ABSTRACTS . . . . E. S. Lutton, Editor

• Oils and Fats

R. A. Reiners, Abstractor

Determination of Bellier index of vegetable oils and its application to the assay of peanut oil in oil mixtures. Clementina Amato and Maria E. Wohlers de Almeida (Inst. "Adolfo Lutz" Sao Paulo). *Engenharia e quim.* (Rio de Janeiro) 4, No. 3, 7-13, 16(1952). The turbidity temperature (Bellier test) of various vegetable oils was determined. The oil, number of samples analyzed, turbidity-temperature range, and average, respectively, are: peanut, 62, 39.7-42.5, 41.0; olive, 77, 12.5-19.5, 16.1; cottonseed, 32, 18.6-21.4, 19.9. Oil mixtures containing peanut oil were prepared and the turbidity temperature was found to depend on the amount of peanut oil present. (*Chem. Abs.* 46, 8877)

Simple, direct extraction of coconut oil. Anon. *Food Eng.* 24(10), 143-5(1952). A pilot plant operating in Calamba, Laguna, P. I., is described. Coconut kernels are comminuted and pressed to yield a milky fluid. The cake is dried and expelled to obtain prime oil. The "milk" is centrifuged to obtain a "cream" which is subjected to enzymatic action, then chilled and on melting recentrifuged to recover the remaining oil. The quantity of oil recovered is about 1% less than in the copra process but the oil requires no refining so that the overall yield is reported as much as 10.2% higher.

Advantages accrue from propane use in solvent separation of fatty acids. Anon. *Chem. Proc.* 15(10), 44-46(1952). A description of a plant in Hammond, Indiana, in which propane is used to fractionate fatty acids and to decolorize oils.

More fatty acids for Canada. Anon. *Can. Chem. Proc.* 36(9), 42-44(1952). The new plant to be erected by Canada Packers Ltd. will utilize a continuous two-step fatty acid distillation unit.

Continuous solvent extraction for "Ardil" fibre meal. Anon. *Can. Chem. Proc.* 36(5), 60-66(1952). A new solvent extraction unit used to remove oil from peanuts is described.

Composition and properties of various Vanaspatis (hydrogenated-oil products) and their corresponding crudes. G. K. Belekar, P. T. Bhide and J. G. Kane (Univ. Bombay). *J. Sci. Ind. Research* (India) 11B, 140-6(1952). Samples of unrefined peanut, sesame, cottonseed, and coconut oils and the Vanaspatis were analyzed. The ranges of iodine, SCN, saponification, and acid values, and the % linoleic, oleic, and saturated acid glycerides, respectively, of peanut oil were 88.9-97.1, 70.7-78.2, 190.5-202.4, 1.4-10.8, 18-31, 52-72, 15-20 and of sesame oil were 103.8-118.7, 75.3-81.5, 189.3-197.9, 2.0-14.3, 31-50, 38-59, 11-17. The ranges of the Vanaspatis derived from peanut and sesame oils were 59.5-71.3, 58.0-67.3, 189.5-196.3, 0.1-1.0, 0-12, 59-77, and 22-33, plus iso-oleic acid 15-44. The Ni content varied from 0.1 to 0.5 p.p.m. and the phosphatide content from 0.001 to 0.005%. Experiments on solvent crystallization of Vanaspatis showed an even distribution of iso-oleic acid among all the fractions. (*Chem. Abs.* 46, 8879)

How much soybean oil can we use in edible products? H. C. Black (Swift & Co.). *Soybean Digest* 12(11), 53(1952). The increase in the quantity of soybean oil used in edible products will be directly proportional to the degree that flavor instability can be overcome.

Chemical composition of the oil from seed of Fagara coco. P. Cattaneo, Maria M. Gonzales and Germaine K. de Sutton (Univ. nacl. Buenos Aires). *Anales soc. cient. argentina* 153, 95-101(1952). Seeds of *F. coco* contained 24.4% oil with the following characteristics: iodine value (Hanus) 108.0, saponification value 194.1, acid value 5.5, unsaponifiable matter 0.68%. The total acids contained myristic 1.6, palmitic 15.5, stearic 2.8, oleic 45.0, linoleic 23.3, and linolenic 11.8%. (*Chem. Abs.* 46, 9326)

Reactions of fatty materials with oxygen. XII. New method for concentrating long chain peroxides. J. E. Coleman, H. B. Knight and D. Swern (East. Reg. Res. Lab., Philadelphia 18, Penna.). *J. Am. Chem. Soc.* 74, 4886-89(1952). Precipitation of the nonperoxidic portion of methyl oleate autoxidation mixtures (4-37% peroxides) as urea complexes gives concentrates containing 70-90% peroxides in 50-95% yields. The procedure is very simple. Preliminary study indicates that this technique may be applied successfully to autoxidized methyl elaidate and polyunsaturated acids.

The diffusion of atmospheric gases through fats and oils. Dorothy Davidson, P. Eggleton and Patricia Foggie (Univ. Edinburgh, Scot.). *Quart. J. Exptl. Physiol.* 34, 91-105(1952). An apparatus is described for measurement of both the solubility and the diffusion constant of a gas in a liquid solvent. The solubilities and diffusion constants of H_2 and O_2 were determined in olive oil, and of N_2 in olive oil, oleic acid, and liquid ethyl palmitate. The behavior of the gases in lard was studied. H_2 dissolves in and diffuses through stearic acid crystals at 25°. Crystalline ethyl stearate and palmitate can dissolve CO_2 but not N_2. The bearing of the results on the movement of N_2 in the body is discussed. (*Chem. Abs.* 46, 8735)

The drying oils in the seeds of Mercurialis perennis (dog's mercury). T. P. Hilditch (32 Beresford Road, Oxton, Birkenhead). *Chemistry & Industry* 1952, 981. Fatty acids from the seed oil of *M. perennis* was found to consist of 67% linolenic, 17.3% linoleic and 15.7% saturated acids. Due to harvesting difficulties and toxic seed cake little promise as a drying oil appears.

The polymorphism of 1-stearyl- and 1-palmityldiacetin, -dibutyrin, -dicaproin and 1-stearyldipropionin. F. L. Jackson and E. S. Lutton (Procter & Gamble Co., Cincinnati 17, Ohio). *J. Am. Chem. Soc.* 74, 4827-29(1952). The solid polymorphic forms observed are: sub-alpha, α and β for 1-palmityl and 1-stearyldiacetin and for 1-stearyldipropionin; sub-alpha and α for 1-palmityl and 1-stearyldibutyrin; sub-alpha and β' for 1-palmityl dicaproin and sub-alpha, β' and β for 1-stearyldicaproin. All polymorphic forms are of triple-chain-length structure. The relationship of the melting points and x-ray long spacings of these glycerides to others of the SC_nC_n and PC_nC_n series is shown. A new waxy, translucent relatively stable form was observed for the five lower molecular weight members.

How much soybean oil can we use in industrial products? J. C. Konen (Archer-Daniels-Midland Co., Minneapolis, Minn.). *Soybean Digest* 12(11), 41-2(1952). A stable industrial market of 150-175 million pounds of soybean oil now exists. This volume may double if economic conditions are favorable.

Scoreboard on chemical production—vegetable oils. H. McLeod (Dominion Bureau of Statistics). *Can. Chem. Proc.* 36 (7), 16-20(1952). Canadian vegetable oil imports, production and consumption are given.

Preparation and properties of the fatty acid esters of the hexitols. Genevieve Nicoud. *J. recherches centre natl. recherche sci., Labs. Bellevue* (Paris) 1950, 227-43. A series of fatty acid esters of mannitol and sorbitol was prepared and studied. (*Chem. Abs.* 46, 9060)

Preparation of higher fatty alcohols from sperm blubber oil by catalytic hydrogenation. H. Nobori, H. Anzo, T. Kobashi and T. Tahira (Dai Nippon Fat & Oil Co., Tokyo). *J. Chem. Soc. Japan*, Ind. Chem. Sect. 53, 74-7(1950). Among various hydrogenation catalysts, CuO-diatomaceous earth containing ZnO was found to be effective. At maximum pressure of 190 atmospheres, a product of hydroxyl value 203.7 was obtained. Addition of a small amount of Cr_2O_3 or NiO increases the activity and durability of the catalyst. (*Chem. Abs.* 46, 8877)

Comparative examination of different apparatus utilizing infrared rays for the determination of moisture in oil seeds. Pasquier and M. Th. Francois (Lab. Chevreul, Paris). *Bull. mens. inform ITERG* 6, 280-8(1952). Rapid moisture determinations in the "Infradior," "X-14-Agat," "Gallia" and M. Fauve apparatus agreed well with determinations by the official method on linseed, rapeseed, soybean, and mustard seed. The apparatus is described and precautions useful in each technique are given. (*Chem. Abs.* 46, 8879)

Oil from the pulp of different varieties of olives of Pradejon (Logrono). J. O. Pastor (Inspeccion farm. munic., Pradejon, Logrono, Spain). *Anales bromatol.* (Madrid) 4, 63-5(1952). Acidity, density, saponification no., and iodine no. were determined from the pulp oils of the Negral, Impeltre, Royuela, Macho, and Redondal varieties of *Olea europae*. (*Chem. Abs.* 46, 9327)

Olive oil from different parts of the fruit. J. O. Pastor (Inspeccion farm. munic., Pradejon, Logrono, Spain). *Anales bromatol.* (Madrid) **4**, 67-9(1952). Acidity, density, saponification no. and iodine no. were determined on the pulp, seed, and bone oils of the Negral variety of olive. (*Chem. Abs.* **46**, 9326)

Wild sesame seed from northern Rhodesia. R. W. Pearman, W. D. Raymond and Miss J. A. Squires. *Colonial Plant & Animal Products* **2**, 297-99(1952). The wild seeds contained 28.4% oil as compared with 45.7% in commercial seeds. The sesamin content was approximately 9%.

Therapeutically usable fat from the liver of the thornback (Raja clavata). K. P. Petrov. *Rybnoe Khoz.* **24**, No. 6, 47-8 (1948); *Chem. Zentr.* (Russian Zone Ed.) **1949, I**, 1058. The liver of *Raja clavata* is 6.5% of the fresh body weight of this sea animal. Its fat content is 60.4-66.6%. The characteristics are d. 0.930, iodine no. 176, saponification no. 171, and unsaponifiable matter 1.55%. It has a high vitamin A content and should be useful as a medicinal. (*Chem. Abs.* **46**, 8877)

Cholesterol. I. The cholesterol content of food. A. Pihl (Univ. Oslo, Norway). *Scand. J. Clin. & Lab. Invest.* **4**, 115-21(1952). The cholesterol contents of foods common in the Norwegian diet are presented. (*Chem. Abs.* **46**, 8779)

Determination of isovaleric acid in the presence of butyric and caproic acids. U. Pratolongo and F. Mecca (Univ. Milan). *Chimica e industria* (Milan) **34**, 1-3(1952). The determination of the 3 acids in butter, hydrogenated fat, and margarine by a method based on the principle of independent fractional distillation is described. This determination is carried out in continuation of a determination of the Reichert-Meissl no. Details are given of the distillation conditions, apparatus and calculations, and the results of 21 analyses are tabulated. The method is particularly useful for the identification in butter of hydrogenated dolphin fat, which contains a relatively high amount of isovaleric acid. Italian butter contains more caproic acid than butyric acid, while American butter contains more butyric acid. (*Chem. Abs.* **46**, 8782)

The use of gallic acid and its esters as antioxidants of lard. A. Rutkowski (Univ. Poznan). *Roczniki Panstwowego Zakladu Hig.* **3**, 71-88(1952). The esters of gallic acid (methyl, ethyl, propyl, isobutyl) in 0.01% concentration increased the stability of lard 3-7-fold without altering its organoleptic properties. NDGA (nordihydroguaiaretic acid) in 0.01% concentration increased the stability of lard 2.4-3.0 times. The preparation "2246" (American Cyanamid Co.) was the most effective antioxidant (0.0001%), but it altered the color and taste of lard and lost its activity at 210°. (*Chem. Abs.* **46**, 9227)

The influence of pH on primary antioxidants in fat-water systems. L. O. Spetsig. *Svensk Kem. Tid.* **64**, 191-5(1952). O-absorption curves for a 0.30% hydroquinone solution and for the same solution in contact with an equal amount of methyl linoleate were found to coincide; this indicates that the rapid absorption in both cases was due to hydroquinone. However, the autoöxidation of methyl linoleate was strongly inhibited, even after all the hydroquinone had been oxidized. O-absorption curves were obtained for 0.0025% solutions of hydroquinone and nordihydroguaiaretic acid in methyl linoleate, in contact with aqueous phases of different pH values. The antioxidant efficiency of hydroquinone and nordihydroguaiaretic acid diminished gradually from pH 5 to pH 9.2 and was practically nil at pH 9.2. (*Chem. Abs.* **46**, 9326)

Practical ways to harden fatty oil with unreduced catalyst. IV. Hardening oil under atmospheric pressure. S. Ueno and S. Hamada (Osaka Univ.). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **53**, 140-1(1950). Oils from herring, dewaxed rice-bran, rapeseed, and whale could be hardened by passing in H gas under atmospheric pressure with vigorous agitation at 200-230° in the presence of the carbonates of Ni and Cu. (*Chem. Abs.* **46**, 9325)

Have we overexpanded soybean processing capacity? R. M. Walsh (U. S. Dept. Agr.). *Soybean Digest* **12**(12), 10-11 (1952). The soybean processing industry has reached a stage of maturity where competitive forces come strongly into play.

Sinitiro Kawamura, Abstractor

Concentration of vitamin A by the solvent process. II. The influence of added antioxidant in the furfural-methanol process with cod-liver oil. Yoshirô Abe, Toyoko Ihara, and Ryûzô Taguchi (Keiô Univ., Tokyo). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **55**, 489-91(1952). In the method of concentrating vitamin A by the furfural-methanol process described previously [*Ibid.* **54**, 229(1951)] the influence of NDGA or unsaponifiable matter of soybean oil as the antioxidant on the yield of vitamin A was slight. The addition of NDGA increased the stability of the concentrate.

Semiindustrial molecular distillation of fatty oils. II. Concentration of tocopherol from rice oil. Saburô Komori, Akira Shinsugi, and Hiroshi Tsujimoto (Osaka Univ.). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **55**, 466-7(1952). Partially deacidified rice oil, (tocopherol 1.6 mg./g., acid value 22.3) 38.5 kg., was mol. distd. at 140° (bath temp.) to give 2.3 kg. distillate (acid value 150.5) and 35.8 kg. residue (acid value 10.9); the latter, distilled at 260°, gave 8.4 kg. distillate (tocopherol 5.6 mg./g.) and 27.4 kg. residue (tocopherol 0.4 mg./g.). Experiments and calculation showed that the initial distillation at 140° may be omitted. Repeated distillation produced an oil containing 3-5% tocopherol.

Preparation of tocopherol concentrate from a fraction of molecularly distilled rice oil. Saburô Komori and Akira Shinsugi (Osaka Univ.). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **55**, 468-9(1952). Tocopherol was not decomposed when hydrogenated at 200° with Ni catalyst. Tocopherol content was raised by 2.5-3 times by dewaxing the hydrogenated tocopherol concentrate in acetone. Chromatography on alumina produced a product containing 30% tocopherol with absorption maximum $E^{1\%}_{1\,cm.} = 135$ at 297 mμ. The tocopherol concentrate from rice oil was a powerful antioxidant for vitamin A when used together with lecithin.

Rice oil. IX. Separation of rice oil fatty acids by urea additive. 3. Separation of palmitic acid. Hiroshi Sakurai (Osaka Univ.). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **55**, 501-3(1952). Gradual formation of urea additive from mixed distilled fatty acids was not effective in obtaining sharp separation. Conditions for sharp separation of pure palmitic acid by urea additive method were studied. The solution of urea : water 40 : 44 was optimal at 25°.

PATENTS

Hydrogenation process employing dissociated ammonia. W. A. Jacob, Jr. and A. D. Van de Erve (Armour & Co.). *U. S. 2,602,806.* Liquid NH_3 is dissociated by conventional cracking apparatus and the resulting H and N are freed from NH_3 by passing through towers containing an adsorbent for NH_3. The H and N are heated and compressed before entering the hydrogenator. An unsaturated organic liquid is hydrogenated by a single-pass contact with the gases. The stream of mixed gases is continuously withdrawn through a control valve actuated by a gas density meter. (*Chem. Abs.* **46**, 9329)

Method of modifying butter. C. H. Bettman. *U. S. 2,612,454.* A method of processing butter is disclosed which comprises bringing the butter approximately to its boiling point in the presence of a relatively small amount of salt and cooling the mass to cause it to settle into a stratified mass of a cheese-like substance, a modified mass of butter and a milk-like substance and separating the modified butter mass from the residue.

Method of reduction of esters, etholides, glycerides. P. Anglaret. *U. S. 2,612,527.* In the method of production of higher alcohols by the reduction of fatty acid esters with sodium, an improvement is claimed which comprises carrying out the reaction between 80° and reflux temperature in the presence of CO_2 and water to decompose the sodium alcoholate as fast as it is formed.

Treatment of glyceride oils. K. F. Mattil (Swift & Co.). *U. S. 2,613,215.* A process of producing a nonreverting glyceride oil is claimed which comprises hydrogenating the reverting oil containing unsaponifiable matter to reduce the iodine value 4-20 points, subjecting this oil to a fractionation operation in the presence of a liquefied normally gaseous hydrocarbon solvent under temperature conditions whereby phase separation occurs, one phase being relatively rich in nonreverting glyceride oil.

Apparatus for expressing oil. C. T. Nemir (K. N. H. Corp.). *U. S. 2,613,592.* A press for expressing oil from oil-containing material is disclosed.

Recovery of oil and meal from oil-bearing marine life. W. C. Davis (The Sharples Corp.). *U. S. 2,614,110.* A process for removing fish oil from fish solids is disclosed, comprising subjecting an aqueous slurry of fish solids to a centrifugal force sufficient to separate solids from liquids, subjecting separated solids to a centrifugal force sufficient to separate residual liquids therefrom, combining the separated residual liquids with the first-mentioned separated liquids, and thereafter subjecting the separated liquids to a centrifugal force sufficient to separate the liquids into water and oil phases.

Process of refining glyceride oil in a liquid paraffinic solvent with a concentrated alcoholic alkali metal hydroxide solution. A. L. Ayres (Phillips Pet. Co.). *U. S. 2,614,111.* A process for refining glyceride oils is disclosed which comprises contacting a solution of the oil in a liquid paraffinic solvent with a concentrated alcoholic alkali metal hydroxide solution, alkali metal hydroxide in 75-100% alcohol, for a period of time sufficient to neutralize the free fatty acids and to extract the alcohol-soluble bodies, separating the spent alcoholic caustic solution from the miscella, and separating the paraffinic solvent from the refined oil.

Countercurrent extraction process and apparatus. M. Bonotto. *U. S. 2,614,911.* A continuous countercurrent extraction unit is disclosed for use with a solvent of higher specific gravity than the solid process material.

Method of recovering germ oil. M. M. Rosten (Nat. Dist. Prod. Corp.). *U. S. 2,615,029.* Distillers' slop which is recovered by distillation of beer is subjected to centrifugal force of at least 4,000 g's while at a temperature of at least 150°F. to produce a liquid phase rich in oil.

Recovering valuable components from oil bearing seeds, and products therefrom. W. G. H. Forstmann, G. Hillmann and E. M. H. Radde. *U. S. 2,615,905.* Lupine seed is simultaneously debittered and deoiled by extraction with a mixture of two organic solvents and water in the presence of a volatile base. The two solvents form with water a ternary azeotropic mixture and the water content of the solvents-water mixture should not exceed the water content of such a ternary azeotropic mixture.

Method of purifying glycerin. A. C. Reents (Illinois Water Treatment Co.). *U. S. 2,615,924.* A method of purifying glycerin solution is claimed which includes the steps of contacting the solution with cation and anion exchange materials and thereafter passing the effluent through a body comprising a substantially homogeneous mixture of a cation exchange material and a strongly basic anion exchange material comprising a quaternized polymerization product of styrene and divinyl benzene containing an ammonium group.

Pyrolysis of ricinoleic esters. Societe Organico. *Brit. 668,530.* Methyl esters of ricinoleic acid are pyrolyzed with the formation of heptanal and methyl undecylenate by contact with a metal, such as stainless steel or molten Pb, or quartz sand at 480-550°. The vaporized reaction products are carried away from the reaction site and rapidly condensed. Because of rapid condensation, the heptanal is prevented from decomposition by contact with the hot surface. With molten Pb at 550-60°, 1,000 g. of castor oil, converted to methyl esters, yielded 211 g. heptanal and 392 g. methyl undecylenate. (*Chem. Abs.* **46**, 9122)

Selectively hydrogenating fats. R. Miyake (Nippon Marine Co.). *Brit. 670,906.* Fats or oils containing both mono- and polyunsaturated fatty acids can be selectively hydrogenated so that the polyunsaturated acids are converted to the monounsaturated acids and the latter are not substantially changed. Such hydrogenation is accomplished by adding H to the fats at 100-230° and 1-20 atmospheres or at 100-200° and 20-80 atmospheres in the presence of a Cu catalyst. The Cu catalyst may be dispersed on an inert carrier and reduced after H is introduced. (*Chem. Abs.* **46**, 8880)

Solvent extraction of oil-bearing materials. A. H. Manning (Bamag Ltd.). *Brit. 670,958.* Mechanical details of recirculation of both fresh and partially saturated solvents during extraction of oil-bearing materials, particularly seeds, are given. (*Chem. Abs.* **46**, 8880)

Decolorization of rice oil. T. Tsuchiya (Tokyo Ind. Res. Inst.). *Japan 37('50).* Rice oil is treated with dilute H_2SO_4 (density 1.84) at 70-100°, the sludge and the acid are removed, and the oil is then treated with 10 parts acid clay containing 0.1-0.3% concentrated H_2SO_4 at 70° and filtered. (*Chem. Abs.* **46**, 8881)

Refining oil of high acidity. E. Munakata, K. Miyai and H. Kashima (Asahi Chemical Industries Co.). *Japan 2888('50).* The acidity of a crude oil, such as rice oil, is lowered through the counter-current flow of 70% methanol or ethanol to give neutral glyceride and free fat acids in the alcohol. (*Chem. Abs.* **46**, 9330)

Esterification of fats and oils with lower alcohols. S. Sumiki. *Japan 2890('50).* NaOH (430 g.) is dissolved in water to make a 60% aqueous solution, and this solution is mixed with 8 l. 95% ethanol, a part of which is mixed with a part of 20 l. soybean oil having an acid no. of 6, heated, and agitated at 60° to make a clear reaction product. The alkaline-ethanol is added in portions at the rate of 28 l./hr., keeping the reaction mixture clear throughout. Warm water (600 g.) is added, the mixture is stirred well, and then separated into 2 layers to give an 85% yield of ethyl ester. (*Chem. Abs.* **46**, 9329)

Extraction of palm oil from waste products. L. M. Garcia. *Span. 196,303.* In palm-oil extraction there is a residue of 25 to 75% (by volume as well as weight) of the original raw material treated. This residue contains about 15% oil and is treated with water and alkali (NaOH, KOH, etc.) in an open vessel at 105°; the remaining grease is saponified. After standing, the foreign materials will settle, and the floating soap is separated and solidified in molds. (*Chem. Abs.* **46**, 9330)

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• Biology and Nutrition

R. A. Reiners, Abstractor

Dynamics of the accumulation of oil in hemp seeds and the change in their quality during ripening. A. I. Arinstein. *Selekt. u. Samenzucht* **16**, No. 5, 48-50(1949); *Chem. Zentr.* **1950, I**, 635. The more dense the stand of hemp plants the more rapidly is the oil deposited in the seed. The iodine no. of the oil from seeds which have just developed is high and increases considerably during subsequent ripening. Even though both seed and oil yields increase between the time the seeds in the middle of the spike ripen and the time the top of the spike ripens, harvesting is best done at the earlier period because of the large seed loss during the later ripening. (*Chem. Abs.* **46**, 9327)

How much soybean oil meal can we use? R. M. Bethke (Ralston Purina Co.). *Soybean Digest* 12(11), 49(1952). At the present growth rates about a million more tons of soybean oil meal will be required in 1960 than in 1950.

Studies on essential fatty acid deficiency in three strains of mice. L. P. Cerecedo, F. P. Panzarella, Agatha B. Vasta and E. C. DeRenzo (Fordham Univ., New York, N. Y.). *J. Nutrition* **48**, 41-47(1952). The most characteristic symptoms of essential fatty acid deficiency in mice were: dermatitis of the skin and extremities, scaliness of the ears, alopecia, a neck lesion, and retardation of growth. One strain was found to be more sensitive to the deficiency than the other two. About 5 mg. methyl linoleate daily satisfies the requirement of the mouse.

Separation of D vitamins from other sterols by paper chromatography and the quantitative determination of 7-dehydrocholesterol. R. B. Davis, J. M. McMahon and G. Kalnetsky (State Univ. Iowa, Iowa City). *J. Am. Chem. Soc.* **74**, 4483-4(1952). The separation of vitamins D_2 and D_3 from a mixture of cholesterol, 7-dehydrocholesterol, ergosterol and sitosterol by chromatography on impregnated filter paper is described.

The influence of dietary fat and carbohydrate on reproduction and lactation in rats. C. E. French, R. H. Ingram, L. K. Knoebel and R. W. Swift (Penna. State College, State College). *J. Nutrition* **48**, 91-101(1952). With an average number of 78 matings for each diet, a significant decrease in reproductive performance of rats receiving a 23% fat diet was observed when compared to the control (4.4% fat) and the high-carbohydrate-fed (3.4%) animals. This was manifest in the smaller numbers of lighter weight young in the litters of the high-fat group. There was no impairment of lactation in the high-fat group.

Fat absorption and the experimental basis of oral fat emulsions. R. P. Geyer (Harvard School of Public Health, Boston, Mass.). *Ann. N. Y. Acad. Sci.* **56**, 16-21(1952). A review.

Soybean oil meal in the nutrition of swine. L. E. Hanson (Univ. Minn., Minneapolis). *Soybean Digest* 12(12), 12-13 (1952). Soybean oil meal can be used safely as the major portion of the supplemental feed used to balance a grain ration for pigs.

Experimental avitaminosis A in young pigs. J. F. Hentges, Jr., R. H. Grummer, P. H. Phillips, G. Bohstedt and D. K. Sorensen (Univ. of Wisconsin, Madison). *J. Am. Vet. Med. Assoc.* **120**, 213-16(1952). The average blood-plasma level of vitamin A in 91 normal guinea pigs was 23.2 γ/100 ml. Values fell below 5γ/100 ml. before visible symptoms of avitaminosis appeared. Night blindness occurred only when all measurable vitamin A reserves were exhausted. There was no direct effect of a deficiency of vitamin A on appetite or rate of gain of weight. (*Chem. Abs.* **46**, 8729)

Biology of fats. V. Paper chromatography of blood lipides, the cancer problem, and fat research. H. P. Kaufmann and J.

Budwig (Chem. Landesuntersuchungsamt Nordrhein-Westfalen, Munster i. W., Ger.). *Fette u. Seifen* **54**, 156-65(1952). Blood samples were taken from the finger or the ear immediately after thorough defatting of the skin with ethyl ether and were transferred to filter paper. The lipides were eluted with methanol-acetone mixtures of increasing acetone content after acidification of the spots with acetic acid vapor. The upper lipide zone appeared to consist mainly of monoglycerides; these were more frequently found in women than in men. Blood from cancer patients, on development with acid-free anhydrous methanol until the solvent front had migrated about 20 cm. above the blood spot, gave a yellowish green or dirty green area above the blood spot; this area was surrounded by a border of a substance which fluoresced blue under ultraviolet light. The presence of cytochrome c in the colored zone is indicated. (*Chem. Abs.* **46**, 8703)

Linseed oil problems in food use. H. J. Lips and E. W. Crampton (National Research Council). *Can. Chem. Proc.* **36**(6), 66-68(1952). The most serious objection to the use of linseed oil as a salad oil or shortening material is the rapid flavor reversion of processed product even when it was hydrogenated to a hard fat. Furthermore polymerization products formed on heat treatment of linseed oil are toxic.

Fat ingestion and chylomicrons. H. Necheles (Michael Reese Hosp., Chicago, Ill.). *Ann. N. Y. Acad. Sci.* **56**, 46-54(1952). A review is presented in which the composition and origin of chylomicrons are discussed.

Effect of the level of fat in the diet on the growth performance of dogs. A. J. Siedler and B. S. Schweigert (Univ. Chicago). *J. Nutrition* **48**, 81-90(1952). The rates of gain of young cocker spaniel pups for a 10-week period when 4, 6 or 8% fat was added to the basal diet or when 6% fat was added to a commercial meal, were equal or slightly superior to those obtained when the diets without added fat were fed.

The importance of fat in the diet. R. W. Swift (Penna. State College, State College). *Ann. N. Y. Acad. Sci.* **56**, 4-15(1952). This is a review in which it is emphasized that the efficiency of energy utilization of diets, furnishing equal quantities of protein and energy, increases with increasing dietary fat content.

Effect of prolonged starvation on the lipides in Phascolosma gouldii. C. G. Wilber. *J. Cellular Comp. Physiol.* **29**, 179-83 (1947); *Annee biol.* **52**, 248(1948). Fatty acids and phospholipides are greatly diminished, but the amount of cholesterol is scarcely altered. (*Chem. Abs.* **46**, 8778)

Standardization of adsorbent mixtures used in vitamin A chromatography. J. B. Wilkie and S. W. Jones (Food and Drug Admin., Washington 25, D. C.). *Anal. Chem.* **24**, 1409-11(1952). Quantitative determinations of the adsorbent strength (g. F & D Butter Yellow No. 4 per g. adsorbent) have been conducted with magnesia and magnesia-celite mixtures. Chromatography may be made more dependable by the use of the proposed standardization technique.

Sinitiro Kawamura, Abstractor

The food value of the fish oil deodorized by the process of aeration. Rinjirô Sasaki, Yoshiyuki Otake, and Motoyoshi Miyazaki (Univ. Tokyo). *J. Japan. Soc. Food Nutrition* **3**, 139-44 (1951). The oil of plaice (*Pleuronectes* sp.) aerated at 95-100° for 87, 175, and 300 hrs., increased gradually in d, *n*, sapon. no., and oxidized acids content, and decreased in iodine no., polybromide content, and neutralization no. of fatty acids excluding oxidized acids. The artificial digestion experiments with pancreatin showed that the plaice oil aerated for 300 hrs. was slightly inferior to the original and less aerated oil. Feeding tests with albino rats showed that the aerated plaice oil was nutritionally available.

The nutritive value of lipides. Hideo Higashi and Takashi Kaneda (Govt. Fisheries Expt. Sta., Tokyo). *J. Japan. Soc. Food Nutrition* **3**, 144-53(1951). Finback-whale oil was of definite nutritive value, not improved by hydrogenation. Polymerized finback-whale oil was not toxic. Sardine oil (iodine no. 166) was improved by hydrogenation to iodine no. 90 in respect to the nutritive value as determined by the increase in the body weight of albino rats. Polymerization in CO_2 at 170° for 4-5 hrs. was a simpler method of improving the nutritive value of sardine oil than hydrogenation, with respect to apparatus needed.

The nutritive value of ethyl esters of the mixed fatty acids of spermaceti oil. Toshimi Akiya, Taizô Masuhara, and Seiichi Hayakawa. *Rept. Food Research Inst.* (Japan) **3**, 167-72 (1950); *J. Japan. Soc. Food Nutrition* **3**, 153-5(1951). Spermaceti oil (d^{25} 0.8751, n^{30} 1.4580, unsaponifiable matter 41.7%) was saponified to yield 61.6% mixed fatty acids, consisting of 20.89% solid acids and 79.11% liquid acids. Fractional distillation and determinations of some characteristics showed the presence of lauric, myristic, palmitic, and stearic acids in the solid fraction, and dodecenoic, tetradecenoic, palmitoleic, oleic, and linoleic acids in the liquid acid fraction. The spermaceti fatty acids were converted to ethyl esters. Feeding experiments on rats showed that the ethyl esters were equal to soybean oil in increasing the body weight when added to the basal diet.

Nutritional studies on edible fats and oils. Kôsaku Kakinuma *et al.* (Univ. Tokyo). *J. Japan. Soc. Food Nutrition* **3**, 156-72 (1951). Growth experiments on albino rats showed relative nutritional values of natural butter, soybean oil, finback-whale oil, and sperm-whale oil were respectively 104, 100, 100, and 80. The specific dynamic action as determined on human subjects was similar for all fats and oils (butter, margarine, soybean oil, polymerized and refined finback-whale oil and shark oil. No significant differences were observed among butter, soybean oil, finback-whale oil, and shark oil in the components of human blood after feeding these oils. Experiments on human subjects showed that sperm-whale oil was inferior, and nutritionally satisfactory finback-whale oil was not much improved by polymerization or hydrogenation.

Biochemical studies of dietary fats. II. The effect of continued intake of whale oil on the human body. Yoshihiro Matsumura. *J. Japan. Soc. Food Nutrition* **3**, 173-4(1951). Daily intake of 40 g. polymerized finback-whale oil everyday for 78 days by 3 university students was not detrimental, and 93.7% was absorbed.

III. The effect of a large amount of fats on the human body. Y. Matsumura and Kôichi Anan. *J. Japan. Soc. Food Nutrition* **3**, 175-6(1951). Daily intake of 80-140 g. polymerized finback-whale oil was not injurious to the absorption of carbohydrate and protein as well as to the absorption of oil itself.

IV. The basal excretion of fats. Toshio Asada. *J. Japan. Soc. Food Nutrition* **3**, 176-9(1951). The basal excretion of fats, regardless of nonfat basal diet, can be correlated with the amount of fatty acids and the iodine no. of the fatty acids in feces. The apparent absorption rate and the true absorption rate corrected for the basal excretion were, respectively, soybean oil 98.0, 100; rice oil 96.7, 98.5; polymerized finback-whale oil 93.7, 96.0; sperm-whale oil 87.9, 89.1%.

V. The effect of a large amount of various fats on the metabolism of porphyrin bodies. Goro Koike. *J. Japan. Soc. Food Nutrition* **3**, 179-83(1951). A large amount of polymerized finback-whale oil caused an increase in porphyrin bodies excreted in the urine, an increase in urinary pigments, increase in urinary iron, and decrease of the resistance against the hemolysis of erythrocytes, compared to soybean oil.

VI. The effect of a large amount of fats on the metabolism of calcium and phosphorus. Seiji Kasuga and Goro Koike. *J. Japan. Soc. Food Nutrition* **3**, 183-6(1951). Intake of 100-200 g. oil (polymerized finback-whale oil, refined rice oil, or hardened oil) caused decrease of Ca and P excreted.

Availability of whale and other oils. I. Digestibility and physiological effects of whale oil. Minoru Hara et al. (Keiô Univ., Tokyo). *J. Japan. Soc. Food Nutrition* **3**, 186-90(1951). Refined finback-whale oil, polymerized finback-whale oil, rice oil, margarine prepared chiefly from polymerized whale oil, shark oil, sperm-whale oil, hydrogenated sardine oils, soybean oil, and butter (the latter 2 were control edible fats) were all more or less suitable for edible purposes, when judged from the absorption rate (on average about 90%; but for shark oil, 71%), but all except margarine and control fats were unsuitable due to their disagreeable odors.

II. The effect of whale oil on the liver function. Tetsuo Wakamatsu *et al. J. Japan. Soc. Food Nutrition* **3**, 190-7(1951). There were no injurious effects in liver functions, when whale oil products were given.

PATENTS

Preparation of cottonseed meal. J. V. Rice (Buckeye Cotton Oil Co.). *U. S. 2,615,808.* A process for the detoxification of solvent extracted cottonseed flakes containing intact glands comprising free gossypol is disclosed, which involves intimately contacting the flakes with a completely water-soluble aliphatic solvent, having at normal atmospheric pressure a b.p. not substantially higher than 220°F., for at least 2 minutes and until substantially all gossypol has been liberated from the glands and is diffused throughout the flakes, and distilling substantially all solvent from the mixture at a temperature in excess of 140°F. but insufficient to effect substantial heat denaturing of protein, whereby substantially all solvent is removed from the mixture in the vapor phase without substantial removal of gossypol and whereby substantially all gossypol is converted to non-toxic form.

Method for concentrating carotenes. H. J. Passino (M. W. Kellogg Co.). *U. S. 2,615,927.* A method is disclosed for concentrating carotene from an oil containing carotene complexes of substantially higher molecular weight than carotene, which includes the steps of: heating the oil to a temperature between 200°F. and 500°F. for a period of 10 minutes to one hour to convert the carotene complexes to carotene forms of substantially lower molecular weight; then contacting the oil with a solvent having a critical temperature less than 450°F. at temperatures in a range of temperatures near the critical temperature to fractionate the oil into extract and raffinate phases, the extract phase containing an oil concentrated in carotene; and recovering from the the extract phase a concentrate of carotene in a form of substantially lower molecular weight than the original carotene complexes.

• Drying Oils

Stuart A. Harrison, Abstractor

Boiled oils. G. Balbi. *Olearia,* May-June, 144-153(1952). The basic principles in the modern preparation of boiled drying oils are reviewed. The precautions which should be taken when boiling them are explained in detail. Special reference is made of the use of octoates. The author examines at length the chemical, physical, and technological constants laid down by the several standard analytical methods and the manufacturers. Attention is called to the need in Italy for standardizing the leading qualities of boiled oils. Some examples of methods for testing the oils are given.

The catalytic polymerization of linseed oil with sulfur dioxide. C. Boelhouwer, E. F. Boon, W. V. Klaveren, A. Siedsma, M. C. Wagemaker and H. I. Waterman. *Chem. Eng. Sci.* **1**, 117 (1952). The presence of small amounts of oxygen are indispensable in linseed oil sulfur dioxide catalyzed polymerizations, but the amount of air in normal linseed oil is sufficient for this purpose. A laboratory scale continuous heat bodying of linseed oil was conducted at 290° with a flow of 1,000 cc. of SO_2 per hour and 300 cc. of linseed oil per hour. A good stand oil was obtained. (*Chem. Abs.* **46**, 9320)

Synthetic fatty acid triglycerides and natural drying oils. P. S. Hess and G. A. O'Hare. *Ind. Eng. Chem.* **44**, 2424(1952). The drying characteristics of three synthetic triglycerides, trilinolenin, trilinolein and triolein were compared with those of linseed oil and soybean oil. Films of the oils with and without drier were spread and the gain in weight, set-to-touch time, dust-free and tack-free times determined. The trilinolenin gained weight fastest and reached set-to-touch time, etc., first. It was followed by linseed oil, trilinolein, and soybean oil in order. The triolein did not dry and gained weight very slowly. The trilinolenin gains about fourteen per cent in weight, linseed oil and trilinolein about nine per cent and soybean oil about seven per cent. They all reach a maximum weight and gradually decrease and reach a steady value after about thirty days of aging. The film properties are discussed.

The reaction between styrene and drying oils. S. Kut. *Paint Technol.* **17**, 295(1952). One of a series of review papers, presenting a critical survey of published papers on the styrenation of oils.

Styrenation of esters of bisphenol epichlorohydrin condensates. J. W. McNabb and H. F. Payne. *Ind. Eng. Chem.* **44**, 2394 (1952). The dehydrated castor oil acids were used to esterify Epon 1001 and 1004 (commercial bisphenol A-epichlorohydrin condensate). These were styrenated by the solvent method. By adding the styrene catalyst mixture in portions to the heated ester a clear product was obtained. The products obtained with di-t-butyl peroxide were decidedly superior in color to those obtained when benzoyl peroxide was used. Preliminary evaluation of films of the copolymers indicate improved water and alkali resistance without loss of the other properties inherent in the Epon esters.

Studies on grape-seed oil. R. Rigamonti. *Olearia,* May-June, 139-143(1952). The catalytic isomerization of linoleic acid to conjugated diethenoid acid has been studied. Experiments were made with nickel, iron, and cobalt catalysts and their mixtures. The most notable results were obtained with Ni-Co mixtures and with Raney nickel. Isomerization was accompanied with a slight dehydrogenation which increased the iodine number. The isomerized oils which were obtained exhibited much faster drying properties.

Isomerized linseed oil. J. P. Sohier. *Chim. Peintures,* **15**, 54 (1952). The properties of a linseed oil isomerized such that it contains about 50% of conjugated double bonds are described. The oil bodies at 270°-275° to give a 50-poise stand oil in two hours compared with 22 hours for untreated oils. The stand oils produced dry in about one-half the time of regular linseed stand oils. [*Brit. Abs.* **BII**, 773 (1952)]

PATENTS

Short-oil alkyd resin of low acid number and methods of preparing the same. R. N. DuPuis and H. J. Wright. *U. S. 2,609,348.* Alkyd resins are prepared having low acid and hydroxyl numbers but free of gel by adding what is called an inhibitor to the resin formula. Some of the inhibitors recommended are monoglycerylamine, glyceryldiamine, glycerylphthalimide, glyceryldiphthalimide, etc. These resins have the advantage of drying quickly at room temperature to hard tough films, similar to those normally obtained by baking an alkyd.

Modification of drying oils. H. S. Bloch. *U. S. 2,611,788.* The octene fraction of a mixture of conjunct hydrocarbon copolymers is treated in an autoclave with liquid HF. The sludge is separated and then poured in ice water to give an unsaturated oil with an average molecular weight of 263 and about three double bonds per molecule. With drier this dries to brittle films. If, however, it is heated to 120°C. for four hours with ethylene or other mono olefins a new drying oil is formed which has better film properties. Dehydrated castor and tung oils can also be heated with mono olefin to give products which dry to clear non-frosty films.

• Waxes

E. F. Guttenberg, Abstractor

PATENTS

Recording paper. Alexander Murray. *U. S. Pat. Appl. 790,115. Official Gaz.* **652**, 617(1951). A printing process employs black paper coated with palmitic acid alone or with 20% by weight $Al(OH)_2$, thick enough to appear white but thin enough to soak into the paper; a heat image projected on the material causes the wax to melt (at 100-200°F.) and an immediate print is given. (*Chem. Abs.* **46**, 8294)

Electrical insulating and potting composition. P. J. Franklin (to U. S. Sec. of State) *U. S. 2,537,983.* A stable composition of high melting point, excellent insulating properties, and exceptional hardness at high temperature, useful as a potting or electrical insulating material for high- and ultra-high-frequency circuits, is prepared by heating a mixture of ceresin 10-30 and beeswax 55-65 part until it is melted, then slowly adding 15-25 part of ethylcellulose and cooling to 140°. (*Brit. Abs.* **BI**, June, 1952, p. 881)

Detergent for removing skin adherents. S. Clemos. *U. S. 2,539,531.* Adhesive tape, theatrical make-up, gum, paint, shoe polish, grease, etc. can be removed from skin or hair without irritation, by use of a paste comprising light liquid petrolatum, a deodorized hydrocarbon boiling in the kerosene range, lanolin, and Al stearate. (*Brit. Abs.* **BII**, 649, June, 1952)

Photoengraving. Alfred E. Dirkman (Agnes M. Dirkman, executrix of Alfred E. Dirkman, deceased). *U. S. 2,592,546.* This new and improved procedure for producing half-tone photoengraved plates consists of applying a hard, adhesive, acid-resistant, water-immiscible, protective material containing a plurality of hard waxes such as candelilla, carnauba, and ouricury, together with a high-melting fatty acid ester amide, rosin, and beeswax, to a partially etched plate. This procedure is equally as applicable to the re-etching of the several plates required in 3- and 4-color process work as it is to the re-etching of black-and-white plates. Superior Cu half-tone plates can be produced at reduced cost, and the process can also be used to reduce the cost of vignetting. Tonal lightening and the desired tonal separation between the high lights, the middle tones, and the shadows can be very satisfactorily accomplished. (*Chem. Abs.* **46**, 5472)

Artists' paints. Wilfried Kress. *Austrian 172,039.* The usual components of artists' oil paints are emulsified with waxes which have been at least partially saponified. The waxes are dissolved in oil of turpentine and saponified by treating them with NH_3 or NH_4 salts. The excess of the saponifying agent and the water are then removed by heating. With the paints containing such wax soaps, better artistic effects are obtained. (*Chem. Abs.* **46**, 8392)

Ethylene interpolymer waxes. Gerard D. Buckley, Neil H. Ray, and Imperial Chemical Industries Ltd. *British 669,771.* Waxes having improved dye compatibility are prepared by copolymerizing C_2H_4 and allyl or methallyl alcohol at 60-200° under pressure with a free-radical catalyst, such as an organic peroxide or an azo nitrile. The wax has an OH content up to 5%, preferably 1.5%. Thus, 5 parts allyl alcohol and 0.8 part azodiisobutyronitrile are treated with 25 parts C_2H_4 at 200 atmospheres and 80° for 18 hrs. with stirring. The vessel is cooled, and the contents are extracted with ether to remove alcohol to yield 8 parts wax having a melting point of 100°, a molecular weight of 1500, and an OH content of 2.5%. A mixture of 90 parts wax, 10 parts paraffin wax, 1 part stearic acid, and 1 part nigrosine (dissolved in 250 parts of hot white spirit) gives a paste suitable for black shoe polish. Waxes suitable for wax crayons and carbon paper are similarly prepared. (*Chem. Abs.* **46**, 8398)

Purifying wax which has been extracted from peat. Cornelis Perridon and Antonius C. M. J. Munninghoff. *Dutch 69,709.* The wax is treated in a molten or a dissolved state at 110-50° with an acid-active earth of the frankonite type. The humic acid components coagulate and are separated. The decolorized wax is suitable for mixing with paraffin in order to obtain shoe polish or impregnating wax. (*Chem. Abs.* **46**, 8398)

Sulfonylchlorides of bleached montan wax. Lech-Chemie Gersthofen (Paul Heisel, inventor). *German 817,307.* Treating bleached montan wax (I) with a Cl_2-SO_2 mixture under the influence of active light, possibly in the presence of solvents and (or) catalysts gives montan wax sulfonylchlorides useful as intermediates in the preparation of the corresponding sulfonic acids, esters, amides, etc. Introducing a SO_2-Cl_2 mixture (molecular ratio 1 to 1) into 2500 g. I (acid number 140) at 90° under irradiation with ultraviolet light gives after 30 hrs. 3525 g. of a yellow paste containing 6% S and 17.5% Cl. Using Bz_2O_2 as the catalyst and CCl_4 as the solvent gives a sulfonylchloride, containing about 10% S and about 17% Cl. (*Chem. Abs.* **46**, 8398)

Montan wax sulfonic acids. Lech-Chemie Gersthofen (Paul Heisel, inventor). *German 822,687.* Hydrolyzing montan wax sulfonyl chlorides (I) (cf. Ger. patent 817,307) with water under heating gives montan wax sulfonic acids with tanning properties, the alkali metal salts of which are useful washing and wetting agents, whereas the heavy metal salts find use as stomach poisons in pest control. Boiling 1 part I with 10 parts H_2O until complete water solubility is reached and evaporating in vacuo gives a pale-brown, water-soluble paste, S content 3.43%. (*Chem. Abs.* **46**, 8398)

Wax to be used for grafting trees. Takashi Nakama. *Japanese 1539('50).* The wax is prepared by mixing 55 kg. pitch of pine-root oil neutralized with 5.5 kg. $Ca(OH)_2$, 2.5 kg. Japan wax saponified with NaOH and 35 kg. hard pitch. (*Chem. Abs.* **46**, 8294)

• Detergents

Lenore Petchaft, Abstractor

The trend of development in the soap industry. T. W. Breaden. *Perfumery & Essential Oil Record* **43**, 324-28(1952). The changes in the soap industry within the last thirty years are reviewed. These include changes in toilet soaps, development of continuous operations and new soap equipment, uses of soap germicides, and introduction of new synthetic detergents.

Bacteria removal by hand dishwashing detergents. Lawrence Flett (National Aniline, Div. Allied Chemical & Dye Corp., New York) and Albert Guiteras (Hudson Laboratories, Inc., New York). *Soap. Sanit. Chemicals* **28**, No. 10, 48-50(1952). This study involved comparison of the relative effectiveness of sodium sesquicarbonate with and without an anionic detergent as measured by residual bacteria. The mixture with the anionic detergent consisted of 80 parts of the alkali and 20 parts of an alkyl aryl sulfonate detergent. Bacterial counts were made on dinner plates and on dishwater. Parallel tests were run in which the plates were washed with soap and towel-dried. Results showed the lack of any relationship between the residual bacteria on dishes and the number of bacteria in the dishwater. Therefore, the data indicate that the number of residual bacteria on a dinner plate after dishwashing is dependent on the washing agent and not on the number of bacteria on the dirty plate nor on the number of bacteria in the dirty wash water.

Laundering Experiments with artificially soiled nylon fabrics. A. v. Segesser and H. Stupel (Seifenfabrick Hochdorf, Hochdorf, Switz.). *Textil-Rundschau* **7**, 93-8(1952). Nylon fabrics are harder to soil and easier to wash than cotton. The relative laundering properties of various detergents are similar on nylon and cotton. Products without builder become effective at concentrations of the order of 2 g./l. With Na_2CO_3 as a builder, less detergent is needed. Temperature sensitivity is generally less than in the case of cotton, but the time dependence is greater with synthetic detergents and with phosphate-built soap. Special detergents for nylon could be formulated with compositions significantly different from those of the present cotton detergents. (*Chem. Abs.* **46**, 9328)

More effective soap powders. Paul I. Smith. *Am. Perfumer Essential Oil Rev.* **60**, 215(1952). Sudsing properties of soap powders may be increased by incorporating tetrasodium pyrophosphate in the powder formulation. In actual tests it has been shown that one ounce of pyrophosphate is capable of releasing 2.3 ounces of soap (calculated as sodium stearate) from commercial powders which would normally be converted into insoluble soap by the action of hardness salts.

Laboratory laundering with synthetic detergents and other laundering agents. II. Relation between detergency and water hardness. H. Stupel (Seifenfabrick, Hochdorf, Switz.). *Fette u. Seifen* **54**, 321-4(1952). The detergency of detergents is decreased by water hardness (I). Soil removal also depends on the types of soil and textile used; a fat acid condensate defatted the wool better in water of 10° (German) hardness than in distilled water. Nonionic and anionic detergents are equally affected by I. The Ca:Mg ratio is more important than I, all compounds tested showed more detergency with Mg hardness. This suggests the use of Mg salts as builders. (*Chem. Abs.* **46**, 8880)

Surface active agent phenomena in dust abatement. P. L. Walker, Jr., E. E. Petersen, and C. C. Wright (Pennsylvania State College, State College, Pa.). *Ind. Eng. Chem.* **44**, 2389-93 (1952). A wide variety of surface active agents useful in dust abatement were investigated in order to determine the most economical ones in terms of efficiency and cost. The relative merits were determined by gently dropping coal particles, ranging in equivalent diameter from 25 to 100 microns, individually, onto the surface of solutions of wetting agents of various concentrations contained in 250-ml. beakers. This was done to find a means of relating the activity of various agents in the form of bulk solutions with their activity in the form of sprays. Experimental results based on the above technique showed that the requisite concentration, hence the cost of agent, increases rapidly with decreasing spray droplet size, and may be 10- to 100-fold greater than for dust wetting by bulk solutions.

Solubilization in alcohol-soap micelles. II. Electrolytes as additives. H. B. Klevens (Laboratoire de Chimie Physique, Institut Pasteur, Paris, France). *J. Am. Chem. Soc.* **74**, 4624-6 (1952). The addition of electrolytes to alcohol-soap systems results in an initial marked increase in hydrocarbon solubility followed by a decrease when the concentration of electrolyte is further increased. The effect is in the order $KCL > K_2SO_4 > K_4Fe(CN)_6 3H_2O$ for systems in which the concentrations of both alcohol and soap are low; the differences between electrolytes are smaller at higher soap and/or alcohol concentration. The apparent maxima in hydrocarbon solubility observed are probably due to the presence of micelles of a maximum solubilizing power and do not involve changes from solutions in which the hydrocarbon is dissolved to one in which water is solubilized.

Electrocapillary analysis of detergents. W. Kopaczewski. *Chimie & industrie* **67**, 761-6(1952). Review. (*Chem. Abs.* **46**, 8879)

Guanidine soaps. E. Neuzil and P. Talpin. *Bull. soc. pharm. Bordeaux* **90**, 123-30(1952). The soaps are prepared by reaction of a fatty acid in alcohol with guanidine carbonate. The aqueous soap solutions are strongly alkaline and with C_4 to C_{12} acids are stable. The solutions can be adjusted to pH 7.2 without change in fluidity. The soaps form liquid molecular complexes with many water-insoluble compounds and appear to be better solubilizers than alkali soaps. *Chem. Abs.* **46**, 9328)

Black and coloured dirt. The nature of the washing process. I, II. Horst Reumuth. *SVF Fachorgan Textilveredlung* 6, 245-56, 285-99 (1951). In this study of the interaction between dirt, fiber and washing agent the development of technique which culminates in the use of the microscope and microfilm, is reviewed. The process of removal of foreign matter is very complex and involves several subsidiary processes which may or may not occur simultaneously, thus rendering observation very difficult. The nature of the "soil," for example, fat, oil, dyestuff particles, dirt, etc., and the manner in which it is attached to the fibers are examined. The influence of fabric structure and the twist and count of yarns in the fabric have a significant bearing on the location of the dirt in or on the material. The attachment of the various types of soil to different fibers, for example, cotton, rayon, wool and synthetic fibers is discussed at some length.

Black and coloured dirt. The nature of the washing process. III. Horst Reumuth. *SVF Fachorgan Textilveredlung* 7, 85-98 (1952). The deposition of insoluble metallic salts and soaps on and in textile materials is discussed, considerable attention being paid to calcium deposits, conditions for their deposition, mode of attachment or inclusion (for example, in the capillaries of a fiber), crystallization of such deposits, and the difficulties associated with their removal from various fibers including cotton and artificial fibers.

X-ray and optical properties of spherical and cylindrical aggregates in long-chain hydrocarbon polyethylene oxide systems. J. H. Schulman, R. Matalon, and M. Cohen (Univ. Cambridge, Eng.) *Discussions Faraday Soc.* **No. 11,** 117-21 (1951). Surface-active agents having the composition $H(CH_2)_x(OCH_2CH_2)_yOH$ were made by condensation of pure long-chain alcohols with ethylene oxide, followed by fractionation by molecular distillation. The products included the range in which $x = 12\text{-}16$ and $y = 3\text{-}8$. Their solutions in petroleum ether gave no main x-ray diffraction spacing, even at concentrations as high as 50%, but addition of H_2O immediately produced viscous, birefringent systems with comparatively sharp x-ray bands. Systems with a single surface-active component gave evidence of an ordered lamellar structure that became heterogeneous if the molecular ratio of H_2O to ethylene oxide units exceeded 1 to 1. Systems containing mixed components having equal x but different y showed more disorder, easier swelling and flow birefringence in only one direction. Systems containing mixed components having unequal x and y showed even greater disorder. The increasing disorder is postulated to correspond to the transitions: lamellae ——→ cylinders ——→ systems existing as spheres when warm and lamellae or cylinders when cold. (*Chem. Abs.* **46,** 9327)

Sinitiro Kawamura, Abstractor

Synthesis of cationic surface-active agents. I. Synthesis and properties of polyethylene polyamine derivatives. Kôichi Isoda, Kanji Matsubayashi, and Ryôhei Oda (Kyoto Univ.). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **55,** 441-2 (1952). Tetraethylenepentamine (b.p. 195-208°/18 mm. Hg) was synthesized by reacting ethylene chloride with NH_3; pentaethylenehexamine (b.p. 230-240°/29 mm. Hg) was prepared from diethylenetriamine and ethylene bromide; heptaethyleneoctamine (b.p. 250-265°/12 mm. Hg) was synthesized similarly. Lauric acid monoamides of these polyethylenepolyamines were prepared. Also *N*-dodecyl derivatives were prepared. Surface activity of these compounds as well as other tests as textile agents were described.

II. Polyethylenepolyamine derivatives. Kôichi Isoda, Kanji Matsubayashi, and Ryôhei Oda (Kyoto Univ.). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **55,** 621-3 (1952). Higher polyethylenepolyamines were synthesized by ammonolysis of ethylene chloride and reaction of triethylenetetramine and ethylene bromide. Then these were converted to *N*-dodecyl derivatives, which were then condensed with monochloracetic acid. Surface-active properties were tested.

Utilization of aryl alkanes. II. Synthesis and properties of sodium alkylbenzenesulfonates. 2. Masaya Ogawa (Osaka Univ.). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **55,** 464-5 (1952). *p*-Dibutylbenzene, 3-phenyl-3-ethylhexane, cyclohexylbenzene, *p*-dodecyltoluene, 1,5-dimethyl-2-octadecylbenzene, 1,11-diphenylhendecane, and *p*-dodecyl-cyclohexylbenzene were sulfonated, neutralized, and surface activity and detergent coefficient were measured.

III. Solubility of sodium alkylbenzenesulfonates. Masaya Ogawa (Osaka Univ.). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **55,** 527-9 (1952). The relation between the structure of alkyl group(s) and the solubility was studied by measuring critical solution temperature. The change of solubility of Na alkylbenzenesulfonates was studied in relation to the presence of 2 detergents, inorganic salts, acid or alkali, or organic solvent (*p*-cresol).

PATENTS

Detergent composition. John J. Morrisroe (California Research Corp.). *U. S. 2,610,950.* A product of high detergency co-acting with high foam is prepared from a four-component system consisting of a major proportion of inorganic alkali metal salts and a minor proportion of organic detergents, the ratio of inorganic salts to organic detergents ranging from above 1.0 to less than 2.1.

Composite detergent bar. Donald E. Marshall (Micro Processing Equipment, Inc.). *U. S. 2,613,185.* A composite detergent bar is prepared from a homogeneous solid body of cold milled soap having an ultra-micro-crystalline structure and exceptional cold welding properties and another solid body of synthetic detergent, the sections being permanently bonded together by the cold welding properties of the soap.

Alkyl thiophene sulfonate wetting agents and method for making same. Philip D. Caesar, Pharex G. Waldo, and Duncan J. Crowley (Socony-Vacuum Oil Co.). *U. S. 2,614,084.* A novel type wetting agent is prepared by reacting an alkylthiophene having from 4 to 25 alkyl carbon atoms with a sulfonating agent such as concentrated sulfuric acid and oleum, quenching the reaction mixture with water and then neutralizing with a base such as an alkali metal hydroxide or ammonia.

Improvements in detergent composition. W. C. Preston (Procter & Gamble Co.). *Brit, 638,637.* An improved detergent consists of a ternary mixture of a water-soluble soap which forms water-insoluble soap curd with calcium and magnesium salts in hard water, a water-soluble organic sulfuric acid reaction product which has pronounced sudsing and detergent properties in hard water, and an amide.

Manufacturing detergents. Henri Brunel. *Brit. 680,200.* Detergents are prepared from fatty acid glycerides or fatty acids, their amides or esters, colophony resins or their distillate and mineral oils by treating the primary material with sulfuric acid, adding sodium hydroxide, decanting to separate the oily layer from the aqueous layer, and treating the oily layer with further aqueous solution of sodium hydroxide until the cessation of all exothermic reaction.

Detergent composition. Procter & Gamble Co. *Brit. 680,346.* A spray-dried detergent is manufactured by forming an aqueous mixture containing one part of a water-soluble triphosphate, an anion-active synthetic detergent, and a water-soluble silicate, and then spray-drying the mixture to produce a dried product with a pH of at least 9.