TABLE I

Average Fatty Acid Composition of Depot Fats From "Normal" and "Icterus" Swine

Depot Fat	No. Samples Averaged	Iodine Value	Fatty Acid Composition %				
			Arachidonic	Linolenic	Linoleic	Oleic	Saturated
Icterus Swine							
Back	17	73.3	0.65	0.80	14.77	44.74	39.04
Belly	15	73.0	0.68	0.79	12.62	50.76	35.15
Abdominal	18	64.4	0.74	0.65	12.93	40.78	44.90
Normal Swine							
Back	9	73.82	0.83	0.83	15.20	45.80	37.34
Belly	9	69.67	0.61	0.72	12.93	46.93	38.81
Abdominal	9	56.72	0.67	0.45	7.65	43.77	47.45

position are shown in Table I. The data represent values from back fat, belly fat, and abdominal fat which was primarily leaf fat but consisted in a few cases of caul fat. The fats were rendered in the laboratory by standard procedures. The iodine values were determined by the rapid Wijs method of Hiscox (4) and the unsaturated fatty acid composition by the method of Mitchell, Kraybill, and Zscheile (6), using the constants of Beadle and Kraybill (2). For comparative purposes the fats from nine normal pigs obtained at intervals over approximately a six-month period were examined in the same fashion.

Results and Discussion

The first back fat samples from "icterus swine" indicated a linoleic acid value higher than normally found in lard. All other fatty acid values seemed to be normal. However, when composition data from icterus swine were compared with the data obtained from normal animals as is shown in Table I, the values appear quite normal. The maximum variation seems to be in the linoleic acid composition from different parts of the carcass of the animal rather than between "icterus" and "normal" swine. Hilditch (3) cites numerous cases of variation of composition of pork fat with difference in carcass location. The only variation noted between "types" of animals was in the abdominal fats wherein those from "icterus swine" had somewhat higher linoleic acid content. Since the abdominal fat obtained from normal animals was mostly caul fat while that from the "icterus swine" was mostly leaf fat, the linoleic acid disparity may lie in a difference in composition of these two fats. A continuing study on the composition of carcass fats will shed more light on this variation in composition of swine body fat.

Tests on the yellow fat to confirm the presence of bile pigments were of little value. When minute quantities of yellowish substances were isolated from a chromatographic column of silicic acid, tests in solution for bile pigments were inconclusive. A spectrophotometric examination of the solutions of colored substances from the column revealed maxima which correspond to that exhibited by some of the bile pigments.

In view of the data in Table I and the spectrophotometric examination it is believed that the yellow color in the fat of "icterus swine" is caused by bile pigments and is not due to an abnormal fatty acid composition.

Summary

The fatty acid composition of depot fats from 18 "icterus swine" has been determined. These fats represented back, belly, and abdominal fats. Depot fats from comparable carcass locations in nine normal swine were examined in the same manner. The fatty acid composition of depot fats from "icterus swine" corresponds well with that from the same carcass location of normal swine. The yellow fat in "icterus swine" is believed to be due to bile pigments or similar substances deposited by the pig under the conditions of disease existing in the animal. This yellow fat (from diseased swine) differs from that observed by Beadle, *et al.* (1), in that it has an apparently normal linolenic acid content whereas they found an abnormal linolenic acid content which they ascribed to dietary effects.

REFERENCES

1. Beadle, B. W., Wilder, O. H. M., and Kraybill, H. R., J. Biol. Chem., *175*, 221-229 (1948).

2. Beadle, B. W., and Kraybill, H. R., J. Am. Chem. Soc., *66*, 1232 (1944).

3. Hilditch, T. P., "The Chemical Constitution of Natural Fats." 2nd Ed., John Wiley and Sons, Inc., New York, N. Y. (1947).

4. Hiscox, Dorothy J., Anal. Chem., *20*, 679-80 (1948).

5. Lalor, R. J., Leoschke, W. L., and Elvehjem, C. A., J. Nutr., *45*, No. 2, 183-188 (1951).

6. Mitchell, J. H. Jr., Kraybill, H. R., and Zscheile, F. P., Ind. Eng. Chem., Anal. Ed., *15*, 1-3 (1943).

7. Shorland, F. B., Nature, *165*, 766-67 (1950).

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ABSTRACTS . . . . Don Whyte, Editor

• Oils and Fats

R. A. Reiners, Abstractor

Studies of Spanish decolorizing earths. I. Preliminary tests of activation and decolorization. J. M. R. de la Borbolla y Alcala, R. de C. Ramos and R. V. Ladron (Inst. esp. grasa, Sevilla). *Ion* 11, 135-41(1951). Earths from Lebrija were studied to determine the usefulness of native earths for refining olive oil. The influence of concentration of HCl and time of attack on the activation of the earths is determined. The most suitable period of contact between oil and earth is 15 minutes and satisfactory results were obtained by using 1% earth. The apparent density of the earth, the dehydration curve, and the capacity for activation are correlated. The difference between the pH of an earth determined with water and that determined with a solution of KCl is a measure of potential activity. (*Chem. Abs.* **46**, 1273)

The components of the swell-fish oil. I. Solid fat in the liver oil of Spheroides stictonotus. T. Kaneko, H. Kotake and S. Senoo (Osaka Univ.). *Kagaku no Ryoiki* (J. Japan. Chem.) 3, 23-5(1949). Solid fat (approximately 2 kg.) separated from the liver oil of *S. stictonotus* (6.9 kg.) on standing at room temperature. The solid fat was purified by repeated recrystallizations from acetone and ethyl acetate. Purified solid fat, m. 50-2°, had a saponification value of 188, an acetyl value of 0, and a molecular weight of approximately 750 (freezing-point method). The fatty acids in the solid fat were examined on the basis of free acids and their methyl esters. They comprise chiefly palmitic and stearic acids in the ratio of 2:1. The main component of solid fat was considered to be stearodipalmitin. Cholesterol was identified in the nonsaponifiable matter of solid fat. (*Chem. Abs.* **46**, 1273)

Oil from the seeds of Xanthium strumarium as a food product. A. S. Borozenets and A. P. Georgievskii (Khabarovsk Med.

Inst.). *Gigiena i Sanit.* **1951**, No. 7, 39-43. The oil is found to be equivalent in taste properties to other common vegetable oils and causes no toxic effects. The seeds of the plant are free of alkaloids. The oil has d^{15} 0.9286, n^{20} 1.4771, acid no. 1.54, saponification no. 193, Reichert-Meissl no. 1.7, iodine no. 136, and thiocyanogen no. 79.7. (*Chem. Abs.* **46**, 1273)

Detection of peanut oil in olive oil. S. Allavena (Lab. chim. provinciale, Milan, Italy). *Olii minerali, grassi e saponi, colori e vernici* **28**, 57-61(1951). The oil is saponified with alcoholic KOH and the soap is treated with alcoholic lead acetate; the lead soaps are decomposed with HCl, and the fatty acids are dissolved in alcohol. By cooling the alcoholic solution to 13-14°, arachidic and lignoceric acids crystallize and are identified by microscopic examination and melting point. (*Chem. Abs.* **46**, 1273)

Determination of the nonoil fraction in the oil from olive cakes. D. Rossetti (Staz. sper. olii e grassi, Milan, Italy). *Olii minerali, grassi e saponi, colori e vernici* **28**, 33-7(1951). The nonoil fraction is the sum of water and volatile matters at 105°, diethylketone-insoluble matter, unsaponifiable matter, and ligroin-insoluble matter. (*Chem. Abs.* **46**, 1273)

Peroxide value of normal commercial olive oil. H. Hadorn and R. Jungkunz (Lab. VSK, Basel, Switz.). *Mitt. Gebiete Lebensm. Hyg.* **42**, 281-5(1951). The peroxide value, stability (i.e. peroxide value after 48 hrs. incubation at 50°), tallow content, and flavor of 23 commercial olive oils were determined. The peroxide values (8-12) were found to be higher than in most other edible fats or oils. The degree of stability varies and is not influenced by the original peroxide value. It has been assumed that the high peroxide value and high squalene content of olive oils (0.3% on the average) are related. (*Chem. Abs.* **46**, 1273)

Determination of the neutral fraction in pure oils and in mixtures of oils with low and high acidities. A. Accinelli (Staz. sper. olii e grassi, Milan, Italy). *Olii minerali, grassi e saponi, colori e vernici* **28**, 76-82(1951). The free acid is neutralized with KOH and the solution is treated with a water-alcohol-NaCl solution at 50°. After the salting of the soap the oil is extracted 3-4 times with ethyl ether and the extract is dried with anhydrous Na_2SO_4. The extract corrected for unsaponifiable matter is the total neutral oil. The method can be used for pure oils and mixtures. (*Chem. Abs.* **46**, 1272)

Impurities of oils. E. Marini (Lab. chim. provinciale, Potenza, Italy). *Olii minerali, grassi e saponi, colori e vernici* **28**, 105-7 (1951). Various methods already proposed for the determination of so-called impurities give different results. Therefore it is proposed to extract the oil with ligroin, then with ethyl ether, determining the solid residue directly by weight, and calculating water by difference. This moisture agrees well with that of the German Standard Method (loss of weight at 110°). (*Chem. Abs.* **46**, 1272)

Determination of iodine number by the Winkler gravimetric method. E. Lindner, Jr. (Muszaki Egyetem, Elelmiszerkem. Tanszek. Budapest). *Magyar Kem. Folyoirat* **56**, 441-4(1950). For a quick, cheap, and simple determination of the iodine number of fats and oils the following modification of the Winkler gravimetric method was elaborated: Measure 0.15-0.20 g. fat into a flat glass container and add slowly a Br solution, prepared by mixing 2 ml. Br, 10 ml. glacial acetic acid, and diluting with CCl_4 to 100 ml. Cautiously shake until the fat is dissolved and add Br solution until a stable yellow color is obtained, add 1.0 ml. excess Br. solution, evaporate the excess Br, take up the residue with 1.5 ml. Br solution, evaporate the excess liquid again, dry for 45 minutes at 100°, and determine the weight increase. The iodine number is obtained by multiplying the quotient, weight increase in g./wt. of sample in g., by 158.7. A series of tests was conducted to compare the values obtained by the new method with those obtained by the Kaufmann method. The results show that the deviations are shifted in a negative direction, when the iodine numbers increase. (*Chem. Abs.* **46**, 1271)

Comparison of fat determination methods for preserved eggs. H. Hadorn and R. Jungkunz (Lab. Verbandes Schwiez. Konsumvereine, Basel, Switz.). *Z. Lebensm.-Untersuch. u.-Forsch.* **93**, 277-85(1951). In investigating the accuracy of the fat determination on dried eggs, extractions with petroleum ether, ether, absolute alcohol, 1:1 alcohol:benzene, and extraction according to the Baur-Burschell and the Terrier methods were compared. Petroleum ether and ether quantitatively extracted free fatty acids, glycerides, cholesterol, and 62-78% of the lecithin; the remaining lipid could be extracted after acid digestion of the residue. Extraction with ether followed by alcohol, by the Terrier method extracts 90% of the lecithin. Better yields of total lipids were obtained with absolute alcohol but the most quantitative extraction was with 1:1 alcohol: benzene. (*Chem. Abs.* **46**, 1175)

Enzymic hydrolysis of triglycerides. P. Desnuelle (Univ. Marseille, France). *Bull. soc. chim. biol.* **33**, 909-23(1951). A review. (*Chem. Abs.* **46**, 1059)

The manufacture of soybean protein. II. Extraction of soybean oil. Defatted soybean meal as the raw material for manufacturing soybean protein. S. Kawamura (Nihon Univ., Huzisawa, Kanagawa-ken). *Bull. Coll. Agr., Nihon Univ.* (Japan) No. 2, 17-36(1951). Extraction of oil from soybean flakes with trichloroethylene for 2 hrs. at 60-65° gave a good raw material (0.45-0.55% residual oil) for protein manufacture. Naphtha b. 60-70, 70-80, 80-90, and 90-100° extracted at 60° after 30 minutes, 95.6, 95.7, 90.2, and 78.8%, respectively, of the oil in the soybean flakes. The velocity of oil extraction with naphtha, b. 60-90°, was measured at 20, 45, and 55° for 30-120 minutes. (*Chem. Abs.* **46**, 1174)

Chromatographic determination of the volatile fatty acids C_4 to C_{10}. H. J. Nijkamp (Agr. Univ. Coll., Wageningen, Netherlands). *Anal. Chim. Acta* **5**, 325-31(1951). A semimicro method is described; and the preparation of a suitable silica gel absorbent is also discussed. (*Chem. Abs.* **46**, 850)

A quantitative reaction for recognizing sesame oil in other cooking oils. N. E. Buhrer (Inst. biol. pesquisas tecnol., Parana, Brazil). *Anais assoc. quim. Brasil* **9**, 95-6(1950). To 10 cc. oil add 0.1 cc. alcoholic furfural solution (2 cc. furfural in 100 cc. 96% ethanol) and 10 cc. concentrated HCl, and stir well. Two layers will separate. The presence of sesame oil is denoted by a deep carmine coloration of the lower layer, the intensity of which is proportional to the amount of oil present. If no sesame oil is present, the lower layer will be faintly rosy or colorless. (*Chem. Abs.* **46**, 658)

Separation and estimation of saturated C_2-C_7 fatty acids by paper partition chromatography. R. L. Reid and M. Lederer (C.S.I.R.O., Sydney, Australia). *Biochem. J.* **50**, 60(1951). Fatty acids of the normal series from acetic to heptanoic can be separated, identified and estimated with an accuracy of ± 2-5% for each acid. Isomeric acids cannot be separated.

The branched-chain fatty acids of butter fat. I. The isolation from butter fat of branched-chain fatty acids with special reference to the C_{17} acids. R. P. Hansen and F. B. Shorland (Dept. Sci. Ind. Res., Wellington, New Zealand). *Biochem. J.* **50**, 207 (1951). Two C_{17} methyl branched-chain fatty acids are shown to be present in butter fat. One of the acids (m.p. 54.4°) appears to be an *iso* acid, while the other (m.p. 39.8°) appears to be the *anteiso* acid.

The branched chain fatty acids of butter fat. II. Isotation of a multi-branched C_{20} saturated fatty acid fraction. R. P. Hansen and F. B. Shorland (Dept. Sci. Ind. Res., Wellington, New Zealand). *Biochem. J.* **50**, 358(1952). A C_{20} saturated acid fraction containing at least three and possibly four methyl groups has been isolated from butter fat.

Effects of electronic irradiation on fats. R. S. Hannan and J. W. Boag (Low Temp. Station Res. Biochem. Biophy., Cambridge). *Nature* **169**, 152(1952). Butter fat when irradiated in an electron beam from a Van der Graaff generator developed peroxides, the amount being inversely proportional to the temperature. Irradiation at 20° of methyl stearate, methyl oleate, methyl linoleate or tristearin produced 2 to 3.5 μ mole/g. of peroxides for a dose of 2 million r.e.p. Similar effects were obtained using hexane and cyclohexane.

Vapor pressures and distillation of methyl esters of some fatty acids. T. H. Scott, Jr., D. Macmillan and E. H. Melvin (Northern Reg. Res. Lab., Peoria, Ill.). *Ind. Eng. Chem.* **44**, 172 (1952). Boiling points of methyl esters of even-numbered C_8 to C_{18} acids are given at pressures to 0.1 to 6 mm. Hg.

Flavour changes and some associated chemical reactions in whole milk exposed to sunlight. E. G. Pont (Commonwealth Sci. Ind. Res. Org., Melbourne). *Australian J. App. Sci.* **2**, 326(1951). The fat of milk exposed to sunlight for periods as short as 1 minute was oxidized. With exposures giving oxidized flavors in milk, peroxide values (ferric thiocyanate method) ranged from 0.30 to 2.00 and the fat was oily or tallowy in flavor. Pasteurization increased susceptibility. Preheating to 80° for 20 minutes further increased peroxide values, but not oxidized flavor. Summer and autumn milk exposed to light at temperatures from 5-40° showed, both in fat oxidation and flavor development, a negative temperature coefficient. Preheating to 80° for 20 minutes destroyed the effect.

Processing procedure and flavor stability in soybean oil. H. J. Lips, N. H. Grace and J. A. Ziegler (Nat. Res. Labs., Ottawa).

Can. J. Tech. 30, 1(1952). Chemical and physical measurements and small scale taste panel tests on laboratory refined American and Canadian solvent extracted soybean oils indicated that their quality was generally similar. Flavor stability was not improved by deodorization in the presence of citric acid, increased deodorization time, treatment with activated magnesia, preliminary treatment with concentrated hydrochloric acid, or by refining in miscella with or without subsequent addition by butylated hydroxyanisole.

Microdetermination of fatty acids in serum. Elizabeth Kaiser and B. M. Kagan (Michael Reese Hosp., Chicago). *Anal. Chem.* 23, 1879(1951). A relatively simple and rapid method for the determination of fatty acid concentrations in 0.2 ml. of blood serum has been developed and its accuracy and reproducibility have been demonstrated to be within 5%.

Linseed, the seed of the flax plant. Anon. *Oils Oilseeds J.* 4(5), 17(1951). A short review.

Fats in the dairy industry. K. T. Achaya. (Central Labs., Hyderabad-Deccan). *Report Proc. Symposia Fuels, Fats and Oils, Res. and Ind.* (Hyderabad-Deccan, India). 161(1951). A review.

The future of the edible fat industries in India. S. A. Satelore (Central Labs., Hyderabad-Deccan). *Report Proc. Symposia Fuels, Fats and Oils, Res. and Ind.* (Hyderabad-Deccan, India). 103(1951). A review of the present Indian production facilities.

Rancidity of vegetable oils. *Ibid.*, 141. The author suggests that nitrogen is "fixed" by oils during oxidation in air.

Odor, flavor and peroxide value as measures of rancidity in frozen ground pork. H. D. Naumann, D. E. Brady, A. Z. Palmer and L. N. Tucker (Univ. Missouri, Columbia). *Food Tech.* 5, 496(1951). Flavor, odor and peroxide values were not found to be closely associated with each other in a study of rancidity in frozen ground pork although flavor was more closely associated with peroxide values than odor. The fat of individual pork carcasses varies greatly in susceptibility to rancidity.

Studies on degradation of fats by microorganisms. II. The mechanism of formation of ketones from fatty acids. S. Mukherjee (Univ. Calcutta). *Arch. Biochem. Biophy.* 35, 23(1952). The experiments carried out on the oxidation of butyric acid by *A. niger* indicate that butyric acid oxidation *in vitro* by molds can be believed to take place according to the β-oxidation theory or according to the dehydrogenation mechanism. The presence of acetoacetic acid in the oxidation products supports the former hypothesis and the development of slight unsaturation is indicative of the latter. Optimum pH for the oxidation of butyric, β-hydroxybutyric, and crotonic acids was found to be 6.5.

III. The metabolism of butyric acid by A. niger. *Ibid.*, 34. The author concludes that butyric acid is metabolized both by the process of β-oxidation to form β-hydroxybutyric acid and by dehydrogenation to form crotonic acid which adds water to form β-hydroxybutyric acid. The latter product is oxidized to the β-ketone which is decarboxylated to form acetone.

Improvement of stability of butter. V. Bogdanov and A. Titov. *Molochnaya Prom.* 12, No. 9, 26-31(1951). Results of plant studies show that for storage at subzero temperature the butter from sweet cream is superior, since microbial activity is essentially stopped by low temperature. Acid cream butter, however, shows continuation of chemical processes even at low temperature, especially if NaCl and acids are allowed to remain in the product, which develops a fishy taste. At temperature above 0° the latter butter type, however, is more stable since microbe development is retarded in it by the presence of lactic acid. (*Chem. Abs.* 46, 657)

The polymorphism of some natural fats. I. Thermal and microscopic study of cacao butter. S. V. Vaeck (Ministere affaires econ. et classes moyennes, Central lab., Brussels, Belg.). *Rev. intern. chocolaterie* 1951, 12 pp. The melting and microscopic characteristics of cacao butters were studied. A γ form is obtained by very rapid cooling, but it is impossible to determine a true m.p. because this rapidly transforms into the α form (m. 20.7-24.6°). Allowing the α form to stand 1 hr. at about 20° causes transformation to the β'' form (clear point 28°). The stable β form (m. 33.7-35.7°) is obtained by storing the sample at ordinary temperatures (about 20°) for a month. The literature on the subject is critically reviewed. (*Chem. Abs.* 46, 761)

Research problems of the vegetable oil industry. M. Jaky (Research Inst. Agr. Ind., Budapest). *Mezogazdasag es Ipar* 3, No. 11/12, 8-11(1949). To avoid oil losses owing to refining with alkalies, selective processing with ethanol was tried. Acidity of crude sunflower-seed oil was removed by 90% ethanol to a higher degree than by 96% ethanol, provided the crude oil had a high acidity. In case of crude oils of a low acidity 96% ethanol is preferred. Proteins were quantitatively removed by the ethanol treatment. The extract obtained by processing crude oils with 96% ethanol amounted to 2.2% of the original crude oil. The extract contained free fatty acids 42.5, neutral glycerides 53.7, and unsaponified substances 3.9% (chiefly lecithin). Highest lecithin yields were obtained when processing freshly manufactured oils. Saponification of the extract gave a substance containing 63.6% free sterols. The crude oil obtained from the ligroin extraction of rice-mill wastes and sunflower-seed cake was processed with 95% ethanol. Oil losses were high, therefore another experiment was conducted with 90% ethanol. This latter treatment diminished the acid no. from 3.1 to 1.6. The extract contained some sterols but no lecithin. (*Chem. Abs.* 46, 761)

Changes in grape seed oil during its storage. L. Hasko. *Mezogazdasag es Ipar* 3, No. 11/12, 6-7(1949). Seeds of Hungarian grape, type "Sand Riesling," contained moisture 9.9 and oil (petroleum ether extract) 13.20%. The extracted oil has d^{20} 0.9228, n^{20} 1.4750, viscosity 3.15° E. at 50°, acid no. 1.42, saponification no. 192, iodine no. 122, acetyl no. 10.5, thiocyanate no. 76, unsaponifiable substance 0.56%, hydroxy fatty acids 0.10%, and solidification point of fatty acids 19°. The fatty acids of the oil consist of saturated fatty acids 12.0, oleic acid 34.8, and linoleic acid 53.2%. When seeds are stored moist, *Aspergillus* and *Penicillium* grow on the surface and oil content diminishes and acetyl no. and hydroxy fatty acid contents of the extracted oil increase. When the seeds are separated from the fermented and distilled marc and stored in heaps, the inner portions of such heaps develop temperatures of 50-60° and emit CO_2, owing to decomposition of the carbohydrates. Oil extracted from seeds stored for 3 weeks in such heaps showed acid no. 20.5, iodine no. 125.7, acetyl no. 28.0, and hydroxy fatty acid content 0.50%. (*Chem. Abs.* 46, 761)

The bacteriostatic effects of saturated fatty acids. J. B. Hassinen, G. T. Durbin and F. W. Bernhart (Wyeth, Inc.). *Arch. Biochem. Biophys.* 31, 183(1951). The growth of gram-positive and gram-negative bacterial cultures was not significantly inhibited by 500 γ/ml. of C_4, C_6, C_{16} and C_{18} saturated fatty acids. Both gram-positive and gram-negative organisms were inhibited by C_8 and C_{10} acids; the C_{14} acid inhibited only the growth of gram-positive organisms. With each increase of 2 carbon atoms from C_8 through C_{12} the bacteriostatic effect increased an average of 3.5 times.

Methanolysis of some simple glycerides of the higher fatty acids. J. Pore. *Oleagineux* 7, 21-24(1952). The kinetics of methanolysis of simple tri-glycerides and mixed tri-glycerides showed that in the case of small quantities of methanol the speed of reaction of the simple tri-glycerides is slower than that of the mixed tri-glycerides. Saturated (stearic) simple tri-glycerides are more easily methanolized than the unsaturated (oleic) ones while the length of the saturated chain has no effect on the speed of methanolysis.

Parasitical saponification in the neutralization of vegetable oils. F. Soccart. *Oleagineux* 7, 65-68(1952). Parasitical saponification often accompanies the neutralization of vegetable oils and involves quite an important glyceride loss. The distinction between the whole loss in the course of oil refining and the glyceride loss proper can be calculated as the loss coefficient. This compares with the results given by industrial experience. The carrying away of neutral oil in soap stock amounts to at least one franc per kilo. The eliminating of parasitical saponification may be achieved if the neutralization of fatty acids is fully completed before the saponification of glycerides can be started. The use of a continuous integrator, simultaneously fed with oil and alkali, enables such results to be obtained.

Carotene content of palm oil-cakes. P. Cubier and M. Servant. *Oleagineux* 7, 81-82(1952). It appears that a super carotenated oil can be obtained by extraction of fresh palm fibers. Such an oil could be an important source of provitamin A.

The addition of a carotenoid concentrate extracted from palm oil to the diet of a cow results in increased amounts of carotene and vitamin A in the milk. M. Leroi, A. Francois and R. Fevrier. *Oleagineux* 7, 1-7(1952). As soon as the amount of ingested carotene reaches a certain level the milk begins to be enriched in vitamin A.

The utilization of palm oil as a motor fuel. P. H. Mensier. *Oleagineux* 7, 9-13(1952). Only under very peculiar economic conditions would the utilization of palm oil as a motor fuel be feasible.

Bleaching of oils and fats with adsorbents. Anon. *Seifen-Ole-Fette-Wachse.* 78, 23-26(1952). The properties of the most important adsorbing bleaching agents for edible oils such as fuller's earth and active carbon are described here. The factors so essential for the bleaching process such as amount of surface, hydrophilic properties, temperature and duration of action are discussed in connection with the oils to be bleached.

Thixotropy and its use in cosmetics. T. Rumele. *Seifen-Ole-Fette-Wachse.* **78**, 32-33(1952). The use of thixotropy in the production of a number of cosmetic preparations based on carnauba wax, lanolin, cetyl alcohol, vaseline, etc., is discussed.

Refining of acid olive oils which were solvent extracted from press-cakes. E. Santelli. *Oleagineux* **6**, 699-706(1951). Highly acid oils extracted from the press-cake are decolorized and then directly esterified to give an edible oil.

PATENTS

Process for the continuous recycling of an alcoholic oil solvent in oil extraction. A. C. Beckel and J. C. Cowan (U. S. D. A.). *U. S. 2,584,108.*

Dry rendering of sewer grease. N. E. Fazenbaker. *U. S. 2,584,795.* Sewer grease is admixed with cracklings and dry rendered. The non-fat solids are agglomerated by this process permitting separation of the fat from the solids.

Reconstruction of glyceride oils. H. H. Mueller (E. F. Drew & Co., Inc.). *U. S. 2,585,027.* A method of reconstructing glyceride oils is claimed which comprises mixing a coconut type oil with a mixture of higher fatty acids having from 12 to 18 carbon atoms in excess of that necessary to displace the lower fatty acids of said oil, heating the mixture to a reaction temperature to displace a major portion of the lower fatty acids having 6 to 10 carbon atoms and to cause said higher fatty acids to enter into combination in said glyceride oil, removing the latter from the zone of reaction, thereafter introducing glycerine into the reaction product, and heating to cause esterification of glycerine with said product until the acid value is about 5-6%.

Process of preparing fatty compounds. A. I. Gebhart and J. Ross (Colgate-Palmolive-Peet Co.). *U. S. 2,585,129.* A unitary process of preparing fatty acid compound containing an odd number of carbon atoms in the molecule and numbering at least 7 is disclosed which comprises dissolving in a solution of peracetic acid in acetic acid a mono-olefin of the formula, $R_1 = R_2$, wherein R_1 and R_2 represent alkyl groups of which one group at least contains an odd number of carbon atoms and not less than 7, reacting the mono-olefin with peracetic acid to form a hydroxy-substituted saturated hydrocarbon, saponifying and acidifying the same to yield a dihydroxy saturated hydrocarbon, selectively oxidizing by treating with periodic acid to cause cleavage between hydroxylated carbons and form thereby a fatty aldehyde containing an odd number of carbon atoms in the molecule, further selectively oxidizing with peracetic acid in acetic acid to form the corresponding odd-numbered carbon fatty acid.

Extraction apparatus and method. A. B. Kennedy. *U. S. 2,585,473.*

Production of aliphatic acids. F. W. Banes, W. P. Fitz Gerald and J. F. Nelson (Standard Oil Development Co.). *U. S. 2,585,723.* A process for preparing a mixture of even numbered saturated aliphatic carboxylic acids containing 4 to 10 carbon atoms per molecule is disclosed which comprises reacting acetic acid with ethylene in the presence of ditertiary butyl peroxide at a temperature of 145 to 170° and at a pressure of 800 to 1,000 p.s.i. for a period of one to four hours and recovering even numbered saturated carboxylic acids containing 4 to 10 carbon atoms per molecule from the reaction.

Soybean treating process. N. F. Kruse (Central Soya Co., Inc.). *U. S. 2,585,793.* In a process for treating solvent-extracted soybean oil meal containing liquid, the steps are claimed of heating the meal below the boiling point of water, introducing steam into said meal to condense steam thereon to bring the moisture content of the meal into the range of about 14% to 30%, and cooking the meal at a temperature above the boiling point of water.

Recovery of sterols. M. Mattikow and D. Pearlman. *U. S. 2,585,954.* Sterols are recovered from vegetable oil phosphatidic material by treating the material with an excess of a strong non-oxidizing acid in a lower aliphatic alcohol at a temperature between 64 and 150° for sufficient time to decompose the phosphatides. This liberates the sterols which dissolve in the alcohol at the reaction temperature. On cooling the solution to 0-20° the sterols crystallize.

• Biology and Nutrition

R. A. Reiners, Abstractor

Metabolism of isooleic and saturated acids of hydrogenated peanut oil by albino rats in relation to age. S. M. Bose and V. Subrahmanyan (Indian Inst. Sci., Bangalore). *Ann. Biochem. and Exptl. Med.* (India) **10**, 53-64(1950). Isooleic and saturated acids were isolated from hydrogenated peanut oil and then mixed with the original sample to give higher levels of the products. Weanling rats were fed a fat-free synthetic diet for 4 weeks and were then divided into 2 groups of 32 rats each, receiving diets containing 30% fat of either low (A) or high (B) content of isooleic and saturated acids. Apparent digestibility of fat B was lower than that of A, presumably because of greater fecal excretion of saturated acids, especially of stearic and arachidic acids. Digestibility of both fats was lower in young rats than in adults. The 2 groups did not differ in body fat content or in percentage of liver fat. Isooleic acids appear to be normally metabolized; during fasting, however, deposited isooleic acids disappeared more rapidly from the body stores than did saturated or average fat acids. (*Chem. Abs.* **46**, 594)

The apparent intestinal synthesis of carotene by sheep. W. A. McGillivray (Univ., N. Zealand, Palmerston North). *Brit. J. Nutrition* **5**, 223-8(1951). Carotene:lignin ratios were determined through the digestive tract of 4 sheep. The ratios decreased through the upper parts of the small intestine, increased through the ileum, reached a maximum in the cecum, and decreased slightly through the colon and rectum. The increase in the ratio was not due to a partial digestibility of the lignin or to the presence of some noncarotene pigment. It is suggested that carotene is synthesized by the microorganisms of the ileum and cecum. A solid medium containing agar 2%, tryptose 2%, dextrose 0.1%, and NaCl 0.5% was inoculated with cecal contents; 1.2 to 1.8 γ carotene/ml. was formed. The microorganisms responsible were not identified. (Chem. Abs. **46**, 598)

Influence of dietary fats on certain constituents of liver, blood, and body of albino rats with special reference to fat utilization. S. M. Bose and V. Subrahmanyan (Indian Inst. Sci., Bangalore). *Ann. Biochem. and Exptl. Med.* (India) **10**, 35-44(1950). Weanling rats were fed a practically fat-free synthetic diet for 4 weeks. They were then divided into 4 groups of 16 rats each, receiving (a) the basal diet, (b) 30% refined peanut oil, (c) 30% Vanaspati (hydrogenated peanut oil, m. 37°), and (d) 30% cow ghee. Diets were supplemented with fat-soluble vitamins. No symptoms of fat deficiency developed in rats receiving the basal diet, which contained 0.38% ether-extractable material. All groups grew equally well. On the fat-containing diets, apparent digestibilities of the fats were similar (94-96%), as were percentages of liver and body fat, plasma fat acids, and plasma cholesterol. Iodine values of body and plasma fat, but not of liver fat, paralleled those of the dietary fats. Vitamin A contents of the livers were similar in all groups. (*Chem. Abs.* **46**, 594)

The carotenization and vitaminization of milk by the cow. II. Natural enrichment of winter butter with carotene and vitamin A. F. Kieferle, A. Seuss and Ida Zenglein (Chem. Inst. Suddeut. Vers. 4, Forsch. Milchwirtschaft, Weihenstephan, Ger.). *Milchwissenschaft* **6**, 295-303(1951). It was demonstrated over a 3-yr. experimental feeding program that the carotene and vitamin A content of winter butter could be substantially increased by the daily incorporation of 10-20 kg. carrots in the rations. Milk of cows on rations containing 10 kg. carrots was enriched to the extent that it compared favorably on the average with good pasture summer butter. Color measurements on the derived winter butter showed that the addition of artificial butter coloring oils could be dispensed with. (*Chem. Abs.* **46**, 656)

Studies on dye analyses. I. Detection of annatto in food fats. H. Thaler and R. Scheler (Deut. Forschungsanstalt Lebensmittelchemie, Munich, Ger.). *Z. Lebensm.-Untersuch. u-Forsch.* **93**, 220-4(1951). The principal constituent of annatto dye, bixin, even in the presence of fat, is strongly absorbed by standard Al_2O_3. Other carotenoids that may be present in food fats as well as most artificial colors are not retained by the oxide in this test. Martius yellow (dinitro-1-naphthol) and Sudan G (aniline-azoresorcinol) give adsorptions similar to those of bixin, but both of these are eluted with alcohol whereas bixin is unaffected. For confirmation the Carr-Price reaction can be used. Excessive amounts of free fatty acids inhibit the adsorption of bixin. (*Chem. Abs.* **46**, 658)

The conversion of carotene to vitamin A in sheep and cattle. W. A. McGillivray (Massey Agr. Coll., Palmerston North, N. Z.). *Australian J. Sci. Research* **B4**, 370-7(1951). Sections of sheep intestines incubated with colloidal carotene showed highly significant increases in vitamin A content. High vitamin A levels in intestinal as compared with nonintestinal lymph, in six sheep and one bullock, support the view that the intestine is the site of conversion of carotene to vitamin A in both sheep and cattle. (*Chem. Abs.* **46**, 588)

Amino acid content of proteins of soybeans, string beans, and lentils. A. I. Taranova. *Gigiena i Sanit.* **1951**, No. 8, 38-40. Soybean proteins compare favorably in the content of arginine, histidine, lysine, tyrosine, tryptophan, and cystine with that found in the meat protein. String bean product is low in tryptophan and arginine and high in cystine and tyrosine, while lentil protein is high in arginine and cystine but low in histidine and tryptophan. The quality of the product and conditions of growth appear to affect the amino acid content. (*Chem. Abs.* **46**, 588)

Incorporation of short chain fatty acids into phospholipides by the rat. B. P. Stevens and L. I. Chaikoff (Univ. Calif. School Med., Berkeley). *J. Biol. Chem.* **193**, 465(1951). Lauric acid-1-C^{14} was fed to rats and the phospholipid fatty acids of the carcass were shown to contain a 12-carbon fatty acid containing C^{14}. Rapid conversion of fed lauric and myristic to 16- and 18-carbon fatty acids was demonstrated. Well over 90% of the C^{14} found in the tissues after administration of lauric acid-1-C^{14} was found in 16- and 18-carbon acids.

Availability of the essential amino acids in cottonseed meal. K. A. Kuiken (Texas Agr. Exp. Station, College Station). *J. Nutrition* **46**, 13(1952). Marked variation in individual amino acid availability was characteristic of commercial hydraulic cottonseed meal. Lysine and methionine were particularly low, with values of 64 and 67%, respectively. Heat treatment as severe as autoclaving for 1 hr. at 15 lb. pressure did not reduce the availability of the essential amino acids in cottonseed meal of low oil content. However, this treatment caused a 10% loss of lysine.

Studies in vitamin A. XVI. Spectroscopic properties of all-trans-vitamin A and vitamin A acetate. Analysis of liver oils. H. R. Cama, F. D. Collins and R. A. Morton (Univ. Liverpool). *Biochem. J.* **50**, 48(1951). Natural and synthetic vitamin A are indistinguishable. The factor for converting $E^{1\%}_{1\,cm.}$ to I.U./g. is not strictly constant but varies with the solvent and the state of combination of the vitamin A. The complete absorption curve for the reaction product of vitamin A and antimony trichloride is given. The value of $\epsilon_{max.}$ is 144,900 ± 870 at 620 mμ. Although the $E^{1\%}_{1\,cm.}$ value at 325-328 mμ is a good guide to potency, accurate vitamin A assay must take into account the presence of various compounds closely related to vitamin A.

Do skin creams show hygienic activity? J. Klosa. *Seifen-Ole-Fette-Wachse* **25**, 31-32(1952). Skin fats or other fats used as skin creams are used to prevent the spread of infections which are caused by pathogenic fungi.

• Waxes

E. H. McMullen, Abstractor

Silicones in wax polishes. T. H. Welch. (Linde Air Products Co.). *Soap and Sanitary Chemicals* **28**, 1, 117, 119, 121 (1952). A review of the use of silicone oils in automobile and furniture wax polishes, including formulas. The properties of dimethyl and diethyl silicone oils used in wax polishes are compared.

A study of the allergenic constituents of lanolin (wool fat). Marion B. Sulzberger and M. Paul Lazar (N. Y. University Post Graduate Medical School, New York, N. Y.). *Journal of Investigative Dermatology* **15**, 453-8(1950). Four subjects who showed allergic eczematous contact-type hypersensitivity to lanolin did not react to the mixed fatty acids, cholesterol, or lanosterol, but only to the mixed alcohol fraction (*Chem. Abs.* **46**, 613)

Hydrolysis of wool wax and related high molecular weight esters. III. Heterogeneous reaction: water-in-oil emulsions. J. L. Horner and E. V. Truter. *Journal of Applied Chemistry* **1**, S81-5(1951). Reaction rates for the hydrolysis of cholesteryl caprylate, *n*-octadecyl caprylate and wool wax in the form of water-in-oil emulsions were measured, and the effect of various factors on the kinetics was investigated. In general, soap catalyzes the reaction and higher alcohols inhibit it. Solvent alcohols have a slight catalytic effect, but are antagonistic to soap. The alkali acts both as a reactant and as an electrolyte. A theory that covers the observations is advanced.

Lanolin from wool-washings. N. Haidee. *Monit. farm. terap.*, **57**, 177-178(1951). Aqueous wool washings treated with 66° Bé H_2SO_4 yield an upper fat-rich layer which is separated on a filter-press. Alternatively, if air is blown in, the froth holds the lipid substances and may be easily separated. The recovered fat is extracted with light petroleum in a Soxhlet-type apparatus, treated with alcoholic KOH, and washed with aq. alcohol. A 70-73% yield of unpleasantly smelling crude fat is obtained. A better method is to treat the washings in a Sharples centrifuge at 25,000 r.p.m. at 45-70°, i.e., above the melting point of the wool fat, and pH 8. In both cases the fat is treated with alcoholic KOH to remove free acid, and the lanolin extracted with light petroleum. Bleaching is carried out by Cl_2, H_2O_2, $K_2Cr_2O_7$, etc., H_2O_2–NH_3 mixture being best. Superheated steam removed the odor. (*Brit. Abs.* **1951**, B II, Oct., 902)

PATENTS

Decolorizing organic substances. A. P. Lien, B. L. Evering, and B. H. Shoemaker (Standard Oil Co. of Indiana). *U. S. 2,495,852.* Coloring substances are extracted from hydrocarbon oils, waxes, natural fats, and fatty oils, ester waxes, rosin, etc., with a solvent comprising a complex of BF_3 with an oxygenated alkane compound having not more than 5 C atoms in the alkyl group, in the presence of 100-200 volume % (based on feed stock) of an aliphatic hydrocarbon diluent having a boiling point of 90-300° F. Sufficient complex is used to give a diphasic separation of a raffinate and an extracted phase. The decolorized substance is recovered from the raffinate, and the diluent and complex are recovered from the extracted phase. (*Chem. Abs.* **46**, 724)

Higher alcohols. H. C. Black and W. M. Leaders (Swift & Co.). *U. S. 2,567,541.* A process for the recovery of higher alcohol from natural waxes, such as beeswax, candelilla wax, montan wax, and in particular, crude sperm oil and spermaceti in substantially pure form and without appreciable discoloration of the soap stock, consists of saponifying the wax with an excess of alkali and adding C_3H_8 (or some similar type solvent such as C_2H_6, C_4H_{10}, C_3H_6, C_4H_8, or mixts.) in ratios of 3/1 to 10/1 in a mixing zone at 100-150° F. and 225-300 lb./square inch. The mixture is then settled to remove the soap stock, and the alcohol is either recovered immediately by stripping off the solvent or diluted with a further addition of solvent to a ratio of 10/1 to 40/1 and fractionated at 160-205° F. and 450-700 lb./square inch into a saturated top fraction and an unsaturated bottom fraction while a temperature gradient of 3-8° F. is maintained in the column. (*Chem. Abs.* **46**, 763)

High-melting wax derived from cardanol. British Resin Products, Ltd. *British 653,302.* Reaction of 2 moles hydrogenated cardanol (1-hydroxy, 3-pentadecyl-cyclohexane) melting at 126° F. in a solution of 2.5 moles NaOH in 5.33 moles H_2O with 1 mole $Cl(CH_2)_4Cl$ for 10 hours at reflux gave a waxy solid, melting at 190° F. This high-melting wax is compatible with other waxes, such as beeswax, pettroleum wax, and carnauba wax. (*Chem. Abs.* **46**, 763)

• Drying Oils

Stuart A. Harrison, Abstractor

Chemical examination of castor-oil gel hydrolyzate. A. Sen-Gupta and J. S. Aggarwal. *J. Sci. Ind. Research* **10B**, 73 (1951). When castor oil gel is heated to 185-95° in an autoclave a liquid hydrolysate results. This contains about 3% unsaponifiable material. The saponifiable part of the hydrolyzate contains approximately 14% monomeric acids and 86% linoleic acid dimer. Fifty grams of the hydrolyzate mixed with 0.5 g. of cobalt naphthenate and heated to 150° gives a product which when dispersed in 10 cc. of turpentine spreads on an iron surface and baked at 120° C. gives a water resistance lustrous film. Quick drying lacquers and other finishes may be prepared. (*Chem. Abs.* **46**, 758)

Factors accelerating and retarding the drying of linseed oil. J. d'ans and K. Meier. *Farbe u Lack.* **57**, 7(1951). Experiments on the drying process taking place in oil films showed the importance of purely physical forces, in particular those inducing molecular orientation. Speed of oxygen absorption is accelerated by (1) the substrate (iron had an effect greater than paraffin wax which was greater than glass), (2) even neutral pigments, (3) minute glass particles and fibres, and (4) decrease in viscosity. Driers have little effect on the rate of oxygen absorption by unsaturated fatty acids such as linolenic. (*Brit. Abs.* **1951**, B II, 924).

Fatty acid requirements in paints and resins. H. M. Enterline. *Paint Varnish Production* **42**, No. 2, 34(1952). The types and quantities of fatty acids used in paint and resin field are discussed. The specifications of the different acids are described. The properties sought for through the use of special fatty acids and mixtures are discussed.

Polymerization and drying of oils and esters of fat acids. XI. Changes of elementary composition of oil films under various regimes of drying. A. Ya Drinberg and M. G. Rokhlin. *Zhur. Priklad. Khim. (J. Applied Chem.)* **24**, 220(1951). Films of linseed oil and linseed pentaerythritol esters were examined after six months of natural drying and 24 hours of accelerated test drying. The accelerated drying leads to greater loss of material weight and the films are more crumbly. Uptake of oxygen by linseed oil is greater in the natural drying (11.2%), while in the accelerated test a drop (apparent) of 3% oxygen takes place; pentaerythritol films give similar results although their oxygen content is somewhat higher. Anticorrosion properties after any form of test are best for pentaerythritol derived products. No direct connection between anticorrosion protection and mechanical properties of the films could be found. (*Chem. Abs.* **46**, 1266)

The cultivation and production of tung oil. G. T. Bray. *Paint Manuf.* **22**, No. 2, 56(1952). Tung trees *(fordii)* grow best on well drained soil. They require at least 30 inches of rainfall but 50 to 70 inches is preferable. The trees start to bear fruit in three years but not on a commercial scale until the fifth year. Processing the fruit involves three stages: drying of the fruits, removal of hulls and nut shells, and expression of oil. In general, the fruit is dried on the ground, the hulls are removed in a mechanical huller, and the oil is expressed in hydraulic presses. A yield of 400 lb. of oil per acre per year is considered satisfactory.

What 1951 did for the paint industry. G. S. Cook and H. G. Woodruff. *Paint Varnish Production* **42**, No. 1, 18(1952). The development and accomplishments of the paint industry are reviewed for the year of 1951.

The component fatty acids and glycerides of tung oil. T. P. Hilditch and A. Mendelowitz. *Jour. Science of Food and Agriculture* **2**, 548(1951). The oil coming from the nuts of the *A. Montana* tree is generally considered inferior to that coming from *Aleuritis Fordii.* In many cases the oils have been judged solely on a standard heat test. Examination of the composition of the oils from the two sources shows that the two fall in the same class. Both vary with source but contain between 72 and 82% eleostearic acid. The heat test was found to be unreliable as an indication of the quality of the oil, especially on old samples since the presence of free fatty acid affects the gelation time. Some of the differences in the properties of the oil may be due to a difference in the proportions of tri-, di- and mono-eleostearins present.

Conjugated linseed oil. J. A. Blekkingh, N. M. H. Blonk, and H. A. Boekenoogen. *Paint, Oil, Chem. Rev.* **115**, No. 4, 18 (1952). Linseed oil is conjugated by heating to 120° with an undisclosed catalyst. About 50% of the double bonds are conjugated. The advantage of the process over existing methods is that good color of the oil is maintained and no after-tack of the dry films is experienced. The properties of the films compare favorably with those from tung oil.

Dehydrated castor oil and the replacement of tung oil. F. Ijak. *Chim. Paint* **14**, 188(1951). In the manufacture of stand oils from dehydrated castor oil, the best results are obtained in a closed pot (CO_2 atmosphere) at 310°. Blown dehydrated castor oils may be prepared by blowing at 95° which dry more rapidly and give harder films than stand oils. The best drier combination for dehydrated castor oils is 0.3% Pb plus 0.03% Co. Small amounts of manganese (.005-.01%) accelerate the dry to touch but larger amounts tend to delay drying. The oil is very sensitive to antioxidants. (*Brit. Abs.* **1951**, B II, 924)

Dielectric properties of organic coatings. T. W. Dakin. *Official Digest Federation Paint & Varnish Production Clubs.* **No. 324**, 42(1952). The conductance including a-c and d-c and the dielectric strength of six representative drying oil varnishes were determined. These properties were determined on films baked on steel panels. The effect of underbaking and overbaking was observed. According to the results, the dielectric properties should be especially valuable in indicating the degree of internal molecular cohesion and the internal viscosity of the varnish films.

Cooking of tung oil with two different alkylphenolic resins. J. F. H. van Eijusbergen and J. A. Pheysier. *Chim. peintures* **14**, 255(1951). A fast-reacting alkylphenolic resin (1 part) and a slow-reacting one (1 and 2 parts) were cooked with 2 parts of tung oil at 240 and 280°. Gelatinization with the fast-reacting phenolic occurred after 30 minutes at 240° and 0 minutes at 280°. The slow-reacting phenolic (1 to 2) jelled in 50 minutes at 240° and 5 minutes at 280°. Better varnishes were obtained at 240° than at 280°. Longer cooking at 240° gave better elasticity, shorter cooking at 280° gave better air drying. (*Chem. Abs.* **46**, 757)

Double bond conjugation in aromatic neucleus. XXIII. The diene numbers of oils based on p-benzoquinone. M. L. Tamayo and C. Estada. *Anales de fis. y quim (Madrid)* **47B**, 815-818 (1951). The diene numbers of linseed, cottonseed, chinawood and palm oils were determined using p-benzoquinone. Results are in fairly close agreement with those of Kauffmann. The influence of temperature, time and concentration was evaluated.

PATENTS

Copolymer of styrene and rosin and esters thereof with the alcoholysis product of a drying oil and polyhydric alcohol containing free hydroxyl groups. J. A. Arvin and W. B. Gitchel. *U. S. 2,580,876.* Three parts of rosin to one part of styrene are heated together under reflux for about four and one-half hours. At this point the temperature has reached 408° F. and very little styrene remains. When 1,000 parts of this resin are added to 1,600 parts of dehydrated castor oil which had been previously alcoholized with 84 parts of glycerine (litharge catalyst) and the mixture held at 550° F. until the acid number is seven, a varnish is obtained. A 60% solution of the varnish in mineral spirits has a Gardner viscosity of U. With drier, the varnish dries rapidly to clear films.

Production of drying oils. J. C. Hillyer and J. T. Edmonds. *U. S. 2,581,413.* Linseed oil (145 g.) and butadiene (94 g.) are heated in an autoclave to 250-300°F. for six hours. After venting the unreacted butadiene, the remainder was heated to between 550 and 600°F. for two hours. The butadiene dimer was separated by fractionation. The product had an iodine number of 153. Films dried in 12 hours as compared to 24 hours for bodied linseed oil. The drying rate of soybean oil and other oils can be improved by the same procedure.

Olefin copolymers having drying properties. H. S. Bloch and A. E. Hoffman. *U. S. 2,582,411.* A hydrocarbon drying oil is obtained by copolymerizing butadiene and isobutylene at low temperature using hydrogen fluoride as the catalyst. The copolymers have molecular weights in the range of 600 to 1,000. Films of the copolymers dry tack free in 24 to 48 hours.

Production of hydrocarbon drying oils having improved drying characteristics. A. E. Hoffman and H. S. Bloch. *U. S. 2,582,434.* A mixture of copolymers of propylene and the butylenes having a bromine number of about 132 and an average molecular weight of about 105 are added to anhydrous hydrogen fluoride. The saturated hydrocarbons are washed from the HF sludge. The sludge is hydrolyzed in the water. A hydrocarbon oil containing conjugated unsaturation is obtained which has drying properties.

Manufacture of oleo-polymers from vinyl compounds. R. S. Robinson. *British 651,560.* An aromatic vinyl compound (styrene) is copolymerized with unpolymerized esters derived from alcohols containing four hydroxyl groups or less and unsaturated fatty acids containing eight or more carbon atoms. The reaction may be carried out in aqueous emulsion or in the presence of solvent. A polymerization catalyst may be used and soluble natural or synthetic resins added at any stage of the process. Partially polymerized esters derived from a mixture of polyhydric alcohols and unsaturated fatty acids may also be used. (*Brit. Abs.* **1951**, B II, 925)

Manufacture of interpolymers of styrene with unsaturated fatty acids and polyhydric alcoholic esters thereof. L. Berger & Sons, Ltd., L. E. Wakeford, F. Armitage, and J. J. Sleightholme. *British 654,031.* In the manufacture of interpolymers of styrene or nuclear alkyl- or halogen-substituted styrenes with unsaturated fatty acids or their polyhydric alcohol esters in the presence of terpene compounds as controlling agents, it has been found that, by activating the terpenes before use by blowing with air or oxygen, the viscosity rises more rapidly during the polymerization and the products give films of greater transparency. The interpolymerization may take place in solution in a mutual solvent for the reactants. (*Brit. Abs.* **1951**, B II, 1044)

• Detergents

Lenore Petchaft, Abstractor

Surface active alkyl aroyl sulfopropionates. Glen W. Hedrick, W. M. Linfield, and J. T. Eaton (E. F. Houghton Co., Philadelphia, Pa.). *Ind. Eng. Chem.* **44**, 314-7 (1952). A new series of surface active alkyl aroyl sulfopropionates may be prepared by a Friedel-Crafts acylation of the appropriate aromatic compound with maleic anhydride esterification of the resulting aroylacrylic acid and subsequent treatment of the resulting ester with an alkali bisulfite. By the appropriate choice of the alkyl group on the ester linkage and of the substituents on the acyl group, the surface active properties can be modified as desired to give a wetting agent or detergent. These compounds are being tested as wetting, leveling and dispersing agents in the dyeing process, as water dispersants in the dry cleaning of fabrics, as desizing agents, and in various applications in the paper and the textile industries.

Extraction of the active agent from detergent mixtures. S. A. Miller, B. Bann and A. P. Ponsford. *J. Appl. Chem.* **1**, 523-24 (1951). The active agent in dilute (0.4-4.0%) detergent solutions may be separated quantitatively from builders, etc. by adding sodium carbonate (4%), extracting with n-butanol, and evaporating the extract in vacuo. The method is applicable to anionic, cationic, and non-ionic compounds.

Metallic staining of silverware. L. R. Bacon and E. G. Nutting, Jr. (Wyandotte Chemical Corp., Wyandotte, Mich.). *Ind. Eng. Chem.* **44**, 150-55 (1952). The conditions under which metallic staining of silverware occurs during washing have been studied. Dissolved copper, derived from the action of polyphosphate-type detergent solutions on cuprous metals of dishwashing machine parts or the base metals of silverware exposed through imperfect silver plate, has been found to be responsible. Copper electroplates onto the silver, then the ware is electrocoupled to actively dissolving metals, notably zinc. Corrosion data on various coupled combinations of silver, copper, Monel, iron, zinc, and aluminum in polyphosphate and polyphosphated detergent solutions are presented.

Polyphosphate detergents in mechanical dishwashing—solubilizing action of polyphosphates on certain metals. L. R. Bacon and E. G. Nutting, Jr. (Wyandotte Chemicals Corp., Wyandotte, Mich.). *Ind. Eng. Chem.* **44**, 146-50 (1952). Solutions of four polyphosphates have been shown to dissolve copper, zinc, or brass. Corrosion rate data are presented for several metal-polyphosphate combinations at 80° and for several commercial and experimental dishwashing detergents. The inclusion of sodium metasilicate affords a practical means of retarding the corrosive action of polyphosphate dishwashing detergents on dishwashing machine parts.

The sulfonation reaction in detergent chemistry. H. Stuber (Seifenfabric Hochdorf, Switz.). *Angew. Chem.* **63**, 461-7 (1951). A comprehensive treatise based on more than 100 references, especially patent references. It covers alkylsulfates, direct sulfonation of the main valence chain to alkylsulfonates (the Hostapon light process), petro-sulfonates, sulfonation of natural fats and oils, fatty acid condensation products, and alkyl aryl sulfonates. (*Chem. Abs.* **46**, 1274)

Bactericidal activity of phenols in aqueous solutions of soap. II. Benzylchlorophenol in potassium laurate solutions. H. S. Bean and H. Berry (Univ. London). *J. Pharm. Pharmacol.* **3**, 639-55 (1951). Separate solutions of benzylchlorophenol (I) and K laurate (II) show negligible bactericidal activity. When the concentrations of I and II are raised by the same proportion, the activity of the solutions at first increases then drops and finally slowly increases. An increase in the proportion of I to II in the solutions produces a marked increase in bactericidal activity. The activity is related to the concentration of I in the micelles of II, and is independent of the overall concentration in the solutions. The maximum activity of a bactericide consisting of a halogenated phenol solubilized by an aqueous solution of a soap is exhibited at the critical concentration of the soap. (*Chem. Abs.* **46**, 219)

High grade metallic soaps. P. I. Smith. *Am. Perfumer Essent. Oil Rev.* **59**, 123-4 (1952). The following precautions should be noted during manufacture of metallic soaps to ensure high grade product: the moisture content must be reduced to a minimum, there should not be more than 0.5% of water soluble salts present, the percentage of free ash, which varies from soap to soap is very important, there should only be a small amount of free fatty acid present to avoid undue cloudiness, the soap should be in the form of free flowing fine powders, have a mild odor, and constant solubility.

The effect of pH on the rate of surface tension lowering. E. J. Burcik and C. R. Vaughn (U. of Oklahoma, Norman, Oklahoma). *J. Colloid Sci.* **6**, 522-7 (1951). In this research the effect of pH on the rate of surface tension lowering of pure sodium myristate, dodecylamine hydrochloride, and sodium dodecyl sulfate was determined. The rate of surface tension lowering of 0.005 N sodium myristate, a hydrolyzable anionic surface-active agent, increases with increasing pH. The rate of surface tension lowering of 0.01 N dodecylamine hydrochloride, a hydrolyzable cationic surface-active agent, decreases with increasing pH. The rate of surface tension lowering for 0.005 N sodium dodecyl sulfate, a surfactant which does not hydrolyze, is independent of pH.

A comparative study of sonic and mechanical home washers. I. Strength and dimensional changes. P. B. Mack, J. A. Balog, and M. M. Jordan (Pennsylvania State College, State College, Penn.). *Textile Research J.* *22*, 30-42 (1952). In a study of the performance of a laboratory model of a home sonic washer, the effect on the strength and dimensions of six rayon fabrics representing a wide variety of types was studied. Comparisons were made with the results of washing by hand and with washing by means of the sonic device. The results generally favored the sonic washing technique. In another series of comparisons, 20 repeated launderings, using a neutral soap, were carried out with the sonic device and with a conventional automatic home washing machine. Over-all washing time was the same in both cases. Dimensional and strength changes tended to be greater with the automatic home washing machine for fabrics of less firm construction, with little difference in the case of the firmest fabric.

The investigation of soap coacervates. H. L. Booig. *Kolloid Zeit.* **125**, 21-31 (1952). A study was made on the influence of organic molecules on soap coacervates. The biological activity of many substances may be related to the distribution of the substances in a lipid system within the organism or cell.

PATENTS

Noncaking compositions of matter. T. O. Funderburk (E. I. du Pont de Nemours & Co.). *U. S. 2,579,380.* Process for imparting to hygroscopic solids such as detergents improved stability toward moisture by incorporating in the hygroscopic solid one or more of the reaction products obtained by reacting a water-soluble aluminum salt with boric acid or a water soluble borate.

Plastic detergents. R. C. Wood (Procter & Gamble Co.). *U. S. 2,580,713.* Process of preparing a plastic detergent especially suitable for use as a shampoo consisting of a mixture of a sulfated synthetic organic detergent and a soap product obtained from the middle or neat phase in soap production which imparts the plasticity to the product.

Abrasive detergent composition. C. J. Munter (Hall Labs. Inc.). *U. S. 2,581,278.* A finely-divided free-flowing and non-hygroscopic detergent consisting of a sodium soap, water-insoluble crystalline sodium metaphosphate, potassium metaphosphate and tetrasodium pyrophosphate, said detergent when used having both water softening and abrasive properties resulting from that portion of the crystalline sodium metaphosphate which is not dissolved while the product is being used.

Aqueous solutions containing soapless detergents. F. J. Pollok (Imperial Chemical Industries, Ltd.). *U. S. 2,583,492.* Detergent compositions of improved dispersing power and stability consisting of an aqueous solution of an anionic surface active soapless detergent in quantity not above 8% of the weight of the composition and not over 4% of a crude water-soluble alkali metal salt of carboxymethylcellulose in combination with an alkali metal carbonate.

Washing composition. Vladimer Dvorkovitz and Thomas G. Hawley, Jr. (Diversey Corp.). *U. S. 2,584,017.* A composition for washing glassware consisting of caustic alkali and sufficient gluconate (sodium and potassium gluconate) to prevent the formation of hard adherent scale and to inhibit glassware attack by the alkali.

Improved detergent products. Swift & Co. *British 665,264.* A mixture of the condensation products of alkylolamines and an acylating substance having 8 to 14 carbon atoms in the molecule and an alkyloamine soap of a higher fatty acid having more than 14 carbon atoms per molecule.

Strongly foaming detergent. General Aniline. *British 658,512.* A mixture of a diethylene glycol monoalkyl ether, an ion-sequestering agent, and a long-chain fatty acid tauride or its N-alkyl derivative, long-chain fatty acid sarcoside, or long-chain fatty acid ester of a hydroxy-alkanesulfonic acid is a liquid detergent having strong foaming properties.