yu Elovich. *J. Phys. Chem.* (U.S.S.R.) *20,* 1085-93 (1946). Solutions of 0.7 g. of oleic acid in 20 c.c. of AcOH + Ac_2O were shaken with H_2 in the presence of 0.1 g. of Pt on $BaSO_4$. The rate of consumption of H increased with the rapidity of shaking up to 300 (at 15°) or 600 (at 40°) shakes per minute and remained constant at a more intense agitation. It is concluded that below 300-600 shakes the rate of reaction is determined by diffusion, and at higher frequencies by the kinetics of the chemical process. (*Chem. Abs. 41,* 2973.)

ELECTRICAL METHOD OF OBTAINING POWDERED NICKEL. A. I. Levin. *J. Applied Chem.* (U.S.S.R.) *19,* 779-92 (1946). A combined method of cathodic precipitation of Ni in a powdered form, with a subsequent annealing of the product in a H_2 current at high temperature was considered the most expedient method of preparing powdered high active Ni.

CATHODE DISPERSION OF NICKEL. M. Loshkarev, O. Gornostaleva, and A. Kriukova. *J. Applied Chem.* (U.S.S.R.) *19,* 793-800 (1946). Methods, composition, and activity of products are evaluated.

FAT AND FAT COGNATES AS FOOD. H. Schmalfuss (Reichsuniversität Posen). *Z, Fleisch- u. Milchhyg. 54,* 155-8, 167-9, 176-8, 185-7 (1944). A review. 83 references.

LIPIDES OF THE FASTING MOUSE. III. PHOSPHOLIPIDE TO NEUTRAL FAT RELATIONSHIP IN THE BLOOD LIPIDES. H. C. Hodge, P. L. MacLachlan, W. R. Bloor, E. A. Welch, S. L. Kornberg, and M. Falkenheim (Univ. Rochester, N. Y.). *J. Biol. Chem. 169,* 707-11 (1947). A slight lipemia was observed in the early fasting days followed by a decrease on the 5th day. The blood phospholipide concentration increased steadily until the 4th day, then fell on the 5th day. The per cent P^{32} dose in the blood phospholipides increased to a maximum on the 2nd day and was elevated again on the 5th day.

RELATIVE DIGESTIBILITY OF COMMON EDIBLE FATS. II. HYDROLYSIS BY PANCREATIC LIPASE. B. Ahmad and A. N. Bahl (Univ. Chem. Lab., Lahore). *J. Sci. & Ind. Res.* (India) *5B,* 1-3 (1946). The relative digestibilities of various fats at pH 9.5 by pancreatic lipase, activated by $CaCl_2$, were determined. Cow ghee was digested more rapidly than buffalo ghee. The order of digestibility of several oils was: groundnut > coconut > sesame > cottonseed > olive > linseed > kadoo > almond > mahuwa > castor > mustard. Large differences in the rates of hydrolysis of hydrogenated oils were found. Some oils as kadoo, almond, and mahuwa, which were readily digested by *Ricinus* lipase, were not digested as rapidly by pancreatic lipase. Animal depot fats were digested less rapidly than vegetable or hydrogenated oils. (*Chem. Abs. 41,* 4178.)

THE NUTRITIVE VALUE OF FRACTIONS OF BUTTERFAT PREPARED BY COLD CRYSTALLIZATION. R. P. Geyer, B. R. Geyer, P. H. Derse, H. Nath, V. H. Barki, C. A. Elvehjem, and E. B. Hart (Univ. Wisconsin, Madison.). *J. Dairy Sci. 30,* 299-305 (1947). Butterfat prepared from butter made in various months of the year has been fractionated into 2 fractions by cold crystallization from an acetone solution. A liquid fraction from Sept., 1945, butter allowed rats to grow at a superior rate, while a solid fraction prepared from this butter caused a very slow rate of growth. This phenomenon was not repeated to the same degree in subsequent trials using other samples of butter. Corn oil was separated into 2 fractions by a similar procedure but rats grew equally well when fed either of these fractions or corn oil itself. The treatment of either fat by solvent had no deleterious effect on its nutritive value.

FAT DIGESTION AND STOMACH EVACUATION. P. Veghelyi (Petrus-Pazmany Univ., Budapest). *Ann. Paedit. 168,* 93-104 (1947). Active lipase is always present in the stomach and is not dependent on the fat content of food as is pepsin. The amount of lipase is increased in certain acute diseases but returns to normal on restoration of health. In most cases of arterial hypotension, a lowered rate of fat splitting accompanies disturbances of evacuation. (*Chem. Abs. 41,* 4223.)

CONVERSION OF LAURIC AND MYRISTIC ACIDS INTO FAT ACIDS OF HIGHER MOLECULAR WEIGHT IN THE RAT ORGANISM. A. Klem. *Fette u. Seifen 51,* 184-8 (1944). A group of female rats were fed rations containing deuterized tetradecenic acid, another group received D-lauric acid. Analysis of the body fats showed that the first group synthesized C_{16} acid from C_{14} acid and the second group synthesized C_{14} acid from C_{12} acid. A group of male rats synthesized C_{14}, C_{16}, and C_{18} acids from C_{12} acids. This was interpreted as evidence for the reversibility of β-oxidation.

DIET OF MOTHER AND BRAIN HEMORRHAGES IN INFANT RATS. E. E. Brown, J. F. Fudge, and L. R. Richardson (Texas Agr. Exper. Sta., College Station). *J. Nutr. 34,* 141-50 (1947). Female rats were reared to maturity on a synthetic diet that was deficient in vitamin K. If lard was removed from their diet and the females allowed to bear litters, a high incidence of brain hemorrhages occurred in the offspring. The hemorrhages did not occur when the diet contained either lard or vitamin K. The whole blood coagulation time of females which produced hemorrhagic young and of young with visible hemorrhages was normal. This shows that the prothrombin level was not abnormally low and it is suggested that the substance which acts normally to maintain capillary strength is not synthesized by the body when the diet is low in fat and deficient in vitamin K. An assay with chicks shows that lard may contain a small but insignificant amount of vitamin K.

ECZEMA AND ESSENTIAL FATTY ACIDS. A. E. Hansen, E. M. Knott, H. A. Wiese, E. Shaperman, and I.McQuarrie (Univ. Texas School Med., Galveston). *Am. J. Diseases Children 73,* 1-18 (1947). In a group of 171 eczematous patients, 80% of the infants under 2 years of age, 75% of the children 2-15 years of age, and slightly over 50% of the adults had lower I numbers for the serum fatty acids than those found normally. The I numbers tended to increase and the clinical condition improved when fats rich in unsaturated acids were added to the diets. Increased I numbers were also observed with clinical improvement in patients treated solely with coal-tar ointment. The specific role of fatty acids in eczema appears to be the restoration and maintenance of the normal nutrition of the skin. More accurate methods for determination of specific fatty acids are needed to establish the interrelations in lipide metabolism in eczematous tissues and the blood serum. (*Chem. Abs. 41,* 4837.)

A STUDY OF THE MECHANISM OF FATTY ACID OXIDATION WITH ISOTOPIC ACETOACETATE. J. M. Buchanan (Univ. Pennsylvania, Philadelphia), W. Sakami, and S. Gurin. *J. Biol. Chem. 169,* 411-18 (1947). A study of the metabolism of fatty acids and ketone bodies in liver tissue has been made with the use of carboxyl isotopic octanoic acid and acetoacetate labeled either in the carbonyl or carboxyl position. It has been found that acetoacetate is not split to a measurable extent into 2-C fragments which recondense randomly into acetoacetate again. The results of the experiments with isotopic acetoacetate differ in some respects from previous experiments of others concerning the oxidation of carboxyl isotopic octanoate to acetoacetate. From the experiments reported in the present paper the conclusion is reached that the appearance of isotope in the carbonyl C of acetoacetate during the metabolism of carboxyl isotopic octanoate in liver slices does not result from a preliminary formation of carboxyl isotopic acetoacetate and a secondary splitting of this isotopic species into 2-C fragments which recondense randomly to form acetoacetate labeled in both carbonyl and carboxyl positions.

OXIDATIVE DECOMPOSITION OF VITAMIN A. I. STABILITY OF VITAMIN A TOWARDS OXIDATION AND IRRADIATION. R. A. Bolomey (Monsanto Chemical Co., Oak Ridge, Tenn). *J. Biol. Chem. 169,* 323-9 (1947). II. ADSORPTION SPECTROPHOTOMETRY OF OXIDIZED VITAMIN A. *Ibid.* 331-5. Aeration of vitamin A acetate dissolved in triacetin and of soup fin shark liver oils or long standing of diluted solutions of these oils both in the presence and in the absence of light resulted in the successive appearance of maxima towards lower wavelengths. These were located at 326-328, 310-312, 294-296, 284-286, and 274-275 mμ. It is believed that irradiation produces a secondary photo-oxidation that is responsible for the changes in the absorption spectrum of vitamin A reported by others.

THE PRODUCTION OF SARCOMA WITH WHEAT-GERM OIL. P. N. Harris (Lilly Res. Labs., Indianapolis). *Cancer Research 7,* 26-34 (1947). In contrast to the observations of Rowntree, Lansbury, and Steinberg, no tumors appeared in 85 rats surviving oral treatment for 3-18 months with 2-8 c.c. of wheat-germ oil daily (total 220-1780 c.c.). The major portion of the oil used was prepared from wheat germ from the same source (Gen. Mills, Minneapolis) as that used by Rowntree. The oil and a greenish sediment in it showed spectroscopic properties of none of the better-known carcinogenic hydrocarbons. Neither thiamin nor riboflavin deficiency promoted tumor development in animals fed the oil. Repeated subcutaneous or intraperitoneal injection of the oil caused sarcomas in 2 mice (5% of animals tested) and 16 rats (8%). The production of these tumors is considered to be a nonspecific reaction to chronic irritation. The ether extracted oil was more irritating than expressed oil. (*Chem. Abs. 41,* 4224-5).

THE DETERMINATION OF TOCOPHEROL IN NATURAL FATS AND OILS. N. Lundborg (Univ. Stockholm). *Arkiv. Kemi, Mineral., Geol. A21,* No. 2, 1-13 (1945). By the method of Emmerie and Engel and the saponification method of Allport the contents of tocopherol in mg. per 100 g. of oil or fat were found to be: soybean 23.4, peanut 11.2, rape 9.0, butter 3.0 or less, and margarine 8.9. Tocopherol was detected in skim milk, and the maximum content was 42 mg. per 100 ml. (*Chem. Abs. 41,* 3549.)

BIOLOGICAL DETERMINATION OF LIPOCAIC. V. Baccari and F. Fidanza (Univ. Napoli, Italy). *Boll. soc. ital. biol. sper. 22,* 772-4 (1946). Lipocaic (antifatty liver factor) was prepared by the method proposed by Entenman *et al.,* and its preventive action against P intoxication studied. White rats were given 2 subcutaneous injections (total 75 mg./kg.) of phosphorated oil. All were kept on the same diet but some also received 50 mg. of the antifatty liver factor *per os* daily. The treated rats showed initial loss in weight as did the controls but soon their weight increased to above normal values. The livers of these rats contained a much lower titer of lipoids. (*Chem. Abs. 41,* 3154.)

MECHANISM AND ACTION OF LIPOCAIC. I. ACTION ON GAS AND SUGAR METABOLISM. G. Frada and V. Cali (Univ. Palermo, Italy). *Boll. soc. ital. biol. sper. 22,* 906-8 (1946). Oral administration of 0.5-1 g. pancreatic powder to humans caused no appreciable modification of energy metabolism or blood-sugar titer. Intramuscular injections of the hormone (prepared according to the Dragstedt method) were made in guinea pigs in doses corresponding to 500 mg. powdered pancreas. These injections caused an increase of 8-10% in ketone bodies of the blood. There was an increase in the respiratory quotient and an initial increase of 10-15% in blood-sugar titer followed by a moderate diminution after 3-4 hours. In animals killed 6-8 hours after the injection there was a marked reduction up to 50% in hepatic glycogen and a lesser diminution in the glycogen of the heart, skeletal muscle, and liver. (Chem. Abs. 41, 3213.)

INORGANO-ORGANIC GELS IN PINENE. V. GEL-STRENGTH MEASUREMENTS OF GELS OF SODIUM STEARATE IN PINENE. M. Prasad, S. S. Dharmatti, and G. S. Hattiangdi (Royal Inst. Sci., Bombay). *Proc. Ind. Acad. Sci. 24A,* 287-94 (1946). The gel strengths of gels of Na stearate in pinene were measured by means of a plunger method. For these gels log (gel strength) varies linearly with log (concentration). VI VISCOSITY CHANGES WITH TIME AND SHEAR DURING THE GELATION OF SOME SOAP SYSTEMS IN PINENE. *Ibid.* 295-303. G. S. Hattiangdi and S. P. Adarkar. A rotating-cylinder viscometer was used to determine the viscosity of gel-forming solutions of Na oleate, stearate, or palmitate in pinene. Determinations were made at various time intervals at different rates of shear. (*Chem. Abs. 41,* 1910-11.)

PATENTS

RENDERING OF FATTY MATERIALS. H. L. Keil (Armour & Co.). *U. S. 2,423,102.* A process for rendering fats from animal fatty materials comprises conditioning the materials by mixing therewith a proteolytic enzyme material, and to produce liberation of the fats from the protein tissue by subjecting said conditioned material at a pH in excess of 6.0 to the action of heat in excess of 140° F., and separating the released fat from the protein matter.

APPARATUS FOR DEODORIZATION OF ANIMAL AND VEGETABLE OILS. D. K. Dean (Foster Wheeler Corp.). *U. S. 2,422,185.* The raw oil which is to be deodorized is passed continuously through a preliminary deaerating chamber before being heated at all, or before being heated to a sufficient temperature to cause any adverse chemical effect, to remove a portion of the vapors and especially the air before the oil undergoes the high temperature treatment necessary to complete deodorization. With this method, steam consumption and operating costs are reduced as compared with prior methods, and the size of the apparatus required for carrying out the method is reduced and the cost thereof is correspondingly less.

WINTERIZING VETETABLE OILS. F. P. Parkin and G. N. Walker (Minnesota Linseed Oil Paint Co.). *U. S. 2,425,001.* The process of purifying natural, vegetable oils for simultaneously removing the hydrophilic and waxy components comprises pre-chilling the oil to a temperature below 60° F. for a period sufficient to cause a cloudy precipitate to form therein when a sample of the oil is permitted to resume a normal temperature, maintaining the thus chilled oil at a temperature sufficiently low so that the cloudy precipitate does not redissolve in the oil, thereafter adding ½ to 5% of water to the oil, thoroughly admixing the oil and water and centrifuging the oil to separate the resultant sludge.

METHOD OF TREATING TALL OIL. J. Harwood and E. F. Binkerd (Armour and Co.). *U. S. 2,423,236.* A pretreatment of tall oil fatty acids with 2-10% alkali renders them more susceptible to hydrogenation.

WAX EMULSIONS. J. O. Handy (Duzzel Corp.). *U. S. 2,424,952.* A coating emulsion particularly for fresh fruit and vegetables to retard decay and minimize shrinkage contains candelilla wax, paraffin, shellac, neutral soap, and water.

CLEANING AND PRESERVING WAX. G. P. Beach. *U. S. 2,423,137.* The product is prepared by heating 40-55 wax, 20-50 linseed oil, and 18-22% alkali.

ICE CREAM. M. Landers (Lanco Products Corp). *U. S. 2,423,600.* A composition for improving the texture of ice cream comprises a water-soluble salt of carboxymethylcellulose and a mixed glycerol diester of a higher fatty acid and an aromatic carboxylic acid.

COMPOSITE CREAM WHICH, WHEN APPLIED TO THE SKIN, FORMS A PROTECTIVE COATING AGAINST FLASH-BURNS. G. B. Fauley (U. S. Navy) and A. C. Ivy. *U. S. 2,425,311.* An ointment effective against burning by sparks and hot objects contains fatty oil, fat acids, solvents, metallic soaps, borax, and pigment.

ANTIFOAMING AGENTS. Imperial Chemical Industries, Ltd. *Brit. 568,510.* Certain acylated diamines and polyamines of comparatively high molecular weight when added to H_2O in a steam generator reduce foaming and priming during evaporation and permit a considerable increase in the concentration of solids in the H_2O without carry-over in the boiler or generator. Thus antifoaming agents were obtained from oleic acid and diethylenetriamine (low-melting brown wax), from stearamide and CH_2O (light-colored waxlike solid), from palmitamide and trioxymethylene (light-colored waxlike solid), and from castor oil and triethyltetramine (very viscous brown oil), from decamethylenediamine and myristic acid (tan wax), and from several other similar combinations. (*Chem. Abs. 41,* 4260.)

CONDENSATION PRODUCTS OF AMINES CONTAINING HYDROXYL GROUPS AND FATS, FATTY ACIDS, THEIR ESTERS, SULFONIC ACIDS, SULFONATED FATTY ACIDS, AROMATIC MONO- OR POLYCARBOXYLIC ACIDS, OR THE LIKE. N. V. Olieraffinaderij "Zuilen." *Dutch 55,072.* Reaction follows either by esterifying the HO group or by acylating the amino groups and takes place in an autoclave, which is evacuated before heating to start reaction. The pressure occasioned by water vapor and the heat is trying on the autoclave and it lowers the output. In an example 500 g. fatty acid (I value 59, acid value 245) is heated in an autoclave after evacuating 1.5 hours at 210-15° with 135 g. 100% $EtNH_2$. After 1 hour, the pressure is slowly lowered and kept low. (*Chem. Abs. 41,* 3479.)

COPPER HYDROXY SOAPS. A. Minich (Modex Products Co., Inc.). *U. S. 2,423,611.* The new fungicidal, anti-fouling, insecticidal compound is a dry granular hydroxy Cu soap of a plurality of acids, one of which is naphthenic acid and the remainder of which is selected from the soap-forming acid group consisting of oleic acid, 2-ethylhexoic acid, hydrogenated rosin, cocoanut fatty acid, and stearic acid.

METHOD OF PREPARING COPPER FUNGICIDE SOLUTIONS. L. Roon (Nuodex Products Co.). *U. S. 2,423,619.* The method comprises: reacting water-insoluble Cu, Cu metal, $Cu(OH)_2$, or $CuCO_3$, together with at least one substantially water-insoluble monobasic organic acid in the presence of aqueous ammonia to produce *in situ* an aqueous ammoniacal solution of a substantially water-insoluble Cu soap.

WATERPROOFING TEXTILE MATERIAL WITH LINSEED OIL. L. Witbaard. *Dutch 53,616.* The material is treated with a mixture of equal volumes raw linseed oil, boiled linseed oil, and a watery suspension of lime, ZnO, or MgO, and some siccative. Fat may be added. (*Chem. Abs. 41,* 3634.)

FROTH FLOTATION OF NONMETALLIC MINERALS. J. B. Clemmer and C. Rampacek. *U. S. 2,424,552.* Fatty acids and alkaline phosphates are used as the flotation agent.

BREAKING PETROLEUM EMULSIONS. C. M. Blair, Jr. (Petrolite Corp.). *U. S. 2,422,177.* Subresinous derivatives of fatty oils are used as demulsifiers.

PETROLEUM DEMULSIFIERS. C. M. Blair, Jr. and D. M. Schulz (Petrolite Corp.). *U. S. 2,423,364.* Specially treated condensation products of fatty oils and certain organic acids are used.

PETROLEUM DEMULSIFIER. C. M. Blair, Jr. (Petrolite Corp.). *U. S. 2,423,365.* Special derivatives of fat acids and amines are utilized as petroleum demulsifiers.

PROCESS FOR BREAKING PETROLEUM EMULSIONS. P. G. Carpenter (Hercules Powder Co.). *U. S. 2,425,175.* A process for breaking petroleum emulsions of the water-in-oil type comprises subjecting the emulsion to the action of an aminated chlorinated paraffin which is characterized by a nitrogen content of 1-11% and a chlorine content of 2-20%.

ADDITION AGENT TO LUBRICANTS. J. M. Musselman (Standard Oil Co.). *U. S. 2,422,206.* It is an object of the invention to carry out the reaction between a sulfide of phosphorus and an oxygen-containing raw material, such as an ester type wax, under conditions to improve the yield of the reaction product.

LUBRICATING COMPOSITION. A. T. Knutson and E. F. Graves (The Lubri-Zol Corp.). *U. S. 2,422,243.* A lubricating composition comprises a major proportion of mineral lubricating oil and an amount sufficient to impart extreme pressure properties of *p*-Et benzene sulphinic acid.

COMPOUNDED LUBRICATING OIL. C. Winning (Standard Oil Development Co.). *U. S. 2,422,275.* The invention relates to lubricating oil additives prepared from S halides and unsaturated materials.

COMPOUNDED LUBRICATING OIL. L. S. Mikeska (Standard Oil Development Co.). *U. S. 2,242,276.* The invention relates to lubricating oil additives prepared from S halides and unsaturated materials.

LUBRICANT COMPOSITION. W. J. Sparks and D. W. Young (Standard Oil Development Co.). *U. S. 2,424,588.* Polyester compounds of glycol and dimerized unsaturated fat acids are added to mineral oil lubricants to improve the viscosity index.

Drying Oils

Edited by HOWARD M. TEETER

DRYING OIL POLYMERIZATION. T. F. Bradley. *J. Oil, Colour Chemists' Assoc. 30,* 225-44 (1947). A critical review of the polymerization of drying oils and of the polymerization of simpler substances of similar structure. 35 references.

APPLICATION OF SELECTIVE SOLVENTS FOR THE EXTRACTION OF CAMELINE OIL. C. Paquot and M. Le Comte. *Compt. rend. 224,* 348-50 (1947). Selective solvents such as methanol, ethanol, acetonitrile, and furfural were used for the extraction of cameline (wild flaxseed) oil (*I*). When *I* (I. V. 139-43) was extracted with methanol or ethanol at 15° a fraction (35-40% of *I*) of iodine value 16-18 higher than *I* was obtained. Furfural gave a fraction having an iodine value 23 higher than *I*. An apparatus for a continuous laboratory procedure is described (*Chem. Abs. 41,* 5321-2.)

AN ALKYD RESIN CONTAINING SHELLAC AND DEHYDRATED CASTOR OIL FATTY ACIDS. L. L. Carrick, S. M. Das Gupta, and R. C. Das Gupta. *Am. Paint J. 31,* No. 47, 70, 72, 76 (1947). The resin was prepared by first reacting glycerol and dehydrated castor oil, then cooking in shellac, and finally reacting with phthalic anhydride. Further condensation with maleic anhydride was found to improve the resin. The product is compatible with nitrocellulose lacquers in all proportions and on baking at 90° produces a varnish film superior to pure shellac film. The dielectric strength and water resistance of the film indicate possibilities as an insulating varnish.

ON THE HARDENING OF PHENOL ALCOHOLS AND THEIR REACTION WITH DRYING OILS. W. Charlton and L. E. Perrins. *J. Oil, Colour Chemists' Assoc. 30,* 185-198 (1947). The hardening of phenol alcohols and their reaction with drying oils was studied by measuring the amount of water and formaldehyde liberated during thermal treatment. The presence of linseed oil had little effect on the evolution of formaldehyde, indictating that the methylol groups undergo merely the characteristic hardening reaction under these conditions. In the presence of tung oil, the evolution of both formaldehyde and water was reduced. This indicates that few methylol groups undergo the hardening reaction and that most of them react with the oil, partly by addition and partly by condensation. The behavior of dialcohols with Synourin and with linseed stand oil resembled more their behavior with tung oil than with linseed oil. To what extent these results may be applied to the reaction of alkaline condensed resins with drying oils remains to be determined.

AUTOXIDATION OF OLEFINS. FORMATION OF UNSATURATED ALCOHOLS FROM OLEFINS BY THE ACTION OF ORGANIC PERACIDS. W. J. Hickinbottom (Univ. Birmingham). *Nature 159,* 844 (1947). When peracetic acid reacts with α- and β-diisobutylenes unsaturated alcohols are formed in addition to other products. It is now found that the formation of these alcohols does not depend on substitution of the olefin, but on the isomerization of the intermediate epoxide. Thus, 2,4,4-trimethylpentan-2,3-epoxide yields 2,4,4-trimethylpenten-1-ol-3 when treated with acetic acid containing a trace of sulfuric acid. These results provide experimental support for the hypothesis that hydroperoxides are formed from unsaturated fat acids by saturation of the double bond by molecular oxygen, opening of the moloxide ring, and change in position of the double bond.

KINETIC STUDIES IN THE CHEMISTRY OF RUBBER AND RELATED MATERIALS. IV. THE INHIBITORY EFFECT OF HYDROQUINONE ON THE THERMAL OXIDATION OF ETHYL LINOLEATE. J. L. Bolland and P. ten Have (British Rubber Producers' Research Assoc., Welwyn Garden City, Herts). *Trans, Faraday Soc. 43,* 201-10 (1947). Study of the kinetics of the oxidation of Et linoleate in the presence of hydroquinone shows that the inhibitory effect of the hydroquinone is due solely to termination of the oxidation chains by reaction with peroxide radicals. The hydroquinone undergoes chemical change during this reaction.

PATENTS

Emulsions for painting and varnishing purposes. G. B. Heijmer. *U. S. 2,424,458.* A water-in-oil emulsion suitable for use as varnishes and paints comprises an initial fraction of tall resin oil containing about 50% of unsaponifiable oil-like matter and a balance mainly of fatty acids, obtained by acidifying and distilling in vacuum the sulfate soap of the sulfate soap process. The remainder of the continuous phase comprises a film-forming vehicle containing at least 20 % by weight of drying oil and a sufficient quantity of water-insoluble organic solvents to form a brushable coating composition. The discontinuous phase consists principally of water.

Tall oil ester resins and their production. F. A. Bent and E. A. Peterson (Shell Development Corporation). *U. S. 2,424,074.* A tall oil ester resin is prepared by heating tall oil with a polymerized ester of a carboxylic acid and an aliphatic unsaturated monohydric alcohol containing an olefinic linkage between the β- and γ-carbon atoms.

Modifying drying oils. F. G. Nessler and C. E. Penoyer (Sherwin-Williams Co.). *U. S. 2,425,200.* A non-hydroxylated, non-ketonic type of drying oil having non-conjugated double bonds is modified to improve the oil as to drying speed and for heat bodying speed by heating the oil to a temperature in the range of 240°-340° and intimately contacting it at such a temperature with an anhydride of a saturated, aliphatic, mono-carboxylic acid having up to five carbon atoms, for a time sufficient to effect such modification of the oil by contact with the anhydride.

Emulsions for painting and varnishing purposes. Klint, Bernhardt and Co. *Brit. 575,448.* Water-in-oil emulsions for painting, varnishing or lacquering are prepared by forming a solution of tall oil resin together with an alkyd resin and a drying oil with or without the addition of organic solvents, and then emulsifying the solution with water, and incorporating pigments for the manufacture of oil paints. (*Chem. Abs. 41,* 5324.)

Soaps

Edited by
LENORE PETCHAFT

Soap expands industrial uses. Milton A. Lesser. *Soap 23,* No. 8, 37-40, 152C (1947). A review article covering increased uses of soap in industrial fields. Fields discussed include: emulsification in solvents, rubber polymerization, flotation, oil well treatment, lubrication, metal processing and cleaning, bituminous emulsions, insulating materials, textiles, paper, adhesives and plastics, and resins. 90 references.

Mersol and sodium mersolsulfonic acid. H. P. den Otter. *Chem. Weekblad 43,* 211-17, 276-82 (1947). Mersol contains 80-86% of aliphatic sulfonyl chloride (average chain length 15 C atoms) and 14-20% of unhydrolyzable material. The Na salt of the corresponding sulfonic acid (called Na Mersolsulfonat, Na Mersolat, or simply Mersolat) is hygroscopic and easily soluble. The manufacture of Mersol by reaction of SO_2 and Cl with hydrocarbons produced by the Fischer-Tropsch synthesis is described. Depending on the reaction conditions, there is produced Mersol D (50-60% of monosulfonyl chloride, 10-20% of di- and higher sulfonyl chlorides, and about 20% of unchanged hydrocarbon) or Mersol H (about 50% monosulfonyl chloride and 50% of unchanged hydrocarbon). Unchanged hydrocarbon is best removed by extraction with benzine; steam-distillation is too expensive. Production of Mersolat and its use as a detergent are described (*Chem. Abs. 41,* 5327.)

New types of soap and similar substances. Ch. Granacher. *Ciba Rev. 56,* 2039-45 (1947). Fat-acid condensation products, sulfonated alcohols, ion-inactive products (obtained by the action of ethylene oxide on fat acids, fatty alcohols, or other suitable compounds), and cation-active compounds are discussed, and uses of various commercial products in the textile industry are described. (*Chem. Abs. 41,* 4936.)

Glycerine. N. N. Dalton. *Soap 23,* No. 8, 41-2, 139 (1947). This review includes chemical and physical properties of glycerine, uses—with emphasis on peace time applications—and historical review of production methods and consumption.

Manufacture of sulfo-oxygenated soaps from petroleum by-products. The van Andel process. E. Lemaire. *Genie civil 122,* 27-9 (1945); *Chimie & Industrie 55,* 368 (1946). The van Andel process starts from hitherto unused residues from the manufacture of lubricating greases. The residues are distilled and 160-310° fraction contains a large proportion of olefins; appropriate treatment with H_2SO_4 permits the production of sulfo-oxygenated soaps comparable in value to soaps presently found on the market. They have the same colloidal properties as ordinary soaps, which properties are the basis of their detergent power; but whereas ordinary soaps have the general formula RCO_2Na, the sulfo-oxygenated soaps have the general formula RSO_3Na (sulfonate) or $ROSO_3Na$ (alkylsulfates) or a mixed formula. Presence of the CO_2Na group confers on soaps properties similar to those or carbonates: precipitation by all metal salts except alkali metal salts and easy decomposition by acids. The sulfonates and alkyl sulfonates, on the other hand, remain soluble irrespective of the cation combined to the functional group: they are not precipitated by Ca or Mg salts or hard water, they are not decomposed by acids or sea water. They are much more water-soluble than ordinary soaps, their solutions have a lower viscosity, on the whole their wetting and detergent power is definitely higher. From this standpoint the van Andel sulfo-oxygenated detergents are superior to all other products: in 35% aqueous solution they are still fluid, whereas other sulfonates or alkylsulfates cannot be used at concentrations above 5% and soaps above 1%; their Ca and Mg salts are highly soluble and unaffected by sea water. They are the best products for cleaning, laundering, bleaching, and degreasing in the textile and dyeing industry. (*Chem. Abs. 41,* 4936.)

An attempt to determine the activity of the ions of the fatty acids in soap solutions. Per Ekwall and Olavi Harva. *Finska Kemistsamfundets Festskrift 1891-1941, 1944,* 257-67. A preliminary
Festskrift 1891-1941, 1944, 257-67. A preliminary
study which shows that it is possible to determine the activity of the ions of the fatty acids in soap solutions by the use of the electrode Ag/Ag salt of the fatty acid. The results obtained agree in general with those of several other methods used for the study of the structure of soap solutions. (*Chem. Abs. 41,* 4995.)

The salting out of tall-oil soaps. Olavi Harva (Turun Saippua O. Y., Turku, Finland). *Suomen Kemistilehti 19B,* 77-83 (1946). In the purification of soaps prepared by saponification of tall oil, 3 or 4 salting-out operations must be made. The 1st should be at 60-80° with 7% brine in order to give a spent lye with 4.5-5% NaCl. The loss is 3-4%, but it consists mainly of oxidized resin and fatty acids and the resinous and tarry matter responsible for the dark color of the soap. Higher temperatures are unsatisfactory because separation of the spent lye is more difficult and the salting-out losses are greater without practical advantage. In successive saltings, the temperature may fall to 40-50°, but the salt concentration must be the same as or higher than in the 1st to minimize salting-out loss. The 3rd and 4th salting operations eliminate organic coloring matter and other substances lowering the quality of the soap. The amount of resin and fatty acids lost at this point is small. The total loss of tall-oil soap is 6-7%. (*Chem. Abs. 41,* 5326.)

Medicated and cosmetic soaps. S. Alperin. *Am. Perfumer Essent. Oil Rev. 49,* No. 7, 53-5, No. 8, 167, 169, 171-2 (1947). Toilet and cosmetic soaps may have skin irritating properties if they contain K coconut oil soap. Colloidal thickening agents—cellulose esters—which act as protective colloids inhibit this property. Superfatting agents insure neutrality, reduce cracking tendency, produce smooth lather and may act as solvent for other additives. Typical agents are lanolin, fatty- or wax-alcohols, lanette wax, vaseline, lecithin, and cholesterol. Formulations using some of these compounds are listed. The function of soap as a germicidal agent and carrier of other such agents is discussed. Carbolic acid, ti-tree oil, tar, sulfur, and Givaudan-Delawanna's G-11 are suggested as ingredients for the production of "medicated soaps."

Studies on detergent power. J. P. Sisley. *Am. Dyestuff Reptr. 36,* 457-65 (1947). The factors on which detergent power depends are reviewed. These include: wetting power, foaming power, emulsifying power, dispersing or deflocculating power, solvent power, protection against redeposition, and resistance to lime salts. The mechanism of the manifestations of detergent power depends on other variables such as the nature of the detergent, nature of the surface to be cleansed, nature of the impurity or soil to be removed, nature of the water employed, and effect produced on the surface to be cleansed. These factors are discussed at length. Methods of determining detergent power of agents to be used in laundry work are covered. Actual washing tests or empirical physical tests are the two most prevalent types, while others are measurement of diminution in weight of fabric being washed or the whitening effect on the washed sample. Numerous soiling formulas and techniques are also disclosed. The Kier Method in which a sample of soiled fabric is subjected to kier boiling and the amount of dirt removed determined gravimetrically, and the Pressing Method which consists of duplicating the mechanism of hand washing and determining the detersive effects colorimetrically are described in detail. Other fields covered in this review of evaluation of detergent power are wool scouring, hair shampooing, silk treatment, boiling off of vegetable fibers, and rayon and spun rayon treatment. 53 references.

Effect of temperature on micelle formation as determined by refraction. H. B. Klevens (Univ. Chicago). *J. Colloid Sci. 2,* 301-3 (1947). Careful measurements of the critical concentration for the formation of micelles in aqueous solutions of Na decyl sulfonate, Na dodecyl sulfonate, K laurate, and K myristate at 25-65° reveal that the critical concentration increases slightly with increasing temperature. The data were obtained by the use of refraction. The dye-spectral method gives lower values which decrease with increasing temperature. This discrepancy is a property of the dye-spectral method, which does not give a completely accurate picture of micelle formation. (*Chem. Abs. 41,* 4694.)

A phase study of sodium palmitate-alkaline electrolyte-water systems. Merrill and Raymond Getty (Philadelphia Quartz Co., Philadelphia, Pa.). *J. Am. Chem. Soc. 69,* 1875-82 (1947). A phase study has outlined the regions of existence of isotropic solutions up to 160° for 5 Na palmitate-builder-water systems. The effect of the builders on the transition temperature from hydrated crystalline to liquid crystalline Na palmitate was also determined. The builders were Na_3PO_4, $Na_4P_4O_7$, Na_2SiO_3, and Na silicates of SiO_2/Na_2O ratios by weight of 2.46 and 3.93. The results resemble qualitatively those previously obtained with a commercial soap and various builders, and with Na or KCl and other soaps. More of the silicious silicates than of the metasilicate or phosphates is required to "salt in" liquid crystalline middle soap or to "salt out" liquid crystalline neat soap. The silicious silicates have less effect than the phosphates on the transition temperature from crystalline to liquid crystalline soap systems.

Aluminum dilaurate as association colloid in benzene. James W. McBain and Earl B. Working (Stanford Univ., Calif.). *J. Phys. Colloid Chem. 51,* 974-80 (1947). Al dilaurate, $Al(OH)L_2$, is an association colloid in benzene, as shown by osmotic-pressure measurements indicating rapid association with increasing concentration, and by viscosity measurements which show an increase of relative viscosity with increase of temperature, as well as a great dependence of structural viscosity upon concentration and time.

Studies of aluminum soaps. VIII. Water sorption and moisture content. G. W. Shreve, Harold H. Pomeroy, and Karol J. Mysels (Stanford Univ., California). *J. Phys. Colloid Chem. 51,* 963-6 (1947). The moisture content of Al dilaurate, $Al(OH)L_2$ is readily determined gravimetrically. A sorption isotherm of water vapor on $Al(OH)L_2$ at 50° is reported showing less than 3% sorbed, and at moderate humidities only 1%. The formation of water by reactions between fatty acids and basic Al soaps or from OH groups does not occur during moisture determination of Al soaps by benzene distillation, but it is brought about by the Karl Fischer reagent.

PATENTS

Soap. David Cauchaner. *Brit. 569,106.* Egg yolk or yolk and white are suspended in $CHCl_3$ or $C_3H_5(OH)_3$ and added to the soap mass immediately before it passes through a soap-milling machine. (*Chem. Abs. 41,* 4940.)

Improvements in the manufacture of soap. Lever Brothers & Unilever, Ltd. *Brit. 577,880.* Dark-colored fats, greases or tallows are treated with H_3PO_4 and H_2O_2, bleached with bleaching earth, saponified to form a soap, and the soap is bleached with a bleaching agent to yield a light-colored product. The fats are bleached according to *Brit. 577,879.* The fatty acids obtained upon saponification are bleached with 0.01-0.5% of Na dithionite or Na sulfoxylate to yield products lighter in color than the original stock, indicating that no color reversion occurs during saponification and bleaching. The yellow and red colors on the Lovibond scale are both decreased in the process. (*Chem. Abs. 41,* 4937.)

SHORT FATTY ACIDS USED IN DETERGENTS. Emil E. Dreger and John Ross (Colgate-Palmolive-Peet). *U. S. 2,422,613.* Short chain fatty acids normally of little value in detergents are reacted to form efficient detergents and wetting agents. This process is accomplished by converting the fatty acids into ketones; hydrogenating the ketones to form secondary alcohols; sulfating the alcohols to produce secondary alcohol sulfuric acid esters, and then neutralizing the esters with lime, ammonia, or alkali metal hydroxides.

PROCESS OF MAKING MIXTURES OF EMULSIFYING AND WETTING AGENTS. Alfred R. Globus. *U. S. 2,424,951.* Improved wetting and emulsifying agents prepared by sulfonating cycloaliphatic hydrocarbons using an excess H_2SO_4, a fatty acid such as oleic as an absorbing agent, and using triethanolamine as a neutralizing agent.

CONDENSATION OF OLEFIN SULFONIC ACIDS WITH AROMATIC COMPOUNDS. Walter P. Williams (The Procter & Gamble Co.). *Brit. 568,725.* Propylene or isobutylene sulfonic acid is condensed with a substituted benzene or naphthalene, whose substituent is alkyl, aryl, aralkyl, OH, alkoxy, hydroxyalkoxy, aryloxy, keto, or acid amide. The alkyl benzene or naphthalene should contain 8-15 C atoms in the aliphatic side chain. The reaction is carried out in a solvent and with a catalyst, such as H_2SO_4 or HF, or a Friedel-Crafts catalyst, such as BF_3. The H_2O-soluble salts of the compounds thus formed have detergent properties. (*Chem. Abs. 41,* 4513.)