data in Table VII. Depending on the particular detergent system, it may increase or decrease the values.

Summary

Foams from detergent solutions may show large differences in apparent viscosity or consistency. Procedures are given for relative measurement of this property.

A decrease in foam consistency may be obtained with soap solutions upon addition of inorganic salt or of hardness. A critical temperature range exists for consistency of foams from detergent systems. Foams of high consistency may be altered to low consistency by raising the temperature.

The data suggests a relation between foam consistency and the liquid drainage and surface viscosity characteristics of foam systems. High consistency values were obtained for foams having slow drainage rates and high surface viscosity. These characteristics for foams of detergent solutions are attributed to the presence of certain polar organic substances (e.g., saturated fatty alcohols and acids) which are strongly adsorbed at the liquid-air interfaces.

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REFERENCES

1. Bikerman, Trans. Far. Soc., *34*, 634-8 (1938).
2. Ross, J., and Miles, G. D., Oil & Soap, *18*, 99-102 (1941).
3. F. Schutz, Trans. Far. Soc., *38*, 85-104 (1942).
4. Miles, G. D., Ross, J., and Shedlovsky, L., J. Am. Oil Chem. Soc., *27*, 268-273 (1950).
5. Clark, G., and Ross, S., J. Ind. Eng. Chem., *32*, 1594-8 (1940).
6. Miles, G. D., Ross, J., and Shedlovsky, L., J. Phys. Chem., *49*, 93-107 (1945).
7. Brown, A., Thuman, W., and McBain, J., Abstr. Am. Chem. Soc., 118th Mtg., p. 19 G (1950).
8. Hardy, Proc. Roy. Soc. London, A *86*, 610-635 (1912).
9. Mitkevitch, G., Zhur. Priklad, Khim. (J. Applied Chem.), *22*, 846-7 (1949).
10. "Physical and Chemical Examination of Paints, Varnishes, Lacquers, and Colors," H. A. Gardner, 9th Ed., dist. by Inst. of Paint and Varnish Research, Wash., D. C.
11. Brookfield Engineering Laboratories Inc., Stoughton, Mass.
12. The American Thermos Bottle Company, Norwich, Conn., Item No. 8621.

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

• Oils and Fats

R. A. Reiners, Abstractor

The infrared absorption spectra of saturated fatty acids and esters. R. G. Sinclair, A. F. McKay and R. N. Jones (Queen's Univ., Ottawa). *J. Am. Chem. Soc.* **74**, 2570-75(1952). The infrared absorption spectra of saturated fatty acids and methyl esters of varying chain length have been measured. In solution, most of the absorption bands are broad; the spectra are qualitatively independent of the chain length but the relative intensity of the methylene rocking vibration at 720 cm.$^{-1}$ increases progressively as the chain is lengthened. In the crystalline state the spectra show much more structure than in solution and significant qualitative differences occur on alteration of chain length. The spectra also differ for polymorphic varieties of the same acid, a factor which complicates the use of such spectra in analysis. The principal absorption bands are assigned to the vibrations of specific molecular groups.

Band progressions in the infrared spectra of fatty acids and related compounds. R. N. Jones, A. F. McKay and R. G. Sinclair (Queen's Univ.). *J. Am. Chem. Soc.* **74**, 2575-78 (1952). A progression of absorption bands of uniform spacing and intensity is observed between 1180 and 1350 cm.$^{-1}$ in the spectra of fatty acids in the solid state. The changes induced in these bands by alteration in the chain length, the introduction of substituents and the replacement of the terminal carboxylic acid by other groups has been investigated. It is suggested that the bands arise from interactions among the rocking and/or twisting vibrations of the methylene groups.

The infrared absorption spectra of unsaturated fatty acids and esters. R. G. Sinclair, A. F. McKay, G. S. Myers and R. N. Jones (Queen's Univ., Ottawa). *J. Am. Chem. Soc.* **74**, 2578-85 (1952). The infrared absorption spectra of several unsaturated fatty acids, methyl esters and brominated derivatives have been determined at room temperature and when cooled with liquid nitrogen. The absorption bands characteristic of the unsaturated linkages are described and discussed. A spectrographic method is proposed for the determination of the degree of unsaturation of mixtures of *cis*-unsaturated acids, based on the measurement of the optical densities of the absorption bands at 3020 and 2920 cm.$^{-1}$. The spectra of liquid films or solutions of stearic, oleic, linoleic and linolenic acids do not differ sufficiently to permit the spectrographic analysis of the individual acids in complex mixtures. However, cooled solid films of binary mixtures of oleic and linoleic acids show large and progressive changes with concentration, especially between 680 and 750 cm.$^{-1}$ and the quantitative analysis of pairs of the above unsaturated acids from solid film measurements would appear to be feasible.

Infrared spectra of branched long-chain fatty acids. N. K. Freeman (Univ. California). *J. Am. Chem. Soc.* **74**, 2523-29 (1952). The infrared absorption spectra of 27 branched long-chain fatty acids have been studied in an attempt to correlate them with types of chain branching. Branching within five carbon atoms of the carboxyl group, and particularly on the α-carbon, can be recognized. Indications may be seen for ethyl and propyl groups, and for two methyl groups on the same carbon atom. Of the latter type, the isopropyl group is distinguishable. The number of branches (terminal methyl groups) can be determined. The provisional character of this kind of infrared spectral evidence in general must be borne in mind, and specific limitations have been pointed out.

Unimolecular films. III. Mixed films of fatty acids and paraffin. R. Matsuura (Kyusyu Univ., Hukuoka, Japan). *Mem. Faculty Sci., Kyusyu Univ. Ser. C Chem.* **1**, No. 2, 69-79 (1949). The pressure-area and area-composition curves of films of paraffin-stearic acid and paraffin-myristic acid mixtures on water were determined. (*Chem. Abs.* **46**, 4885)

Orientation of fatty acid and soap films on metal surfaces. J. W. Menter and D. Tabor (Univ. Cambridge, Engl.). *Proc. Roy. Soc.* (London) **A204**, 514-24(1951). The orientation and structure of films of lauric, myristic, palmitic, stearic, and octacosanoic acids and certain of their heavy metal soaps on surfaces of Pt, Ag, Cu, Cd, Zn, and mild steel were studied by electron diffraction. Films were applied by retraction of molten drops and by rubbing at room temperature. The effect of surface temperature on orientation was studied. For all films there was a characteristic temperature at which disorientation occurred. For acids on nonreactive metals the transition occurred near the melting point. On reactive metals, Zn and Cd, disorientation occurred near the softening point of the corresponding soap, suggesting soap formation. Soap films were found to disorient near their softening point. Film transition temperatures as shown by electron diffraction were correlated with the transition temperatures as shown by the coefficient of friction and found to be in fair agreement. (*Chem. Abs.* **46**, 4875)

Structure of thin films of aliphatic esters and alcohols on metals. J. V. Sanders and D. Tabor (Univ. Cambridge, Engl.). *Proc. Roy. Soc.* (London) **A204**, 525-33(1951). The structure and orientation of thin films of octadecyl and melissyl alcohol, methyl and ethyl stearate, and melissyl melissate in thin crystal layers and as films on Pt, Cu, Cd, Zn, and mild steel were studied by electron diffraction. The orthorhombic structures of thin crystal layers observed at room temperature in transmission experiments changed to hexagonal at a temperature just below the melting point for both alcohols and esters. Films prepared by either retraction from the melt or solution or by rubbing were oriented in the 1st layer with the hydrocarbon chain normal to the metal surface. Disorientation occurred for both alcohols and esters as the surface temperature approached the melting point. The temperature of disorientation shown by electron diffraction correlated well with that shown by measurement of coefficient of friction. (*Chem. Abs.* **46**, 4875)

The component acids of the fats of some Indian fresh-water fish. S. P. Pathak and C. V. Agarwal (Benares Hindu Univ.). *Biochem. J.* **51**, 264-68(1952). The compositions of body, viscera and liver lipids from bhakur (*Catla buchanani*), and of liver fat of pahuna (*Wallago attu*) have been studied. The fat content of viscera is remarkably high, 45%, as compared to 6.3% in the body and 8.5% in the liver on wet tissues, and industrial exploitation of the fat has been suggested. The liver lipids of pahuna contain more phosphatides than bhakur liver fat, and there are minor differences in the acid components.

Syntheses of derivatives of dihydroxyacetone and of glycerides. H. Schlenk, Beverly G. Lamp and B. W. DeHaas (Texas Agr. Exp. Station, College Station). *J. Am. Chem. Soc.* **74**, 2550-52 (1952). Dihydroxyacetone esterified with fatty acids is an intermediate in the procedure. In the further reactions the keto group is catalytically reduced and forms the β-hydroxy group of the glycerol. The scope of applications for synthesizing glycerides should be comparable with that of the methods so far known. Radioactive labeling of the glycerol is made possible and the relative positions of the fatty acids with respect to this label will then be known.

The oil of the dolphin's body. S. Cmelik (Inst. Oceanografiju ribarstvo F.N.R.J., Split, Yugoslavia). *Bull. soc. chim. Belgrade* **15**, 173-82(1950). Compositions of oils from lower jaw, head, back, and abdomen are considerably different. The subcutaneous fat contains no highly unsaturated fatty acids such as clupanodonic acid. Chromatography of the unsaponifiable indicates that the fatty acids of the jaw oil are esterified chiefly by $C_{14}H_{29}OH$ and those of the head oil by $C_{16}H_{33}OH$. (*Chem. Abs.* **46**, 6410)

Molecular distillation of whale-liver oil. T. Agawa, S. Komori and Y. Nishimura (Osaka Univ.). *Yushi Kagaku Kyokaishi* (J. Oil Chemists' Soc., Japan) 1, No. 1, 12-16(1952). When whale-liver oil was molecularly distilled at 250-260°, the recovery of vitamin A was about 135-170%. The additional vitamin A evolved from the decomposition of kitol. (*Chem. Abs.* **46**, 6410)

Seeds of Cardiosperum helicacabum. M. Covello (Univ. Naples). *Ann. chim.* (Rome) **41**, 780-4(1951). Air-dried seeds had moisture 10.71, ash 3.00, total N 2.22, organic phosphorylates 2.34, and oil 32.28%. The oil contained volatile acids 0.75, arachidic and lignoceric 11.00, stearic 6.00, oleic 71.03, and linoleic acids 1.30%, along with unsaponified fraction 0.64 and glycerol 9.88% (calculated). For the oil, the following were determined: d^{15} 0.8903; m. 9-11°; $[\alpha]^{25}$, $-1°25'$; n^{25}, 1.4678; saponification no. 190; acetyl no. 25; abs. I_2 no. 103; Reichert-Meissl no. 5.83. The press cake is rich in mucillaginous matter and in N and P. (*Chem. Abs.* **46**, 6409)

Detection of groundnut oil in mustard oil. S. N. Mitra. *Current Sci.* (India) **20**, 158-9(1951). Heat 1 ml. oil with 5 ml. 1.5 *N* alcoholic KOH, neutralize with 1:1 acetic acid (phenolphthalein indicator), and add an additional 0.2 ml. 1:1 acetic acid. Add 25 ml. 70% ethanol and heat to 50°, and cool with constant shaking in a water bath maintained at 15°. The temperature at which the first sign of cloudiness appears, the turbidity temperature, is noted. The turbidity temperatures of several vegetable oils are: groundnut oil, 40-1°; mustard oil, 21-3.5°; coconut, 18°; linseed, 21.5°; nigerseed, 27°; sesame, 20°. The turbidity temperature of mustard oil increases with the amount of groundnut oil present. The amount of groundnut oil in mustard oil may be determined from a curve in which the turbidity temperatures of mixtures of groundnut oil in mustard oil are plotted against compositions of the mixtures (*Chem. Abs.* **46**, 6410)

Significance of hydroxyl values in the analysis of dehydrated castor oils. E. O. Phillips. *J. Oil & Colour Chemists' Assoc.* **33**, 395-6(1950). Two dehydrated castor oils (viscosity 2 and 6 poises, respectively) were molecularly distilled and the OH value of the fractions and their derived methyl esters were determined. The presence of substantial amounts of estolides and partial glycerides was deduced. It is concluded that the OH value, as usually determined, is unreliable as a measure of the dehydration of castor oil. (*Chem. Abs.* **46**, 6409)

Coloration of edible rice oil obtained by removing free fat acids in vacuo. S. Nakajima and K. Kosuge. *J. Nippon Oil Technol. Soc.* **4**, 23-9(1951). Before removing free fat acids by distilling in vacuo, the crude oil should be decolorized to Yellow 19, Red 4, Blue 0.7 in 1-in. cell by treatment with H_2SO_4 and acid clay. It is necessary to avoid contacting of the oil with an Fe vessel when the temperature is above 100°. (*Chem. Abs.* **46**, 6409)

A modified bromine-vapor method for the determination of iodine values. M. Atmore and F. Hawke (Univ. Witwatersrand, Johannesburg). *J. S. African Chem. Inst.* [N.S.], **3**, 23-8 (1950). Method: treat 0.08-0.12 g. oil on a glass plate 1 hour with 2 g. Br_2, remove excess Br_2 with N_2 or air, desiccate under vacuum for 3 periods of 5 minutes, allow air to enter in the intervals, blow air or N_2 at 80° over the surface for 5 minutes, desiccate, cool under vacuum to constant weight, and weigh. Iodine value $= 100\ [126.9/79.92]\ [w_2 - w_1)/w_1]$ where w_1 is initial weight of sample and w_2 is weight of brominated sample. (Chem. Abs. **46**, 6408)

The lipides of the human fetal membranes. S. Cmelik (Inst. Hyg., Zagreb, Yugoslavia). *Biochem Z.* **322**, 150-3(1951). Fat content of the fetal membranes is about 0.5% (fresh substance). The presence of hydrocarbons could not be demonstrated. Cholesterol content is high (87.7% of the unsaponifiable fraction). Fatty acids consist of 53.8% water insoluble and 14% soluble, the former being largely oleic acid. However, highly unsaturated fatty acids are not found. The higher (solid) fatty acids are chiefly stearic. (*Chem. Abs.* **46**, 6232)

Fatty acid content of the fat body of spontaneously or force-fed toads. P. Cattaneo, G. K. de Sutton and J. C. Penhos (Inst. biol. exptl. med., Buenos Aires). *Anales asoc. quim. argentina* **39**, 206-21(1951). Fatty acid composition of the fat body of force-fed or spontaneously fed male toads (*Bufo arenarium*) was studied. Palmitic, hexadecanoic, and C_{18} acids lacking 2.7 H atoms per completely saturated molecule make up the major portion of the fat bodies. The lesser portion is made up of lauric, myristic, stearic, arachidic, dodecanoic, tetradecanoic and C_{20} acids — 3.4 H. Evidence was found for the existence of other octodecatrienoic acids differing from linolenic acid. (*Chem. Abs.* **46**, 6212)

Reduction of glycerides by lithium aluminum hydride. V. M. Micovic and M. Lj. Mikhailovic. *Bull. soc. chim. Belgrade* **14**, 256-7(1949). The acid component in tripalmitin and triolein, oleic acid, olive oil, lard, and oil of chaulmoogra reduced with $LiAlH_4$ gives the corresponding alcohol in 94-98% yield. The double bonds in the acids remain unchanged. (*Chem. Abs.* **46**, 6407)

The quality of Siamese rice bran as a raw material for fats and oils. Y. Takeshita, Y. Kai and I. Ohba (Tokyo Fats Oils Co.). *J. Nippon Oil Technol. Soc.* **4**, 17-22(1951). The average content of crude fats is 17%; those containing 60-70% rice hull have little or no value as a commercial source for fats and oils. (*Chem. Abs.* **46**, 6407)

Curupira chestnut fat. M. Silva and Maria da C. P. B. Cavalcanti. *Rev. quim. ind.* (Rio de Janeiro) **20** (228), 20-5(1951). The chestnut contains a kernel rich in oil. Extraction with ether gave 63.6% fatty material, dry basis. The fat is semisolid and has n^{15} 1.4727, d^{15} 0.9068, m. 35°, solidification point 29.3°, acidity (oleic acid) 30.9%, saponification no. 168, iodine no. (Hanus) 70, ester value 106, unsaponifiable matter 2.04%, Hehner value 96.86, oxyacids 8.9%, hexabromide no. 10.55, acetyl no. 19. The low saponification value is due to the presence of arachidic acid, relatively high unsaponifiables and oxyacids. The fatty acids gave m.p. 51°, solidification point 42.5°, hexabromides 1.74%, saponification no. 179, acid no. 163, iodine no. (Hanus) 84, and comprise: oleic 82.29, linoleic 0.80, isooleic 2.17, linolenic 0.63, arachidic 6.29, stearic 7.95%. The soap made from curupira fat is softer and more transparent than soap made from tallow. Comparative tests according to Rhodes and Wynn gave a detergent value for curupira soap of 15.8%, whereas for tallow soap 12.18%. The extraction residue of curupira fat has 41.06% protein and is recommended as fertilizer and animal fodder. (*Chem. Abs.* **46**, 6407)

Separation and identification of fatty acids. X. Simplified methods of the preparation of hydroxamic acid solutions for paper partition chromatography. Y. Inoue and M. Noda (Kyoto Univ.). *J. Agr. Chem. Soc. Japan* **24**, 291-5(1951). Paper chromatography with hydroxamic acid solutions was applied to butter, coconut oil, and K salts of free fatty acids extracted from fruits of *Ginkgo biloba*. These substances contained, respectively, butyric, caproic, and caprylic acids; caproic and caprylic acids; and formic, propionic, butyric, caprylic, ginkgolic, and some di- or tribasic acids.

XI. Paper partition chromatography of aliphatic carboxylic acids by means of hydroxamic acid method. *Ibid.* 295-8. The method reported earlier for saturated fatty acids was made applicable for unsaturated, hydroxy, and polybasic acids.

XII. Application of paper chromatography to the analysis of fats. *Ibid.* **25**, 161-5(1951). Paper chromatograms of hydroxamic acid derivatives prepared from linseed, rape, soybean, olive, and herring oils, Japan wax, and beef tallow are shown.

XIII. Investigation of the constitution of unsaturated fatty acids by paper chromatography. 1. Y. Inoue, M. Noda and Y. Hamuro. *Ibid.* **25**, 491-5(1952). This method of investigating the chemical structure of unsaturated acids was tried on oleic, erucic, linoleic, and linolenic acids with success.

XIV. Paper chromatography of fatty acids using the filter paper impregnated with silicic acid. Y. Inoue and M. Noda. *Ibid.* 496-9. Saturated fatty acids themselves were chromatographed with methanol as the fixing liquid phase and naphtha, b. 70-90°, as the migrating liquid phase on ordinary or silica-impregnated filter paper, but with inferior result to the paper chromatography of hydroxamic acids. (*Chem. Abs.* **46**, 6408)

Determination of the solubility of cyclopropane in fats and oils with the use of the Warburg apparatus. A. G. Blumberg, B. N. La Du, G. T. Lesser and J. M. Steele (New York Univ., N. Y.). *J. Pharamacol. Exptl. Therap.* **104**, 325-8(1952). A new technique utilizing the Warburg apparatus is described. The results agree well with values obtained with a tonometer system and with a Van Slyke method. They are higher than previously reported by others. The solubility of cyclopropane gas in olive oil was 11.00 ml./g. oil at 35.5° and 14.36 ml./g. at 27.5°; in pooled rat fat the solubility was 10.84 at 37.5° and 13.95 ml./g. at 27.5°. (*Chem. Abs.* **46**, 6405)

Oleic acid monolayers on concentrated salt solutions. A. R. Gilby and E. Heymann (Univ. Melbourne). *Australian J. Sci. Research* **A5**, 160-72(1952). Equilibrium spreading pressure (ESP) and force-area curves were determined for oleic films on solutions of salts and of sucrose, by use of a Langmuir surface balance with ferric stearate coating on trough, barrier, etc. The salts gave a linear increase in ESP up to activities of 5 or 6; thereafter the increase was smaller and continued as a smooth curve (in some cases up to activities of 80 or 90). Sucrose gave similar results. The order of effects on ESP, $Li^+ < Na^+ < NH_4^+ < K^+$, $Mg^{++} < Ca^{++} < Ba^{++}$, and $Cl^- < Br^- < CNS^- \ll SO_4^{--}$, is that of the lyotropic series and is also the order of decreasing energy of hydration; this suggests that ions of stronger hydration are less adsorbed in the surface. Counteracting this there appears to be a charge effect, most marked with anions, of attraction between polar groups of the film and the ions. (*Chem. Abs.* **46**, 5405)

Single-solution detergent-method for determining butterfat in milk. P. Schain (Halloran Veterans Hosp., Staten Island, N. Y.). *Proc. 43rd Ann. Meeting Milk Ind. Foundation, Lab. Sect.* **1950**, 12-17. The materials entering into the reagent consist of tetradecyl desoxypolyethylene glycol (the nonionic detergent), dioctyl Na phosphate (the anionic detergent), Oil Red 0, a fat-soluble dye, and methanol. The one-solution method is far simpler than any of the existing methods and is more accurate than either the Babcock or Gerber tests. (*Chem. Abs.* **46**, 5739)

Comparative study of susceptibilities to rancidity of ghee, vanaspati, and vegetable oils. O. Prakash, A. Ram and M. Prasad (H. B. Technol. Inst. Kanpur, India). *Proc. Oil Technol. Assoc., India* **6**, 38-56(1950). The keeping qualities of Vanaspati (vegetable-fat ghee) were superior to those of vegetable oils or genuine ghee as determined by a modified accelerated oxidizability test. (*Chem. Abs.* **46**, 5740)

Deodorization of edible oils. A. Arneil. *J. Oil & Colour Chemists' Assoc.,* **33**, 381-94(1950). It is essential to avoid oxidation of the oil; the deodorized oil should be cooled to < 50° before exposure to the atmosphere. Tocopherol can be recovered from the sludge from cooling water, but is only economic if appreciable amounts are present in the original oil. Deodorization of poor-quality oils can be assisted by the addition of various materials (e.g., H_3PO_4, citric acid, sorbitol, glycerol). (*Chem. Abs.* **46**, 5740)

Cottonseed-oil color for coloring vanaspati. L. B. Mathur (Amrit Vanaspati Co., Ghaziabad, India). *Proc. Oil Technol. Assoc., India* **6**, 60-2(1950). The author recommends addition of 5% cottonseed oil to Vanaspati made of the usual mixture (95:5, respectively) of hardened peanut and sesame oils so that an agreeable color is obtained which is not akin to the genuine ghee tinge. The Lovibond tintometer yellow and red readings, respectively, of various products were: the above composition 1.5, 0.5; buffalo ghee 0.7-0.9, 0.2-0.3; cow ghee 8.3-8.5, 1.0-1.2; goat ghee 2.5-2.7, 0.3-0.4; and commercial uncolored Vanaspati 0.8, 0.2. (*Chem. Abs.* **46**, 5741)

Ester interchange between polyoxyethylene glycol and fatty oils. H. Senda and R. Oda (Kyoto Univ.). *Chem. High Polymers* (Japan) **7**, 229-33(1950). Alcoholysis between polyoxyethylene glycol and palm or soybean oil takes place easily at 200°. (*Chem. Abs.* **46**, 5343)

Aromatic hydroxyl, amino, and quinoid compounds as fat antioxidants. K. Taufel and H. Rothe (Inst. Ernahrung Verpflegungswiss., Potsdam-Rehbrucke, Ger.). *Fette u. Seifen* **53**, 381-5(1951). A large no. of compounds were tested as antioxidants on an olive-oil substrate. In general the aromatic hydroxyl compounds were more effective than aromatic amino compounds or quinones. The antioxidant effect of aromatic hydroxyl compounds and aromatic amino compounds is increased: by the presence of more than 1 OH or NH_2 group, by the possibility of quinone formation (p-substituted compounds are more effective than o-substituted; m-substituted compounds generally have no effect), and by distribution of OH or NH_2 groups among the rings of polynuclear compounds. The activity of a compound has no significant relation to its solubility in fats or its relative reducibility. When the free OH groups are blocked all activity stops; this indicates that the H atoms of the free OH groups act as H donors. (*Chem. Abs.* **46**, 5866)

Polyunsaturated fatty acids in butter and their influence on the oxidation of butter. II. Oxidation of butterfat of different compositions. S. Matteson, K. E. Thome and P. Swartling. *Medd. Statens Mejeriforsk* **33**, 23 pp.(1951). By feeding cows with linseed and soy beans in increasing amounts a number of butterfat samples were obtained with varying content of dienoic and trienoic acids. In the "linseed butter" series, the contents of linoleic and linolenic acids remain constant. In the "soya butter" series the content of linoleic increases while that of the conjugated C_{18} acid and linolenic remains constant. The butterfat obtained when no linseed or soy beans were added corresponds to ordinary winter butter, "linseed butter" corresponds to summer butter, while "soya butter" appears to have no natural counterpart in Sweden. The length of the induction periods as well as the rate of oxidation in the active periods is influenced by the content of linoleic and of conjugated C_{18} acid in the butterfat. (*Chem. Abs.* **46**, 5218)

The chemical nature of the fatty acids of Lactobacillus arabinosus. K. Hofman, R. A. Lucas and S. M. Sax (Univ. Pittsburgh). *J. Biol. Chem.* **195**, 473(1952). A large amount of *Lactobacillus arabinosus* cells was grown on a semisynthetic medium and the individual fatty acids within the cells were characterized. The dry cells contained 2.5% lipids, 80% of which were present in the "bound" form while only 20% were extractable with acetone-ether. The total lipids contained palmitic acid, stearic acid, *cis*-11,12-octadecenoic acid and lactobacillic acid. The latter has the composition $C_{19}H_{36}O_2$ and contains a cyclopropane ring.

Separation of the higher fatty acids. E. H. Ahrens Jr. and L. C. Craig (Rockefeller Inst. Med. Res., New York). *J. Biol. Chem.* **195**, 299-310(1952). A mixture of lauric, myristic, palmitic and stearic acids has been separated by counter-current distribution in systems which give nearly linear partition isotherms. Similarly, complete separation of oleic, linoleic and linolenic acids has been effected. The fatty acids obtained by hydrolysis of pig mesenteric fat has been subjected to counter-current distribution. The percentage composition of the fatty acid mixture could be calculated from the distribution of 3 g. of this mixture.

Vegetable oils. I. The component acids of Strophanthus sarmentosus seed oil. F. D. Gunstone (Univ. Glasgow). *J. Sci. Food Agr.* **3**, 185-89(1952). The component acids of *Strophanthus sarmentosus* seed oil are palmitic 11.9, oleic 38.3, linoleic 29.8, stearic 9.2, saturated acids higher than C_{18} 4.0 and an unsaturated hydroxy acid 6.6% by weight.

The component acids and glycerides of an Indian tiger (Felis tigris) fat. S. P. Patlak and C. V. Agarwal (Benares Hindu Univ.). *J. Sci. Food Agr.* **3**, 136-40(1952). The component acids of tiger depot fat are myristic 1.0, palmitic 22.4, stearic 24.6, arachidic 1.2, tetradecenoic 0.6, hexadecenoic 7.1; oleic 38.9, linoleic 4.1 and unsaponifiable 0.1% by weight. The chief component glycerides are diunsaturated-monosaturated 51%, monounsaturated-disaturated 43% and fully saturated 6%. This glyceride composition does not follow the rule of even distribution.

The significance of peroxide determination in fats by the dichlorophenol-indophenol method. L. Hartman and Margaret D. L. White (Dept. Sci. Ind. Res., Wellington, New Zealand). *J. Sci. Food Agr.* **3**, 112-115(1952). The analysis of hydrogen peroxide and benzoyl peroxide with the dichlorophenol-indophenol method yields in the presence of air results which are too high. It is concluded that peroxide values obtained by this method for fats are incorrect.

High oxidation stability of vegetable oleic acid is coupled with bland odor and light color. Anon. *Chem. Proc.* **15** (7), 20 (1952). The properties of a commercial oleic acid are described.

The irradiation-induced autoxidation of linoleic acid. J. F. Mead (Univ. Calif., Los Angeles). *Science* **115**, 470-472(1952). X-irradiation of linoleic acid solution at pH 8.5-9.0 was investigated. The degree of conjugation of linoleic acid was found to be directly proportional to the concentration of the substrate, the rate and duration of irradiation.

The oxidation of monoethenoid fatty acids and esters. The union of gaseous oxygen with erucic acid and methyl and n-propyl erucate. J. H. Skellon and P. E. Taylor (Acton Tech. College, Acton). *J. Chem. Soc.* **1952**, 1813-16. Oxidation of highly purified erucic acid at 120° results in rapid hydroperoxide decomposition, and there is evidence that at moderate temperatures (55-85°) the mechanism is different. The composition of the oxidation products varies considerably with conditions of oxidation and, in oxidations of the esters, the presence of the terminal alkyl group apparently has considerable influence, not only on the rate of entry of oxygen but also on that of decomposition of the hydroperoxides.

The problem of shortening specifications for the prepared mix industry. W. F. Schroeder (HumKo Co.). *Trans. Am. Assoc. Cereal Chem.* **10**, 141-147(1952). Dilatometry is the best known method for describing the characteristics of fats and constitutes a valuable additional tool for the prepared mix manufacturer. The effect of incorporation of hard fats and of hydrogenation is shown.

Buttermaking experiments with an antioxidant prepared from whey. K. E. Thome, T. Olsson, L. O. Lodin and A. B. Buhrgard. *Medd. Statens Mejeriforsok* **32**, 21 pp.(1951). An antioxidant (''ABV''), prepared from whey by treatment with alkali and evaporating to powder form, when added to the cream in a concentration of 3 kg. per 100 l. had a marked antioxidative effect and virtually precluded the incidence of oily flavor, but the buttermilk was discolored. When ''ABV'' was added to both cream and butter or to the butter alone, there was also a marked antioxidative effect. The antioxidative effect is, however, notably dependent on the oxidative tendency of the butterfat. Where the oxidative tendency was strong, the antioxidative effect was not sufficient, even in the highest concentrations, to remove completely the risk of oily flavors. (*Chem. Abs.* **46**, 5218)

Effect of solid and liquid fat contents on shortening properties. W. Q. Braun, O. J. Pickens and H. T. Spannuth (Wilson and Co.). *Bakers Digest* **26**(3), 30-32(1952). Four all-hydrogenated shortenings were subjected to storage at 45°, 72°, 80°, 87° and 92° F. The shortenings gave best results when stored at 70-75° F. and used in an unleavened pound cake formulation at a batter temperature close to 70°F. High temperature storage harmed the creaming qualities of all 4 shortenings. An animal and vegetable fat shortening was found to be more resistant to temperature damage because of a higher solid to liquid fat ratio. The animal and vegetable fat shortening was the only one that made a passable cake at a batter temperature of 82° F.

The component acids of the milk fat of the grey Atlantic seal. M. L. Meara (Univ. Liverpool). *Biochem. J.* **51**, 190-93(1952). Seal milk (50% fat) contained only those acids present in seal blubber. The milk fat composition in weight per cent was myristic 2.8, palmitic 16.4, stearic 2.8, unsaturated C_{14} 1.7 (—2.0), unsaturated C_{16} 12.7 (—2.2), unsaturated C_{18} 36.6 (—2.3), unsaturated C_{20} 13.6 (—6.6), unsaturated C_{22} 13.4 (—11.2). The mean unsaturation of these acids is given in parenthesis.

Partition chromatography of aliphatic acids. F. A. Vanderheuvel and E. R. Hayes (Fisheries Res. Board of Canada, Halifax, N. S.). *Anal. Chem.* **24**, 960-65(1952). A new multicolumn technique allows separation of monocarboxylic acids from C_2 to C_{12}, and with only a modification of the column mixture composition, dicarboxylic acids from C_4 to C_{10}. Recoveries are often better than 95%. The method is more rapid and reliable than previous methods.

The determination of cholesterol in serum. P. Trender (Roy. Infirmary, Sunderland, Durham). *Analyst* **77**, 321-25(1952). Serum is heated with alcoholic KOH and the free cholesterol extracted with light petroleum. The desolventized extract is dissolved in ethylene dichloride and a mixture of acetyl chloride and sulfuric acid added. After incubation at 37° for 15 minutes and cooling to below 20°, the optical density is read on a colorimeter.

The polymorphism of some natural fats. II. Calorimetric studies on cacao butter. S. V. Vaeck (Ministere affaires econ. et classes moyennes, Central Lab., Brussels, Belg.). *Rev. intern. chocolaterie* **6**, 350-2, 354, 356-8, 360-1(1951). The melting point curves of the 3 polymorphic forms of cacao butter were determined with the apparatus of Straub and Malotaux. The heats of fusions were calculated: β form 36 ($\pm$0.5), β' 28, α 19 cal./g. The curves for the β' and α forms were affected by the presence of other forms, but the approximate true curve was extrapolated. Solidification curves of the cacao butter were developed by cooling at 2, 4, and 8°. These indicated heats of solidifications of 28.5, 23.5, and 20.5 cal./g., respectively. (*Chem. Abs.* **46**, 5341)

Course and mechanism of autoxidation of fats. M. J. Hendrickson, O. S. Privett and J. R. Chipault. *Ann. Rept. Hormel Inst.* **1948-49**, 10-15. The mechanism of photooxidation differs materially from the free-radical chain mechanism which has been demonstrated for thermal oxidation. (*Chem. Abs.* **46**, 6167)

Chemical and physical characteristics of synthetic oils. L. Matarese. *Ann. chim.* (Rome) **41**, 264-73(1951). The d^{15} values, n^{25}, viscosity at 20°, acidity as oleic acid, saponification no., iodine no., acetyl no., and acetyl saponification values are determined for synthetic edible oils and 5 natural edible oils. The acetyl no., the viscosity, and to a certain extent the refractive indices appear to be best suited for the differentiation, but do not allow a distinction between synthetic oils and natural oils in mixtures. The incompleteness of esterification of glycerides in the synthetic oils is based on the oxidation of the free alcohol groups to carbonyl groups with H_2O_2 or HNO_3 and determination of aldehydic and ketone groups. (*Chem. Abs.* **46**, 4818)

Chemical examination of Ipomoea muricata seeds. Part I. A. L. Misra and J. D. Tewari. *Jour. Indian Chem. Soc.* **28**, 721-726 (1951). These seeds gave an 8.4% yield of a semi-drying oil which analyzed as follows: oleic 58.8%, linoleic 18.6%, linolenic 1.13%, palmitic 7.8%, stearic 11.2%, dihydroxy-stearic acid 1%. The unsaponifiable matter (1%) was made up of 3 sterols.

Part II. *Ibid.* **29**, 63-67(1952). The alcoholic extract of the seeds gave a waxy crystalline substance which melted at 68°. In addition, a phytosterol melting at 136-137°, Muricatin-A, caffeic acid and a wax-like product containing phosphorus have been isolated.

The measurement of the peroxide number in olive oil. J. M. R. de la Borbolla and R. G. G. Quijana. *Anales de fis y quim.* (Madrid), **48B**, 255-266(1952). The Lea method for peroxide no. determination was compared to the Wheeler, Shelton and Wills methods. The differences between the Lea and Wheeler results are due to the time of reaction, the solvent quantity and the weight of the sample used. The method of Shelton and Wills can be modified by using an acetic acid-chloroform (3:2) solvent and carrying out the reaction for one hour in order to obtain results comparable to the Lea method.

A kinetic study of the action of anti-oxidants. P. Dubouloz, J. Laurent and G. Joune. *Oleagineux* **7**, 265-271(1952). Tocopherol, when added to fats, will prevent the formation of peroxides but it has no effect on peroxides already present before the tocopherol was added.

Madagascar oil plants and oils. I. *Aleurites Fórdii.* G. Bourlet. *Oleagineux* **7**, 259-264(1952). The development of *Aluerites Fordii* as a source of drying oil is discussed.

The measurement of iodine in the Hanus and Wijs solutions. H. D. Simoes Lopes. *Olaeria.* **6**, 80-84(1952). A simple and accurate method for determining the ratio of I:Br or I:Cl in the Hanus and Wijs solutions is described.

Structure and characteristics of copolymers between olefines and drying oils. G. Jacini. *Olearia.* **6**, 75-79(1952). Copolymers of drying oils and semi-drying oils with synthetic olefines, such as styrene and cyclopentadiene were discussed. A theory for the reaction of an unsaturated oil with an olefine in the presence of peroxides is described.

The Instituto de Oleos at Rio de Janeiro and its part in the development of the oil and fat resources and industries of Brazil. G. B. Martinenghi. *Olearia* **6**, 61-68(1952). The aims and the organization of this institute which was set up to train technical experts in fats, oils and their by-products is discussed.

The sterols of jute seed oil (Corchorus capsularis). Part I. N. K. Sen and J. K. Chakravarti. *Jour. of Indian Chem. Soc.* 28, 727-731(1951). A new sterol ($C_{29}H_{50}O$, m.p. 128-129) was found in the unsaponifiable portion of the oil.

Determination of humidity in oil seeds and cakes by the dielectric method. R. Massoni and P. Desnuelle (Lab. natl. mat. grasses, Marseille, France). *Bull. mens. ITERG* 6, 39-42(1952). The relation between dielectric constant and moisture in the material in the apparatus cannot be expressed by a simple function and therefore a separate calibration is necessary for each kind of seed. The determination takes from 1 to 2 min. and the precision is between 0.3 and 0.5%. Among the 8 seeds examined those of small size (linseed, colza, etc.) gave the best results; soybean and peanut were less satisfactory; for palm kernels the method seems unreliable. Coconuts must be previously ground. Application of the method to oil cakes is only possible if one employs a rather granular mixture obtained by mixing 400 ml. of cake particles passed by a 77-200 screen with 200 ml. of pumice screened by a no. 12 screen. Precision is best if moisture of the samples is above 6%. (*Chem. Abs.* 46, 4816)

Investigations concerning solvent extraction. I. J. Mayolle (Lab. Cjevreul, Paris). *Bull. mens. ITERG* 6, 96-101(1952). Peanuts were extracted with 95% ethanol at 120° (3-4 atmosphere) in a small metallic pilot plant. The oil separated by decantation retained about 10% of solvent, is easily refined by the usual operations, and is of good color. Colza-seed oil obtained in similar manner but at slightly higher temperature had a bad odor. In a smaller glass laboratory apparatus, comparative extractions were made with ethylene dichloride, carbon disulfide, hexane and methyl ethyl ketone, dropping at controlled rate (1 ml. per min.) through a column containing 10 g. of exhausted mustard seed, the column being maintained at 34.5° by an external heating device employing ethyl ether vapors. After 90 min. 2.82 g. of oil had been extracted by ethylene dichloride against 2.68 with carbon disulfide, 2.50 with hexane, and 2.47 with methyl ethyl ketone. At 56° hexane gave 2.55 g. (*Chem. Abs.* 46, 4816)

Fish oil. I. Extraction of liver oil from migrating fishes. W. Shimizu and T. Yamada (Kyoto Univ.). *Bull. Research Inst. Food Sci., Kyoto Univ.* 5, 29-33(1951). The liver of mackerel contains as little as 8.4% oil and the separation was difficultly obtained by 30-150 min. digestions with 1-5% NaOH followed by centrifugation. The oil recovery from the liver was optimum after 2-3 weeks' storage and with digestion for 1 hr. at pH 9.5. Vitamin A (50%) was extracted from the liver, with 10% extraction oil after digestion with NaOH at 70° for 45 min.; 2nd and 3rd digestions and extractions yielded 28 and 6%, respectively, vitamin A.

II. Deodorization of fish oil, especially on polymerization by heat. W. Shimizu and Y. Toyohara (Kyoto Univ.). *Ibid.* 6, 19-22. After comparison of polymerization, saponification, aromatization, chlorination, sulfonation, and sulfidation for the deodorization of fish oil, the polymerization method was found best for the purpose. The changes of color, viscosity, acid value, iodine value, and amount of ether-insoluble polybromide were established at various intervals in the course of polymerization by heat at 200-300°. The change of viscosity does not appear to run parallel with the chemical change but to be caused by dispersion of the polymerized glycerides into the unpolymerized glycerides. The fishy odor disappears when the iodine value decreases to a certain degree and the ether-insoluble polybromide disappears completely; however, an irritating odor is evolved. A treatment at 270° for 3-5 hrs. is most effective for deodorization. The irritating odor can be almost completely removed by 3 hrs. steaming. (*Chem. Abs.* 46, 4817)

Fatty alcohols. L. Schon (Cyclo Chemicals, Ltd., London). *Soap, Perfumery & Cosmetics* 25, 67-70(1952). The physical characteristics, methods of productions, and utilization of the C_8-C_{18} fatty alcohols, particularly lauryl, cetyl, stearyl, and oleyl alcohols are discussed. (*Chem. Abs.* 46, 4818)

Industrial use of Pongamia glabra. N. L. Vidyarthi (Provincial Ind. Research Lab., Patna). *Indian Soap J.* 17, 54(1951). The seeds from this tree yield an oil known in commerce as pongam (hongay, karanj) oil. Cold-pressing of the crushed seeds gave 28.29% of oil, and additional oil was obtained by hot-pressing. The total yield was 34.4%. The oil had the following characteristics: d^{30} 0.9273, n^{30} 1.4736, acid value 6.3, saponification value 181, iodine value 89, acetyl value 21, unsaponifiable 4.2%, and resin acids 1.2%. The oil could not be decolorized with fullers earth or H_2O_2. Treatment with 20% NaOH solution at 80° to neutralize the free acids gave a brown soap stock. The separated oil, after washing free from alkali, was pale in color but turned brown in 3 months. Treatment with SO_2, 30% or 50% H_2SO_4 was unsuccessful in decolorizing the oil. An oil which retained its pale color and was without odor and free from rancidity on storage was prepared by treatment first with 50% H_2SO_4 then with 10% NaOH solution at 80° to neutralize the acids, followed by blowing with steam. (*Chem. Abs.* 46, 4817)

PATENTS

Recovery of glycerides from tank settlings. M. M. Durkee (A. E. Staley Mfg. Co.). *U. S. 2,601,375.* A process is disclosed for treating crude vegetable oil tank settlings, obtained from tanks in which the crude oil has been temporarily stored, to recover the oil therefrom which comprises adding a substantial portion of water to the settlings, agitating and heating the mixture, allowing the mixture to cool and settle to form an upper oil layer and separating the oil.

Stabilization of glyceride oils with acetone dicarboxylic acid. A. W. Schwab, Helen A Moser and C. D. Evans (Sec. Agr.). *U. S. 2,605,186.* A new composition of matter, a glyceride oil and a stabilizing amount of acetone dicarboxylic acid, is claimed.

Solvent extraction of oil. J. V. Hunn, A. Lake and M. W. Pascal (Sherwin-Williams Co.). *U. S. 2,605,271.* A method of extracting oil from oil bearing seeds is disclosed which comprises contacting crushed oil bearing seeds with an aqueous solution of a hydrophilic organic solvent for oil to form a flowable slurry with the meal, passing the slurry through an extraction zone, passing an aliphatic organic solvent for the oil through the zone counter-currently to the direction of the slurry and in admixture therewith (the aqueous solution containing sufficient water to render the solution substantially immiscible with the aliphatic solvent and insufficient water to cause complete insolubility of the oil in the aqueous solution) agitating the mixture in the extraction zone whereby the oil in the meal is taken up by the aliphatic solvent to form a miscella while the substantially oil free meal remains in the slurry with the aqueous solution, progressively separating the mixture into two phases, one being the miscella and the other the substantially oil-free slurry, and separately withdrawing the miscella and the substantially oil-free slurry from the extraction zone.

Alkali refining of fatty glycerides. (Lever Brothers & Unilever Ltd.) *Brit. 661,703.* Inorganic phosphate compounds in amount of 0.75% maximum and 0.05-0.5% optimum, based on the anhydrous oil weight, are added to the oil prior to alkali treatment. Reduced refining loss is claimed. (*Chem. Abs.* 46, 5870)

Fat hydrolysis. *Brit. 666,785.* (Establissements Fournier-Ferrier.) Hydrolysis of fats is effected solely in the liquid phase, without a catalyst, by subjecting 10-60% of water and 90-40% of fat to a temperature of 240-295° at a pressure of 110-180 kg./sq. cm. A horizontal hydrolysis tube is employed from which all the reaction products are simultaneously removed. The resulting glycerol solution may exceed 30% strength. Apparatus is described, and a continuous process is provided. (*Chem. Abs.* 46, 6414)

Fatty acid production. *Brit. 667,388.* (Bamag Ltd. and Hans Asch.) White fatty acids are produced from dark soap stock by the addition of 1-2% of fuller's earth as a bleaching agent during distillation. An alternate method is to distill the acids, bleach such acids with fuller's earth, and then redistill. For this final distillation, the earth need not be removed. (*Chem. Abs.* 46, 6414)

Separation and isolation of oil-soluble substances. (Lever Brothers & Unilever N. V.) J. Boldingh. *Dutch 68,577.* Oil in a solvent which is miscible with oil is brought into contact with a finely divided solid substance, such as Mealorub or Silastic, in a chromatographic column. The examples describe the separation of palm oil dissolved in iso-butyl alcohol into fractions rich in free fatty acids and fractions rich in carotene; the separation of soybean oil dissolved in acetone into fractions of different iodine no.; the separation of fish-liver oil dissolved in petroleum ether into fractions with a strong odor and color and fractions with an enhanced vitamin A content. (*Chem. Abs.* 46, 5870)

Catalytic oxidation in the gaseous phase of normally solid or liquid unsaturated fatty acids. K. G. Olund. *Swed. 131,987.* Unsaturated fatty acids are converted to the gaseous phase in a nonoxidizing atmosphere and this phase is first mixed with a gaseous oxidizing agent in the catalyst chamber. The reaction is carried out at a 0.1-2 atmosphere pressure, at about 380°, and in the presence of compounds of V, Sn, Ag, or Os, followed by immediate cooling of the product. An example is given in which olein is oxidized with air at 350° in the presence of Ag vanadate catalyst to yield some dibasic acids, such as azelaic acid, which are removed by washing with water, and lower monobasic acids, such as pelargonic and enanthic acids, which are recovered by vacuum distillation in steam. (*Chem. Abs.* **46**, 5075)

Catalytic oxidation in the gaseous phase of normally solid or liquid unsaturated fatty acids. K. G. Olund. *Swed. 131,988.* Unsaturated fatty acids are oxidized by passing a mixture of an oxidizing agent, e.g. air, the vaporized fatty acid, and steam over a catalyst. The fatty acid may be vaporized conveniently by direct heating with steam. An example is given in which azelaic acid, pelargonic acid, and enanthic acid are obtained by passing a gaseous mixture of olein, steam, and air at 380° over V_2O_5 and immediately cooling the product. (*Chem. Abs.* **46**, 5075)

Esterification of fatty acids. S. Aoki, *et al.* (First Industrial Drug Manufg. Co.). *Japan 173,473.* Fatty acid and H_2SO_4, as catalyst in the esterification vat, are heated to 100° and ethanol is introduced at the bottom so that the alcohol is vaporized immediately for the reaction. (*Chem. Abs.* **46**, 5615)

SINITIRO KAWAMURA

Alkali fusion of higher aliphatic ketones. I. Products of alkali fusion of laurone. Kenjirô Takeshita (Kyushu Univ., Fukuoka). *J. Chem. Soc. Japan,* Ind. Chem. Sect. **55**, 223-5(1952). In order to explain the mechanism of the conversion of fatty acid salts into hydrocarbons by dry distillation, the probable intermediate ketone was put to pyrolysis with NaOH. When laurone was heated with NaOH at 290-350°C. for several hrs., there were produced lauric acid and a higher olefin, $C_{34}H_{68}$, melting at —10°C., probably 12-undecyl-11-tricosene.

II. The reaction mechanism of alkali fusion of laurone. *Ibid.* 279-80. Higher ketones such as laurone could lose alkyl radical by ionic reaction. They showed similar reaction to that of Cannizzaro to produce fatty acid and alcohol, and the latter decomposed to olefin.

Glycerides. V. The amount of triacetin produced by the reaction of acetic acid with glycerol. Issei Nakamori (Kyushu Univ., Fukuoka). *J. Chem. Soc. Japan,* Ind. Chem. Sect. **55**, 225-7(1952). This study proved that the amount of triacetin produced was not greater than 5% of that of α-monoacetin formed.

VI. The products of the reaction of stearic acid with glycerol. Determination of monostearin. *Ibid.* 277-8(1952). Monostearin, isolated from the reaction products between stearic acid and glycerol at 240-250°C., dissolved in C_2H_5OH, could be reacted quantitatively with HIO_4, hence was almost completely in α-form. The products of the reaction of stearic acid with glycerol (1:1.4 molar ratio) at 240-250° consisted of tristearin 0.11×10^{-3}, distearin 0.56×10^{-3}, and monostearin 1.1×10^{-3} moles/g.

Highly unsaturated fatty acids of the liver oil of Stereolepis ishinagi. Tomotarô Tsuchiya and Akio Katô (Govt. Chem. Ind. Research Inst., Tokyo). *J. Chem. Soc. Japan,* Ind. Chem. Sect. **55**, 232-3(1952). The fatty acids of this liver oil contained 9.34% of fatty acids (neutralization no. 183, iodine no. 268) yielding acetone-soluble sodium salts. The highly unsaturated fatty acids consisted mainly of C_{20} and C_{22} acids, and a little C_{24}, C_{18}, and lower acids.

Oleic acid and its esters autoxidized in the course of long storage. Yoshiyuki Toyama and Tsutomu Yamamoto (Nagoya Univ.). *J. Chem. Soc. Japan,* Ind. Chem. Sect. **55**, 235-7(1952). From a sample of ethyl oleate autoxidized after 6 years of storage were separated nonylic, lauric, myristic, azelaic, and dihydroxystearic acids and a dimer of oleic acid polymerized at its ethylenic double bond. All these oxidation products were detected in a sample of methyl oleate stored for 11 years, and besides them monohydroxystearic and ketostearic acids were probably present. Dihydroxystearic acid was detected in the autoxidized oleic acid stored for 6 years. Other oxidized products could not be separated.

Preparation of unsaturated higher alcohols by catalytic reduction. XIV. Preparation of unsaturated higher alcohols by reduction of lead soaps under pressure. Saburô Komori, Yoshihiro Shigeno, and Ichirô Yoneda (Osaka Univ.). *J Chem. Soc. Japan,* Ind. Chem. Sect. **55**, 237-9(1952). Experiments with lead salts of erucic and linoleic acids and mixed liquid fatty acids of rice-bran oil showed that the preparation of unsaturated higher alcohols by this method was easy for the oleic acid series, but was unsuitable for more highly unsaturated acids, because of heat polymerization.

Higher aliphatic nitriles. II. The catalyst for preparing lauronitrile by the gas phase. Saburô Komori and Yoshio Kaminô (Osaka Univ.). *J. Chem. Soc. Japan,* Ind. Chem. Sect. **55**, 243-5 (1952). Lauric acid with NH_3 was heated over suitable catalyst to give lauronitrile. The catalyst consisted of 60% alumina and 40% glass powder or 30% glass powder plus 10% water glass (or 10% ammonium molybdate). Addition of phosphoric acid instead of water glass was also suitable.

Fat splitting by the autoclave process. VII. Fat splitting with the industrial autoclave. Chizuo Yonese (Sansuiso Fat Ind. Co., Kyoto). *J. Chem. Soc. Japan,* Ind. Chem. Sect. **55**, 268-9(1952). Coconut oil gave the hydrolysis rates of 66.0-79.8% in 1 step (6 hrs.) and 93.1-95.5% in 2 steps (6 hrs. each), and hardened soybean oil gave the rates of 80.8% and 95.3% in 1 and 2 steps, respectively, with a batch of 2,000-2,500 kg. The change of acetyl no. indicated the presence of some intermediate hydroxy compound during the course of fat hydrolysis. The heating was done with steam at 100 lb./sq. in., and $Ca(OH)_2$ 1-2% and ZnO 1% (of oil) were added.

VIII. Semi-industrial experiment with high-pressure autoclave. *Ibid.* 311-12(1952). Hardened whale oil (5 kg.) with 6.5 kg. H_2O was split at 240-252° under 56-85 kg./sq. cm. for 2 hrs. The hydrolysis rate was 90.6-92.8%.

Oil tanning. Saburô Komori and Yoshio Kaminô (Osaka Univ.). *J. Chem. Soc. Japan,* Ind. Chem. Sect. **55**, 289-91 (1952). Ethyl ester of herring oil fatty acids gave satisfactory tanning of ox hide; the action was more rapid than that of glycerides. Partially air-oxidized cod oil gave a good result. Tanning by methyl oleate could be improved by adding 30% methyl esters of highly unsaturated fish oil fatty acids or 40% methyl linolenate. Squalene was insufficient in tanning action.

Highly unsaturated hydrocarbon in fatty substance of sperm whale liver. Tomotarô Tsuchiya (Govt. Chem. Ind. Research Inst., Tokyo). *J. Chem. Soc. Japan,* Ind. Chem. Sect. **55**, 312-13(1952). A hydrocarbon isolated from fatty matter of sperm whale liver described earlier [*ibid.* **54**, 592(1951)] was oxidized by alkaline $KMnO_4$, and acetone and levulinic acid were detected among oxidation products. From this and other evidences the structure of this hydrocarbon was supposed to be either $C_{50}H_{82}$, $(CH_3)_2C:CH\cdot CH_2[CH_2C(CH_3):CH\cdot CH_2]_4\cdot$ - $[CH_2CH:C(CH_3)\cdot CH_2]_4\cdot CH_2\cdot CH:C(CH_3)_2$ or $C_{49}H_{80}$, $(CH_3)_2\cdot$ - $C:CH\cdot CH_2[CH_2C(CH_3):CH\cdot CH_2]_8\cdot CH_2(CH_3)C:CH_2$.

Industrial application of mannitol. II. Esterification of mannitol with drying oil fatty acids. Takeo Takahashi and Toshio Takeshita (Univ. Tokyo). *J. Chem. Soc. Japan,* Ind. Chem. Sect. **55**, 281-3(1952). The esterification of mannitol with drying oil fatty acids (1:6 Molar ratio) at 200° for 600 min. or at 250° for 120 min. proceeded up to 4.8 moles of fatty acids. The drying oils used were linseed, soybean, and calamary oils.

• Biology and Nutrition

R. A. Reiners, Abstractor

Conversion of C^{14} palmitic acid to glucose. II. Specific glucose carbons labeled. S. Abraham, I. L. Chaikoff and W. Z. Hassid (Univ. Calif., Berkeley). *J. Biol. Chem.* **195**, 567-80(1952). In the experiment in which diabetic dogs were fed palmitic acid-1-C^{14}, all the C^{14} activity was found equally distributed between carbons 3 and 4 of the isolated urinary glucose. When palmitic acid-6-C^{14} was administered, about 10% of the C^{14} activity resided in carbons 3 and 4, the remaining 80% was distributed equally among carbons 1, 2, 5 and 6. About 6% of the carboxyl carbon was recovered as urinary glucose in 48 hours and about 14% of the 6th carbon in 96 hours.

Effect of soya "lecithin" on number of clostridia in rat feces. F. W. Bernhart, G. T. Durbin, Elizabeth Linden, J. B. Hassinen and R. M. Tomarelli (Wyeth, Inc.). *Proc. Soc. Exp. Biol. Med.* **79**, 470-73(1952). A reduction in clostridia count was observed when 8.3% soybean phosphatides was added to the diet of rats. Under the same conditions the addition to the diet of soybean oil, choline, inositol or ethanolamine resulted in no significant change in the number of these microorganisms.

Determination of vitamin A in margarine. O. R. Braekkan and G. Lambertsen (Norwegian Fisheries Research Inst., Bergen). *Tids, Kjemi, Bergvesen Met.* **12**, 29-31(1952). The method of Boldingh and Drost has been simplified by placing both chromatographic adsorbents in the same column separated by a cotton plug. The reproducibility of the modified method is comparable to that of the original (2-4% deviation). (*Chem. Abs.* **46**, 6282)

Stability of carotene in mixed feeds. H. L. Mitchell and R. E. Silker (Kansas Agr. Expt. Sta., Manhattan). *J. Animal Sci.* **11**, 72-6(1952). Carotene was more stable in feeds which contained 10% alfalfa than in undiluted alfalfa. Ground yellow corn and wheat bran were more effective than dried brewers' yeast, solvent-extracted cottonseed meal, and ground oats in stabilizing carotene. Dried skim milk and solvent-extracted soybean meal were ineffective. The addition of Cu, Co, Fe, and Mn did not increase carotene destruction. (*Chem. Abs.* **46**, 6283)

Formation of lipids and carotenoids by Phycomyces blakesleeanus grown on a sodium acetate medium. E. C. Grob, M. Bein and W. H. Schopfer (Univ. Berne, Switz.). *Bull. soc. chim. biol.* **33**, 1236-9(1951). When grown on a medium containing 0.2% of ammonium lactate and 1% of sodium acetate as the only sources of N and C, the mold was able to form about the usual amounts of fat, sterols, and carotenoid pigments. (*Chem. Abs.* **43**, 6186)

Filled milks for dairy calves. III. Comparative value of various soybean oils and butter oil in a practical dietary regime. H. B. Barker, G. H. Wise and N. L. Jacobson (Iowa State College, Ames). *J. Dairy Sci.* **35**, 507-513(1952). Milk reconstituted from non-fat milk solids plus various oils at a 3% concentration, was fed to 3 groups of dairy calves. Although butter oil produced slightly greater weight gains and somewhat better general appearance than the other oils, freshly processed hydrogenated soybean oil was satisfactory whereas crude soybean oil was unsuitable.

Effect of low fat and high fat diets on the synthesis of cholesterol in rats. Roslyn B. Alfin-Stater, M. C. Schotz, F. Shimoda and H. J. Deuel, Jr. (Univ. So. Calif., Los Angeles). *J. Biol. Chem.* **195**, 311(1952). The amount of newly formed cholesterol, determined by tracer techniques, present in the liver and plasma of rats prefed on a low fat diet is unchanged when the animal is placed on a high fat diet. In the livers of the animals, prefed a high cholesterol diet, synthesis was quite depressed at the end of 8 days on a low fat diet; at the end of 16 days, synthesis had returned to normal. In animals fed high fat diets synthesis of cholesterol in the liver was normal at the end of 8 days. The newly formed cholesterol appearing in the plasma of rats prefed a high cholesterol diet is much lower than that found in the control animals. A high fat diet seems to be more efficient in removing cholesterol which had accumulated in the liver during the preexperimental cholesterol feeding.

Studies on the utilization of lipids by Streptomyces griseus. D. Perlman and G. H. Wagman (Squibb Inst. Med. Res., New Brunswick, N. J.). *J. Bact.* **63**, 253-61(1952). Lipids including animal and vegetable oils may be used as replacements for glucose on a caloric basis in media for the cultivation of the antibiotic producing *Streptomyces griseus* cultures without reduction in antibiotic production.

The effect of processing on the enzymatic liberation of lysine and arginine from soybean oil meal. D. R. Clandinin and A. R. Robblee (Univ. Alberta, Edmonton). *J. Nutrition* **46**, 525-530 (1952). Amino acid or α-amino-nitrogen values obtained from enzymatically hydrolyzed soybean oil meals processed under various conditions do not constitute a reliable index of nutritive value. Maximum processing temperatures, however, can be used to characterize good meals.

The measurement of fat absorption and distribution using eleostearic acid. J. F. Mead, Dorothy L. Fillerup, A. B. Decker and L. R. Bennett (Univ. Calif., Los Angeles). *J. Nutrition* **46**, 499-513(1952). The absorption of methyl oleate by mice can be accurately measured with methyl β-eleostearate as a tracer. Both the amount of eleostearate disappearing from the intestine and the amount appearing in the blood can be measured. The inclusion of 5% eleostearate in the fat increased the rate of absorption of the whole mixture about two-fold.

The effect of dietary fat on the reproductive performance and the mixed fatty acid composition of fat-deficient rats. F. A. Kummerow, H. P. Pan and H. Hickman (Univ. Illinois, Urbana). *J. Nutrition* **46**, 489-97(1952). Female rats which had been grown to maturity on a fat-free diet, and bred, gave birth to young which were dead or died soon after birth. When this diet was supplemented with 5% hydrogenated fat, the animals gave birth to living young which did not live more than 72 hours, while those fed 5% corn oil weaned 85% of their young. Total fat analysis showed that the animals on fat-free diets were deficient in arachidonic acid. The phospholipids of the young animals which had received corn oil contained 5-10, and those from animals on hydrogenated fat two, times more arachidonic acid than those from rats on a fat-free diet.

Tocopherol content of human milk and of cows' milk products used for infant feeding. P. L. Harris, Mary L. Quaife and Patricia O'Grady (Distn. Prod. Ind.). *J. Nutrition* **46**, 459-65 (1952). Tocopherol content of a series of human milk samples representing various stages of lactation was 0.10-0.48 mg./100 ml. milk with a mean of 0.24 mg./100 ml., or about 80 μg./g. fat. Tocopherol values did not vary with the stage of lactation. Evaporated cows' milk and samples of whole milk powder contained 23-40 μg. tocopherol/g. fat.

Some relationships among dietary sterols, plasma and liver cholesterol levels and atherosclerosis in chicks. D. W. Peterson, C. W. Nichols, Jr. and E. A. Shneour (Univ. Calif., Berkeley). *J. Nutrition* **47**, 57-65(1952). The inclusion of soybean sterols in a high (1%) cholesterol diet over a period of 28 days prevented the usual hypercholesteremic response obtained with chicks on such a diet without added soybean sterols. The presence of soybean sterols also decreased deposition of cholesterol in the livers and the incidence of atherosclerosis.

The estimation of vitamin E. I. Separation of tocopherol mixtures occurring in natural products by paper chromatography. F. Brown (Hannah Dairy Res. Inst., Kirkhill, Ayr). *Biochem. J.* **51**, 237-39(1952). A method is described for the detection of α, β, γ, and δ tocopherols by filter-paper chromatography.

Application of chromatography to estimation of vitamin A in low-potency fish oils. M. Wilhelmina Dowler and D. H. Laughland (Dept. Agr., Ottawa, Ont.). *Anal. Chem.* **24**, 1047-49(1952). A chromatographic technique is described which is simpler and more rapid than the usual saponification procedures and the extracts obtained by chromatographing contain less irrelevant absorption than do the nonsaponifiable extracts of the same oil.

The utilization of surplus herring for the production of oil and of a protein feeding-stuff by the process of alkali digestion. J. A. Lovern and W. Preston (Torry Research Station, Aberdeen). *J. Sci. Food Agr.* **3**, 274-77(1952). Digestion of minced herring with 3% alkali at 90° gave optimum oil yields, but the use of 2% alkali at 70° gave a much higher protein recovery.

Experimental cataract in the growing rat on a diet rich in cholesterol and polyunsaturated fatty acids. J. Mawas, R. Jacquot and Jeanine Raulin. *Compt. rend.* **234**, 665-7(1952). When weanling rats were placed on a diet high in polyunsaturated fatty acids and cholesterol was fed simultaneously, a characteristic syndrome rapidly developed. There was increased mortality, depressed rate of growth, sterility in females (male fertility not checked) and development of cataract in about 15% of animals in 15 days. (*Chem. Abs.* **46**, 5690)

The influence of solvent-extracted and hydraulic-processed cottonseed meals upon performance and level of plasma carotene, vitamin A, and fat in the blood of wintering beef cows. A. P. Parham, R. W. Colby and J. K. Riggs (Texas Agr. Expt. Sta., College Station). *J. Animal Sci.* **9**, 560-4(1950). The blood fat levels of cows receiving hydraulic-processed cottonseed meal was significantly higher than those of cows fed solvent-extracted meal, 187.5 and 176.6 mg. per 100 ml. of blood, respectively. The feeding of solvent-extracted cottonseed meal had little effect on plasma carotene and vitamin A. (*Chem. Abs.* **46**, 5151)

Vitamin A in butter: a new colorimetric method of determination. A. Neri (Lab. Nefer, Milan). *Latte* **25**, 297, 336, 370, 514(1951). Put 1 g. melted and filtered butter into a PQ3 tube of an Akari colorimeter, add 5 cc. $CHCl_3$ and 5 cc. Carr and Price reagent (saturated solution of $SbCl_3$ in $CHCl_3$), measure light absorption and calculate the vitamin A content on the basis of a standard curve (0-100 γ). (*Chem. Abs.* **46**, 5218)

The toxic protein of raw soybeans. Hemolytic reaction of the soybean saponin. K. Okano. *J. Agr. Chem. Soc. Japan* **22**, 23-4(1948). The aqueous extract of raw soybeans was toxic for rats. Extraction of oil from soybeans with ethyl ether or C_6H_6 had no effect on the toxicity, but treatment of raw soybeans with ethanol eliminated the toxicity owing to the denaturation of the protein. The crude aqueous extract was made nontoxic by heating or acidification. Albumin plus proteose in aqueous solution, obtained by dialyzing the aqueous extract of raw soybeans (to precipitate globulin) followed by 0.1 saturation with $(NH_4)_2SO_4$ (to precipitate albumin) and dialyzing, had the strongest toxic action. The lethal dose for the rat of 150 g. body weight was 5-6 mg. (albumin 3 mg.), which caused death 10-15 hrs. after injection. The toxic component was very unstable but the purified albumin solution had a relatively lasting toxicity. (*Chem. Abs.* 46, 5197)

SINITIRO KAWAMURA

Nutritive test on vaccenic acid. Akihiko Nakayama (Univ. Tokyo). *J. Japan Soc. Food Nutrition* 4, 178-9 (1952). Vaccenic acid was prepared by catalytic hydrogenation with Raney Ni of eleostearic acid obtained from tung oil. Feeding experiments with albino rats showed no growth-promoting activity of ethyl vaccenate in comparison with soybean oil.

Lipoxidase. I. A method for the determination of lipoxidase. Hiroyasu Fukuba (Univ. Tokyo). *J. Agr. Chem. Soc. Japan* 25, 483-7 (1952). Two methods were described. One is based upon the decolorization of crocin, a carotenoid pigment obtained from the fruit of *Gardenia jasminoides*, and the other upon the manometric measurement of oxygen absorbed by the action of this enzyme. In the latter method, methyl linoleate emulsified by ultrasonic waves was employed. This enzyme was inactivated at the early stage of its action, presumably by the inhibiting action of the oxidation products.

• Drying Oils

Stuart A. Harrison, Abstractor

The reaction between styrene and drying oils. S. Kut. *Paint Technol.* 17, 101, 149 and 199 (1952). This is a comprehensive and critical survey of published papers on the styrenation of drying oils.

Role of oxygen in drying of oils. H. P. Kaufmann and R. Berger. *Angew. Chem.* 62, 41 (1950). The oils were sealed in ampoules which were either evacuated or filled with air or oxygen. Daylight and contact with oxygen were necessary for the formation of surface films. The oxygen consumed was approximately four moles per mole of glyceride. Water was produced only from linseed oil and not from tung or other oils tested. In darkness gels were formed in presence of oxygen but no film formation occurred. (*Chem. Abs.* 46, 6402)

Fungus growth on coatings. K. Meier and H. Schmidt. *Deut. Farben-Z.* 6, 87 (1952). The varieties of fungi found on coatings are reviewed. One rapid growing fungus, an ascomyete (*Penicillium*, green), was studied extensively. Addition of 0.2% of a number of fungicides to the film forming material failed to stop the growth of the fungi. (*Chem. Abs.* 46, 6400)

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Dehydration of castor oil. R. J. Carter and M. Bristow. *U. S. 2,598,108.* Color of dehydrated castor oil is improved by carrying out the dehydration with ortho-phosphorous acid as the catalyst; e.g., dehydrated castor oil prepared with 0.5% O-phosphorous acid catalyst had a color of 0.75 on the Paint Research Station scale whereas an oil prepared with 0.4% p-toluensulfonic acid catalyst had a color of 8.

Styrenated oil styrene oxide-phenol resin, drying oil coating composition. P. E. Marling. *U. S. 2,598,644.* While styrenated oils are incompatible with phenol-formaldehyde tung oil solutions, it has been found that the styrenated oils are compatible with styrene oxide-phenol resins-tung oil solutions. A varnish in mineral spirits of the latter combination gives films which dry rapidly. These films have better properties than those of the unmodified styrenated oil.

Styrenated-unsaturated oil modified alkyd drying oil, and a phenolstyrene oxide resin coating composition. P. E. Marling. *U. S. 2,598,645.* The method described in *U. S. 2,598,644* is applied to oil-modified alkyds. Films of the new varnish have better solvent, alkali and water resistance than the original oil-modified alkyd.

Preparation of drying oils. H. M. Teeter. *U. S. 2,598,729.* Process for converting non-drying oils into drying oils involves first chlorinating the oil in such a manner that no chlorines are vicinal, then dehydrochlorinating by heating with a solution of salt of a weak acid, e.g., soybean oil is chlorinated using t-butyl hypochlorite. The product has 10.2% chlorine. It is then dehydrochlorinated by heating to 250° with a 15% solution of $NaHCO_3$. Final product has total conjugation of 31.5%.

Copolymers of fatty oil modified polyesters and vinyl monomers. J. Wynstra. *U. S. 2,600,457.* Oil-modified alkyds are made from drying and semi-drying oils by alcoholysis with glycerine followed by esterification with the adduct of maleic anhydride and dicyclopentadiene. The alkyds are then copolymerized with styrene in xylene solution. Part of the maleic anhydride adduct can be replaced by other dibasic acids. Products are suitable for use in coating compositions.

Modified alkyd resin reacted with styrene and an acrylonitrile. J. H. Daniel, Jr. and J. C. Petropoulos. *U. S. 2,600,623.* Modified alkyds are reacted with styrene and acrylonitrile using di-t-butyl peroxide catalyst to give products whose films have better solvent resistance than those of the styrenated alkyds.

Synthetic drying oils from polyvinyl alcohol and method of production. G. L. Schertz. *U. S. 2,601,561.* Polyvinyl alcohol (88 pts., molecular weight range 6,000 to 80,000) is dissolved in phenol (800 pts.) and the solution heated to 160°C. Dehydrated castor oil acids (700 pts.) are added slowly and the temperature raised gradually to 235°C. Phenol and water are removed. At the end of 6.5 hours the esterification is complete. After removal of unreacted materials, the remaining oil is dissolved in xylene and drier added. The polyvinyl ester dries much more rapidly than the corresponding glyceride.

Copolymers of cyclopentadiene. *H. L. Gerhart. U. S. 2,601,273.* Unsaturated glyceride oils such as linseed oil are copolymerized with cyclopentadiene and either a vinyl monomer such as styrene or a divinyl monomer such as divinyl benzene. Products are claimed to give excellent films.

• Waxes

E. F. Guttenberg, Abstractor

Plant waxes. I. Wax from leaves of Chamaecyparis obtusa. Tatsuo Kariyone, Hisanori Watanabe, and Hirokazu Kadowaki (Univ. Kyoto). *J. Pharm. Soc. Japan* 72, 5-7 (1952). Dried leaves of "hinoki," *Chamaecyparis obtusa*, yielded 1.8% wax, melting at 67-72.5°, acid number 49, ester number 171 (after acetylation 214), and iodine number 18.6; saponification yielded 83% acids (I) and 9% unsaponifiable substance. I contained juniperic (III) and sabinic acids (IV), and II consisted of myricyl alcohol, 1,12-dodecanediol, melting at 80-1°, and 10-nonacosanol.

II. Estolides of Hinoki-leaf wax. *Ibid.* 7-9. The wax was separated into acids (V) and neutral estolides (VI) (a long-chain ester of a hydroxy acid with itself). V was fractioned into various portions by chromatography; estimation of acid number and ester number of the fractions of V showed that the estolide is composed of 3-5 molecules of III and IV.

III. Konotegashiwa-leaf wax. *Ibid.* 10-11. A white wax, melting at 78-9°, was obtained in 0.5% yield from dried leaves of *Biota orientalis*. Its acid number was 17.8, saponification number 225, and ester number 207.9. Saponification of the wax gave 81% acids (mostly III with a small amount of IV in estolides form) and 7% II, of which pentatriacontane and a 1,16-hexadecanediol, melting at 87-8°, were isolated.

IV. Sawara-leaf wax. *Ibid.* 11-13. The withered leaves of *Chamaecyparis pisifera* yielded 1.2% white wax, melting at 71-2°; acid number 34.2, saponification number 165.2, ester number 131, and iodine number 13. Saponification of the wax gave 73% acids (mostly of III and IV in estolides form) and 21% II (mostly of 10-nonacosanol which is also contained in *Juniperus chinensis* and *Chamaecyparis obtusa*). (*Chem. Abs.* 46, 5868-9)

Marine products. XXXI. Palysterol and other lipid compounds of sea anemones. Werner Bergmann, Robert J. Feeney, and Abbott N. Swift (Yale Univ.). *J. Org. Chem.* 16, 1337-44 (1951). The extraction of two sea anemones, *Palythoa mammilosa* and *Zoanthus proteus*, with Me_2CO and C_6H_6 gives a green wax. (*Chem. Abs.* 46, 5609)

Chemical and engineering research in Australia. Anon. *Int. chem. Eng.* 32, 539-42 (1951). Work on wool and sugar cane wax, organized and directed by the Commonwealth Scientific Industrial Research Organization, is reviewed. [*Brit. Abs.* **BI**, April, 434 (1952)]

The tuberculin reaction. V. The antigenicity of chloroform-soluble tuberculoprotein wax. Quentin Myrvik and Russel S. Weiser (Univ. of Washington, Seattle). *J. Immunol.* 68, 413-19 (1952). The tuberculoprotein (I) was prepared by three $(NH_4)_2SO_4$ precipitations of the culture filtrate of BCG strain of *M. tuberculosis* var. *bovis*. The purified wax was prepared from a crude extract by 2 precipitations from Et_2O with 2 vols. of cold MeOH. (*Chem. Abs.* 46, 5700)

Evaluation and classification of coals from commonwealth sources. W. Francis. *J. Inst. Fuel* 25, 15-28 (1952). Valuable resins and waxes have been extracted from some samples of coals and lignite from Australia, Borneo, Nigeria, and Pakistan; a Nigerian lignite yielded 15-25% of extract. The dependence of the properties on the composition, and the relation between the ultimate and rational (ulmins, cuticles, fusain, opaque matter, resin, wax) analyses are discussed. [*Brit. Abs.* **BI**, April, 479(1952)]

Simplified embedding of biological material for thin sectioning. R. F. Baker and O. Warren. *Nature* **169**, 420-1(1952). A snow-white (cosmetic) grade of beeswax is mixed in the ratio 1:2 with a synthetic resin used for microscopical mounts. Methods of carrying out the embedding, cutting, and solvent extraction (if desired) are given. [*Brit. Abs.* **C** June, 272 (1952)]

Wool wax. II. Lime saponification. S. D. Rossouw and E. Von Rudloff. *J. Appl. Chem., Lond.* **2**, 335-338(1952). The rate of saponification of wool wax with lime has been investigated and the effects of certain additives on the rate have been studied.

Utilization of rice oil. IV. Jun-ichi Kawai and Juichi Hayakawa. *J. Nippon Oil Technol. Soc.* **4**, 6-10(1951); cf. C.A. **44**, 5617. The Me esters of rice-oil fat acids were hydrogenated to an iodine number of 56.8-71.5 and solidifying points of 19.5-10.5°. The stability of the ester of iodine number 56.8 was better than a comparable Me ester of Tsubaki-seed oil, while that having iodine number 71.5 was slightly inferior.

V. Jun-ichi Kawai. *Ibid.* 11-16. Data are given on alcoholysis of dewaxed oil and crude rice wax with MeOH or EtOH with H_2SO_4 as a catalyst by refluxing and by heating in an autoclave.

VI. *Ibid.* 37-43. Rice wax prepared by precipitating and washing with acetone and then hydrogenating had about the same hardness as that of carnauba wax. (*Chem. Abs.* **46**, 5867)

Wax of the white wax scale, Ceroplast es destructor (Newstead). R. H. Hackman. *Arch. Biochem. Biophys.* **33**, 150-154(1951). The wax consists principally of a mixture of esters of C_{26}- and C_{28}-alcohols and acids together with these acids and alcohols in the free state. Paraffin hydrocarbons were not detected. [*Brit. Abs.* **BII**, April, 391(1952)]

Spanish esparto. A. Soler and G. Guzman. Publ. Univ. Murcia, 1951, 81 pp. The extraction and utilization of esparto wax is discussed. [*Brit. Abs.* **BII**, April, 364(1952)]

Chemistry of indigenous drugs. III. Preliminary chemical examination of the leaves of Bridelia stipularis, Blume. P. V. Nair and K. S. Madhavan Pillay. *Bull. Cent. Res. Inst. Univ. Travancore* 1, 51-59(1950). Ethyl ether yields 10.5% of a wax containing esters of cerotic, palmitic, and stearic acids and of some liquid acids. Bridelyl alcohol, $C_{22}H_{45}OH$, melting point 84°, was separated from the unsaponified wax, and the coexistence of other higher alcohols was indicated. [*Brit. Abs.* **BII**, April, 333(1952)]

Hydrolysis of wool wax and related high-molecular-weight esters. II. Heterogeneous reaction: oil-in-water emulsions. E. V. Truter. *J. Appl. Chem., Lond.* 1, 454-6(1951). The aqueous alkaline hydrolysis of wool wax, n-octadecyl octanoate and palmitate, and cholesteryl octanoate and palmitate, in the form of oil-in-water emulsions stabilized by various emulsifiers, has been examined. The extent of reaction in a given time is not related to the quality of the emulsion, but is limited by the rate at which ester molecules can penetrate the interface. When about 30% of ester is saponified, the alcohol liberated competes with ester for places in the interface, and ester molecules are soon excluded by a mass-action effect. Attempted removal of cholesterol from the interface, to allow saponification of wool wax to go to completion, by precipitation with digitonin, failed, since digitonin also blocks the interface. [*Brit. Abs.* **BII**, April, 314(1952)]

Investigation of fatty oil from seeds of Spirea ulmaria. A. M. Nordström and C. G. Nordström. *Suom. Kem. Tiedskr.* **59**, 11-24(1950). *Spirea ulmaria* seeds contain 17% of a drying oil having similar composition and properties to linseed oil. The oil contains 17% of a wax with melting point 240-260, saponification value 100, and yields a mixture of higher alcohols, melting point 114-154°, and acids, melting point 169-170°, on saponification; these are as yet unidentified. The wax-free oil has d^{20} 0.9331, n^{16} 1.4848, saponification value 191, iodine value 182, acid value 4, and OH value 10. Saponification yields a mixture of fatty acids with the following % composition: oleic 28.2, linoleic 16.2, linolenic 46.8, and saturated acids 8.8. The saturated acids have not been identified. The oil contains 5% of unsaponifiable matter, including 0.27% of steroid substance. [*Brit. Abs.* **BII**, April, 387(1952)]

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Dewaxing of rice oil. Masaji Hitotsumatsu, Kaizo Mizuto, and Fumio Iwata. *Japanese 180,820.* Gelatin 5 kg. in 100 kg. water and 100 kg. $(CH_2OH)_2$ at 20° is mixed with 50 kg. rice oil at 20° and allowed to settle to give a liquid oil emulsion and solid wax on top. The emulsion is heated to 40° and centrifuged to obtain 35 kg. oil; the upper layer is washed with hot water and centrifuged to obtain 12.5 kg. wax. (*Chem. Abs.* **46**, 5870)

Wax compositions suitable for floor polishes. Semtex, Ltd., F. G. Mottershaw and W. Saul. *British 649,013.* The composition which affords a satisfactory finish but less slippery than normal comprises an aqueous emulsion containing a disperse phase of wax 15-30% and a second disperse phase of resinous film-forming material 10-30%, e.g., a vinyl polymer or a vulcanized oil-resin composition. Thus, an aqueous emulsion containing about 30 wt. % of plasticized polyMe methacrylate is mixed with 1 part of commercial wax polish (I) to give a composition which affords a treated floor surface of coefficient of friction 0.22 (as compared with 0.18 for I alone). [*Brit. Abs.* **BII**, April, 395(1952)]

Container-sealing compositions. Dewey & Almy Chem. Co. *British 660,361.* A composition suitable for a glass closure sealing material consists of a congealed mass of plasticizer and a wax or a long chain alcohol, having uniformly dispersed in it particles of a filler and of a resin which is paste-forming with the placticizer. [*Brit. Abs.* **BII**, April, 414(1952)]

Electric primary batteries (General Electric Co., Ltd.) W. A. Nattrass. *British 662,342.* In batteries annular members are made of bitumen or wax. [*Brit. Abs.* **BI**, April, 555(1952)]

Cable-length for joining submarine and other electric cables. Comp. Gén. d'Electricité. *British 662,728.* A cable-length for joining two cables having thermoplastic insulating coverings of different melting point, e.g., gutta percha (60°) and polyethylene (120°), is provided with an insulating covering, the melting point of which varies progressively from one end to the other, e.g., the covering of the cable-length may consist of gutta percha, and of polyethylene, mixed with varying proportions of carnauba wax. [*Brit. Abs.* **BI**, April, 558(1952)]

Oxidation of waxes. (Anglo-Iranian Oil Co., Ltd.) R. A. Dean, F. A. Fidler, and V. E. Grip. *British 664,448.* Waxes (comprising mainly hydrocarbons) are oxidized at 100-170° (110-130°) with O_2 (air) in presence of a Mn oxide, e.g., MnO_2 and (optionally) alkali, e.g., 1% of 5N-NaOH, in an Al vessel, to give material useful in the production of soap, surface-active agents, or bitumen emulsion. [*Brit. Abs.* **BII**, April, 395 (1952)]

Extreme-pressure lubricant. Walter E. Waddey (Standard Oil Development Co.). *U. S. 2,592,497.* A mixture of a fatty composition, which has been treated with P_2S_5 and a halogenated wax, when added to mineral oil, produces a lubricating composition which is suitable for heavy load conditions. (*Chem. Abs.* **46**, 5832)

Fatty alcohols from waxes. Paix & Cie. *French 959,651.* Natural waxes are partially saponified with a caustic alkali solution under a pressure of 25 kg./sq. cm. The saponification is completed in a 2nd stage, with an agitator, the fatty alcohols being distilled off below 350° while the mixture is stirred. (*Chem. Abs.* **46**, 5870)

Neutral wax from crude, high-acid-containing rice wax. Kisaku Kitsuta. *Japanese 179,872.* A crude rice wax (acid number 151) is esterified with EtOH and H_2SO_4 to make the Et ester of free fat acids. The remaining free fat acids are removed by washing with aqueous NaOH and water, and the esters are separated from the wax by pressing and then distilling *in vacuo.* A neutral rice wax thus prepared melted at 74°.

Preparation of neutral rice wax from crude wax having an acid number below 80. *Japanese 179,873.* In this case, the crude rice wax with aqueous NaOH is poured into 50 volumes of hot water. The wax floating on top is separated from the aqueous soap layer, and the separated wax is washed with hot water to give a neutral rice wax.

Purification of rice wax. *Japanese 179,874.* Four parts crude wax is sulfonated with one part concentrated H_2SO_4 at 80° for 10 minutes and poured into 4 vols. hot water, the aqueous layer is removed, aqueous NaOH is added to neutralize the acid, 8 vols. hot water is added, and the wax floating on top is separated from the non-wax aqueous layer. (*Chem. Abs.* **46**, 5870)

• Detergents

Lenore Petchaft, Abstractor

Carboxymethylcellulose: applications in detergents. R. Dicker. *Rayonne* 6, No. 2, 73-7, No. 3, 77-80(1950). The preparation, properties, and uses of carboxymethylcellulose (I) in the textile industry are outlined. It increases the cleansing power of detergents and decreases the amount of dirt redeposited. Tests in which the effect of I on the detergent power of G-1226 and Igepon T was compared with that of 7 other detergent-aids showed that, in general, I was the most efficient. The uses of I in sizing, dyeing, and finishing are described briefly. (*Chem. Abs.* **46**, 4239)

Shrinkage of cotton fabrics—shrinkage behavior of certain cotton fabrics in laundering. Hazel T. Stevens and Sarah M. Browning (Florida State University, Tallahassee, Florida). *Rayon, Synthetic Textiles* **33**, No. 7, 62-4 69(1952). Dimensional changes of selected preshrunk and non-preshrunk cotton fabrics, when laundered according to the ASTM method, were studied. Five launderings would more nearly have brought results to within 1% residual shrinkage than did one laundering.

Detergency experiments of soap-phosphate combinations. H. Stupel. *Textil-Praxis* **7**, 231-4(1952). In laboratory wash tests on artificially soiled cotton, 1-2-g. soap samples were built with 0.5-6.0-g. complex phosphates. $Na_6P_6O_{18}$ (Na hexametaphosphate) (I), $Na_5P_3O_{10}$ (tripolyphosphate) (II), $Na_4P_2O_7$ (tetrapyrophosphate) (III), $Na_6P_4O_{13}$ (tetrapolyphosphate) (IV), and $(KPO_3)_x$ (V), a K metaphosphate, were used in the tests. V was superior in every respect, but because of its insolubility and high price it was used only in mixtures with III. III was followed by IV, II, and I. Dispersion of precipitated Ca soaps was in the order I, IV, II, and III. Optimum results were obtained with soap 1, III 1, and V 1.5 g./l. A similarly built synthetic-detergent mixture gave still better results. (*Chem. Abs.* **46**, 6411)

Effect of wetting agents on corrosion. II. The influence of nonionic wetting agents. Luigi Piatti. *Werkstoffe u. Korrosion* **2**, 441-4(1951). Surface-active agents in concentration of 0.4% were used. Nonionic agents cause less loss of weight by corrosion than do ionic agents. The greater the surface-activity of the agent (in the range studied) the more favorable is its effect on corrosion. (*Chem. Abs.* **46**, 4456)

Detergents from petroleum. Giuseppe Trinchieri. *Tinctoria* **48**, 339-42(1951); **49**, 31-3(1952). The syntheses of: soaps from synthetic fatty acids (obtained by oxidation of paraffin or from olefins and CO), alkyl sulfates from olefins by direct sulfonation or from synthetic alcohols, alkylsulfonates by sulfonation of paraffins, alkylarylsulfonates by sulfonation of synthetic alkyl benzenes and naphthalenes, and alkylarylpolyglycol ethers by condensation of synthetic alkylphenols with ethylene oxide are described. (*Chem. Abs.* **46**, 5868)

The testing of disinfectant soaps. Harry Pritchard. *Mfg. Chemist* **23**, 227-31(1952). Review of various disinfectants practical for use in soap. Various methods of testing the value of a disinfectant are discussed. No one test seems to be satisfactory. However the use of the following series of tests seems to be the best answer: a dilution test similar to the Rideal-Walker test, penetration tests, and practical tests.

Adsorption in the detergent process. Arthur L. Meader, Jr., and Bernard A. Fries (California Research Corp., Richmond, Calif.). *Ind. Eng. Chem.* **44**, 1637-48(1952). This study determined the extent of adsorption of detergents on cloth, ease of rinsing, and effect of adsorption on soil removal in the washing process. Carbon 14 and sulfur 35 were used as tracers to aid in the measurement of adsorbed material. Adsorption of sodium alkyl aryl sulfonate and sodium palmitate was appreciable enough to deplete seriously the concentration of detergent in washing solutions. Increasing temperature increased rate but decreased magnitude of adsorption. Desorption of sulfonate was more complete in distilled than in hard water, but desorption of palmitate was greater in hard water. Wool adsorbed more palmitate and sulfonate than cotton and retained them more tenaciously on rinsing. There appears to be no simple relationship between adsorption and detergency. A rapid, convenient method for direct measurement of adsorption on cloth was developed. The results should help in formulating detergent blends, calculating consumption of detergents and in studies of behavior of cotton and wool with anionic surface active agents.

Detergents from petroleum. Foster Dee Snell (Foster D. Snell, Inc., New York, N. Y.). *Petroleum Processing* **7**, 982-6(1952). Manufacture of alkylarylsulfonates and nonionic detergents from petroleum is reviewed. Production of petroleum based detergents has increased 650% since 1943 as a result of ample raw materials and simple processing needs.

Determination of soap, acid, and alkali in synthetic latices. S. H. Maron, I. N. Ulevitch and M. E. Elder (Case Institute of Techn., Cleveland, Ohio). *Anal. Chem.* **24**, 1068-70(1952). Conductometric titration procedures can be utilized for the analysis of GR-S latices prepared with either fatty or rosin acid soaps. By these procedures it is possible to determine the soap and free acid contents of such latices by individual direct titrations with acid and base; or by use of the indirect conductometric procedure involving the addition of hydrochloric acid followed by titration with base, to determine the soap and acid or free alkali content of a latex with a single titration.

The effects of magnesium ions on the detergency of wool using sodium dodecyltoluenesulfonate. T. Earl Jordan, George Volz, Jack Gelb and Cyril Romanovsky (Publicker Industries, Inc., Philadelphia, Pa.). *Am. Dyestuff Reptr.* **41**, 413-4(1952). Magnesium ion has been found to increase several fold the detergency properties for wool of sodium dodecyltoluenesulfonate mixed with sodium sulfate. Approximately 40% organic content, 15% magnesium sulfate, and 45% sodium sulfate seem to be optimum. Other sulfonates and ions were tested and found to be inferior to the magnesium dodecyltoluenesulfonate combination.

Surface active agents. R. C. Tarring. *Perfumery, Essent. Oil Record* **43**, 193-5(1952). This reviews physical properties of surface active agents and applications in shampoos, bath preparations, cleansing lotions, and in various types of emulsions.

Detergency measurement. E. H. Armbruster and G. M. Ridenour (University of Michigan, Ann Arbor, Mich.). *Soap Sanit. Chemicals* **28**, No. 6, 83, 85, 86, 89(1952). This paper reviews methods of evaluating detergency by the use of radioactive tracers and cites advantages and disadvantages of the method and specific applications such as use in determining bacteria residuals in self service launderies and measuring the cleanability of various types of multiple-use eating utensils.

Requirements of germicidal soap. Paul I. Smith. *Am. Perfumer, Essent. Oil Rev.* **59**, 463(1952). A good germicidal soap must exhibit effective germicidal activity and it should possess effective detergent and washing properties. The soap should have a good appearance with a pleasant finished surface. Easy solubility in water is also important. The germicide must be selected carefully. The protective wrappers used for the finished soap should prove effective in screening soap from light and in preventing deterioration of the germicidal agent.

New look at floor cleaners. Louis E. Wells, Jr. (Peck's Products Co., St. Louis, Mo.). *Soap Sanit. Chemicals* **28**, No. 6, 42-5(1952). This article stressed the effect of the floor cleaner on the floor itself rather than on detergency as such. Various flooring materials such as linoleum, rubber tile, asphalt tile, plastic tile, marble and terazzo were tested in various solutions of soaps, detergents, and built products. Results indicated that synthetics used were less damaging than soap products; builders seemed to increase attack effect of both soap and synthetics.

PATENTS

Process of dedusting soap and the resulting product. John W. Bodman (Lever Bros.). *U. S. 2,592,535.* Process for treating granulated water-soluble soap to reduce the amount of dust therein, comprises applying to at least a portion of the surface of the soap particles a hygroscopic phosphate for maintaining the soap particles in an undried plastic condition.

Continuous soapmaking. Lowell A. Ledgett (Colgate-Palmolive-Peet Co.). *U. S. 2,594,461.* The process of making soap continuously comprises maintaining a mass of soap under continuous flow around a closed path, continuously dispersing proportioned amounts of fatty acids and alkali without premixing in said circulating mass, and continuously removing a stream of soap from said circulating mass.

Sterilizing detergent composition. John Charles Lovell Resuggan (Industrial and Commercial Detergents, Ltd.). *U. S. 2,599,127.* Method is described for cleansing and sterilizing milk bottles by scouring the said bottles with a jet of an aqueous solution of N,N-dioctyl,N,N-dimethyl ammonium bromide.

Iodine germicidal detergent. Abraham Taub (Benjamin Clayton). *U. S. 2,599,140.* A disinfecting detergent composition comprises a solvent mixture of glycerin and a glycol, containing in solution elemental iodine which is the active ingredient, an alkali metal iodide and at least one detergent such as an anionic organic non-soap synthetic detergent which is inert to reaction with iodine.

Floating detergent cake. Compagnie Internationale de Commerce. *Fr. 988,900.* A floating detergent cake, without fatty material, is formed from a mucilaginous gel, a concentrated vegetable substance and a substance of very low specific gravity and high absorbent power. This cake has a high cleaning and foaming power and dermatological properties.