ABSTRACTS . . . . Don Whyte, Editor

• Oils and Fats

R. A. Reiners, Abstractor

Hardening of fatty oil with use of multiple-component catalysis. I. Catalytic activity of unreduced catalyst consisting mainly of nickel and copper. S. Ueno, T. Yoshizaki and S. Ito (Osaka Univ.). *J. Chem. Soc. Japan,* Ind. Chem. Sect., **52,** 194-6(1949). A Ni-Cu-kieselguhr (1:1:7) catalyst was prepared by mixing kieselguhr with $NiCO_3$ and $CuCO_3$ which were precipitated from a $NiSO_4$-$CuSO_4$ solution. The precipitate was washed, filtered, and dried at 100-105°. This catalyst was used without being subjected to reduction in H_2. Experiments were done at 180-200° with soybean oil in an autoclave under varying H_2 pressures, amounts of catalyst, durations, and water contents. Hardening occurred at low pressures. Above 200° hardening occurred even at 1 atmosphere pressure within 2 hrs. with 1% catalyst; addition of free fatty acid showed small effect. Water added to oils worked as a negative catalyst in some cases, but accelerated the reaction in others. Addition of Na, K, Mg, Ca, Al, Pb, Cr, and Mn salts to the catalyst showed negative results. This unreduced catalyst showed a lag of time before hardening began. (*Chem. Abs.* **45,** 4063)

Stabilization of oils, fats, and soaps. R. Cartwright. *Soap, Perfumery & Cosmetics* **24,** 47-51(1951). A discussion concerning hydrogenation, prooxidants, natural and synthetic antioxidants, and colors and perfumes. (*Chem. Abs.* **45,** 4063)

Catalytic hydrogenation in the presence of water. II. Unsaturated fatty oil and rice-bran oil having high acid numbers. S. Tsutsumi (Osaka Univ.). *J. Chem. Soc. Japan,* Ind. Chem. Sect., **52,** 191-3(1949). Satisfactory hydrogenation of chrysalis oil (iodine no. 124, acid no. 1.6) could not be obtained with a catalyst containing Ni oxide + water, or Ni oxide + Japanese acid clay. Reaction goes smoothly with a catalyst containing 2% Ni oxide + 2.5% water + 3% Japanese acid clay. With this catalyst, under 15 atmospheres of H_2 and at 180°, the reaction is completed within 2 hrs. The resulting oil has iodine no. 2.2, acid no. 10.9, and m.p. 60.5-61°. Rice-bran oil having a high acid value could be only poorly hydrogenated. The role of water and the clay in the case of unsaturated fatty oil as well as that of the clay on high acid no. oil is to polarize the double bond of the carboxyl group which favors the reaction. (*Chem. Abs.* **45,** 4063)

Ricinoleic acid. II. Some physical properties including polymorphism. F. Hawke (Univ. Witwatersand, Johannesburg). *J. S. African Chem. Inst.* [N.S.] **2,** 125-9(1949). Pure ricinoleic acid exists in 3 polymorphic forms with m.p.s. 5.0°, 7.7°, and 16.0°; the transition temperatures are 6.0° and 7.2°. d^{25} is 0.9417; n^{25} is 1.4703; $[\alpha]^{25}$ is 7.79. (*Chem. Abs.* **45,** 4063)

Problem of synthetic fatty acids. S. Namyslowski. *Przemysl Rolny i Spozywczy* **4,** 173-7(1950). A review of the methods of oxidation of paraffins. It is estimated that 1,500,000 tons of the paraffin fraction from Fisher-Tropsch synthesis will be needed for covering of the Polish demand for technical fats. (*Chem. Abs.* **45,** 4062)

Marine animals as a source of fat. J. A. Lovern. *Brit. J. Nutrition* **2,** 184-7(1948). There is no essential difference between whale and fish oils as sources of edible fat, but both contain higher proportions of unsaturated acids than do land animal and seed fats. This is advantageous, as on hydrogenation it gives plasticity over an extended range of temperature. The future of the herring-oil industry and its production are discussed. (*Chem. Abs.* **45,** 4061)

Technical reesterification of fats. M. Naudet (Faculte sci., Marseilles). *Bull. mens. ITERG* **5,** 51-4(1951). The effects of undirected resterification on m.p., crystallization, and plasticity of mixed triglycerides are discussed. Frothing of mixtures containing glycerides of very different chain lengths disappears as a consequence of reesterification. Catalysts and the new processes of directed reesterification are reviewed. (*Chem. Abs.* **45,** 4061)

A comparative study on the chemical compositions of different parts of soybean. I. K. Nakajima and S. Sakurada (Sugiyama Research Inst. Ind. Chem.). *J. Agr. Chem. Soc. Japan* **18,** 835-42(1942); *Bull. Agr. Chem. Soc. Japan* **18,** 69-70(1942). The large perfect seeds of the soybean produced in Chien-tao, Eastern Manchuria (293 seeds weighing 100 g.), were composed of 6.13% hull, 1.67% embryo, and 92.20% cotyledon, by weight. The cotyledon was divided into 3 parts and analyzed. The exterior part (comprising 27.2%), middle part (42.3%), and interior part (30.5%) had, respectively, crude fat 13.87, 19.25, 22.51%, crude protein 48.41, 45.12, 42.18%, and ash 5.04, 5.13, 4.60% on a moisture-free basis. The embryo contained only 10.03% of oil of iodine value 149, while the whole bean contained 18.35% of oil of iodine value 131. (*Chem. Abs.* **45,** 3912)

Osageorange oil. J. L. Beal and D. G. Wenzel (Univ. of Kansas, Lawrence). *Trans. Kansas Acad. Sci.* **54,** 94-8(1951). Physical constants and the chemical composition were studied of osageorange oil, from *Maclura pomifera* (Rafinesque). The physical properties of the oil (foots removed) were found to be: d_{25} 0.9793, n_{20} 1.4950-1.5012, viscosity (Engler 37.8°) 21.0, saponification value 150.8, iodine value 100.8. Fatty acids constituted 69% of the oil; of these, 71.5% (48.9% of the oil) were unsaturated. The oil in the raw form is not edible because of a delayed burning sensation which it causes. A clear, amber-colored oil, without this taste, was produced by shaking the oil with 10% Na_2CO_3 and then washing with distilled water until the washings were neutral to litmus. (*Chem. Abs.* **45,** 5950)

The origin of volatile oils in seaweed. S. Cmelik (Inst. Oceanography Fisheries, Split, Croatia). ***Arhiv Kem.*** **21,** 204-8(1949). It was shown that the brown algae ***Dictyopteris polypodioides,*** which has a strong odor, contains 0.06% oil volatile with steam. Properties of the oil were: n_D^{20} 1.4899, acid no. 24.8, saponification no. 124.6, ester no. 99.8, acetyl no. 97.1. The similarity of the ester no. and the acetyl no. indicates negligible acetylation of the natural oil. From other values it is clear that the oil is rich in saponifiable compounds. Qualitative tests showed S in large amounts. The absence of N ruled out thiocyanate compounds; hence the oil was a polysulfide. The presence of dimethyl sulfide was not proven, but the strong and unpleasant odor of the live algae suggests that it may be formed *in vivo* (degradation product of original S-containing compounds) and may serve as defense against the epiphytes which are known not to feed on the algae. (*Chem. Abs.* **45,** 5949)

The decolorization of rice oil. I. Yamakita and Y. Fujii (Kyoto Univ.). ***Bull. Inst. Chem. Research, Kyoto Univ.*** **20,** 64 (1950). Pretreating crude rice oil with a dilute solution of acid or salt promotes the decolorizing effect of activated acid clay. The color of the oil of higher acid value caused by contact with iron is also easily removed by the same treating. (*Chem. Abs.* **45,** 5949)

The solubility of castor oil in solvent benzine. G. B. Martinenghi (Ist. nacl. Oleos, Rio de Janeiro, Brazil). *Olearia* **5,** 5-10(1951). The solubility curve of castor oil in commercial hexane for various temperatures and various contents of free acidity (expressed as oleic acid) shows that up to an acidity of 10-15% the critical temperature of mutual solubility is about 29°. For oils of acidity above 20-25% the critical temperatures are lower: for 30%, about 27.6°; for 50%, about 21.4°; for 65%, about 11.2°. (*Chem. Abs.* **45,** 5949)

The index of unsaturation and its relation to the indexes of acidity and peroxides of oils. L. R. Guimaraes and Emilia Pechnik. *Engenharia e quim.* (Rio de Janeiro) **3,** 18-23(1951). The peroxide no., acid no., and index of unsaturation of 3 oils were determined over a period of 75 days at room temperature. In cottonseed oil, the peroxide no. dropped from 100 to 78, acid no. (4) and index of unsaturation (60) remained practically constant. In the oil of *Oenocarpus batana,* the peroxide no. dropped from 110 to 71, acid no. increased from 140 to 166, and the index of unsaturation oscillated between 176 and 133. In oil of *Cocos coronata,* the peroxide no. dropped from 63 to 52, acid no. increased from 100 to 134, and index of unsaturation remained constant at about 110. (*Chem. Abs.* **45,** 5948)

The tendency of two isomers of linoleic acid to diene conjugation. P. Desnuelle and R. Massoni. *Compt. rend.* **230,** 965-6 (1950). The smaller tendency of certain oils after chemical treatment to form conjugated double bonds on heating with alkaline glycol than that of the original oil has been attributed to the presence of isolinoleic acid in the treated oils. In dehydrated castor oil there was found nearly as much isolinoleic as natural linoleic acid. This led to the hypothesis that dehydration of ricinoleic acid produced geometric isomers of linoleic acid in which conjugation is slower or less nearly complete than that of the natural isomer. To test this hypothesis linoleic acid was elaidinized. The linolelaidic acid formed on treatment with alkaline glycol gave a product with much lower absorption coefficient than that from natural linoleic acid. (*Chem. Abs.* 45, 5947)

Lubricating properties of vegetable oils. I. Comparative study of Domba oil, Hongay oil, and Mohua oil. V. Thiagarajan and B. S. Srikantan (Coll. Eng., Madras). *J. Indian Chem. Soc., Ind. & News Ed.* 13, 163-6(1950). Domba oil, Hongay oil, and Mohua oil from the seeds of *Calophyllum inophyllum, Pongamia glabra,* and *Bassia longifolia* have the following characteristics, respectively: iodine value 92.8, 89.1, 64.5; acid no. 30.3, 12.9, 12.0; d_{15} 0.9336, 0.9323, 0.9170; saponification value 198.0, 188.9, 195.3. Viscosity, C residue, and gumming and oxidation tests show that Domba oil could be used for general lubrication where a high-class oil is not required, while the other two could be used for bearings of small gas engines, enclosed gears, and heavy engines having forced and splash systems of lubrication. (*Chem. Abs.* 45, 5917)

A micromethod for fat analysis based on formation of monolayer films. K. K. Jones (Northwestern Univ. Med. School, Chicago). *Quart. Bull. Northwestern Univ. Med. School* 24, 253-6(1950). A method is described for the estimation of the mixed lipides of tissue, or the estimation of the saponifiable and nonsaponifiable fractions of such lipides, in which the lipides are spread as monomolecular layers on acidified water and the areas of such layers measured. The method is sensitive to a γ and duplicate samples check within 10% of each other. (*Chem. Abs.* 45, 5754)

Biochemical branched-chain carboxylic acids. IV. Unimolecular films of α-alkylstearic acids. G. Weitzel, Anna M. Fretzdorff and W. Savelsberg (Max-Planck Soc., Gottingen, Ger.). *Z. physiol. Chem.* 285, 230-7(1950). Force/area isotherms for 12 α-alkylstearic acids (alkyl = C_1 through C_{12}) on water were determined. The maximum and minimum surface occupied by a molecule increases with the length of the α side chain up to C_8, and after that point increasing the length of the side chain has no effect on the area. (*Chem. Abs.* 45, 5484)

Chemical-analytical study of the oil of orange seed. A. T. Jimenez-Castellanos. *Rev. real acad. cienc. exact., fis. y nat. Madrid* 36, 223-59(1942). The physical and chemical constants of the oil of orange seed were determined and compared with known constants. The fat acids are linoleic acid 46.69, oleic acid 21.03, linolenic acid 0.61, and solid acids 27.85%. (*Chem. Abs.* 45, 4948)

Self-coking of flaxseed. J. Cruellas. *Rev. facultad quim. ind. y agr.* (Univ. nacl. litoral, Santa Fe, Arg.) 19, No. 32, 97-101 (1950). Flaxseed piled up to a height of 5-6 m. and left for some 10 months carbonized in the lower 1 m. layer. This was due to favorable conditions of temperature rise, germination, fermentation, pressure, and humidity near the ground. In laboratory experiments dry flaxseed submitted to high pressures at 140 to 150° did not coke. On heating under pressure seeds which had started to germinate tended to carbonize. (*Chem. Abs.* 45, 4948)

Oil from the seed of Gokhru (Xanthium strumarium). R. C. Shrivastava, R. S. Krishnamurthy and C. R. Athawale (Agr. Research Inst., Nagpur). *J. Sci. Ind. Research* (India) 9B, 282(1950). The yield was about 175 lb. of oil per acre. The physical and chemical constants of the oil were: n_{40} 1.4697, saponification value 202.5, iodine value 111.9, R.-M. value 2.5. A sample of oil stored for about a year out of contact with air developed a thick, tenacious, pale-yellow, transparent film, slightly sticky but otherwise rubberlike. (*Chem. Abs.* 45, 4948)

Composition and appearance of avocado pears from Adana (Turkey) and properties and constants of their oil. T. Yazicioglu (Univ. Ankara, Turkey). *Fette u. Seifen* 53, 9-10(1951). The fruit contained water 63, oil 27, protein 2.5, N-free extract 3.6, crude fiber 2.5, and ash 1%. The oil was yellowish brown, of pleasant taste and odor, and had the following constants: d_{20} 0.9136, η_{20} 54.25 centipoises, acid no. 7, saponification no. 194, iodine no. (Hanus) 87, thiocyanogen no. (Kaufmann) 71, unsaponifiable 0.81%. The fatty acids consisted of saturated acids 16.8, oleic acid 65.5, and linoleic acid 17.7%. (*Chem. Abs.* 45, 4949)

Hydrogenation velocities of oleic acid and methyl oleate. M. Simonetta. *Chimica e industria* (Milan) 32, 211-14(1950). The velocities of hydrogenation of oleic acid (iodine no. 101, saponification no. 191), methyl oleate (iodine no. 92, saponification no. 189), and a 50:50 mixture of these (acidity 53.85%, iodine no. 95.4, and saponification no. 189.7) were determined by hydrogenating 20-g. samples with 0.5 g. of a Raney catalyst in an autoclave and following the reaction by the changes in H pressure and in iodine no. The kinetics of the hydrogenation at constant pressure of H were first order in all cases and the specific rate constants at all temperatures and pressures decreased in the order $k_{ester} > k_{mixture} > k_{acid}$. (*Chem. Abs.* 45, 4648)

Olive oils of national production. II. Influence of the degree of maturation of the fruits upon the composition of the fatty acids. P. Cattaneo, G. K. de Sutton and Juanita Schmidt. *Anales asoc. quim. argentina* 38, 268-82(1950). The physical and chemical changes in the composition of olive oil during maturation are studied. During this period the yield of olive oil increases from 3.5 to 19.2%, the iodine no. rises from 79.9 to 93.2, and the refractive index remains approximately constant. The content of free fatty acids decreases from 1.06 to 0.30 and increases again in overripe fruits. The unsaponifiable decreases from 1.54 to 1.00%, increasing again in overripe fruits. Oleic acid decreases from 74.5 to 59% (of total fatty acids) whereas linoleic acid increases from 6.6 to 22.5%. The saturated acids (16%) remain practically constant. (*Chem. Abs.* 45, 4947)

Changes in the properties of the fatty acids after sulfonation. E. Sericano (Soc. Olii, degras, affini, Genoa, Italy). *Cuoio, pelli, mat. concianti* 27, 38-41(1951). The sulfonation of oils changes the properties of the fatty acids contained in the oils, so it is not possible to identify the original oil by the examination of the constants of the acids. The experiments show that the sulfonation decreases noticeably the iodine no. of the fatty acids, and the decrease is about proportional to the amount of H_2SO_4 used, and to the time of the operation. The acid no. is sometimes increased by sulfonation, and this can be explained with the formation of lactones or internal anhydrides. In several cases there was observed the formation of fatty oxyacids, it is probable that this formation is related to the decrease of the iodine no. (*Chem. Abs.* 45, 4947)

The lubrication of metals by long-chain organic compounds. K. V. Shooter (Univ. Cambridge, Engl.). *Phys. of Lubrication, Brit. J. Applied Phys.,* Suppl. 1, 49-51(1951). Monolayers of fatty acids were deposited from solution in cetane on the surfaces of Cu, Fe, Zn, Cd, and Mg, and the coefficient of friction in the presence of the monolayer was measured with the Bowden-Leben apparatus. The results confirm Bowden's theory that for efficient lubrication chemical reaction and soap formation must occur. The results also show that more than a monolayer of soap on each sliding surface is required for good lubrication. (*Chem. Abs.* 45, 4914)

Progress in the chemistry of livestock fats. S. Liberman and E. Mirkin. *Myasnaya Ind. S.S.S.R.* 22, No. 1, 20-7(1951). The composition of various livestock and goose fats are discussed. Lard and beef fat were crystallized into 7 fractions and the characteristics of the fractions were determined. Fractionation by crystallization from acetone, methanol, and petroleum ether, and by molecular distillation are discussed. (*Chem. Abs.* 45, 4945)

Bone fats from ox. J. Holmberg and Ulla Rosenquist (Research Lab. LKB, Appelviken, Sweden). *Svensk Kem. Tid.* 63, 12-25(1951). Myristic acid is present from 1 to 5 mole %. Palmitic acid varies from about 19 to 32%. Contrary to earlier reports stearic acid is only a minor constituent, and only traces of arachidic acid are present. Tetradecenoic acid is present to 1 to 2 mole %, and the hexadecenoic acid content is higher (2.6 to 10 mole %). The major unsaturated fatty acid component is oleic acid. Octadienoic (1.5-3.2 mole %) and octadecatrienoic (0.7-1.1 mole %) acids are present in all ox-bone fats. Unsaturated C_{20-22} acids (in part arachidonic acid) are present to 0.5-2 mole %. It is found that the component acids are different in fat from the porous-bone, gelatinous marrow, and yellow marrow from the cavity of the same bone. (*Chem. Abs.* 45, 5425)

Detecting rancidity of olive oils. L. Tombesi (Staz. sper. chim. agr., Rome). *Agr. nuova* 1, No. 67, 15-20(1949). After a brief review, the following method is suggested: Place 2 cc. olive oil into a 10-cc. tube. Add 2 cc. acetaldehyde, shake, add 10 cc. sodium nitrite solution (10 p.p.m.). After standing 24 hrs. add 1-2 cc. Kriess reagent. The more rancid the oil the less colored the aqueous layer under the oil (maximum coloration after 30 min.). It is suggested that the blank be made with 1 cc. paraffin oil. (*Chem. Abs.* 45, 4947)

Development of free fatty acids during storage of brown (husked) rice. I. R. Hunter, D. F. Houston and E. B. Kester (Western Reg. Res. Lab., Albany, Calif.). *Cereal Chem.* 28, 232(1951). Development of free fatty acid in commercially dehulled Caloro brown rice stored 22 weeks at moisture levels of 3.9, 6.6, 9.5, 11.8, and 14.1% (wet basis) and at temperatures of 0°, 25°, and 35° increased with moisture content and temperature of storage. An increase of free fatty acids of approximately 1% per month resulted at 0° in rice containing

14.1% moisture and at 25° in rice with 6.6% moisture. At 25° the initial rates of acid formation were reduced four-fold by lowering the moisture content from 14.1 to 9.5% and 16-fold by drying to 3.8%.

Methods of determination of fat in butter without a balance. A. Dudenkov (Kiev Butter Trust). *Molochnaya Prom.* **12**, No. 3, 36-8(1951). The Godel method gives results that are on the average within 0.33% of the usual gravimetric results. In it the sample (8 g.) is heated in a corked flask to 80°, centrifuged 3-5 minutes, heated 3-5 minutes to 65° and the level of the upper and lower layers is read; computation is by a table. (*Chem. Abs.* **45**, 5332)

The fatty acids and glycerides of okra seed oil. A. Crossley and T. P. Hilditch (Univ., Liverpool). *J. Sci. Food Agr.* **2**, 251 (1951). Okra seed oil of iodine value 94.0, was found to have the following fatty acid composition: palmitic, 23.8%; stearic, 7.4%; oleic, 27.1%; and linoleic, 41.7%. The glyceride composition closely follows the rule of even distribution. This oil is very similar to cottonseed oil.

Studies of the rapid estimation of industrial yields in the olive-oil industry. P. M. Rousseau. *Inds. agr. et aliment* (Paris) **67**, 145-7(1950). A weighed quantity of olive cake is homogenized and mixed with salt solution. It is then boiled several minutes and centrifuged. From the volume of oil that separates the percentage composition by weight is calculated. (*Chem. Abs.* **45**, 5426)

A symposium on fatty acids. A. G. Peck (Peck's Products Co., St. Louis, Mo.), D. H. Wheeler, L. Sutger, R. A. Behrmann, J. D. Ransom, S. Zinzalian, R. E. Wieck, Black, W. G. McLeod, B. Schroeder, H. F. Witler and McCorkle. *Proc. Chem. Specialties Mfrs. Assoc.*, June, **1950**, 151-60. A discussion covering fatty acid discoloration and stabilization at high temperatures, composition, titers, physical variations, fractionation, fractionation tolerance, bleaching, storage in unlined tanks, position of storage tank, storage problems, removal of unsaturated acids, narrowing the variables to produce uniform soaps, moisture control, effect of unsaponifiables on clarity of soap and their removal, effect of oxidized and polymerized fatty acids on viscosity of soap solutions, potash soap manufacture, difference in specifications of single- and double-distilled fatty acids, relative detergency values of soaps made from different fatty acids at cold- and hot-water temperatures, and vegetable oil selection. (*Chem. Abs.* **45**, 5426)

Studies on determination of feed fat with saponification and on digestibility of fat in ruminants. O. Ring (Central Agr. Expt. Sta., Tikkurila, Finland). *Acta Agral. Fennica* **64**, No. 2, 127(1947). It was found that feeds contain considerably more fat than has been found heretofore by the ether-extraction method. The most likely fat contents are obtained by saponifying the feed fats first with alcoholic 23% KOH, then extracting directly with petroleum ether. It was found that feed fats are digested to a smaller extent than can be judged from the digestion coefficients of crude fats used heretofore. Apparently rams and cows more easily digest fatty acids having molecular weights similar to those of the fatty acids of milk fat. (*Chem. Abs.* **45**, 5335)

Fat splitting efficiencies average 98% during year's run of high pressure process. Anon. *Chem. Processing* **14**(7), 38(1951). A brief description is given of the Colgate-Emery process with a material balance on an average feed.

Chemical studies on Korean cattle. I. Physical and chemical properties of the body fat of fattened Korean cows. N. Ando (Coll. Agr. Forestry, Suigen, Korea). *J. Agr. Chem. Soc. Japan* **18**, 995-1007(1942). *Bull. Agr. Chem. Soc. Japan* **18**, 79-81(1942). Fattening of Korean cows with barley, rice bran, hay, and rice straw, and with sweet potato, rice bran, and sweet-potato stems, each with various amounts of soybean meal, had no remarkable effect on the characteristics of the body fat.

III. Physical and chemical properties of the butter fat obtained from the Korean cows and the hybrid from Korean and Holstein stock. *Ibid.* 504-8. The average of the characteristics of butterfat from the the hybrid were, respectively: m.p. 34.0°; acid no. 0.68, 0.84; saponification no. 227.58, 228.38; and iodine no. 35.03-37.65 (36.74), 35.09-37.79 (35.41). (*Chem. Abs.* **45**, 5332)

Unsaturation of corn oil — inheritance and maturity studies. B. Bremhall and G. F. Sprague (Iowa Agr. Exp. Station, Ames). *Cereal Chem.* **28**, 225(1951). The oil from corn, bred for high oil content, was found to have a significantly lower iodine number than that from low oil corn. The unsaturation of corn oil changed little between 20 days after pollenation and maturity.

Effect of water on the interaction between stearic acid and fine powders. W. Hirst and J. K. Lancaster (Associated Electrical Ind. Labs., Aldermaston, Berks, England). *Trans. Faraday Soc.* **47**, 315(1951). The interaction between stearic acid in benzene solution and various powders was investigated. For TiO_2, SiO_2, TiC, and SiC the shape of the desorption isotherm is characteristic of physical adsorption; the presence of water merely reduces the amount of acid adsorbed. With reactive powders (Cu, Cu_2O, CuO, Zn) the influence of water is to initiate chemical reaction. The magnitude of the effect depends on the metal and on the nature of the oxide film.

Progress in solvent extraction of vegetable oils. A. J. Falkenberg (Am. Mineral Spirits Co.). *Oil Mill Gaz.* **55**(10), 36 (1951). The trend toward the use of solvent extraction to recover increasingly large percentages of soybean, linseed and cottonseed oils is discussed.

Volatile fatty acids in the rumen of the sheep. F. V. Gray, A. F. Pilgrim, H. J. Rodda and R. A. Weller (Commonwealth Sci. Ind. Res. Org., Adelaide). *Nature* **167**, 954(1951). By chromatographic analysis the presence of formic, acetic, propionic, n-butyric, isobutyric valeric and caproic acids was demonstrated in the sheep rumen fluid.

The liability of spontaneous combustion of oils on jute. A. N. Saha (Univ. Coll. Sci. Tech., Calcutta). *J. Tex. Inst.* **42**, T207 (1951). The oxidation of oil (linseed, mohua, peanut) on jute proceeds at a slower rate than on cotton, possibly due to the antioxidant action of hemicelluloses.

Hydrolytic rancidity in milk. I. Surface tension and fat acidity as measures of rancidity. W. L. Dunkley (Univ. Alberta). *J. Dairy Sci.* **34**, 515(1951). On the basis of acidity determinations on fat obtained from cream samples, it was found that fat acidity determinations are helpful in classifying cream as "not rancid" or "rancid" but they are of little value as a measure of the intensity of rancidity when compared with organoleptic evaluations. Rancidity in milk was estimated more accurately by changes in surface tension.

Displacement analysis of lipids. V. Separation of substances analogous to fatty acids. R. T. Holman (Texas Agr. Exp. Station, College Station). *J. Am. Chem. Soc.* **73**, 3337(1951). Displacement separation using a charcoal absorbent of members of the homologous series of alkyl halides, alcohols, and ethyl esters of fatty acids is presented. These may find use as carrier substances in displacement separations.

Use the fats that fit your mixes. G. T. Carlin (Swift & Co.). *Food Eng.* **23**(7), 113(1951). Through care in selection of shortenings, particularly in the matter of proper antioxidants, rancidity development, flavor reversion, product discoloration, fat hydrolysis and poor baking qualities can be avoided. The effectiveness of natural antioxidants such as sugar, unbleached flour and ginger is discussed.

World fats and oils situation. R. M. Walsh. *Soybean Digest* **11**(8), 14(1951). The United States has changed in the past 10 years from an oil importing country to an oil exporting country despite increased domestic requirements. In view of the strong demand for fats for export, continued high production is necessary.

A new method for the chemical degradation of n-fatty acids. G. D. Hunter and G. Popjak (Nat. Inst. Med. Res., London). *Biochem. J.* **48**(1), v(1951). To determine the position of the C_{14} atom in labeled hexanoic acid the following steps were carried out: α-bromination of the acid chloride, ethyl esterification of the product, debromination with quinoline and fusion with KOH at 300-330° to yield butyric and acetic acids. The butyric acid can be further degraded by well known methods.

Utilization of acetate for milk-fat synthesis in the lactating goat. G. Popjak, T. H. French and S. J. Folley (Univ. Reading). *Biochem. J.* **48**, 411(1951). By the use of carboxy-C^{14} acetate it was established that acetate is rapidly utilized for the synthesis of milk fatty acids. The plasma fatty acids contained much less C^{14} than milk fatty acids and could not have been directly an important source of the latter. The steam volatile fatty acids had a higher specific activity than the long chain non-volatile acids indicating their independent synthesis. Milk cholesterol is synthesized in the udder and not derived from blood cholesterol.

Contribution to the determination of volatile acids which are soluble or insoluble in fats. Vizern and Guillot. *Oleagineux* **6**, 409-412(1951). This method eliminates the usual nature of Reichert Meissl Polenske which determines only a fraction of the soluble or insoluble volatile fatty acids present in the fat. The soluble volatile fatty acids and the insoluble volatile fatty acids up to and including lauric acid are determined. The presence of lauric acid can be determined, as well as the sum of the fatty acids below C_{12}.

Fish oils in Norway. C. Domart. *Oleagineux* **6**, 351-357 (1951). The processes used to prepare fish oils and fish meal in Norway are described.

Influence of interesterification on the foaming power of the mixed oils from copra and peanut. P. Desnuelle and N. Naudet. *Oleagineux* **6**, 338-339 (1951). Mixtures of oils from copra and peanut were interesterified to produce a homogenous glycidic structure which gave less stable foams.

PATENTS

Halogenated unsaturated higher fatty acids and derivatives. H. M. Teeter and J. C. Cowan (Sec. of Agr.). *U. S. 2,557,159.* A process is disclosed by which unsaturated fatty acids may be halogenated without substantial loss of unsaturation consisting of reacting an unsaturated higher fatty acid or its ester with a tertiary alkyl hypohalite under substantially anhydrous conditions at a temperature of about 30° to 100°.

Outlet valve mechanism for solvent extraction plants. C. W. Zies (V. D. Anderson Co.). *U. S. 2,557,408.*

Oxidation of fatty matter. H. O. Renner (J. R. Short Milling Co.). *U. S. 2,557,564.* A process of preparing oxidation products of fatty material is described in which an aqueous extract containing oxidizing enzymes is gently mixed with a liquid fatty material in a closed vessel containing 30 psi air pressure.

Stabilization of edible fats and oils. J. A. Chenicek and W. K. T. Gleim (Universal Oil Prod.). *U. S. 2,557,921.* A method for stabilizing edible fats and oils against rancidity is disclosed which comprises adding thereto a hexahydroxy-p-terphenyl having two hydroxy radicals on each of the phenyl rings.

Process for extracting sesamin from sesame oil. L. Feinstein and S. J. Ringel. *U. S. 2,557,956.* Sesamin is extracted from sesame oil by treating the oil with several volumes of a low boiling (less than 75°) hydrocarbon solvent at a temperature below 0° and separating the crude sesamin precipitate from the sesame oil solution.

Process for manufacturing margarine. A. D. Wilson and H. B. Oakley (Lever Bros. Co.). *U. S. 2,558,204.* A process for permanently improving the plasticity of margarine is described which comprises first heating, then cooling and finally mechanically working the margarine.

Tall oil separation process. J. W. Davis and H. M. Spurlin (Hercules Powder Co.). *U. S. 2,558,543.* Tall oil is treated continuously in a countercurrent flow apparatus with a mixture of a water-immiscible organic solvent and an alkaline aqueous medium, the amount of alkali present being sufficient to partially neutralize the acids present in tall oil. The fatty acids soaps are removed in the aqueous phase.

Nut butters. B. R. Harris and M. H. Joffe (Emulsol Corp.). *U. S. 2,560,509.* A method of preparing an improved nut butter is disclosed in which a nut butter is mixed at a temperature above 50° with a minor proportion of a higher molecular weight fatty acid partial ester of a polyglycerol and the mixture allowed to cool.

Extraction of oleiferous materials. J. T. Dickinson (M. W. Kellogg Co.). *U. S. 2,560,935.* Liquid propane at about 450° F. is used to extract the oil from finely ground oil bearing materials. When extraction is complete, the temperature is raised to precipitate a mixture of oil and occluded fines which are withdrawn and separated.

Process for making tall oil. R. W. Stephenson (Kirby Chemical Co., Inc.). *U. S. 2,561,150.* A process is disclosed for producing tall oil from sulfate soap skimmings which comprises heating the skimmings with an aqueous solution containing 10 to 40% sulfuric acid, the sulfuric acid being present in sufficient amount to provide at least about 10% free excess sulfuric acid after completion of the reaction, preventing any appreciable commingling of the soap skimmings and acid solution until the boiling point of the acid solution is reached, effecting the rapid, intimate commingling of the entire mass of soap with the acid solution by the ebullition of said acid solution, heating until the tall oil is substantially completely freed from the soap, and separating said tall oil from the reaction mixture.

Process for refining soybean oil. A. L. Ayers (Phillips Petroleum Co.). *U. S. 2,561,330.* An improved process for producing purified soybean oil is disclosed which comprises forming a miscella of soybean oil and a hexane, contacting the resulting soybean oil-hexane miscella with a methanol-water solution and extracting impurities from the oil. The miscella is then contacted with a dilute aqueous solution of an alkali metal hydroxide thereby extracting fatty acids from the oil. The alkaline solution is separated from the miscella and the soybean oil recovered from the miscella.

Fatty acid esters. Z. Welvart. *French 950,609.* A trialkanolamine is added to 2-3 g. cold concentrated H_2SO_4, then castor oil (50-75 g.) or like fatty oil, such as olive oil, is added and the mixture heated to 140-160° for 3-4 hrs. The oil decanted from the excess tertiary amine is a good emulsifier. (*Chem. Abs.* **45**, 5715)

Flavoring olive oil with lemon oil. O. Agamennone. *Italian 454,112.* Olives are ground together with lemon fruits up to 10% by weight, and then the oil is extracted as usual. *Chem. Abs.* **45**, 5338)

Extraction of oils from seeds and the like. G. Arnaud. *Italian 454,621.* The conventional process is modified as follows: The material is extracted two times and between the two extractions it is dried and ground. (*Chem. Abs.* **45**, 5429)

Deacidification of vegetable oils by distilling the fat acids. G. Dini. *Italian 455,242.* A design of a plant is described where the oil is subjected to high temperatures for only 0.5-2 minutes. It is claimed that the oil keeps and has a good taste. (*Chem. Abs.* **45**, 5338)

Preventing autoxidation of edible fats and oils. Nederlandsche Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek ten behoeve van de Voeding. *Dutch 66,584.* Tetraalkylthiuram disulfide is used as an antioxidant in a quantity of less than 0.1%. Without any addition a sample of lard showed an induction period of 5 hours 18 minutes. After addition of 0.01% tetramethylthiuram disulfide the induction period was 9 hours 24 minutes. As the substances in the used concentration are innoxious and do not affect the taste and flavor, they may be used in fat-containing food. (*Chem. Abs.* **45**, 5338)

Saturated fat acid from unsaturated ester of fat acid. S. Tsutsumi. *Japanese 176,379.* The heating of the ethyl ester of palm oil fat acids 100, water 50, NiO 2, and MgO 3 g. with H in an autoclave at 180° for 3 hours gives a product having an iodine no. 4.6 and an acid no. 192. (*Chem. Abs.* **45**, 5429)

Saturated fat acid from unsaturated oil. S. Tsutsumi, *Japanese 176,383.* Soybean oil 150 g. with iodine no. 128.5 and acid no 1.3 is heated in an autoclave with H and water 150, Ni 3, and MgO 3 g. at 230° for 3 hrs. The product has an acid no. 175.6, iodine no. 4.7, and m. 53-5°. (*Chem. Abs.* **45**, 4950)

Deodorization of chrysalis oil. S. Uchida, B. Imai and M. Hamajima. *Japanese 177,092.* The oil is mixed with a milky fluid obtained from green figs at 30-40° for 30 hours. (*Chem. Abs.* **45**, 5429)

Deodorization of fats and oils. T. Koyanagi. *Japanese 177,505.* Aqueous portion (not containing 10% each of first and last distillate) obtainable by the dry distillation of pine roots is mixed with fats or oils and the resultant mixture washed with water. (*Chem. Abs.* **45**, 5429).

• Biology and Nutrition

R. A. Reiners, Abstractor

Nutritional value of soybean proteins. The processor's responsibilities. F. H. Hafner (General Mills, Inc.). *Soybean Digest* **11**(8), 18 (1951). The importance of soybean meal in the feed industry is emphasized. Tests which may be used to determine the quality of the feed are outlined.

Tung oil as a cause of food poisonings, and its detection. I. L. Korotkov. *Gigiena i Sanit.* **1951**, No. 1, 38-9. Tung oil has a refractive index that is higher than other oils used in foods. Its gelling on heating is also much faster. Most specific are tests with HNO_3-H_2SO_4 and $FeCl_3$; tung oil if present in more than 10% admixture causes rapid gelling with these agents, such as is not seen with any other vegetable oil. (*Chem. Abs.* **45**, 5833)

Feeding experiments on calves with hydrogenated soybean oil. Th. J. de Man (Inst. Moderne Veevoed. "De Schothorst" Hoogland, Bij Amersfoort, Netherlands). *Tijdschr. Diergeneesk.* **76**, 175-8 (1951). Calves were fed skimmed milk to which was added 3.5% fat. This fat was: milk fat (full milk), soybean oil (iodine no. 135); hydrogenated soybean oil (iodine no. 75). The per cent fat in the hair on the 3 diets was, respectively: 19, 2.6 and 47; the corresponding iodine values were 115, 37 and 78. The feces contained respectively: 32.7, 4.1 and 24.5% fat. The corresponding iodine values were 81, 65 and 65. (*Chem. Abs.* **45**, 5778)

Influence of fat nutrition upon the growth, fertility and longevity of rats. IV. Beth v. Euler and H. v. Euler (Univ. Stockholm). *Arkiv Kemi* **3**, 31-9(1951). Butter and margarine were compared as to their dietary influence on rats over a period of 18 months, covering 4 generations. The diet consisted of 24% skim-milk powder, 10% fat, 65% wheat powder, 1% NaCl, and additions (per animal per week) of 5 g. spinach, 5 g. meat, 100 I.U. vitamin A and 5.8 I.U. vitamin D. No significant differences were observed relative to growth rate, longevity and fertility. (*Chem. Abs.* **45**, 5776)

A lipolysis liberating glycerol. P. Desnuelle, M. Naudet and M. J. Constantin (Univ. Marseille, France). *Compt. rend. soc. biol.* **144**, 1182-3(1950). The hydrolysis of triolein by pancreatic lipase is a step by step process which does not readily yield free glycerol. Conditions are described whereby a small amount of free glycerol was liberated. (*Chem. Abs.* **45**, 5730)

Methods of determination of carotene. G. E. Sheberstova. *Gigiena i Sanit.* **1951**, No. 1, 37. Neither elimination of the saponification step nor the replacement of alcohol with Na_2SO_4 is permissible for accurate determinations. (*Chem. Abs.* **45**, 5574)

Stability of dry vitamin A concentrates. M. J. Burns and F. W. Quackenbush (Purdue Univ., Lafayette, Ind.). *Ind. Eng. Chem.* **43**, 1592(1951). Seven different dry commercial vitamin A products containing 150 to 1500 micrograms of vitamin A or carotene per gram retained 60-80% of their initial vitamin during a 6-month storage in the dark at room temperature. In most cases mixing with corn or soybean meal improved the stability.

Mode of formation of milk fatty acids studied with the aid of $CH_3C^{14}OONa$. T. H. French, G. D. Hunter, A. J. P. Martin and G. Popjak (Nat. Inst. Med. Res., London). *Biochem. J.* **48** (1), vi(1951). Data obtained by tracer techniques indicate that short chain fatty acids in goat milk represent intermediates in the synthesis of longer ones, and by the process of rapid secretion into the milk have escaped elongation. Extension of the chain takes place by the addition of C_2 units to the carboxyl end of the molecule.

The syntheses and interconversions of polyunsaturated fatty acids by the laying hen. R. Reiser (Texas Agr. Exp. Station, College Station). *J. Nutrition* **44**, 159(1951). Experiments on White Leghorn hens in full egg production showed that on a fat-free diet hexaenoic and pentaenoic acids disappear from neutral fat and linoleic acid concentration reaches a minimum. The hens can synthesize a sufficient amount of polyethenoid acids. Hatchability and production do not appear to be affected. Oleic acid replaces the polyunsaturated fatty acids in the neutral fat of the eggs produced by these hens. On the fat-free rations trienoic acids appear as the concentrations of other polyunsaturated acids decrease. The addition of dienoic acid to the ration resulted in an increase of dienoic and pentaenoic acids but no increase in trienoic or hexaenoic acids. The addition of trienoic acids resulted in increases in all polyunsaturated acids having from 2-6 double bonds. The total lipid, phospholipid, neutral fat and cholesterol composition of egg yolk is unaffected by the kind or amount of fatty acids.

Review on methods of analysis of cottonseed meals. T. H. Hopper (Southern Reg. Res. Lab., New Orleans, La.). *Oil Mill Gaz.* **55**(9), 15(1951). The methods used by the Southern Regional Research Laboratories for the analysis of protein and gossypol are discussed.

δ-Carotene. J. W. Porter and M. M. Murphey (Purdue Univ., Lafayette, Ind.). *Arch. Biochem. Biophy.* **32**, 21(1951). δ-Carotene was isolated from tomatoes and data given on its physical properties. It is suggested that this compound is a dihydro-γ-carotene.

Safflower oil meal in rations for chicks. F. H. Kratzer and D. E. Williams (Univ. Calif., Davis). *Poultry Sci.* **30**, 417 (1951). Decorticated safflower meal (50% protein) was used with soybean meal as a protein supplement for a practical type chick ration. Additional lysine and methionine were required to give optimum growth. Safflower meal and fish meal produced optimum growth but combinations of safflower oil meal with peanut oil meal, sesame oil meal and meat scrap were unsatisfactory.

The relationship of stage of lactation, pasturage, and environmental temperature to the degree of unsaturation of cow milk fat. E. E. Bartley, J. H. Zaletel, E. W. Bird, C. Y. Cannon, G. H. Wise and O. Kempthorne (Iowa Agr. Exp. Station, Ames). *J. Dairy Sci.* **34**, 536(1951). Production of fats with a high iodine value at the peak of milk production followed by a decline in iodine value (ca. 8 units average) to the fourth or fifth month of lactation and then a slight increase (3 units average) to the end of lactation appear to be definite lactation trends in the majority of animals. Seasonal changes in temperature have little effect. The changes in iodine value are associated largely with changes in the oleic acid content of the fat. The linoleic acid content decreased slightly and linearly during the lactation period. Pasture grazing increased the iodine value an average of 5 units. This change in iodine value was associated largely with changes in the oleic acid content of the fat.

Incorporation of carbon^{14} from methionine into fatty acids of Escherichia coli. C. H. Wang, V. H. Cheldelin, T. E. King and B. E. Christensen (Oregon State Coll., Corvallis). *J. Biol. Chem.* **188**, 759-61(1951). The administration of $C^{14}H_3$-labeled methionine to *E. coli* in the presence of 2-chloro-4-aminobenzoic acid resulted in an appreciable incorporation of radioactivity into the fatty acids. The radioactivity was associated with C_{16} acids and very little was found in the non-saponifiable fraction. (*Chem. Abs.* **45**, 4783)

Synthesis of fatty acids by intestinal flora. T. Baumgartel. *Klin. Wochschr.*, 23, 383-4(1944). Synthesis of short-chain acids was demonstrated in suspensions of cecal flora containing sugars, peptones, or casein. (*Chem. Abs.* **45**, 4810)

Effect of refining and deodorizing coconut oil on calcium utilization. H. N. De and J. N. Karkun (Dacca Univ., Pakistan). *Science and Culture* **15**, 486-7(1950). Urinary and fecal analyses on the excrement of four adult rats were used to show that Ca utilization in rats was adversely affected when the coconut oil in their diets was refined and deodorized. (*Chem. Abs.* **45**, 4809)

Importance of the monoglyceride in emulsification and absorption of fat. C. A. Sager. *Monatsschr. Kinderheilk.* **99**, 78-9 (1951). Mono- and diglycerides are formed in the natural cleavage of fats. They are surface-active and facilitate emulsification and absorption of fats. (*Chem. Abs.* **45**, 4814)

Studies to determine the nature of the damage to the nutritive value of some vegetable oils from heat treatment. II. Investigation of the nutritiousness of the products of thermal polymerization of linseed oil. E. W. Crampton, R. H. Common, Florence A. Farmer, F. M. Berryhill and L. Wiseblatt (McGill Univ., Quebec). *J. Nutrition* **44**, 177(1951). It is tentatively concluded that the lowered nutritive value of diets containing thermally polymerized linseed oil is due to the presence of one or more dimeric fatty acid radicals which are in some way inimical to the well-being of the animals.

A comparison between glucose and acetate as precursors of milk fat in the rabbit. T. H. French and G. Popjak (National Inst. for Med. Res., Mill Hill, England). *Biochem. J.* **49**(1), iii(1951). Lactating rabbits were fed C^{14} labeled acetate and glucose. Fatty acid and cholesterol syntheses were about the same from the two sources. However, carbohydrate appeared to be a better source of fat since it also acts as a direct precursor of glycerol.

The component fatty acids of the fecal lipids of normal and cholesterol-fed rats. D. C. Edwards and R. P. Cook (Univ. College, Dundee). *Biochem. J.* **48**(1), ix(1951). The addition of cholesterol to both a high fat and a low fat diet caused increased excretion of normal non-volatile fatty acids.

• Waxes

E. H. McMullen, Abstractor

Wool grease and suint. I. The refractive index of wool grease. S. D. Rossouw (Onderstepoort Labs., Pretoria, S. Africa). *Onderstepoort J. Vet. Sci. Animal Ind.* **24**, 355-62(1950). Wool grease was prepared from 23 samples of Marino wool. The wool was vacuum-dried and Soxhlet extracted with low-boiling petroleum ether. The average refractive index of the 23 samples at 50° was 1.4753 with a maximum of 1.4814 and a minimum of 1.4681. Such a variation is more than is usual for other fats and oils. The best temperature for index of refraction readings on wool grease is 50°. (*Chem. Abs.* **45**, 6399)

Amine emulsifiers for carnauba wax emulsions. J. L. Eaton and F. A. Hughes (Sharples Chemicals, Inc., Wyandotte, Mich.). *Proc. Chem. Specialties Mfrs. Assoc.* **Dec., 1950**, 197-200. A study was made of the relationship of particle size (turbidity) and the type and amount of amine emulsifier used in emulsion polishes. Formulations were prepared by using 60 g. carnauba wax No. 1, 12 g. oleic acid, 500 g. distilled H_2O, and various amounts of amine. The practical application of the results in formulating wax emulsions is discussed. (*Chem. Abs.* **45**, 6403)

"Colloidics" of waxes—foundations for a scientific-technological colloid chemistry of waxes and for a general systematization of organic colloids. Leo Ivanovszky. *Seifen-Ole-Fette-Wachse* **77**, 99-103(1951). A general discussion. (*Chem. Abs.* **45**, 6403)

Silicones in waxes and polishes. C. W. Todd (Dow-Corning Corp., Midland, Mich.). *Proc. Chem. Specialties Mfrs. Assoc.* **Dec., 1950**, 212-15. The chemical structure, properties, uses, and various forms of silicones, e.g., fluids, greases, compounds, resins, rubber, and polishes, are discussed. (*Chem. Abs.* **45**, 6403)

Syrex 200—a new synthetic wax. L. W. Liesh (Velsicol Corp., Chicago). *Proc. Chem. Specialties Mfrs. Assoc.* **Dec., 1950**, 215-18. Syrex 200, a synthetic hydrocarbon wax, is compatible chemically and physically with many commercial waxes, can be used to reduce or replace expensive hard waxes, and gives films having excellent durability, luster, and transparency. Several working formulations, e.g., marking crayon, paste shoe polish, wax emulsion (buffing type), and dry bright floor wax, are given with instructions for manufacture. (*Chem. Abs.* **45**, 6403)

Infrared technique as applied to waxes and polishes. Philip Sadtler (Samuel P. Sadtler & Son, Inc., Philadelphia, Pa.). *Proc. Chem. Specialties Mfrs. Assoc.* **Dec., 1950**, 190-3. Infrared absorption spectra of 18 waxes and wax polishes are given and discussed. Infrared is very helpful in identifying various types of waxes and polishes. Water must be removed by evaporation before an emulsion is studied, because the water has a very high absorption in certain parts of the infrared region. If it is not possible to remove it, the water is saturated with sodium chloride. (*Chem. Abs.* **45**, 6403)

• Drying Oils

Stuart A. Harrison, Abstractor

Tobaccoseed oil in surface coatings. M. N. Rao, C. E. McGrew and A. J. Lewis. *Paint Technology* **16** No. 186, 241(1951). The drying and heat bodying characteristics of tobaccoseed oil are compared with those of soyabean oils and linseed oils. Tobaccoseed oil polymerizes more rapidly, dries faster, yellows less and is less susceptible to after-tack than soyabean oil. It is slower in rate of polymerization and drying than linseed oil but excels in such qualities as ease of refining, bleaching, and color retention. This makes it particularly suitable for white and light-colored paints. In properties and composition it is more like safflower seed oil which is high in linoleic and low in linolenic acid esters.

Urethane oils. E. B. Robinson and R. B. Waters. *Paint Manuf.* **31** No. 7, 254(1951). The work on the treatment of oils with diisocyanates is reviewed. The best results are obtained with 1-chlorophenylene-2-4-diisocyanate. Tests made on linseed oil mixed glycerides show that low percentages of diisocyanate must be used to avoid gelation on aging. The properties of the oils are not particularly good as compared to the alkyd resins. Films of the urethane oils are particularly poor on gloss retention and cracking.

Moisture absorption of protective films prepared from Spanish sardine oil. E. O. Aenlle and R. C. Carro. *Anales de fis y quim (Madrid)* **47B**, 321-326(1951). Moisture absorption capacity of films made from Spanish Sardine oil were investigated by placing the films in an atmosphere saturated with water. Heating the oil with a drier at 150° for several hours decreases the tendency for the film to absorb moisture. Air or steam blowing also decreases the moisture absorption capacity.

Permeability of protective films from sardine oil. E. O. Aenlle and M. V. Nunez. *Anales de fis y quim (Madrid)* **47B**, 313-320 (1951). Driers added to Spanish sardine oil decreases the permeability of the films. The best results are obtained by heating the oil after adding drier at 150° for four hours, while longer heating gives films with greater permeability. Air blowing or steam distillation gives an oil with less film permeability.

Monomeric ring compounds in isomerized linseed oil. J. J. A. Blekkingh. *Chemisch Weekblad* **46**, 362(1950). Monomeric ring compounds in isomerized linseed oil have a bad effect on the drying. An isomerized linseed oil containing about 50% of the total fatty acids with conjugated double bonds, and in which all monomeric ring compounds are absent, gives hard films free from after-tack. Very rapid polymerization of this oil is possible at rather low temperatures.

PATENTS

Polymerized fatty oils. J. C. Konen and E. T. Clocker. *U. S. 2,547,760.* Raw linseed oil is air blown at 180°F. until it reaches a viscosity of 13 poises. It is then bodied to 31 poises at 180°F. using BF_3 (.01 to 0.2%) dissolved in raw linseed oil. The viscosity can be varied according to the length of the blowing and subsequent polymerization times. Oils bodied in this manner have the advantage of better color, stability, and solubility in mineral spirits than oils bodied in the regular manner.

Preparation of resin-drying oil mixture. O. V. Tracy. *U. S. 2,554,280.* A solution of diisobutylene (90 gals.) in commercial propane (200 gals.) is copolymerized at —18° with butadiene (135 gals.) using anhydrous aluminum chloride as the catalyst. The catalyst is added as a 4.3% solution in ethyl chloride over a period of two hours (39 gals.) The catalyst is then inactivated by adding 20 gallons of isopropanol. The mixture is pumped into linseed oil (1,000 lbs.) which has been preheated to 200°. All of the volatile materials flash off. The polymerized portion dissolves in the linseed oil and is then bodied at 285°F. for eight hours to give a satisfactory varnish base.

Copolymers of fatty oils and polyallyl ethers. J. R. Roach. *U. S. 2,555,834.* The allyl ethers are prepared from several polyhydric alcohols by reacting the alcohol with allyl chloride in alkaline solution. Allyl sucrose, allyl sorbitol and the allyl ether of the alkaline condensation product of methyl ethyl ketone and formaldehyde are made in this way. These ethers are then polymerized with drying oils such as linseed or dehydrated castor by blowing with air with and without driers. The products formed give hard varnish type films.

Flexible oil acid modified alkyd resin wrinkle coating composition and method of making. W. A. Waldie. *U. S. 2,556,606.* A composition which bakes to a wrinkle film of high flexibility can be made as follows: Glycerin (15) and phthalic anhydride (30) are heated to 400°F., then castor oil acids (25.5) are added and heating continued at 450°F. until the mixture is homogeneous. Oiticica oil (24) is then added and the mixture heated at 525°F. until a drop applied to a glass plate remains clear. The product is cooled to 200°F. and butanol and cobalt linoleate (5 pts. of 6% solution) added. A film of this gives a wrinkle texture on baking. Other oils and fatty acids may be used.

Polyester drying oil. Z. W. Wicks Jr. *U. S. 2,558,025.* Commercial dipentaerythritol (1094) is esterified with dehydrated castor fatty acids (1792) and phenoxyacetic acid (1459) by holding at 240° for two hours. After cooling to 100° acetic anhydride (1350) is added and the mixture refluxed for three hours. The acetic acid and excess acetic anhydride are removed by vacuum distillation giving an oil compatible with linseed oil, nitrocellulose lacquers and oil modified alkyds. Benzoic acid, mono- and dichloro-benzoic acid may be used in place of phenoxyacetic acid. Other fatty acids such as soya fatty acid may be used in place of dehydrated castor. The products in all cases are drying oils.

Polymerizing fatty oils. P. Meerburg. *U. S. 2,558,494.* Fatty oils, particularly those with iodine numbers below 140 are bodied at 75-200° in the presence of about one-half to an equal weight of antimony trichloride. The antimony trichloride is then separated from the oil and may be reused. The bodying time is normally from 3 to 7 hours.

Catalytic processes for ester-ester interchange. E. W. Eckey. *U. S. 2,558,547.* Sodium hydride is used to catalyze ester-ester interchange between organic esters under non-acid conditions; e.g. sodium hydride (0.8) is added in xylene suspension to the dry methyl esters of cottonseed fatty acids (200). The mixture is heated to 60° under vacuum then triacetin (50) is added in small portions over a period of 20 minutes. The temperature is gradually raised to 98° and methyl acetate removed. The vacuum is broken under hydrogen and glacial acetic acid added to inactivate the catalyst. The product is washed with dilute HCl and then water. The oil has the color of the original methyl esters.

Drying oil copolymers from styrene and unsaturated aromatic petroleum residues. L. E. Wakeford, J. J. Sleightholme and W. T. C. Hammond. *British 649,443.* By adding an unsaturated polyhydric mixed ester, such as dehydrated castor oil, linseed oil, or oiticica oil, to the reaction mixture of styrene and an unsaturated aromatic petroleum residue, a product is formed which behaves like a drying oil when treated with lead and cobalt naphthenates. (*Chem. Abs.* **45**, 5948)

Improvements in or relating to the treatment of drying oils. *British 650,159.* Sulfur dioxide is used in a continuous process in the production of isomerized and polymerized drying oils. A dispersion of the gas and pre-heated oil is passed in a continuous stream through a heated tubular reactor. (*Chem. Abs.* **45**, 5946)

• Detergents

Lenore Petchaft, Abstractor

Soap from synthetic fatty acids. Paul I. Smith. *Am. Perfumer Essent. Oil Rev.* **58**, 53-4(1951). A comparison of soaps made from synthetic fatty acids obtained from the Fischer Tropsch synthesis and soaps made from natural fatty acids showed that the former possessed good detergent properties but an unpleasant odor. The following recommendations were made to improve the odor: refractionation of the fatty acids, so as to remove the low molecular weight compounds, thorough washing of the acids with a small quantity of dilute caustic soda to remove the dicarboxylic and hydroxy acids, use of additives in the soap to mask the odor, and restriction of the quantity of the synthetic fatty acids in the soap.

An analytical survey of the problems of scouring. R. L. Elliott. *Textile Recorder* **68**, No. 817, 102-4(1951). The constitution of vegetable oils and classification of anionic synthetic detergents and nonionic detergents are noted. (*Chem. Abs.* **45**, 5427)

Soiling and soil retention in textile fibers. Cotton fiber-grease-free carbon black systems. J. Compton and W. J. Hart (Institute of Textile Technology, Charlottesville, Va.). *Ind. Eng. Chem.* **43**, 1564-9(1951). Evaluation of the factors affecting the formation and stability of permanent carbon black-cotton fiber complexes shows that the basic factors considered as possibly operative are micro-occlusion and sorption. The formation of the complexes depends on the particle size of the soil and is affected by both detergents and electrolytes when present during formation, but is unaffected by pretreatment of the fiber by detergents or electrolytes. The stability of the complexes formed in the absence of detergents and electrolytes is unaffected by either detergents or electrolytes but strongly affected by the severity of mechanical agitation during classification. Micro-occlusion is thus the major factor contributing to the formation and stability of the complexes in the presence of water.

Hand cleaners and protectants. M. A. Lesser. *Soap Sanit. Chemicals* **27**, No. 6, 30-3, 98, 157, No. 7, 34-7, 139(1951). Extensive review article covering causes of industrial dermatitis, general rules to cut down incidence of dermatitis, and formulations for the main types of protectants: the pore-fillers, the powder types, the fatty mixtures, the film-formers, and miscellaneous types.

Hard surface cleaners. J. C. Harris (Monsanto Chemical Co., St. Louis, Mo.). *Soap Sanit. Chemicals* **27**, No. 6, 49, 51, 53, 57, No. 7, 38-9, 137 (1951). A review of the theory of cleaning hard surfaces and a comparison with methods and evaluation of products in textile cleaning. Some of the factors in hard surface cleaning include free surface energy, electrostatic charge, ion exchange capacity, chemical reactivity of surface, specific surface area and roughness of surface. The results of tests using standard detergents and standard soiled test panels indicate that the chemical structure of the detergent is less important in painted surface cleaning than in textile detergency, but solution concentration is very important. Flat surface cleaning requires lesser amounts and higher concentrations of surface active agents than fabric cleaning.

Cleaning contaminated surfaces. D. H. Ross (Solvay Process Div., Allied Chemical & Dye Corp., New York, N. Y.). *Soap, Sanit. Chemicals* **27**, No. 7, 30-2(1951). Review of use of synthetic detergents, preferably non-ionics, in cleaning radioactive contaminated surfaces.

Coloration of rosin-containing soaps. G. Reutenauer and Mme. S. Dupin. *Bull. news ITERG* **5**, 130-7(1951). Samples of tallow coconut soap containing 15 or 20% of 3 different types of rosin were prepared. Their gradual yellowing was evaluated over a period of 6 weeks with a Toussaint reflectance colorimeter. Coloration progressed a little more in N atmosphere and about half as fast in humid air. Addition of antioxidants did not retard development of color. R. and D. conclude that coloration is due to change of molecular structure of the rosin soap associated with loss of moisture. A reduction in development of color was affected by saponifying the rosin separately from the soap and also by the addition of 2% salt and 0.2% "Sequestrene." No appreciable improvement was effected by hydrogenation or modification in presence of S or Se. (*Chem. Abs.* **45**, 5427)

The behavior of nonionic surface active agents in salt solutions. T. M. Doscher, G. E. Myers, and D. C. Atkins, Jr. (Univ. of Southern Calif., Los Angeles). *J. Colloid Science* **6**, 223-35 (1951). This work was done to determine whether alkali metal ions and alkaline earth metal ions have different effects on the properties of solutions of nonionic surface-active agents. The nonionic surface-active agents used were produced by reacting hydroxylic or acidic water-insoluble compounds with ethylene oxide. Tests conducted included turbidity and viscosity tests, solubilization, surface tension and cataphoretic velocity tests. Results of the tests showed that sodium chloride and other salts of the alkali metals have been found to salt-out nonionic surface-active agents, whereas soluble calcium salts and other soluble salts of heavy metals salt-in these colloids. A crystalline complex of a nonionic surface-active agent, calcium chloride, and water has been isolated. An interpretation of these results indicate that the efficacy of these nonionic materials in improving detergency in hard water is due to the formation of soluble complexes with calcium and enhanced formation of a protective layer of the nonionic colloids on the solid surfaces at which calcium and other heavy metal cations are adsorbed.

Sweating of soaps. P. D. Srivastava and Sethumadhava. *Indian Soap J.* **16**, No. 9, 241-9(1951). Studies of the various factors responsible for the "sweating" phenomenon in soap indicate that (1) sweating increases with the humidity of the surroundings, temperature remaining constant; (2) sweating varies inversely with temperature, humidity remaining constant; (3) temperature and humidity remaining constant, sweating varies inversely with the initial moisture content of the soap; (4) the presence of free alkali in soaps helps moisture absorption; (5) potassium soaps of fatty acids sweat more than the corresponding sodium soaps; (6) sweating capacity increases with molecular weight of the fatty acid; (7) soaps of unsaturated fatty acids sweat more than the corresponding soaps of the saturated fatty acids with same number of carbon atoms; (8) soaps containing glycerine sweat more than soaps without it; and (9) foreign substances of both organic and inorganic nature influence sweating of soaps.

Causation of rancidity in mahwa oil soaps. P. V. Srivastava and S. N. Sethumadhava Rao (Hindu University, Banaras, India). *Soap Perfumery Cosmetics* **24**, 673-6(1951). Mahwa oil, a native Indian fat, was investigated as regards soap-making ability. It was found to contain unsaponifiable material such as sterols, very highly unsaturated hydrocarbons and pigments which are readily susceptible to oxidation. Soaps made from mahwa oil fatty acids freed from the above unsaponifiable matter behave in exactly the same way as the soaps without them, in so far as susceptibility to rancidity is concerned.

Measuring the cleaning power. M. Ringeissen. *Oleagineux* **6**, 345-350(1951). The relative cleaning powers of various detergents was determined for a number of fibers using a standard soil.

Studies in emulsions. Part I. Dispersing ability and emulsifying capacity of emulsifiers. A. N. Saha. *Jour. Indian Chem. Soc.* **28**, 23-28(1951). The capacity of emulsifiers such as various fatty acid soaps, rosin soaps etc. to emulsify a quantity of oil in different dilutions has been studied and the capacity to emulsify oil per unit weight of emulsifier has been found to increase with dilution. The specific interface also increases with the increase of the concentration of emulsifier solution.

PATENTS

Mild detergent and method of making same. J. J. Miskel and L. Rassner (Rare-Galen, Inc.). *U. S. 2,553,716.* Method of making a mild hard-water detergent by which tallow is first esterified with an aliphatic alcohol, the ester is sulfated with concentrated sulfuric acid and then saponified with a 50% aqueous alkali solution.

Dry detergent composition. E. J. Black (General Aniline & Film Corp.). *U. S. 2,555,285.* A dry detergent composition in flake, powder or beaded form consisting of a mixture of three essential components: a normally liquid, nonionic polyglycol ether type detergent (diamylphenol-ethylene oxide condensation product); an alkali metal salt of a formaldehyde naphthalene sulfonic acid; and an inorganic alkali metal salt (sodium sulfate).

Improvements relating to the production of cleansing compositions in solid form. J. Malecki. *British 645,752.* A method of preparing synthetic detergents in solid form by blending the active ingredients with a water or alkali solution of a soluble cellulosic compound such as methyl cellulose.

New or improved solid detergent masses. F. J. Pollak (Imperial Chemical Industries Limited). *British 646,434.* A solid synthetic detergent bar is prepared from the sodium salt of a cellulose ether such as carboxymethylcellulose (containing some NaCl) and a synthetic detergent such as a polyethylene oxide-octylphenol condensation product.