perphases in countercurrent procedure. The first extract containing secondary oxidation products was discarded; the second, third, and fourth extracts, when collected, constituted the hydroperoxide fraction. When the alcohol extract was diluted to 50% with water, the dissolved hydroperoxides and hexane separated.

After evaporation of the pentane-hexane the resulting hydroperoxide was checked for purity by distribution in the Craig apparatus. Unoxidized methyl esters were found to be present to the extent of 4% along with a small percentage of secondary oxidation products.

Acknowledgment

The authors are indebted to C. R. Scholfield, J. A. Cannon, Catherine R. Lancaster, and E. P. Jones for assistance in various phases of the preparation.

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ABSTRACTS . . . . Don Whyte, Editor

NOTE: We have been fortunate in being able to add an abstractor, Sinitiro Kawamura, for the Japanese journals. His abstracts will cover all our fields of interest. In order to give Mr. Kawamura credit for his work we will insert his name in front of each series of abstracts for which he is responsible.

• Oils and Fats

R. A. Reiners, Abstractor

Variations in the composition of some linolenic-rich seed oils. T. P. Hilditch and Collaborators (Univ. Liverpool). *J. Sci. Food Agr.* **2**, 543(1951). Candlenut oils seem prone to exhibit variations, usually of a minor but occasionally a major order, in their content of linolenic; definite but minor variations occur in oils from different fruits of the same tree. Rubber seed oils have, thus far, shown very little difference in composition. Linseed oils from seed grown in England or South Africa have proved satisfactory as regards a high content of linolenic acid. The few specimens of hemp seed oil studied in detail show considerable similarity in composition.

The alpha-naphtholphthalein (ANP) method for measuring fat hydrolysis. I. Application to butter. T. V. Armstrong and W. J. Harper (Ohio State Univ., Columbus). *J. Dairy Sci.* **35**, 59(1952). The water insoluble fatty acid content of butter may be measured to an accuracy of 100 mg. per 100 g. of fat using a modified *α-naphtholphthalein* test. The ANP method is not affected by the presence of butyric and lactic acids but does measure caproic and higher fatty acids. Results indicate close agreement with the WIA method of Hillig.

The structure of sterculic acid. J. R. Nunn (Nat. Chem. Res. Lab., Pretoria, S. Africa). *J. Chem. Soc.* **1952**, 313. Sterculic acid, the main constituent of the kernel oil of *Sterculia foetida* has been isolated in a pure state by means of its urea complex, and evidence is presented for its being ω-(2-n-octylcyclo-prop-1-enyl) octanoic acid. Sterculyl alcohol has been prepared.

Sulphur analysis of Canadian erucic acid oils. H. J. Lips (Nat. Res. Labs., Ottawa). *Can. J. Tech.* **30**, 61(1952). Using an improved method of sulphur analysis it was shown that crude erucic oils contained less than 0.001% sulphur. Alkali refined and bleached oils had no detectable sulphur content.

Constitution of the lipid from stored Florida valencia orange juice. C. W. Huskins, L. J. Swift and M. K. Veldhuis (U. S. Citrus Products Station, U.S.D.A.). *Food Res.* **17**, 109(1952). Canned Valencia orange juice was stored for 2 years at about 75°F. During storage considerable breakdown occurred in the lipid fraction. The amount of conjugated acids increased while the non-conjugated acids decreased.

The oxidation of monoethenoid fatty acids and esters. Union of gaseous oxygen with ethyl, n-propyl and n-butyl oleate. A. J. Fevell and J. H. Skellon (Acton Tech. College, Acton, W. 3). *J. Chem. Soc.* **1952**, 59. Catalytic oxidation of ethyl, n-propyl and n-butyl oleate in the presence of uranium oleate at 120°, 85° and 55° showed that peroxide formation and subsequent decomposition are characteristic of autoxidations at the higher temperatures. Prolonged oxidation at 120° produces some dimerization together with the formation of reducing substances. The nature of the terminal alkyl group influences the course of the reaction, maximum peroxide formation decreasing progressively from ethyl to n-butyl. The oleic esters react more readily than the corresponding elaidic esters.

Azeo-extraction process overcomes fire hazards, fines in rendering. Anon. *Food Proc.* **15**(3), 9(1952). A batch extractor is described in which wet meat scraps are extracted with trichloroethylene. Excellent extraction is obtained and no fines are produced.

A preliminary study of some factors affecting the hydraulic pressing of cottonseed. C. L. Carter (Univ. Tenn.). *Oil Mill Gaz.* **56**(8), 86(1952). Cottonseed meats were cooked at 220°F. at atmospheric pressure for one hour and cakes of about 0.75 in. thickness were formed at different pressing moisture contents using a Carver laboratory press. Under one set of pressing conditions, an increase in pressing temperatures from 130° to 230°F. resulted in a decrease in minimum residual oil from 5% to less than 4% (dry, oil-free basis). It was found that the shape and position of the curve of residual oil vs. moisture are appreciably altered by changes in pressing temperature, rate of application of pressure and hull content of the meats. It was also found that the effects on the residual oil vs. moisture relationship of pressing temperature, total pressure, rate of application of pressure and hull content of meats are not mutually independent.

Problems arising from the use of chemicals in food. Antioxidants. C. H. Lea (Univ. Cambridge). *Chem. Ind.* **1952**, 178. The effectiveness and toxicity of antioxidants used in fats are discussed.

A continuous method of extraction for high proportions of unsaponifiable matter. P. Sherman and J. E. Dillistone (Gestelner Ltd., London N. 17). *Chem. Ind.* **1952**, 130. A continuous method for extracting the unsaponifiable matter with ether from saponified oils is described.

Fatty acids of the lipids from freshly canned Florida valencia orange juice. L. J. Swift (U. S. Citrus Prod. Station, Winter Haven, Florida). *Food Res.* **17**, 8(1952). The methyl esters of the fatty acids from freshly canned orange juice contain 1.3% conjugated diene, 8.8% linolenate, 32.5% linoleate, 18.1% oleate, 10.4% palmitoleate, 18.8% palmitate and 1.7% stearate. Possibly oxidative rancidity is the origin of flavor deterioration.

The antioxidant properties of natural spices. J. R. Chipault, G. R. Mizuno, J. M. Hawkins and W. O. Lundberg (Hormel Inst., Austin, Minn.). *Food Res.* **17**, 46(1952). The antioxidant properties of 32 spices have been determined and all except one sample of ginger exhibited an antioxidant effect on prime steam lard when tested by the A.O.M. at 98.6°. Rosemary and sage exhibited pronounced antioxidant effects. Citric acid exerts a synergistic effect with some spice fractions. The predominant antioxidants in sage and rosemary are soluble in aqueous alkali. These fractions did not contain the characteristic odor components of these spices.

Glyceride oils and the Southwest. K. S. Markley (So. Reg. Res. Lab., New Orleans, La.). *Chemurgic Digest* **11**(3), 4 (1952). A review.

Mixed monolayers. Molecular interaction in the mixed monolayers of fatty acids. T. Isemura and K. Hamaguchi. *Mem. Inst. Sci. and Ind. Research, Osaka Univ.* **8**, 131-9(1951). Binary films of stearic, palmitic, and myristic acids of various compositions were studied. A mixture of acids with the same mean C no. as another single acid showed almost the same pressure-area curves if the difference of chain lengths of the acids in the mixture did not differ by more than 2 C atoms. The area per molecule for the mixed films was less than that of each component in any pressure region. Stable solid films were obtained in mixtures of stearic and palmitic acids. The interaction of the COOH groups in the mixture may not be the same as that in a one-component acid film. Abrupt changes in slope in the pressure-area curves were observed at areas of 27.6, 25.0, 24.0, 23.5, and 23.3 sq. A. These points correspond to published transformation points. (*Chem. Abs.* **46**, 2373)

Dependence of the viscosity of esters of linoleic acid on their oxidation. V. G. Georgievskii and B. N. Shakhkel'dyan (Moscow Polygraph. Inst.). *Zhur. Priklad. Khim.* (J. Applied Chem.) **24**, 593-6(1951). Me linoleate, d^{20} 0.8878, and glycol linoleate, d^{20} 0.9182, show no viscosity changes after heating to 100° in N. Treatment of the esters with an air stream causes a similar uptake of 0 and a sharp rise of viscosity of the glycol ester and a somewhat less rapid increase in the Me ester. Benzoyl peroxide addition hastens the oxidation but does not change the nature of the viscosity increase. (*Chem. Abs.* **46**, 2485)

Fatty acid composition of egg-yolk lipids. F. B. Shorland (Dept. Sci. Ind. Research, Wellington). *New Zealand J. Sci. Technol.* **33B**, 224-9(1951). The lipids (524) which were isolated from dried egg yolks by digestion with 95% alcohol and extraction in a continuous extractor with petroleum ether to which had been added 5% by volume of absolute alcohol were repeatedly treated with boiling acetone to separate the phospholipids (136 containing 3.7% P) from the glycerides (388 which contained 0.2% P). The fatty acid composition of the glycerides resembled that of the depot fat whereas the phospholipids compared with the depot fat contain more C_{20} and C_{22} highly unsaturated acids and less hexadecenoic acid. The phospholipids contained more stearic and less linolenic acid than the corresponding glycerides. (*Chem. Abs.* **46**, 2595)

Viscera of marine animals. I. Utilization of spermatic organs of fish. M. Takaoka, Y. Ishihara and J. Hirayama (Hokkaido Univ., Sapporo). *J. Agr. Chem. Soc. Japan* **20**, 235-8(1944). Spray-dried milts of herring and of salmon, respectively, contained moisture 12.43; 4.68; crude fat 9.91, 5.98; and unsaponifiable matter 1.94, 1.84%.

II. Head oil of a species of dolphin of Hokkaido (Japan). 1. M. Takaoka, Y. Ishihara and T. Hamazaki. *Ibid.* **21**, 27(1946). Head oil of ishi-iruka (stone dolphin) had d^{15} 0.9406, saponification no. 305, iodine no. 35, unsaponifiable matter 1.9, and acid no. 12. Vitamin A content in cod-liver oil units was 0.33-0.4 for crude oils and 0.18 for purified oils. This oil after simple purification is suitable for lubricating precise machines, such as watches. (*Chem. Abs.* **46**, 2821)

Viscosity of the mixture of aluminum monostearate and peanut oil. T. Mizuno, S. Okamoto, S. Yoshida and T. Inaba (Sanyo Chem. Co., Nagoya). *J. Antibiotics* **4**, 450-1(1951). Al monostearate (2.5%) was mixed with peanut oil and heated. At 120-5° it dissolved and the viscosity reached the maximum. The Al_2O_3 existing as an impurity catalyzed hydrolysis of the oil and lowered the viscosity at temperatures higher than 125°. (*Chem. Abs.* **46**, 2823)

Detection of adulteration of ghee—linoleic acid content of ghee and fatty acid composition of buffalo ghee. T. A. Venkitasubramanian and B. N. Banerjee (Indian Inst. Sci., Bangalore). *Indian J. Vet. Sci.* **19**, 301-20(1949). The content of linoleic acid was found to be the only criterion for adulteration in ghee. The percentage of the acid in all the ghees tested was about 1.5%. The oils and hydrogenated products used for adulteration contain a much higher percentage of linoleic acid. A detailed examination of body fat and buffalo ghee showed that the linoleic acid of cottonseed and other oils used in feeding is not absorbed in the butter fat and does not alter its linoleic acid content. The linoleic acid content of fresh ghee was never found to be higher than 2%; rancid ghee showed a higher linoleic acid content. Iodine and thiocyanogen values were determined in order to determine oleic acid from mixtures of oleic, linoleic, and linolenic acids. Estimations of the iodine and thiocyanogen values of butter fat indicate that the linoleic acid glyceride content is practically constant, while the oleic glyceride is the variable factor. (*Chem. Abs.* **46**, 2707)

Chemistry of paraffin oxidation as a source of synthetic fatty acids. H. Anders. *Seifen-Ole-Fette-Wachse*, **78**, 48-50(1952). A mechanism for the oxidation of paraffin is described. Either a dialkyl-peroxide is formed by the action of oxygen on a carbon-carbon bond or a molecular compound results. Then the peroxides decompose into fatty acids or alcohols, esters and aldehydes may form from them. The catalysts and the conditions of reaction are given. A large variety of fatty acids, alcohols, ketones, ethers, di-carboxylic acids and other products are obtained.

Colloidal electrolytes from press cake oils. C. G. Herrera and R. Guzman. *Olearia* **6**, 14-18(1952). Direct sulfonation of various press cake oils gave colloidal electrolytes. The physical-chemical constants of their aqueous solution were measured as well as their detersive properties. The sulfonated oils showed good lather stability and cleaning ability. Low acidity oils gave the best results.

How Fuller's earths act on oils. A. Paleni. *Olearia*, **6**, 19-25 (1952). The active surface area of a Fullers' earth which is available for bleaching is defined. The difference between earths activated by thermal treatment and those activated by acid treatment is discussed.

The action of microbes during the extraction of olive oil. G. Florenzano, *Olearia* **6**, 5-13(1952). The type and activity of microbes found at various stages in olive crushing, pressing and oil separation was studied. Little microbic action can be expected in the purified oil but the microbiological processes are important during the extraction of the oil and to the by-products.

Observations on the analysis of technical monoglycerides. A. Doadrio and R. Montequi. *Anales de fis y quim. (Madrid)* **48B**, 69-74(1952). Sodium periodate can be used satisfactorily in place of periodic acid for the analysis of monoglycerides. A formula was developed for calculating the per cent glycerides present in the technical monoglycerides.

The sunflower, an oil plant. E. Andre. *Oleagineux* **7**, 127-133, 201-205(1952). A general summary of the development of the sunflower as an oil source with particular reference to the countries where it is grown.

SINITIRO KAWAMURA

Hydroxylation of oils. I. Selective hydroxylation of unsaturated fatty acids. K. Arimune (Govt. Chem. Ind. Research Inst., Tokyo). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **54**, 739-41(1951). Hydroxylation of mixed fatty acids of soybean oil with alkaline $KMnO_4$ showed the selectivity of hydroxylation; linoleic acid was more easily hydroxylated than oleic acid, forming sativic acid prior to dihydroxystearic acid. Incomplete hydroxylation of methyl linoleate with alkaline $KMnO_4$ did not demonstrate the selectivity of hydroxylation according to the position of the ethylenic bond.

Hydroxylation of oils. II. Partial hydroxylation of methyl linoleate. *Ibid.* 760-1. Hydroxylation of methyl linoleate with H_2O_2 and CH_3COOH gave a large amount of methyl dihydroxyoctadecenoate. Upon examination the 2 OH groups were found to be attached to 12 and 13 positions. Thus the hydroxylation under this condition is selective at 12,13-ethylenic bond in comparison with 9,10-ethylenic bond.

The manufacture of soybean protein. I. General introduction and preliminary experiments. Sin'itirô Kawamura (Nihon Univ., Fujisawa). *Bull. Coll. Agr., Nihon Univ.* (Japan), No. 2, 1-16(1951) (in English).

II. Extraction of soybean oil. Defatted soybean meal as the raw material for manufacturing soybean protein. Ibid. 17-36. Extraction of oil from soybean flake with trichloroethylene at 60-65° for 2 hrs. gave a good raw material for protein manufacture. Various samples of naphtha were tested as the solvent. The velocity of oil extraction with naphtha, boiling at 60-90°, was measured for 20, 45, and 55° in 30-120 min. Pretreatment with water had no effect on the efficiency of the purification method of the defatted meal. Dilute acetic acid had some effect as the purifying agent.

Unsaponifiable matter of rice-bran oil. I. Hydrocarbons. R. Kaneko and T. Tsuchiya (Govt. Chem. Ind. Research Inst., Tokyo). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **54**, 737-9(1950). The insoluble part in methanol of liquid unsaponifiable matter of rice-bran oil yielded highly unsaturated hydrocarbons of C_{26-34} as nonadsorbable fraction on alumina in the chromatographic method. The main component of these hydrocarbons was isolated and proved to be squalene, $C_{30}H_{50}$, or its isomer. Besides this cyclic and isoparaffinic hydrocarbons exist.

Application of tri- and tetra-butylnaphthalenesulfonic acids as the fat-splitting agent. K. Fukuzumi and S. Ozaki (Govt. Chem. Ind. Research Inst., Nagoya). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **54**, 727-8(1951). These 2 acids were superior to dibutylnaphthalenesulfonic acid in the activity of hydrolyzing soybean and coconut oils. Tetrabutyl compound was a little superior in this activity to tributyl compound.

The protective effect on the oxidation of fats by tannin derivatives. I. The effect of the aliphatic alcohol esters of gallic acid. Yasuyoshi Oshima, S. Yoshihara, K. Nagamizu, and T. Arima (Kyushu Univ., Fukuoka, Japan). *J. Agr. Chem. Soc. Japan* **25**, 53-5(1951). Nine esters were synthesized, among which decyl gallate (m.p. 81-3°) and cetyl gallate (m.p. 84-84.5°) are new compounds. Antioxidant effects of these esters were examined volumetrically (using lard, tung oil, and butter as the test fat) and gravimetrically (using methyl oleate as the substrate). All the esters of gallic acid with alcohols of C_2 to C_{16} showed similarly excellent results. Among them ethyl, isopropyl, and isobutyl gallates were superior.

II. The effect of the alcohol esters of protocatechuic acid. Y. Oshima, S. Yoshihara, and T. Arima. *Ibid.* **25**, 344-6(1952). Six esters of protocatechuic acid were synthesized. These esters had antioxidant effects similar to gallates in the concentration of 0.0001 *M*, but inferior to 0.00002 *M*, using methyl oleate as the substrate.

Separation and identification of fatty acids. X. Simplified methods of the preparation of hydroxamic acid solutions for paper partition chromatography. Yoshiyuki Inoue and M. Noda (Kyoto Univ., Kyoto, Japan). *J. Agr. Chem. Soc. Japan* **24**, 291-5(1951). The chromatographic separations of butter, coconut oil, and fruit oil of *Ginkgo biloba* are given. R_f values for formo- and pelargono-hydroxamic acids are given.

XI. Paper partition chromatography of aliphatic carboxylic acids by means of hydroxamic acid method. *Ibid.*, 295-8. The method reported in Part IX is applicable to saturated fatty acids, unsaturated acids, hydroxy acids and polybasic acids.

XII. Application of paper chromatography to the analysis of fats. *Ibid.*, 161-5. The method involves the oxidative decomposition of fat by $KMnO_4$ in acetone solution, esterification of the acidic oxidation products, preparation of their hydroxamic acid derivatives, and paper chromatographic separation of these acids. The mixture of hydroxamic acid derivatives is specific for each fat, thus making the qualitative analysis of the fat possible. Chromatograms for linseed, soybean, rape, olive and herring oils, Japan wax, and beef tallow are given.

Thermoanalytical investigation of the hydrogenation of fats and oils. I. Hydrogenation of oleic acid and its ester. E. Suito and H. Aida (Kyoto Univ., Kyoto, Japan). *J. Chem. Soc. Japan,* Ind. Chem. Sect. **54**, 765-8(1951). Measurement of the increase of temperature due to heat of reaction was used to determine the reaction velocity and heat of reaction of the system in the liquid phase containing gas (H_2). Oleic acid or methyl oleate was hydrogenated in the presence of Raney Ni. This reaction appeared to be a first order one. The reaction velocity is strictly proportional to the amount of the catalyst and the velocity of passing hydrogen. The activation energy was 7.6 kcal. for oleic acid and 5.8 kcal. for methyl oleate. The heat of hydrogenation was 35.6 kcal./*M.* in both cases.

PATENTS

Purification of tall oil pitch. R. S. Smith (West Virginia Pulp & Paper Co., New York, N. Y.). *U. S. 2,591,885.* Tall oil pitch is treated with dilute aqueous alkali at a temperature close to the boiling point of the mixture to cause the fatty acid esters of alcohols originally present in the pitch to separate from the fatty acid soaps.

Method for making margarine and the resulting product. A. D. Wilson, H. B. Oakley, and J. Rourke (Lever Bros. Co.). *U. S. 2,592,224.* A continuous method of making margarine is disclosed which comprises cooling to a temperature between 23° and 34° and agitating a stream of liquid fat to crystallize selectively the higher melting glycerides in the stream, mixing the fat with the aqueous ingredients, and rapidly chilling and emulsifying the resultant mixture.

Process for improving the color of fats and fatty oils by treatment with chlorine dioxide. E. R. Woodward (Mathieson Chem. Corp.). *U. S. 2,592,226.* Chlorine dioxide diluted with an inert gas is brought into contact with a stream of oil for a short period in contrast to that of tank bleaching.

Formulating tocopherol material. J. G. Baxter (Eastman Kodak Co.). *U. S. 2,592,531.* A method of making biologically active material, which is convertible by reduction to material of high vitamin E biological activity, is disclosed which comprises reacting hexamethylene tetramine and tocopherol material having at least one aromatic hydrogenation on the benzenoid nucleus and hydrolyzing the resulting substituent group to a formyl group.

Formylating and reducing nonalpha tocopherols. L. Weisler (Eastman Kodak Co.). *U. S. 2,592,629.* Biologically active material readily reducible to material of enhanced vitamin E activity may be obtained by reacting tocopherol material with HCN and a hydrogen halide in the presence of a metal salt and then hydrolyzing.

Formylating tocopherol material. L. Weisler (Eastman Kodak Co.). *U. S. 2,592,630.* Material of normally low vitamin E activity, characterized by having at least one aromatic hydrogen atom, is reacted with a trihalomethane and an alkaline material and the resulting product hydrolyzed to form a material which on reduction has high vitamin E potency.

Method of purifying solid saturated fatty acids containing unsaturated free fatty acids and other soluble impurities. L. G. Jenness (The Trendex Co.). *U. S. 2,593,458.* A method is disclosed of treating a composition consisting essentially of fatty materials containing sufficient solid saturated free fatty acid so that it may be flaked, which comprises forming discrete particles of the material, contacting the material with a volatile organic solvent, the saturated fatty acids being substantially non-extractable by the solvent, the amount of the impurities relative to the saturated fatty acids being sufficient to allow penetration of the solvent into the particles to provide effective extraction, and the amount of the impurities being insufficient to permit the remainder of the particles to be substantially broken down during the extraction, causing the solvent to penetrate into the particles and removing the resulting solution.

Prepared cottonseed material for solvent extraction and processes for preparation and solvent extraction of cotton seed materials. M. Bonotto. *U. S. 2,594,117.* A prepared cottonseed material for solvent extraction is claimed comprising a mixture formed of the flaked cottonseed kernel particles which are substantially free from cottonseed hulls combined with a predetermined proportion of hard-surfaced unflaked segmental pieces of the hulls of the cottonseed in cup form and uniformly mixed with the flaked kernel particles, the hard-surfaced unflaked segmental pieces of hulls in cup form providing in the composite mixture isolated cup-shaped voids between the flaked kernel particles.

Stabilization of glyceride oils with iminodisuccinic acid. J. C. Cowan and C. D. Evans (Sec. Agr.). *U. S. 2,594,294.* A composition of matter stabilized against oxidative deterioration is disclosed comprising a glyceride oil having incorporated therein iminodisuccinic acid as a stabilizing agent.

Vitamin A determination and agents therefor. A. E. Sobel. *U. S. 2,594,817.* The method for the determination of vitamin A and carotene is disclosed which comprises adding chloro or bromo glycerol halohydrins to a solution containing vitamin A and carotene.

Method and apparatus for continuous refining and simultaneous deodorizing raw fats and oils by distilling free aliphatic acids therefrom. V. Mares. *U. S. 2,594,953.* A method of continuously refining and simultaneously deodorizing raw fatty materials of the class consisting of fats and oils containing non-fatty matter and free aliphatic acids is claimed which comprises heating the raw fatty material to a temperature to 200° to 300° under vacuum until all non-fatty matter is substantially precipitated and a major proportion of free aliphatic acids volatilized; partially and rapidly cooling the fatty material; adding an adsorptive earth thereto; filtering off the adsorptive earth; and subjecting the fatty material to distillation under vacuum at a temperature of 200° to 250° in the presence of steam to remove substantially all the residual free aliphatic acids from the fatty material.

Purifying fats and waxes. A. Glorifet and J. Coustolle. *French 965,495.* Fats and waxes are brought into intimate contact with a perphosphoric or persulfuric acid at 90 to 92°. Such contact may be effected by melting and stirring, or using a solution or emulsion of the fat or wax, or treating a paste of the wax or fat and a hydrophilic powder diluent, e.g., bentonite. (*Chem. Abs.* **46**, 2824)

Fish-oil refining. O. W. Pueschel. *Italian 461,372.* The oil is warmed at 30° by slowly stirring, 5.60% NaOH solution is added at 12° Bé., the temperature raised to 92-96° in 20-30 min., and the stirring and warming stopped. The oil is washed by spraying a double quantity of water (hardness not over 5-6 French degrees) at 95-99° with occasional stirring and then left for 8 hrs. Soapy wash-waters (bright red color) are separated through the bottom until the emulsion oil-soapy water appears. The latter is separated by a centrifuge with the addition of some 50% ethanol solution. The oil is dried in vacuo under 65 mm. Bleaching earths, 3%, are added and the mixture is stirred, filtered, and demargarinized. The oil obtained is a drying oil and can be sulfonated or hydrogenated. (*Chem. Abs.* **46**, 2826)

Oil from shark liver for use in diffusion pump. S. Fukushima, H. Hinokiyama and T. Kaneno. *Japan 180,491.* Squalene-containing shark-liver oil is distilled, and the fraction $b_{0.001}$ 200-20° is taken, treated in alkali to remove saponifiable matter and then the fraction $b_{0.001-0.00001}$ 180-5° is taken. (*Chem. Abs.* **46**, 2825)

Lowering the melting point of vegetable oils. Sa Ninomiya, *et al.* (Mitsubishi Trading Co.). *Japanese 173,494.* The melting point of vegetable oil is lowered by the addition of Al stearate E.g., 1% in peanut oil gave a melting point of —13°, and 0.8% in cottonseed oil gave a melting point of —10°. (*Chem. Abs.* **46**, 2824)

Deodorization of chrysalis oil. S. Uchida, *et al. Japanese 173,487.* One kg. oil having an acid no. of 25 is mixed with 1 kg. KOH in 9 g. water, 5 g. Mn_2O_3, and 20 g. powder acid clay, heated at 90° while blowing air in at the rate of 25 l./hr. for an hr., and filtered. (*Chem. Abs.* **46**, 2826)

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• Biology and Nutrition

R. A. Reiners, Abstractor

Soybean lecithin and vitamin A utilization. N. B. Guerrant and R. Q. Thompson (Penna. State College, State College). *J. Nutrition* **46**, 377(1952). The vitamin A-sparing effect of crude soybean lecithins is not due to the presence of lecithin, inositol or choline. At least a part of this effect is due to the presence of carotenoids.

The relative utilization of alpha-tocopherol and alpha-tocopherol acetate by humans. E. F. Week, F. J. Sevigne and Marie E. Ellis (Collett-Week-Nebecker, Inc., So. San Francisco, Calif.). *J. Nutrition* **46**, 353(1952). The utilization of free α-tocopherol was found to be significantly (5% level) superior to the utilization of the α-tocopherol ester. The mean value for the free form was 35% greater than the mean value for the ester.

Some factors which affect the utilization of vitamin A. E. H. Kramke, M. D. Lloyd and J. C. Fritz (Borden Co.). *Poultry Sci.* **31**, 49(1952). On a ration in which the only obvious source of vitamin A activity was 0.75% alfalfa meal, chick growth was improved by the inclusion of crude soybean lecithin, defatted lecithin or crude soybean oil. Addition of tocopherol or methylating agents had much less effect upon utilization of the vitamin A activity. Addition of wheat germ oil to the basil ration permitted turkey poults to utilize carotene more efficiently for growth.

The storage quality of eggs produced by hens fed screw pressed cottonseed meal. E. L. Stephenson and R. M. Smith (Univ. Arkansas, Fayetteville). *Poultry Sci.* **31**, 98(1952). The storage quality of eggs produced from hens fed a diet in which screw pressed cottonseed meal was the principal source of protein was similar to those from hens receiving soybean meal as the principal protein supplement.

The loss or inactivation of pure gossypol in a mixed diet. B. H. Heywang, H. R. Bird and R. P. Kupperman (Agr. Res. Admin., U.S.D.A., Glendale, Arizona). *Poultry Sci.* **31**, 35(1952). There was no decrease in hatchability of the eggs from White Leghorn pullets when fed diets into which 0.012 and 0.024% gossypol was mixed 6-7 days before feeding. Only a slight decrease in hatchability was noted when 0.036% was mixed in the diet and in no case was an adverse effect on whole egg weight noted. These data are in good agreement with the results of chemical analysis in that they indicate that most of the gossypol had been destroyed or inactivated within 144 hours after it was mixed with the diet.

The site of nitrogen absorption in rats fed raw and heat treated soybean meals. R. W. Carroll, G. W. Hensley and W. R. Graham, Jr. (Quaker Oats Co., Chicago). *Science* **115**, 36(1952). Properly heated soybean meal is only slightly more digestible than raw soybean meal as measured by fecal nitrogen content. The authors show that properly heated soybean meal is readily digested in the small intestine while the nitrogen from raw meal escapes digestion in the small intestine and must be absorbed from the cecum or colon. Apparently the nitrogen absorbed from the large intestine has little utility for growth.

Rapid determination of plasma tocopherol. M. Farber, Ade L. Milhorat and H. Rosenkrantz (New York Hosp., N. Y.). *Proc. Soc. Exp. Biol. Med.* **79**, 225(1952). Expansion of the micro method of Quaife for the estimation of blood tocopherols affords a rapid and convenient routine analytical procedure.

Effect of raw soybean meal on growth of the chick. H. J. Almquist and J. B. Merritt (Grange Co., Modesto, Calif.). *Proc. Soc. Exp. Biol. Med.* **79**, 277(1952). Using soybean meal as the sole source of protein in the diet, varying proportions of raw to cooked meals were fed to young chicks. Growth inhibition was almost fully developed when one-fourth of the protein was supplied in the raw form. The results are explainable on basis of an antitrypsin which readily inactivates trypsin but permits the remaining proteolytic system in the digestive tract to function at a lowered degree of efficiency.

Effect of corozo palm nut oil meal in the baby chick diet. R. L. Squibb and Miriam K. Wyld (Inst, Agropecuario Nac., Guatemala). *Poultry Sci.* **31**, 118(1952). When corozo oil meal was fed to supply not more than 10% of the crude protein of the baby-chick ration, corozo meal was superior to the equivalent protein supplied by the local cottonseed and sesame oil meals. Corozo oil meal should not be included in baby-chick rations in excess of 50% as depression of growth, lower efficiency of feed utilization and high mortalities may result.

Supplementation with vitamin B_{12} and amino acids of chick diets containing cottonseed or soybean meal. L. J. Machlin, C. A. Denton and H. R. Bird (Bureau Animal Ind., U.S.D.A., Beltsville, Md.). *Poultry Sci.* **31**, 110(1952). Methionine was the only important amino acid deficient in a simple corn-soybean meal diet for the growth of chicks to 6 weeks of age. Lysine was the only amino acid deficient in a simple corn-cottonseed meal (hydraulic processed) diet. When vitamin B_{12} was added to the methionine supplemented soybean meal diet, maximum growth was obtained. When aureomycin fermentation product was added to the lysine supplemented cottonseed meal diet, growth was better than that obtained using a good commercial broiler ration.

Chemical characteristics of turkey carcass fat as a function of dietary fat. A. A. Klose, E. P. Mecchi, G. A. Behman, H. Lineweaver, F. H. Kratzer and D. Williams (Western Reg. Res. Lab., Albany, Calif.). *Poultry Sci.* **31**, 354(1952). Analysis of the feed fat and carcass fat of turkeys for their fatty acid contents demonstrated significant correlation between diet fat and carcass depot fat for linoleic acid and linolenic acid contents. The content of total saturated fatty acids was maintained at a fairly constant level by the turkey. There were no significant differences in fatty acid composition between 3 widely separated depots in the carcass. With respect to the unsaturated fatty acids, the fatty acid composition of depot fats of commercially raised turkeys was shown to be largely a reflection of the fatty acid composition of the dietary fat. Depot fat synthesized by the turkey on a low fat diet was roughly estimated to contain 28% saturated fatty acids and 68% oleic (and hexadecenoic) acid. Depot fat stability was very responsive to dietary fat changes. Fat from sardine oil and linseed oil groups was much less stable than that from soybean oil groups while corn oil, beef fat and low fat groups were significantly more stable.

Rancid lard effect on rats fed complete and riboflavin-deficient diets. H. Kaunitz, Ruth E. Johnson and C. A. Slanetz (Columbia Univ., New York City). *J. Nutrition* **46**, 151(1952). The inclusion of 10% of rancid lard in a purified rat diet led to no toxic symptoms when all known essential factors were fed separately. Five generations of rats were bred with rancid lard as the only fat source; animals receiving rancid lard were however, roughly 5% lighter than controls. Rancid lard accentuated the signs of riboflavin deficiency. Rancid lard seems to increase the requirements for various essential factors.

Some factors affecting stability of chicken fat. H. J. Phillips and I. L. Williams (Univ. Nebraska, Lincoln). *Food Tech.* **6**, 74(1952). Moisture, ammonium chloride and excess (0.3%) vitamin E increased the tendency to rancidify rendered fat as measured by peroxide values. An optimal vitamin E concentration (0.03%) and the absence of moisture resulted in a more stable rendered fat. Feeding choline or crude betaine fractions of beet juice did not increase the stability of skin fat. Addition of vitamin E to the ration (50 mg./100g.) increased the stability of the deposited skin fat.

Separation of the tocopherols by paper chromatography. F. Brown and K. L. Baxter (Hannah Dairy Res. Inst., Kirkhill, Ayr, Scotland). *Chem. Ind.* **1951**, 633. Clear-cut separation of α, β and δ tocopherols has been achieved using reversed phase paper chromatography with vaseline-coated Whatman No. 1 filter paper as the stationary phase and 75% ethanol as the mobile phase.

Digestibility of oils and fats. V. R. Bhalerao, D. Venkatappiah and C. P. Anantakrishnan (Indian Dairy Research Inst., Bangalore). *Indian J. Vet. Sci.* **20**, 271-5(1951). The relative digestibilities of butterfats of cow, buffalo, goat, and sheep, their body fats, some edible vegetable oils and hydrogenated fats of different melting points (pancreatic lipase was used) was studied. The tests indicated in general a higher rate of digestibility for the butterfats than for the body fats of the same mammals and the hydrogenated fats of vegetable origin. The different butterfats and coconut oil were digested at about the same rate. Hydrogenation was said to lower the digestibility. (*Chem. Abs.* **46**, 2639)

Feeding experiments on calves with hydrogenated soybean oil. Th. J. de Man (''de Schothorst'' Hoogland, Amersfoort, Netherlands). *Tijdschr. Diergeneeskunde* **76**, 175-8(1951). An attempt was made to replace milk fat in whole milk for calves with soybean oil and hydrogenated soybean oil. A high percentage of soybean oil and hydrogenated soybean oil were excreted by skin and feces; the fat content of hair from calves with soybean oil as the source of fat was 19%, with hydrogenated soybean oil 47%, and with whole milk 2.6%. The iodine nos. were 115, 78, and 37, respectively. The same experiments 2 weeks later showed fat contents of 13, 27, and 5.6% and iodine nos. of 94, 79, and 72. The fat content of the feces was 32.7, 24.5, and 4.1%, and the amount of dry matter in the feces was 28.6, 26, and 23%, respectively. (*Chem. Abs.* **46**, 2639)

The mechanism of intestinal fat absorption. II. B. Borgstrom (Univ. Lund, Sweden). *Acta Chem. Scand.* **5**, 643-6(1951). The intestinal lymph ducts of rats were cannulated after feeding C^{14}-labeled fatty acids alone or together with glycerides. Most of the absorbed fat was transported via lymphatic channels to the systemic circulation, whether fed as glycerides or as free fatty acids. The proportions of neutral fat and phospholipids were the same in all experiments; 90% of the fatty acids was in the neutral fat, and the remaining 10% in the phospholipids. The neutral fat consisted mainly of triglycerides. No free fatty acids or soaps appeared in the lymph. The hydrolysis and resynthesis of glycerides in relation to the intestinal wall was discussed. The intestinal wall supplied an important part of the phospholipids to the blood during fat absorption. (*Chem. Abs.* **46**, 2648)

• Drying Oils

Stuart A. Harrison, Abstractor

Wrinkle finishes from tobacco seed oil-modified alkyds. S. L. Kapur and K. K. Sarin. *J. Sci. Ind. Research* (India) **10B**, No. 7, 168(1951). Modified alkyds made from tobacco seed oil are suitable in varnishes for producing wrinkle finishes. A varnish made by dissolving the modified alkyd in benzene with added drier is sprayed on a base to a thickness of .055 mm. and baked at 150° for 45-60 minutes gives a wrinkle finish. Up to 10% TiO_2 can be used but traces of iron inhibit wrinkle formation. (*Chem. Abs.* **46**, 2818)

Drying properties of niger seed and safflower oils. N. L. Vidyarthi. *J. Sci. Ind. Research* (India) **10B**, No. 7, 170(1951). The drying properties of raw niger seed and safflower oils are given after the oils have been bodied at 200° and drier added. The oils blown at 100° are tested in the same way. Films of the raw oils containing drier give tack-free films within two hours when dried at 100°. The incorporating of red lead with the processed oils produces compositions suitable for outdoor coatings. (*Chem. Abs.* **46**, 2817)

Effect of acetylation on the drying properties of oils. N. L. Vidyarthi *J. Sci. Ind. Research* (India) **10B**, No. 9, 233(1951). Acetylation of raw drying oils such as linseed, safflower and niger seed by boiling the oil two hours with acetic anhydride reduces the drying time and lightens the color of the films. The best oils were obtained by heating the acetylated oil 3 hours at 200°. Drying times are given. (*Chem. Abs.* **46**, 3295)

Use of marine oils in the paint industry. H. M. Schwartz. *S. African Ind. Chemists* **3**, 66(1949). The use of fish-body oils, especially pilchard-body oil in the paint industry is discussed. Pilchard-body oil has an iodine value of 185 to 195 compared with 180 for linseed oil and contains approximately 27% saturated fatty acids compared with 12% for linseed oil. It dries more slowly than linseed but gives a more flexible film. When it is alkali-refined, cold cleared and heated to 280-290° *in vacuo* to a viscosity of about 9 poises the drying properties are improved, the fishly odor eliminated and the tendency to after-yellow reduced. Fractionated oils with properties similar to tung oil are prepared by splitting the oil, fractionally distilling the fatty acids and re-esterifying with the high iodine value fraction. (*Chem. Abs.* **46**, 3295)

Metallic salts of polymerized fatty acids as varnish resins. S. C. Sethi and J. S. Aggarwal. *J. Sci. Ind. Research* (India)**10B**, No. 9, 205(1951). Oil-varnish formulations containing Al, Ca, Mg, Mn, and Zn salts of polymerized acids derived from safflower, tobacco seed oil, castor oil and castor oil gel hydrolyzate furnish films possessing good gloss and resistance to action of water and organic solvents. Films prepared from acids free of monomer are best. These varnishes can be used for water-proofing cloth and paper and insulating metallic surfaces. Safflower oil (100 g.) heated at 270-80° for 10-12 hrs. (viscosity about 80 centistokes) was saponified with 20% NaOH and the soap was treated with a solution of 22.8 g. of $MnCl_2$, washed with water and dried to give the Mn salt, softening (ball and ring method) 120°; zinc salt softens 106°. The melting points of the salts of tobacco seed and castor oil polymers were given. Varnishes were prepared by heating the metallic salt with twice-boiled linseed oil at 240-60°; the product was thinned with turpentine; cobalt naphthenate (0.5% based on oil) was used as drier. A table summarized the properties of the varnishes. (*Chem. Abs.* **46**, 3296)

Strength of surface coatings. H. Grinsfelder. *Am. Paint J.* **36**, No. 27, 66(1952). Eight commercial alkyd resins of different types were pigmented with titanium dioxide and applied on steel panels and tin coated steel panels. The films on the tin coated panels could be removed by placing the panel in a mercury bath. The tensile strength and elongation of the free films obtained this way were measured after different periods of aging. Fatigue studies were made on the free films by applying a given load (308 psi.) for a period of 12 minutes and then relaxing the film for 12 minutes. This was done with the Scott 1P-2 instrument used for tensile and elongation measurements. The stretch and recovery were followed over 100 cycles of extending and relaxing the film. Other properties tested were scratch resistance, pencil hardness, and rocker hardness. This work was undertaken with the hope that a study of the physical strength properties of organic coatings and the change of these properties with time and environment would provide a better understanding of the mechanism of film performance. As a result of the studies it appears that alkyd films are dynamic in nature. They are dynamic not only in respect to their nature changing with time and environment but also with respect to their cross sectional character. The air exposed surface has considerably different properties than the underlayer, which in turn, differs from the interface.

Some recent advances in the study of dehydrated castor oil. H. S. Lilley and R. J. Carter. *J. Oil & Colour Chem. Assoc.* **35**, 87(1952). The problem of ''after-tack'' in coatings prepared from dehydrated castor oil is studied. It is concluded on the basis of a theoretical treatment that ''after-tack'' is an inherent property of dehydrated castor oil and is the result of a high polydispersity of the polymerized oil. This means that in the polymerized oil there is present a mixture of low and high molecular weight polymers. A measure of this is the ratio of the weight average molecular weight to the number average molecular weight, the higher the ratio the greater the polydispersivity. Figures are given comparing the weight and number of molecular weights for polymerized linseed oil and dehydrated castor oil which shows the ratio of Mw/Mn to be much larger for the latter. In the preparation of oil modified alkyds the ''after-tack'' can be reduced by using low viscosity dehydrated castor oil.

Some castor oil derivatives. J. Sfiras. *Oleagineux* **1**, 135-138, 221-225(1952). The properties of castor oil can be modified by esterification with monobasic or dibasic acids and by hydrogenation. Other important transformations are discussed which involve reactions at the hydroxyl group, such as acetylation, dehydration and dehydrogenation. The thermal decomposition of castor oil, methyl and ethyl ricinoleates and salts of ricinoleic acid was studied. The distillate and the residue were both analyzed and found to contain a variety of acids. The formation of polymeric acids during the thermal treatment was discussed.

PATENTS

Coating compositions containing a drying oil-modified menthane derivative. L. M. Geiger. *U. S. 2,588,821.* A drying oil base material is made by heating a drying oil and an alcohol soluble condensation product of phenol with a natural cyclic terpene, e.g. dehydrated castor oil Z_3 viscosity (160) is heated to 585° F. for 8 minutes and then *cis* 1-8 *bis* (parahydroxy phenyl) menthane (15) is added. This is reheated to 565° F. and kept there for 5 minutes. To this mixture is added moleic modified pentaerythritol rosin ester (85) such as Pentalyn G. The varnish is reduced with 260 parts of mineral spirits. With drier the varnish gave films with improved gloss, adhesion, freedom from skinning and after yellowing over one made similarly but without the menthane derivative.

Process for the manufacture of improved drying oils by the condensation of unsaturated mineral oil polymers with aldehydes. R. C. Goodwin. *U. S. 2,588,826.* Highly unsaturated mineral oil fractions are condensed with aldehydes in the presence of an acidic catalyst to give products which dry to tough films, e.g. an unsaturated mineral oil fraction boiling from 350 to 600° F. and having a Wijs iodine number of over 200 (100 g.) is mixed with benzaldehyde (25 g.) and 50% sulfuric acid (50 cc.). The mixture is heated to 100° F. and agitated for several hours. A heavy liquid polymer is obtained which dries to tough films that do not crack. Other aldehydes may be used to accomplish similar results.

Allyl alcohol-styrene copolymers. E. C. Shokal and P. A. Devlin. *U. S. 2,588,890.* Styrene and allyl alcohol are copolymerized in a nickel lined bomb at 125°. Oxygen bubbled through the solution serves as the catalyst. Starting with 9 parts of allyl alcohol to 1 part of styrene a copolymer having about 38% combined styrene is obtained. The molecular weight of the copolymer is about 480. It averages about 2.6 hydroxyl groups per polymer molecule. When the copolymer is esterified with drying oil acids a drying oil is obtained. Esterified with linseed acids an oil is obtained which with drier dries set to touch in 80 minutes, dries hard in 3 hours and 40 minutes and cotton lint-free in 6 hours and 15 minutes.

Interpolymers and method of making same. F. Armitage and E. S. J. Fry. *U. S. 2,589,655.* Acenaphthylene reacts with drying oils containing conjugated unsaturation to give products which dry rapidly to good films, e.g. acenaphthylene (3 g.) is dissolved on conjugated linseed oil (15 g.) and xylol (25 g.). The reaction mixture is heated at 145° for 5¾ hours to give a clear solution. An additional 3 grams of acenaphthylene is then added and heating continued at reflux for 22 hours. The product is nearly clear. With drier, films dried touch dry in four hours.

Modified short oil alkyd resins. L. Aver. *U. S. 2,589,657.* A new type resin is prepared by condensing ethyl cellulose and the ingredients forming the short oil alkyds, e.g. glycerin (260), phthalic anhydride (415), cocoanut oil fatty acids (225) are heated to 450° F. for 30 minutes to cause initial condensation, then 202 ethyl cellulose (10 cps., 48% ethoxy content) are added. Heating is continued until solution occurs. This requires that the temperature be raised to 540° F. Considerable foaming occurs and the resin darkens at the higher temperatures. This can be avoided by carrying out the reaction in solution and under an inert atmosphere. Different drying and semidrying oils may be used in this process. The products give tough flexible films on drying.

Tall oil modified alkyd resins and process for preparing the same. A. F. Schmutzler. *U. S. 2,590,653.* Tall oil (1700 pts.) is mixed with 98 pts. of maleic anhydride and a small amount of zinc dust added for catalyst. The mixture is heated to 280° for two hours, then 250 parts of pentaerythritol are added and the mixture heated until the acid number is about 14. The modified resin (200 pts.) is then mixed with 45 pts. high boiling hydrocarbon solvent, 1 part butyl carbitol, one-half part acetone, 0.5 part of cobalt naphthenate, 2 parts cumene hydroperoxide and ½ part zinc peroxide. Styrene 16 parts and acrylonitrile 4 parts are then added to the cooled stirred mixture. The temperature is gradually raised to 250° and the product diluted with 100 parts of P-1 ink oil. The resin obtained is especially adapted for use in printing inks, paints and lacquers. A large number of variations of the procedure are given.

Printing inks from tall oil modified alkyd resins. A. F. Schmutzler. *U. S. 2,590,654.* Modifications of processes described in *U. S. 2,590,653* yielding products suitable for making printing inks.

• Waxes

E. H. McMullen, Abstractor

Gloss of self-polishing wax. A. Treffler. *Soap and Sanitary Chemicals* 28, No. 4, 147, 149, 151, 169 (April, 1952). The physical and chemical properties of various materials used in self-polishing waxes are discussed in relation to their effect on gloss of the wax film. The mechanism of emulsification is explained. Results of systematic tests in several wax emulsions which were conducted in an effort to find better ways and means for the production of high gloss producing self-polishing waxes are recorded.

Waxes. Wm. G. Dulmage. *Canadian Chemical Processing* 36, 32-4(1952). A description of the solvent de-oiling process used by International Waxes Ltd. for the production of microcrystalline wax.

SINITIRO KAWAMURA

Purification of rice-bran wax by solvent treatment. J. Kawai and H. Ukiya (Bôsô Fat Ind. Co.). *J. Chem. Soc. Japan*, Ind. Chem. Sect. 54, 735-7(1951). Crude rice-bran wax containing glycerides, separated from crude rice-bran oil by wintering at 20-25°, was treated with solvents, such as methanol, ethanol, acetone, benzene, ether, trichloroethylene, etc., to remove glycerides. Mixtures of solvents, such as methanol-benzene and methanol-trichloroethylene, were effective in giving a sharp separation of soluble and insoluble parts, the latter having sufficiently low saponification value (110 or lower). Repeated extraction of glycerides with methanol or ethanol was also effective.

PATENTS

Bleaching wax. R. S. F. Jarrett-Knott. *French 965,015.* Wax is dissolved in a warm solvent and cooled to give crystals which are then subjected to chlorine bleaching. (*Chem. Abs.* 46, 2826)

• Detergents

Lenore Petchaft, Abstractor

Extraction of the active agent from detergent mixtures. S. A. Miller, B. Bann, and A. P. Ponsford (Brit. Oxygen Co., Ltd., London). *J. Applied Chem.* (London) 1, 523-4(1951). Na dodecyl sulfate, Na sec-alkyl sulfates, sulfated fatty acid monoglyceride, Na arylalkylsulfonates, cetylpyridinium bromide, and nonionic detergents of various brands were quantitatively extracted from dilute aqueous solutions (0.4-4.0%) in the presence of Na_2CO_3 (4% in aqueous solution) with n-butyl alcohol. Recovery was then effected by evaporation of the butyl alcohol in vacuo. (*Chem. Abs.* 46, 3303)

Importance of hydrocarbon chemistry in the synthetic detergent industry. H. Stupel (Seifenfabrick Hochdorf A.-G., Hochdorf, Switz.). *Erdol u. Kohle* 4, 687-92(1951). A general review of the chemistry of sulfonates for the production of detergents. (*Chem. Abs.* 46, 2823)

Sulfated oils and fats. C. Griffiths (Ellis Jones & Co., England). *Paint, Oil and Colour J.* 121, No. 2789, 755-6, 758(1952). Review of method of sulfating various fats and oils to prepare true sulfates (not sulfonates), analysis of the products, means of varying the strength of the products and applications of the oils and other products used principally in detergents.

Infrared analysis for functional groups in surface-active compounds. A. H. Delsemme. *Mededel. Vlaam. Chem. Ver.* 13, 152-8(1951). Techniques are described. (*Chem. Abs.* 46, 3303)

How to make good hand cleaners. Paul I. Smith. *Am. Perfumer Essent. Oil Rev.* 59, 213, 215(1952). Hand cleaners or mechanics' hand detergents must be quick-lathering, easy to rinse and free from dermatitis effects. The base should be a pure coconut or coco-tallow soap perhaps mixed with a small quantity of wetting agent or detergent. The abrasive must be efficient but free from cutting or scratching effect on the skin. Smooth colloidal clays and vegetable scrubbers such as corn meal are usually used. Other ingredients such as emollients, solvents, builders and perfume may also be used.

Detergents and their influence on sewage treatment. W. A. Sperry (Aurora Sanitary District, Aurora, Ill.). *Sewage and Ind. Wastes* 23, 1469-76(1951). A statistical study of the use of synthetic detergents in Aurora, Elgin, and Rockford and correlation of this use with plant operations over a period of years before and since these detergents became popular indicated that detergents tended to reduce the suspended matter and increase the ammonia content of the raw sewage and to inhibit gas production in digesters. The total bacterial content of the raw sewage at Aurora also seemed to be effected downward. (*Chem. Abs.* 46, 2210)

Wool scouring: a practical approach. E. I. Birnbaum. *Can. Text. J.* 68, 25, 76, 78, 82(1951). Review of the development of scouring practice leading to the uses of non-ionic detergents with added salt for cloth oiled with mineral oils. Though the action of salt and soda ash in this process is not fully understood, figures are quoted which show the importance of these additives. The writer stresses that when considering detergent bath composition, not just the surface active agent but the entire composition of the bath should be taken into account.

Continuous soapmaking. J. L. Boyle. *Soap Sanit. Chemicals* **28**, No. 4, 47-9, 71(1952). Review of continuous soapmaking process from hydrolysis, through fatty acid distillation, saponification, flash drying and soap milling or spray drying and packaging. Flow sheet of operations is included.

Steam cleaners. M. A. Lesser. *Soap Sanit. Chemicals* **28**, No. 4, 50-53(1952). Steam cleaning has the advantages of the physical action of steam pressure forcing its way through successive layers of soil, the dissolving and dispersing action of heat on oils, greases, etc., and the chemical action of the detergent in wetting, penetrating and emulsifying surface deposits. Both anionic and nonionic detergents may be used in steam cleaners. Typical formulations are included.

Combination of raw materials improves synthetic detergents. H. Stupel (Seifenfabrick Hochdorf, Switzerland). *Mfg. Chemist* **23**, 99-102(1952). Synergistic effect of 15 combinations of synthetic detergent raw materials was determined by detergency evaluations. Combinations of synthetic detergents were found to be better than the individual components. An advantage may result from the combination of a large amount of weakly detergent substance with a small amount of a highly active substance. Nonionics have a favorable effect on suspending power and degreasing properties, and also have the advantage of being easily removed by rinsing.

Rheological properties of some soap-oil systems. G. B. Moses and I. E. Puddington (Natl. Research Labs., Ottawa). *Can. J. Chem.* **29**, 996-1009(1951). The apparent viscosity of dispersions of Na, Li, and Al soaps in hydrocarbon oils were determined with an extrusion plastometer at temperatures from 35 to 190°, at soap concentrations of 6-27 vol. %, and at rates of shear of 1200-250,000 sec.$^{-1}$. For the Na soaps, both commercial lubricating grease and dispersions of pure Na stearate and oleate in varying proportions in oils were used. The length of the soap particles in several samples was altered by treatment in a colloid mill. The plots of residual viscosity and coefficient of thixotropy against temperature exhibited a sharp decrease to a minimum, an increase to a maximum, and then another decrease, for all the soaps, the temperatures at minimum and maximum depending on the soap used and the degree of unsaturation. The shorter particles showed smaller thixotropy. The shape of the curves was explained in terms of the solution of oil in soap, of soap in oil, of greater flexibility of the fibers at higher temperatures, swelling of the soap crystals, and the influence of the metal ion. The shape factors calculated by applying the Kuhn equation to the data agreed with those observed microscopically. The variation of thixotropy with concentration was in accord with theory. (*Chem. Abs.* **46**, 3302)

Some observations on the wetting of Greige cotton. R. E. Wolfram and A. C. Nuessle (Rohm & Haas Co., Philadelphia, Penn.). *Textile Research J.* **22**, 246-53(1952). In a study of the effect of temperature on Draves wetting time, it has been shown that most wetting agents follow a typical curve characterized by decreased wetting time up to about 140° F., and increase to a peak near 185° F., followed by a sharp drop as the solution approaches the boil. With soap and a few other surfactants the curve levels off after the initial decrease so that there is no peak; but here, too, there is a marked drop beyond 185° F. The peak occurs at approximately the melting point of the cotton wax. A study of wet pickup by cotton fabrics padded through solutions of a wetting agent has revealed that; (1) pickup of absorbent fabrics is not enhanced by the use of wetting agent; (2) pickup to non-absorbent fabrics, such as greige cotton, increases with amount of wetting agent, leveling off only at concentrations considerably in excess of normal use and far above the range of the Draves test; (3) pickup can be effectively increased at normal concentrations of wetting agent (0.02% to 0.1%) by means of multiple padding, or by increasing either the immersion time or the lag time between dip and nip.

Infrared absorption spectra of aluminum soaps. W. W. Harple, S. E. Wiberley and W. H. Bauer. (*Rensselaer Polytechnic* Institute, Troy, N. Y.). *Anal. Chem.* **24**, 635-8(1952). This investigation was undertaken to determine the structure of aluminum soaps by means of infrared spectroscopy. Infrared absorption spectra have been obtained on one series of aluminum soaps prepared by an aqueous metathesis method from α-ethylcaproic acid and lauric acid with varying fatty acid-aluminum ratios and on a second series of aluminum soaps prepared with a constant fatty acid-aluminum ratio approximating that of a disoap from caproic, enanthic, caprylic, pelargonic, capric, lauric, myristic, palmitic, and stearic acids. The presence of a fatty acid band was evident only in soaps containing fatty acid extractable with cold iso-octane, including that trisoaps of the higher fatty acids do not exist as chemical compounds. The spectra of soaps of disoap composition contain a free hydroxyl band, whereas those approaching a monosoap composition contain bonded hydroxyl groups.

The use of isotopes for measuring cleanliness of surfaces. G. M. Ridenour (School of Public Health, University of Mich., Ann Arbor, Mich.). *Modern Sanitation* **4**, No. 4, 61-3, 74(1952). A review of use of radioactive isotopes in measuring effectiveness of various cleaning operations. A combination of both radiological and bacteriological methods, with a knowledge of the advantages of each, offers a measure of (1) total soil removal, (2) total soil residual, (3) bacterial removal and residuals. Details are given of application in self-service laundries.

Preparation of anhydrous sodium stearate. G. Stainsby, R. Farnand, and I. E. Puddington (Natl. Research Labs., Ottawa). *Can. J. Chem.* **29**, 838-42(1951). In a method for preparing Na stearate by the action of Na amalgam on stearic acid under anhydrous conditions the reaction was carried out under atmospheric pressure, in inert dry gas, at 300°; the system was evacuated and cooled to solidify the soap; traces of amalgam were removed from the soap by washing with Hg; and the soap was finally melted and degassed in vacuo. Soap containing free fatty acid produced water and stearone on heating, but the neutral soap was thermally stable. Dilatometric measurements were then carried out from room temperature to the isotropic liquid state. The results were identical with those obtained previously with Na stearate prepared by neutralizing an alcoholic solution of stearic acid with alcoholic NaOH, and then removing moisture by heating in vacuo to 300°. (*Chem. Abs.* **46**, 3300)

Studies on free saponins. III. Fractionation of extracted saponins by differential foaming and evaluation by hemolysis. J. C. Fontan-Candela and V. Villar-Palasi. *Anales de fís. y quím (Madrid)* **48B**, 143-148(1952). Saponin extracts concentrated and purified by differential foaming. The change in concentration was followed by a colorimetric evaluation of the hemoglobin removed in the hemolysis induced by the saponins.

SINITIRO KAWAMURA

Properties of tetrabutylnaphthalenesulfonate as a detergent. K. Fukuzumi, S. Ozaki, and Y. Yamada (Govt. Chem. Ind. Research Inst., Nagoya). *J. Chem. Soc. Japan,* Ind. Chem. Sect. **54**, 728-9(1951). Surface-activity of Na tetrabutylnaphthalenesulfonate was superior to that of Na dibutylnaphthalenesulfonate (the main component of Nekal). The stability to hardness and acidity of water was similar for these 2 compounds. Addition of Na_2SO_4 or Na pyrophosphate increased the surface-activity of them.

Utilization of aryl alkanes. I. Preparation of sodium monoalkylbenzene sulfonates and their properties. M. Ogawa (Osaka Univ., Osaka). *J. Chem. Soc. Japan,* Ind. Chem. Sect. **54**, 779-81(1951). Alkylbenzenes containing normal alkyls of C_2, C_4, C_8, C_{12}, C_{16}, C_{18} were synthesized, and then sulfonated and neutralized. *p*-Toluidine salts of alkylbenzenes were prepared: ethyl m. 202-3°; n-butyl, m. 187-8°; n-octyl, m. 147-8°; and n-dodecyl, m. 144-5°; hexadecyl and octadecyl derivatives could not be obtained as crystals. Solubility and surface tension were measured for the Na salts. Decyl- and dodecyl-benzenesulfonates had the lowest surface tension.

PATENTS

Detergent composition. W. H. Woodstock (Victor Chemical Works). *U. S. 2,586,897.* A detergent composition of excellent soil removing properties comprising a small amount of the neutral organic ester reaction product of a lauryl acid ester of a phosphorus acid and an olefin oxide such as ethylene or propylene oxide, mixed with a large proportion of an alkali metal salt of a molecularly dehydrated phosphoric acid.

Hard water detergent composition. Louis McDonald. *U. S. 2,588,264.* A detergent effective in hard or soft water, comprising a fatty acid soap, an aliphatic non-cationic type high molecular weight organic non-soap detergent which is a strong disperser for calcium and magnesium soaps and has high cleansing efficiency and low tissue adsorption, a second organic detergent which is a solubilizer for soda soap in the presence of electrolytes and an emulsified water insoluble cellulose ether used to promote micelle formation and equalize the rate of solution of the various ingredients.

Improved detergent composition. J. E. Hanson (California Research Corp.). *U. S. 2,590,613.* Improved detergent properties are obtained by intimately incorporating, as by dispersing or dissolving, a water-soluble salt of celluronic acid in a composition containing a non-cationic surface-active organic detergent.