is more calcium in the proteins produced with use of the calcium hydroxide, it is not excessive. The protein obtained from the hydrochloric acid precipitation was darker than that from the sulfur dioxide precipitation. However alkaline solutions of these proteins showed no visual differences. Apparently there is color, possibly from the skins or degraded organic matter, in the protein prepared by hydrochloric acid precipitation which is similar to an indicator, changing with an acid or basic condition.

Rates of settling (1) of protein curds from calcium hydroxide-peptized solutions were faster with sulfur dioxide than with hydrochloric acid and were as rapid as the rates obtained with sulfur dioxide to precipitate protein from sodium hydroxide-peptized protein solutions.

There was practically no difference in the degree of peptization whether distilled or tap water (6) was used. After peptization in the pilot plant, meal residue separated by the horizontal centrifuge could not be pressed.

Summary

It was shown in laboratory peptizations that between the pH range of 7.2 and 9.5, nitrogen solubility obtained with calcium hydroxide solution was a constant and was practically equal to the value obtained with use of sodium hydroxide solution at pH 7.5. Pilot-plant yields of protein and settling rates of protein curds from calcium hydroxide-peptized solution with the use of sulfur dioxide to lower the pH were equal to those obtained previously from sodium hydroxide-peptized solution. This information may be of interest in any instance in which it is advantageous to use the lower-priced peptizing material.

Acknowledgment

The authors wish to thank J. F. Jurgens for the analytical data reported.

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

• Oils and Fats

R. A. Reiners, Abstractor

Synthesis of fatty acids by Clostridium kluyverii. H. A. Barker (Univ. of California, Berkeley). *Harvey Lectures*, Ser. **45**, 242-59 (1949-50). Isotopic, enzymic, and quantitative analysis studies are reviewed which relate to the fatty acid synthesis by the anaerobic bacterium, *Clostridium kluyverii* which requires for its growth, in addition to water and salts, only ethanol, biotin, p-aminobenzoic acid, and either acetic, propionic, butyric, or valeric acid; and which contains a reversible enzyme system which converts almost 100% of the substrate to fatty acids up to C_6 and C_7 acids, by adding a C_2 unit into the COOH end of the synthesized fatty acid. (*Chem. Abs.* **46**, 11314)

Tung oil. II. Polymerization of tung oil. C. Chin (Univ. Formosa, Taihoku). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **53**, 281-3 (1950). Tung oil, α- and β-eleostearic acids, and their methyl esters were polymerized by heating in CO_2, and the products were separated by fractional distillation *in vacuo*. The principal products were dimers of the acids. Polymerization of tung oil is chiefly caused by the dimerization of eleostearic acid. (*Chem. Abs.* **46**, 11716)

Tung oil. III. Dimers of eleostearic acid. C. Chin (Univ. Formosa, Taihoku). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **53**, 283-5 (1950). The dimers obtained from polymerization products of eleostearic acid by fractionation *in vacuo*, were oxidized with $KMnO_4$ and O_3, and dehydrogenated with Se. It was concluded that the dimers chiefly consist of hydrogenated benzene and naphthalene derivatives. The side chains are $-(CH_2)_3CH_3$ and $-(CH_2)_7COOH$. (*Chem. Abs.* **46**, 11716)

The Chayen process for extraction of oils and fats. J. M. Coulson. *Nature* **170**, 881 (1952). Animal fat is separated from crushed bones and similar material by a process in which the material suspended in water is subjected at room temperature to high speed impulses which break open the cell walls, permitting the fat to be separated by gravity. This process is in use on a commercial scale in England and Canada.

Antioxidant concentrates from edible plant materials. D. C. Dhar (Central Drug Research Inst., Lucknow). *J. Indian Chem. Soc., Ind. and News Ed.* **14**, 175-6 (1951). Green chillies, garlic, and onion, which are used in India as antioxidants in ghee, were dialyzed with alcohol. That portion of the dried dialyzate which dissolved in petroleum ether exhibited high antioxidant properties as determined by the Swift stability test. (*Chem. Abs.* **46**, 11497)

Degradation of protein in the rumen of sheep. 1. Some volatile fatty acids, including branched-chain isomers, found in vivo. K. El-Shazly (Rowett Res. Inst., Bucksburn, Aberdeenshire). *Biochem. J.* **51**, 640-46 (1952). Branched-chain lower fatty acids occur in the rumen of sheep on a variety of diets. A significant proportion of the C_4 acids was isobutyric acid, and branched-chain isomers often made up the greater part of the C_5 acids. C_6 acids were present only in small amounts.

Safe handling of hexane in soybean processing. R. E. Greenfield (A. E. Staley Mfg. Co., Decatur, Ill.). *Proc. 6th Ind. Waste Conf., Purdue Univ. Eng. Bull., Extension Ser.* No. **76**, 141-7 (1951). Isolation, closed piping systems, exhaust ventilation, spark-free equipment, and trapping of drains are necessary for the safe handling of C_6H_{14} in the separation or extraction of oil from soybeans. (*Chem. Abs.* **46**, 11716)

Comparative chemical and histological analysis of fatty livers. F. Hartmann and Ursula Fleck (Univ. Gottingen, Ger.). *Klin. Wochschr.* 30, 652-4 (1952). The percentage area of liver section stainable by Sudan IV is roughly proportional to the total liver lipide concentration. No staining occurs if the latter is less than 18-20% of the dry liver weight. (*Chem. Abs.* **46**, 11294)

Water insoluble fatty acids and butyric acid in cream stored at 4°. F. Hillig and W. R. North (Food and Drug Admin., Washington 25, D.C.). *J. Assoc. Official Agr. Chemists* **35**, 844-52 (1952). Cream can be held at 4° for a reasonable period of time without undergoing marked deterioration. Deterioration takes place rapidly at 25°.

Effect of feed on water insoluble fatty acids in cream. F. Hillig and J. C. Palmer (Food and Drug Admin., Washington 25, D.C.). *J. Assoc. Official Agr. Chemists* **35**, 852-55 (1952). Milk produced by cows on dry feed does not contain larger quantities of water insoluble acids than milk produced by the same cows on pasture.

Hydroxylation of fatty oils. XI. Pyrolysis of hydroxylated fatty oils. Y. Ishii (Tokyo Univ.). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **53**, 240-1 (1950). Soybean and castor oils, hydroxylated by various methods, were thermally decomposed, the products fractionally distilled, and the saponification and iodine numbers of the fractions were recorded. (*Chem. Abs.* **46**, 11715)

Revision of the Duclaux numbers of fatty acids. M. Jurecek and M. Vecera (Chem. Research Inst., Pardubice-Rybitvi). *Chem. Listy* **46**, 119(1952). Duclaux numbers were redetermined following the method of Upson *et al.* (*Chem. Abs.* **46**, 11713)

The properties of β-hydroxybutyric lipides. A. Kepes and C. Peaud-Lenoel. *Compt. rend.* **234**, 756-7(1952). The lipides of *Bacillus megatherium* containing $MeCH(OH)CH_2CO_2H$ are shown to be polyesters. The number of β-hydroxybutyric acid residues varies from 6 to 110 in the lipides extracted with dioxane and chloroform. (*Chem. Abs.* **46**, 11106)

Vinyl esters of fatty acids. M. Kita and N. Wada (Osaka Pref. Ind. Research Inst.). *Repts. Osaka Pref. Ind. Research Inst.* **3**, No. 3, 49-50(1951). Lauric, oleic, and mixed fatty acids of rice-bran oil were esterified with CH_2: CHOAc at 30-50° by exchange reactions catalyzed by $Hg(OAc)_2$ and H_2SO_4 to vinyl esters of the corresponding fatty acids, which became highly viscous (polymerized) when heated with 2% Bz_2O_2 in sealed tubes. (*Chem. Abs.* **46**, 11103)

Biosynthesis of fats from saccharides by yeasts. III. Formation of fat from d-xylose and glucose in yeast, Rhodotorula gracilis. A. Kleinzeller, J. Malek, R. Praus and J. Skoda (Tech. Univ., Prague, Czech.). *Chem. Listy* **46**, 470-4(1952). *Rhodotorula gracilis* assimilates, after adaptation to xylose, glucose and xylose at practically the same rates. In a mixture of both sugars, glucose is consumed preferentially. Fat coeffcient for glucose is 21.1, for xylose 15.5, the contents of fat in dry substance of yeast being 70.8 and 61.2%, respectively. Cultivation of yeasts on a mixture of both sugars gives fat coefficient 17.7 and fat content 65.7%. Analysis of yeasts shows a content of 10.3-12.7% of proteins, and 15.6-19% polysaccharides, according to the composition of substrates. Fats produced on substrates of xylose and glucose do not differ except in the content of linoleic and linolenic acids (*Chem. Abs.* **46**, 11315)

Studies on the manufacture of higher fatty alcohols by catalytic reduction of fatty oils. T. Kobashi and H. Nobori (Kao Fat and Oil Co., Tokyo). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **53**, 363-5(1950). It has been found that the activity of the catalyst consisting of cupric zinc oxides and diatomaceous earth is enormously promoted by immersing it in dilute solutions of dichromates or $KMnO_4$ solution. (*Chem. Abs.* **46**, 11714)

The composition of cameline oil. J. D. von Mikusch (F. Thorl's Ver. Harburger Olfabriken A.-G., Hamburg-Harburg, Ger.). *Farbe u Lack* **58**, 402-6(1952). Seeds of *Camelina sativa* contained 6.9% moisture and 32.6% cameline oil, which had the following properties: acid no. 4.5, saponification no. 187.1, Wijs iodine no. 151.1, hexabromide no. 20.9, diene no. 1.2, hydroxyl no. 14.3, Reichert-Meissl and Polenske nos. 0, unsaponifiables 1.0, d^{20} 0.9224, n^{20} 1.4790, solidification point —13°, Lovibond color (1″) 37Y, 18R. Fatty acids from this oil contained 37.5% linoleic and 16.9% linolenic. Also identified were an eicosenoic acid, oleic acid, lignoceric acid, arachidic acid, stearic acid, palmitic acid and a monounsaturated hydroxy acid. (*Chem. Abs.* **46**, 11715)

Revolutionizes fat rendering. R. E. Morse, W. R. Dayen and K. M. Christensen (Kingan & Co.). *Food Eng.* **24**(11), 72-74, 175(1952). A continuous process for rendering animal fat is described. It produces a higher quality fat and in higher yields than the old batch process.

Utilization of silkworm chrysalis. H. Nuruzhan (Eskisehir, Turkey). *Kimya ve Sanayi* **26-27**, 339-41(1952). From Bursa cocoons 23% oil can be extracted with ether. This oil is yellow, has a fishy odor, and the following properties: d^{25} 0.9106, nonsaponifiable matter 4.89%, saponification value 180.5, and acid value 63.22. Soap made from chrysalis oil is highly foaming. (*Chem. Abs.* **46**, 11717)

Phosphatides. I. Isolation of lecithin. Y. Obata, K. Nukata and K. Zama (Hokkaido Univ., Sapporo). *J. Agr. Chem. Soc. Japan* **24**, 29-32(1950). Pure lecithin was isolated from commercial soybean lecithin by extracting the $CdCl_2$ precipitate with ether to obtain a pure lecithin complex in the residue. (*Chem. Abs.* **46**, 11295)

Phosphatides. II. A new method for the isolation of cephalin. Y. Obata, S. Sasa and K. Nukata. *J. Agr. Chem. Soc. Japan* **24**, 33-5(1950). Pure cephalin is obtained from soybean lecithin by a method utilizing the insolubility of the cephalin-basic lead acetate complex in methanol. (*Chem. Abs.* **46**, 11296)

Heat-treatment of vegetable oils. II. The polymerization of olive oil. J. Petit and G. Bosshard. *Bull. soc. chim. France* **1952**, 618-22. During heat-treatment part of the oil is decomposed and the other part is polymerized by utilizing some of the decomposition products. This leads ultimately to the formation of cross-linked solid resins. The polymerized oil is still a glyceride but it contains, in addition to the C_{18} acids present in the original oil, four other types: monobasic acids with chains shorter than C_{18}; dibasic acids of relatively low molecular weight, such as C_{16}; monobasic acids with high molecular weight and long chains such as C_{26} and C_{28}; and finally dibasic acid of high molecular weight such as C_{36}. (*Chem. Abs.* **46**, 11715)

Separation of fat acids and triglycerides with urea addition compounds. R. Rigamonti and V. Riccio (Univ. Torino, Italy). *Fette u Seifen* **54**, 193-7(1952). The influence of some variables on the urea separation of olive oil glycerides and fat acids was investigated. The purity of the products is increased considerably by using 10 times the calculated amount of solid urea and adding a small amount of water or saturated aqueous urea to decrease the required agitation time. Oils of high free fat acid content gave better separation than oils of low free fat acid content. (*Chem. Abs.* **46**, 11714)

Studies on the composition of horse oil. 2. The component fatty acids of lipids from fatty tissues, muscle and liver. F. B. Shorland, L. W. Bruse and A. S. Jessop (Dept. Sci. Ind. Res., Wellington, New Zealand). *Biochem. J.* **52**, 400-407(1952). The fatty acid composition of the glycerides of the fatty tissues, muscle and liver of the horse were shown to be generally similar and to contain 25-30% palmitic acid, 3-6% stearic acid, 4-6% hexadecenoic acid, 50-55% C_{18} unsaturated acids and minor proportions of myristic, tetradecenoic and C_{20-22} unsaturated acids. The liver glycerides contain less oleic acid than those of the muscle and fatty tissues (33-40% as compared with 56-69%), and the ratio C_{18} triene/diene showed progressive diminution from 4.22-4.27 to 2.17-2.39 in passing from the glycerides of the fatty tissue to those of the muscle and liver. Data show that the dietary fats of horses cannot be directly absorbed as such but that they are mixed with those synthesized by the animal, and selectively redistributed to form new glycerides.

Hydrocarbons in fatty matter of dolphin liver. T. Tsuchiya and A. Kato (Govt. Chem. Ind. Research Inst., Tokyo). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **53**, 305-6(1950). Although small in amount, a new saturated hydrocarbon, $C_{44}H_{90}$, m. 80-80.5° has been found in the fatty matter of the liver of the dolphin, *Dolphinus logirostus.* The name "Delphane" has been proposed for this new compound. The presence of unsaturated hydrocarbons higher than C_{40} has also been indicated. (*Chem. Abs.* **46**, 11717)

Practical hardening of fatty oil by unreduced catalyst. III. S. Ueno and S. Ito (Osaka Univ.). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **53**, 252-4(1950). The hardening of soybean oil was carried out in the presence of the catalysts consisting of the metal salts or hydroxides (Ni-Cu-Ca, Ni-Cu-Mn, Ni-Cu-Zn, Ni-Cu) at atmospheric pressure. (*Chem. Abs.* **46**, 11714)

Mechanism of fat splitting by autoclaving. I. Detection of intermediate products in coconut-oil splitting and mechanism of fat splitting. C. Yonese (Sansuiso Fat & Oil Ind. Co., Fushimi). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **53**, 313-15 (1950). Coconut oil was subjected to autoclaving at 200° in the presence of water and H. Mono- and diglycerides of lauric acid were formed as intermediate products. (*Chem. Abs.* **46**, 11713)

Mechanism of fat splitting by autoclaving. II. Detection of intermediate products in coconut-oil splitting by molecular distillation. C. Yonese (Sansuiso Fat & Oil Ind. Co., Fushimi). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **53**, 343-5(1950). The hydrolysis products of coconut oil resulting from autoclaving were molecularly distilled by means of a cyclic still system in the range of 80°-270°. It is concluded that monoglyceride and diglyceride of lauric acid or other fatty acids exist in the oil phase as the intermediate products during the course of coconut-oil splitting. (*Chem. Abs.* **46**, 11713)

Chemistry of lipides. H. J. Deuel, Jr., and R. Alfin-Slater (Univ. of S. California, Los Angeles). *Ann. Rev. Biochem.* **21**, 79-108(1952). A review is given of work published in 1951. (*Chem. Abs.* **46**, 10233)

A report on the analysis of oils obtained from palm fruits (Elaeis guineensis) grown in West Bengal. N. K. Dutta (Calcutta Chem. Co., Ltd.). *J. Proc. Inst. Chemists* (India) **23**, 158-60(1951). The characteristics of the oils from the pericarp and kernels, respectively, of the palm *Elaeis guineensis* were: sp. gr. 0.9504 at 40/40°, 0.9091 at 30/30°; acid value 35, —; saponification value 199, 240.2; iodine no. (Wijs) 55-56, 35; n^{40} 1.4568, 1.44; titer 44°, 25°. (*Chem. Abs.* **46**, 9870)

Determination of the iodine number of microgram quantities of fat. B. W. Grunbaum and P. L. Kirk (California Med. School, Berkeley). *Mikrochemie ver. Mikro-chim Acta* **39**, 268-76(1952). Special apparatus is shown and described for carrying out an analysis with 1 mg. of dry living tissue. The procedure was tested with dry liver and with linseed oil, triolein, cottonseed oil, soybean oil, and Neo-Fat 3-B. (*Chem. Abs.* **46**, 10643)

The combined lipides of diphtheria bacilli. E. M. Gubarev, A. B. Gabrilovich and F. I. Shtul'baum (Inst. Epidemiol. and Microbiol., Rostov). *Biokhimiya* **17**, 303-6(1952). By combined lipides are meant those fat-like substances which are not extracted by neutral but by acid-treated solvents. From the bacterial mass free lipides were first removed, with insignificant yield, and the material was then worked up by extraction with ethanol-ether solution (1:1) containing 1% HCl. The yield of combined lipides was 0.87% of the dry microbial mass. Combined lipides contained 66% of fatty acids of average molecular weight 272. Phosphatides and sterols were absent. In another experiment, the dry microbial mass was extracted with C_6H_6, and then with $CHCl_3$, to remove free lipides. However, it was found that after 31 extractions over a period of 1.5 yrs., the lipide content in the $CHCl_3$ extract still has not decreased. In all, 2% of lipides was extracted. The classification into free lipide and into combined lipides is therefore arbitrary. The difficulty of lipide extraction is not accounted for by adsorption. The basic N compounds of the microbes are probably in chemical combination with the lipides. (*Chem. Abs.* **46**, 10297)

The seed and fruit fats of plants. T. P. Hilditch. *Endeavour* **11**, 173-182(1952). This is a review in which the tendency of related plant species to elaborate similar mixtures of specific fatty acids in their seed glycerides is emphasized.

Hydroxylation of fatty oils. X. Hydroxylation with persulfate. Y. Ishii and T. Fujita (Tokyo Univ.). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **53**, 207-9(1950). Heating soybean oil 100, $(NH_4)_2S_2O_8$ 60, and H_2SO_4 (13-30%) 25-35 g. for 2 hrs. at 115° was suitable for hydroxylation of the oil. The properties of the product indicate that reactions other than α-glycolation also take place at the double bonds. (*Chem. Abs.* **46**, 9869)

Some applications of the formation of complex compounds between urea and fats. G. Knafo (ITERG Research Service, Paris). *Bull. means. ITERG* (Inst. tech. etudes et recherches corps gras) **6**, 323-30(1952). Oxidation of methyl oleate and methyl linoleate in the presence of ultra-violet light and below 30° yields polymerized products that could be separated from the original, because these products, unlike those of higher-temperature oxidation, did not crystallize with urea at 0°. Spectrophotometric examination of the polymers from methyl linoleate, not crystallizable with urea, indicated a diene character and the presence of some ketonic and alcoholic groups. Urea separation of ricinoleic acid which was oxidized at 95° yielded a fraction rich in the dihydroxystearic acid and a non-crystallizable part containing lactones and lactides and having OH no. near 400. Single urea precipitate of rape-oil fatty acids furnished a fraction containing 80% erucic acid; and practically pure erucic acid was obtained on reprecipitation with urea. Urea precipitation of palm-oil fatty acids in ether or alcohol leaves a solution of carotenes. Partially polymerized acids of fish oils were segregated into fractions of very different refractive indices and iodine nos. Other applications of the process concerns deacidification of glycerides, with low losses particularly with high acid oils, and fractionation of hydrocarbons and wool oil. (*Chem. Abs.* **46**, 9869)

Some organic compounds of gold with long-chain fatty acids. N. Kundu (Univ. College Sci. Tech., Calcutta). *J. Indian. Chem. Soc.* **29**, 523-4(1952). The preparation of α-aurothistearic, α-palmitic, α-myristic, and α-lauric acids from the corresponding α-bromo derivatives is described.

Theoretical reasons on intensification of fat rendering. A. Lapshin (Leningrad Inst. Refrigeration Milk Inds.). *Myasnaya Ind. S.S.S.R.* **23**, No. 3, 70-2(1952). The speed of rendering of fat is related to particle size of charge, temperature, and physical properties of the fat. Considerable reduction in time of rendering was obtained when the grinding of the raw material was at a pressure of 200-80 kg. per sq. cm. (*Chem. Abs.* **46**, 9867)

Oxidative-flavor deterioration in fats and oils. H. J. Lips (Natl. Research Labs., Ottawa). *Food in Canada* **12**, No. 6, 9-10, 12, 16(1952). Rancidity can be retarded more effectively than reversion by the stabilizers used, i.e., wheat-germ oil, tocopheral, lecithin, citric acid, gum guaiac, and metaphosphoric acid. Refined linseed oil suffers seriously from reversion. For both the detection of rancidity and reversion, organoleptic tests are still superior to more objective determinations. The most effective stabilizer was hydroquinone. Generally, citric acid exhibited no synergistic or even additive effects with other antioxidants. Off-odors could be detected when the peroxide value reached 15-25 meq./kg., but this odor was of the reverted type. True rancid odors began to appear at peroxide values over 70 meq. per kg. (*Chem. Abs.* **46**, 10644)

Extraction of tissue lipides. C. C. Lucas and J. H. Ridout. *Rev. can. biol.* **9**, 81(1950). A comparison of different methods used for the extraction of tissue lipides shows that many of the suggested procedures fail to remove phospholipides quantitatively. The efficiency of some of the more commonly used methods is presented. (*Chem. Abs.* **46**, 9644)

Setting points of mixtures of fatty acids and their methyl esters. C. Paquot and C. Galletand (Centre natl. recherche sci., Paris). *J. recherches centre natl. recherche sci., Labs. Bellevue* (Paris) **18**, 138-40(1952). The setting points of stearic acid, palmitic acid, methyl stearate, methyl palmitate, and all possible mixtures of these 4 compounds are presented graphically in a single contour-line-type diagram. (*Chem. Abs.* **46**, 10643)

The crystalline adducts of urea and fatty acids. I. Ribas and G. Gilcurbera (Univ. Santiago de Compostela, Spain). *Anales real soc. espan. fis. y quim.* **47B**, 630-48(1951). Adducts of urea and 9 fatty acids are prepared by dissolving the acid in methanol at room temperature, adding urea, heating the mixture till complete solution occurs, allowing to cool, washing the crystals with methanol, and drying. The composition of λ-hydroxystearic, ricinoleic, phellonic, phellogenic, phloionic, and phloionolic acid adducts are given. (*Chem. Abs.* **46**, 10102)

Lipides of the myelin sheath of nerve. R. J. Rossiter. *Intern. Congr. Biochem., Abstrs. of Communs. 1st Congr., Cambridge, Engl.* **1949**, 593-4. The important lipides of the myelin sheath are 2 sphingolipides, cerebroside and sphingomyelin, as well as free cholesterol. Lecithin and cephalin are less prominent. (*Chem. Abs.* **46**, 10370)

Influence of flask material on the value of the saponification number. W. Sandermann and H. Klein (Bundesanst. Forst- u. Holz-Wirtschaft, Reinbek, Hamburg, Ger.). *Fette u. Seifen* **54**, 269-70(1952). Depending on temperature, vigor of boiling, etc., all glass flasks used up varying amounts of alcoholic KOH. For accurate results, Rh-plated Cu flasks were best. (*Chem. Abs.* **46**, 10643)

Esters of pentaerythritol and fatty acids. P. Savary (Univ. Marseille). *Ann. faculte Sci. Marseille* **20**, 39-166(1950). Pentaerythritol tetraesters of C_{12}, C_{14}, C_{16}, and C_{18} saturated fatty acids prepared with p-toluenesulfonic acid as catalyst contained no polymers. Physical properties were similar to those of corresponding triglycerides. Saponification was slower and less complete. Fatty acid esterification with pentaerythritol and that with glycerol start as 2 phases; the monoesters formed dissolve in the acids and are further esterified. In comparing pentaerythritol and glycerol the action was similar but solubility was lower with pentaerythritol. Interfacial tension determinations indicated that the monoester of pentaerythritol is a superior emulsifier to that of glycerol; but, both are greatly inferior to soaps. (*Chem. Abs.* **46**, 9868)

Chlorination of lauric and stearic acids by chlorinated hydrocarbons in the presence of peroxides and by surfuryl chloride. P. Savary and P. Desnuelle (Faculte sci., Marseille). *Bull. soc. chim. France* **1952**, 213-16. Long-chain fatty acids and their glycerides are chlorinated by heating with a chlorinated hydrocarbon in the presence of BzO_2H, and by SO_2Cl_2 with or without BzO_2H. The peroxide increases the activity of SO_2Cl_2. Mixed Cl derivatives are formed, but the monochloro derivative is formed a little more rapidly, and the trichloro derivative a little less rapidly than required by the law of probability. (*Chem. Abs.* **46**, 10643)

Catalytic influence of metals on oxidation of carotene in solutions. B. G. Savinov and A. A. Svishchuk (Org. Chem. Inst., Kiev). *Ukrain. Khim. Zhur.* **16**, 57-63(1950). Autoxidation and oxidation by air or O of carotene in refined sunflower oil is catalyzed by metals; especially strong catalytic effect is shown by Cu, a lesser effect being shown by Sn and Al. Fe has no effect at 40°. Solutions in C_6H_6 are oxidized much more rapidly. Apparently not all reactions involved proceed to decomposition of the carotene molecule as such, some being concerned with changes of less profound character. (*Chem. Abs.* **46**, 10230)

Chemistry (esterification rates) of branched fatty acids. K. E. Schulte. *Angew. Chem.* **62**, 39(1950). The rate constant falls on the introduction of an α- and still more with a β-methyl group, but is unaffected by more distant methyl groups. With ethyl side chains the effect is greater for the α- than for the β-position. (*Chem. Abs.* **46**, 10644)

Evaluation of safflower seed oil in edible fat products. P. Soltoft and F. G. Dollear (So. Reg. Res. Lab., New Orleans, La.). *Oil Mill Gaz.* **57**(4), 13-15, 18(1952). Safflower seed oil processed in the usual way developed an off-flavor within 30 minutes of deodorization. Hydrogenated oils also developed this off-flavor, though more slowly.

Paulownia seed and oil. J. C. Traynard and G. A. Simeonoglou (Faculte sci., Marseille). *Bull. soc. chim. France* **1952**, 480. A *Paulownia* cultivated at the Marseille Botanical Garden yielded small black seeds 0.1 to 0.5 mm. in diameter. Analysis of the seed gave the following: moisture 10.5, nitrogenous matter 17.3, fats 41.1, cellulosic substances 9, non-N extract 15.1, ash (at 500°) 7%. The petroleum ether (60-80°) extract of the pulverized seed gave a fluid, chestnut-brown colored oil with the following indices: d^{20} 0.925; n^{20} 1.476; acid no. 2; saponification index 193; average molecular weight of fatty acids 277; iodine (Hanus) no. 125; hexabromide index 2. This is a semidrying oil, composed mostly of oleic and linoleic glycerides, and a very little linolenic, palmitic, or stearic glycerides. (*Chem. Abs.* **46**, 10302)

Degeneration of hydrogenated oils and fats during storage. II. Relative oxidation of the stearic acids prepared from animal and vegetable hardened oil. S. Ueno and Y. Shigeno (Osaka Univ.). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **53**, 228-9(1950). Color changes taking place during storage of the hardened oil and fatty acids prepared from animal and vegetable oil were studied. The differences are attributed to different minute quantities of the unhardened higher unsaturated fatty acids, oleic, linoleic, and linolenic acid remaining in the products. (*Chem. Abs.* **46**, 9867)

Practical hardening of fatty oil by the unreduced catalyst. S. Ueno, Y. Shigeno and Y. Ishiwatari (Osaka Univ.). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **53**, 218-19(1950). Catalyst coprecipitated by Na_2CO_3 from the solution containing $NiSO_4$, $CuSO_4$, and $Co(NO_3)_2$, and having the respective proportions, Cu: Ni: Co of 7: 3: 2, is active. Preliminary reduction in the hydrogen stream at 350° improves the activity of the catalyst. (*Chem. Abs.* **46**, 9869)

Sinitiro Kawamura, Abstractor

Constitution of fatty oil of Penicillium chrysogenum Q 176. Yoshirô Abe (Keiô Univ., Tokyo). *J. Oil Chemists' Soc., Japan* **1**, 132-5(1952). The dried mold bodies of this penicillin-producing microorganism (moisture 9%) contained 2.67% fatty oil, m.p. 10-12°, d^{20} 0.9175, acid no. 58.8, saponification no. 176.7, and iodine no. 89.0, consisting of fatty acids 86.2 (myristic 3.2, palmitic 10.3, stearic 4.9, *n*-tetracosanic 0.6, oleic 46.2, linoleic 17.5, C_{20-22} monoethylenic acid 3.5), unsaponifiable matter 3, and glycerol 4.1%.

Progress in the methods of fat analyses. Tetsutarô Hashimoto (Govt. Chem. Ind. Research Inst., Tokyo). *J. Oil Chemists' Soc., Japan* **1**, 142-8(1952). A review with many references, including ultraviolet absorption analysis, infrared absorption analysis, chromatography, iodine no., monoglyceride, separation by urea adducts, and peroxide value.

Statistical quality control applied to fats and oils industries. Kusuo Kawai (Nihon Yushi Co., Tokyo). *J. Oil Chemists' Soc., Japan* **1**, 149-53(1952). Applications of the sampling method are illustrated for determining iodine no. of imported beef tallow, control of the m.p. of hydrogenated oil, packaging efficiency of toilet soap, weight of soap pieces, packaging weight of the product tallow, weight of laundry soap, and active substance content of synthetic detergent.

Paper chromatography of fatty acids. Yoshiyuki Inoue and Manjirô Noda (Kyoto Univ.). *J. Oil Chemists' Soc., Japan* **1**, 136-41(1952). Summary of authors' previous reports. See *This Journal* **29**, 248, 304(1952).

Hydrogenation of linoleic acid. I. Hydrogenation of conjugated linoleic acid soap. Shigeru Kinomura and Tomotarô Tsuchiya (Govt. Chem. Ind. Research Inst., Tokyo). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **55**, 639-40(1952). Linoleic acid was isomerized with alkali to a product containing 50.88% conjugated linoleic acid, which was saponified. This soap was hydrogenated with Raney Ni at 50°, and 4 stepwise hydrogenated samples were analyzed. Conjugated dienoic acid soap was more rapidly hydrogenated than linoleic acid soap. Even when hydrogenated down to iodine no. 126.9, saturated acid soap scarcely formed, but a considerable amount of iso-oleic acid was produced.

Determination of specially adsorbed water in oils. Bin Nakajima and Shûichi Kamikawa (Sôgô Kakô Research Inst.). *J. Oil Chemists' Soc., Japan* **1**, 154-5(1952). Samples of fatty acids and oils dehydrated by heating at 130° under atmospheric pressure produced a considerable amount of gas at 1 mm. Hg vacuum. This gas was found to be water vapor. An apparatus was devised to measure such specially adsorbed water by heating under high vacuum.

Glycerides. VII. Hydrolysis of triacetin. Iseei Nakamori (Kyushu Univ., Fukuoka). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **55**, 632-3(1952). Triacetin was hydrolyzed with dilute H_2SO_4 at 60°; the course of hydrolysis was studied by determining free acid, free glycerol, and periodic acid consumption [corresponding to (free glycerin) × 2 plus α-monoacetin]. The velocity constants of hydrolytic processes from triacetin through α,α'-diacetin, α,β-diacetin, α-monoacetin, and β-monoacetin were discussed theoretically.

The reactions of fatty acid nitriles with formaldehyde and hydrazine. Ryôhei Oda and Shigeo Tanimoto (Kyoto Univ.). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **55**, 595-6(1952). Caprinitrile was reacted with formaldehyde to give hexahydro-1,3, 5-tridecanoyl-*s*-triazine, m.p. 149°, or *N,N'*-didecanoylmethylenebisamide, m.p. 120.5-121°, under different conditions. Caprinitrile condensed with hydrazine gave 2,5-dinonyl-*N*-aminotriazole, m.p. 80.5-81°.

Soybean oil-furfural countercurrent extraction. Toshio Sakurai, Hideo Fujikura, Masami Otani, and Toshio Suzuki (Tokyo Inst. Technol. and Nihon Yushi Co., Tokyo). *J. Oil Chemists' Soc. Japan* **1**, 115-18(1952). The method of Gloyer *et al.* [*Ind. Eng. Chem.* **40**, 228, 1162 (1948)] was examined with a furfural tower 200 cm. high and a naphtha tower 185 cm. high. The flow rates of furfural and soybean oil and the solvent ratio were studied. The ratio of extract phase (containing about 3% oil) to naphtha was best at 1.0/1.1. From soybean oil with iodine no. 135.6, extracted oils with iodine nos. 144-151 were obtained. Although the increase of iodine no. was small, the drying tests showed that the extracted soybean oils were improved in drying properties and were comparable with linseed oil.

Properties of continuous extraction apparatus for fatty oils. Akiyoshi Tamaoki (Chiyoda Kakô Kensetsu K. K.). *J. Oil Chemists' Soc., Japan* **1**, 111-14(1952). A review with illustrations of the Bollmann, Hildebrandt, Craun, Allis-Chalmer, Kennedy, Dismett, and Chiyoda types of continuous extraction apparatus for fatty oils.

Absorption spectra of fats and oils produced in Japan. I. Tomotarô Tsuchiya, Ryôhei Kaneko, and Shigeru Kinomura (Govt. Chem. Ind. Research Inst., Tokyo). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **55**, 605-7(1952). Absorption spectra were measured on the following vegetable oils: soybean, rape, peanut, kapok, kaya *(Torreya nucifera)*; inukaya *(Cephalotaxus drupacea)*; carrot, burdock, cayenne pepper, kuromoji-seed (*Lindera sericea*); hôsenka *(Impatiens balsamina)*; karasuuri *(Trichosanthes cucumeroides)*; and coconut oils. Their constituent fatty acids were discussed. Also their physical and chemical characteristics are given.

PATENTS

Waxy triglycerides. F. L. Jackson (Procter and Gamble Co.). *U. S. 2,615,159.* A triglyceride, in a waxy translucent alpha crystalline form, is claimed in which a primary glycerol carbon is substituted by the acyl radical of a fatty acid of 12-22 carbon atoms and the other two carbons by acetyl, propionyl, or butyryl radicals.

Mixed triglycerides. F. J. Baur (Procter and Gamble Co.). *U. S. 2,615,160.* A composition, in a waxy translucent form of great stability, is claimed. It consists of 10-90% diacetyl triglycerides (symmetrical or unsymmetrical) containing an acyl group of 12-22 carbon atoms. The remainder is made up of (a) diacetyl triglycerides differing from the aforementioned diacetyl triglycerides only in isomeric form, (b) diacetyl triglycerides differing only in chain length of the high molecular weight fatty acid from the aforementioned triglycerides, and (c) mixtures of (a) and (b).

Desolventizing of solvent-extracted solid particles. E. H. Leslie (Blaw-Knox Co.). *U. S. 2,618,560.*

Method of recovering oil from castor beans or the like. J. W. Dunning (V. D. Anderson Co.). *U. S. 2,618,643.* Castor bean meats are heated to at least 130° F. for a limited time in the presence of added moisture and are then extracted.

Method of bleaching oil with adsorbent. A. E. Bailey (Girdler Corp.). *U. S. 2,618,644.* A multi-stage oil bleaching treatment is described in which heated oil is first contacted with partially spent adsorbent and then with fresh adsorbent.

Recovery of glycerol from fermentation residues. H. M. Hodge (National Distillers Prod. Corp.). *U. S. 2,620,295.* Fermentation residue is mixed with a shreddy, vegetable fibrous absorbent material so that all the residue is taken up on the absorbent. The resultant mass is then dried, and superheated steam is passed through the dried mass at subatmospheric pressure to remove the glycerol.

Production of guanidino fatty acids. B. Vassel and W. D. Janssens (International Min. & Chem. Corp.). *U. S. 2,620,354.* A process for the preparation of guanidino substituted carboxylic acids is disclosed which comprises reacting a cyanamide with a mixture prepared by heating a halo fatty acid in a liquid medium in which ammonia and CO_2 are present, the reaction being carried out in the presence of hydroxyl ions.

Process of treating oil. B. H. Thurman (Kraft Foods Co.). *U. S. 2,621,191.* A non-reverting hydrogenated oil is produced by conditioning a refined glyceride oil by deodorization at 500-600°F., hydrogenating the conditioned oil, and then deodorizing the hydrogenated oil to produce a bland oil.

Method of deodorizing glyceride oils. B. H. Thurman (Kraft Foods Co.). *U. S. 2,621,196.* Improvements in the deodorization process are claimed which consist of deodorizing small quantities of oil for a short time with fresh steam uncontaminated by previous contact with oil at relatively high temperatures and then promptly cooling the oil.

Purification of glyceride oil. B. H. Thurman (Kraft Foods Co.). *U. S. 2,621,197.* Small quantities of oil are first deodorized at a relatively high temperature for a short time and then deodorized at a lower temperature for a longer time.

Decolorization of tallow. H. J. Passino and O. Morfit (M. W. Kellogg Co.). *U. S. 2,621,198.* The continuous decolorization of tallow with liquid propane is disclosed.

Fat emulsion and method of manufacture. D. D. Peebles and M. D. Girvin (Western Condensing Co.). *U. S. 2,622,984.* A substantially stable oil-in-water emulsion is claimed comprising 10-52% by weight of semisolid fat, 1.2-3.1% sodium caseinate, and the remainder water.

Reesterification of fatty oils. Baker Castor Oil Co. *Brit. 674,870.* A fatty oil is reacted with 7.5-9.5 moles methanol at 15-50° in the presence of an alkaline catalyst and the ester so formed reacted with a polyhydric alcohol to form a partial ester. These esters are useful as hydraulic fluids and plasticizers or may be caused to react with polybasic acids to form resins. (*Chem. Abs.* 46, 11722)

Catalyst for hydrogenation of glycerides and fatty acids. Empresa Nacional "Calvo Sotelo" de Combustibles Iiquidos y Lubricantes. *Span. 192,979.* A new Ni-Cu (3:1) catalyst not readily poisoned was developed. Crude oils may be hydrogenated with this catalyst. (*Chem. Abs.* 46, 11711)

Plastic fats by simultaneous transesterification and hydrogenation. J. M. M. Moreno, F. R. Ayerbes and J. H. Lopez. *Span. 193,123.* Vegetable and animal fats are subjected to partial hydrogenation in the presence of known catalysts at up to 250° and 10 atmosphere. At the same time 2 to 5% of catalyst for transesterification is added, preferably NaOEt, NaOMe, Sn, Zn powder, or mixtures. By adjusting the time of reaction and other factors, it is possible to attain the plasticity desired. (*Chem. Abs.* 46, 11722)

Deacidifying and decolorizing fats and oils. K. Hirano and S. Kokura. *Japan. 518('51).* Fats and oils are treated with alkali in a slight excess and 0.01-0.005% $KMnO_4$. (*Chem. Abs.* 46, 11721)

Refining fatty oils. Y. Miyama. *Japan. 519('51).* Chrysalis oil, whale oil, herring oil, or shark-liver oil is mixed with furfural or allied compounds, which combine with the impurities of the oil, and allowed to separate into 2 layers. The lower layer is cooled at —20°, and the solid deposit separated from the liquid oil to be used as a drying oil; the upper layer is steam-distilled *in vacuo* (1-3 mm.) to separate the remaining furfural and odorous substance, then heated *in vacuo* (0.001 mm.) for complete deodorization. (*Chem. Abs.* 46, 11720)

Hydrogenation of fats and oils by a mixed catalyst. S. Ueno. *Japan. 1118('51).* Soybean oil with 2% catalyst composed of $NiCO_3$: $CuCO_3$: $CaCO_3$(2:2:1), 20% water, and 30-50 atmospheres H for 1 hr. at 150-250° gives a product m.p. 58.5-61° and iodine No. 30.1; the same catalyst without water and without pressure of H at 180-220° for 2 hrs. gives an oil m.p. 50.5° and iodine No. 49.1. (*Chem. Abs.* 46, 11721)

• Biology and Nutrition

R. A. Reiners, Abstractor

The estimation of vitamin E. 2. Quantitative analyses of tocopherol mixtures by paper chromatography. F. Brown (Hannah Dairy Res. Inst., Kirkhill, Ayr). *Biochem. J.*52, 523-26 (1952. A paper chromatographic method has been developed for the quantitative estimation of the individual tocopherols. Results on corn, cottonseed, soybean, sunflower seed and wheat germ oil are presented.

Report on vitamin A in mixed feeds. M. L. Cooley (General Mills, Inc., Minneapolis, Minn.). *J. Assoc. Official Agr. Chemists* 35, 706-15(1952). Further collaborative work on the procedure for vitamin A in mixed feeds indicates that the method is satisfactory.

Report on vitamin D in poultry feed supplements. L. Friedman (Food & Drug Admin., Washington 25, D. C.). *J. Assoc. Official Chemists* 35, 715-21(1952). The reproducibility and accuracy of the present method was reevaluated. The average values found were from 99.6 to 107.2% of the true value.

Intermediates formed during the digestion of triglycerides. F. H. Mattson, J. H. Benedict, J. B. Martin and L. W. Beck (Procter & Gamble Co., Cincinnati, Ohio). *J. Nutrition* 48, 335-44(1952). Appreciable quantities of mono- and diglycerides are formed and accumulate in the lumen of the intestinal tract of rats during digestion of the fat. These glycerides constituted as much as 16 and 36%, respectively, of the total lipids. Almost all of the monoglycerides formed were initially the 2-isomer. It is likely that the diglycerides formed are of the 1, 2-configuration.

Evaluation of the biological values of the proteins in fish meals by the nitrogen retention method. B. Sure and L. Easterling (Univ. Arkansas, Fayetteville). *J. Nutrition* 48, 401-05(1952). All the fish meals were found to have high biological values.

• Drying Oils

Stuart A. Harrison, Abstractor

Comparative effect of oil acidity and resin acidity in aluminum vehicles. C. N. Beck. *Official Digest Federation Paint & Varnish Production Clubs*, No. 334, 726(1952). It was found that aluminum vehicles containing high acid linseed oils showed poor leafing. The leafing was not greatly affected by acidity due to the resin content.

Organic protective coatings for metal cans. S. L. Flugge. *Chemistry in Canada*, 4, No. 10, 31(1952). Reviews the development and use of organic coatings in can linings. Requirements of a coating material used for can coating are discussed. Types of materials in general use are described.

The peroxide induced dimerization of methyl linoleate. S. A. Harrison and D. H. Wheeler. *Minnesota Chemist*, 4, No. 5, 17 (1952). When methyl linoleate is heated to 130° with di-t-butyl peroxide a polymer is formed. The polymer is largely dimer. The dimer has four double bonds per molecule. Spectral analysis shows that there is an average of nearly one pair of conjugated double bonds per dimer molecule. One mole of dimer is formed for each mole of peroxide decomposed.

The identification of standoils, lithographic varnishes, boiled oils, and blown oils obtained from linseed oil. M. Palumbo. *Ind. vernice*, **6**, 113(1952). Distinction among standoils, lithographic varnishes, boiled oils, and blown oils by their chemical and physical constants has not been successful. For the purpose use was made of the observation that linoleates heated in the presence of oxygen produce aldehydes, while linoleates heated above 170° in the absence of oxygen do not. When the mentioned materials were tested for aldehydes all but one gave a positive test. The standoil which was heated in a CO_2 atmosphere gave a negative test; all the other materials had come in contact with oxygen while heating. (*Chem. Abs.* **46**, 11705)

Quick specific qualitative tests for determination of characteristic components in vehicles or synthetic resins. F. Petke. *Official Digest Federation Paint & Varnish Production Clubs*, No. **334**, 731(1952). Several tests for characterizing common resins and additives found in paints and varnishes are described.

Factors affecting the heat thickening of linseed oil. A. J. Seavell and J. J. Sleightholme. *Official Digest Federation Paint & Varnish Production Clubs*, No. **334**, 789(1952). A laboratory study of the significance of the following factors on the thickening of four linseed oils was made: type of vessel, access of air, blowing with inert gas, vacuum, stirring, loss in weight and temperature. The conclusions drawn were: (a) The rate of thickening is mainly influenced by access to air which tends to accelerate the thickening and darken the product. (b) The rapid thickening in an open kettle can be reproduced in a closed kettle by passing air in at a controlled rate. (c) Neither vacuum nor inert gas have any substantial effect upon the thickening rate, though they improve color. (b) In closed systems the acid values are high unless vacuum or inert gas blowing is used.

Metal alcoholates in oleaginous coating systems. F. Schlenker. *Farbe u. Lack* **58**, 351(1952). The addition of aluminum alcoholates to linseed oil, dehydrated castor oil, soybean oil, and alkyds increases their drying speed, reduces their tackiness and increases their water resistance. Aluminated alkyds dry through even in thick films and allow the application of several coatings without delay. These alkyds require 30-50% less drier, are light in color, form harder and glossier films and are better baking enamels. The aluminum alcoholates are soluble in the usual thinners and solvents and are compatible with many resins. (*Chem. Abs.* **46**, 11706)

The reaction mechanism of soybean lipoxidase. A. L. Tappel, P. D. Boyer, and W. O. Lundberg. *J. Biol. Chem.* **199**, 267 (1952). The oxidation of methyl linoleate with oxygen with lipoxidase as a catalyst was studied. Evidence is cited against a chain reaction mechanism for the catalyzed oxidation. A reaction mechanism is proposed involving the formation of a complex of linoleate, oxygen and lipoxidase, followed by a transfer of an electron and a hydrogen ion from the linoleate to the oxygen to form a biradical on the enzyme surface. The biradical then reacts to give a conjugated peroxide and the peroxide dissociates from the enzyme.

Protective coatings. K. Tator. *Chem. Eng.* **59**, No. 12, 143 (1952). A material-of-construction report describes the use of organic coatings to protect against corrosion.

Sinitiro Kawamura, Abstractor

Polyurethan resin produced from hydroxylated soybean oil reacted with diisocyanate. Hitoshi Senda, Fujio Mashio, and Ryôhei Oda (Kyoto Univ.). *J. Chem. Soc. Japan*, Ind. Chem. Sect. **55**, 609-10(1952). Soybean oil was hydroxylated with H_2O_2 and CH_3COOH. Diphenylene-4,4'-diisocyanate was reacted with hydroxylated soybean oil. The polyurethan resin formed was superior to that from castor oil, as the undesirable ring formation was difficult.

Industrial utilization of mannitol. VII. Thermopolymerizing and drying properties of mannitol esters of drying oil fatty acids. Takeo Takahashi and Hisao Takeshita (Univ. Tokyo). *J. Chem. Soc. Japan*, Ind. Chem. Section **55**, 571-3(1952). The esters prepared as reported in Part II (*This Journal*, **29**, 396 [1952]) were excellent in drying and thermopolymerizing properties. The dried films showed suitable pencil hardness and alkali-resistance.

PATENTS

Recovery of drying oils from HF-hydrocarbon complexes. R. J. Lee and P. D. May. *U. S. 2,614,132.* A hydrogen fluoride complex from the treatment of an aromatic free hydrocarbon is decomposed with an aqueous HF solution having 40-45% HF. The complex breaks up to yield an unsaturated oil which is suitable for a drying oil. One example shows an oil having a maleic anhydride number of 340, an iodine number of 419, a molecular weight of 219 and a Gardner color of 14.

Drying oil composition. H. S. Bloch and E. M. Geiser. *U. S. 2,616,863.* Fractions of the unsaturated conjunct polymer hydrocarbons obtained in the hydrogen fluoride polymerization of unsaturates for gasoline production are suitable in drying oil preparation. The fraction boiling from 160 to 400° having a diene number of 85 and a bromine number of 169 is typical of those used. A mixture of 75% of the hydrocarbon with 25 per cent of a styrenated oil dry to clear glossy films which showed good durability on weathering tests.

Coating compositions. P. E. Marling. *U. S. 2,617,776.* Vinyl esters of tall oil are blended in proportions up to 75% with styrenated alkyds to give clear flexibile films. This is especially true in the range of 70 to 75% vinyl esters. Mixtures of the same styrenated alkyd and an oil such as soybean oil give soft, opaque films on drying.

Recovery of valuable products from pentaerythritol mother liquor. W. O. Snelling. *U. S. 2,617,791.* The liquid mother liquor obtained on the production of pentaerythritol contains about 50 per cent water, 14 per cent metal formates and the balance pentaerythritol and other polyhydroxy compounds. Normally this is thrown away. It is found that it can be esterified by adding fatty acids and heating. With soybean oil fatty acids or tall oil fatty acids an oil is obtained suitable for use in varnish formulations.

Copolymers of diallyl phthalate and diallyl esters of dimerized unsaturated fatty acids. *Brit. 672,088.* Diallyl phthalate (60 to 80 parts) is copolymerized with a diallyl ester (40 to 20 parts) of a dimerized mono-olefinic or polyene C_{16} to C_{22} fatty acid, e.g., linseed, cottonseed, or soya bean oil fatty acids. The copolymers upon stoving give flexible adherent films on metal. *Brit. Abs.* **BII**, 999(1952).

Copolymerization of styrene and drying oils. S. E. Bradshaw and E. M. Evans. *Brit. 674,155.* Gels having a high solids content are obtained by copolymerizing styrene with drying oils in the presence of a mercaptan having 3-20 carbon atoms. Thus 95 parts of styrene and 5 parts of raw tung oil are heated at 138.5° in the presence of dodecyl mercaptan (.8% based on styrene). After 5.4 hours the gel contains 69% solids and 68% of the styrene is reacted. After removal of unreacted styrene and the addition of solvents and a drier, a varnish is obtained. (*Chem. Abs.* **46**, 11712)

Esters of unsaturated ethers of polyhydric alcohols. T. F. Bradley and H. Dannenberg. *Brit. 674,841.* Unsaturated monoethers of polyhydric alcohols or their polymers or copolymers are esterified with monocarboxylic acids to give film-forming agents for coating metal or wood, e.g., glycerol and monoallyl ether (32 parts) and stearic acid (140 parts) were heated at 230° in a CO_2 atmosphere for 6¾ hours and then at 2 mm. for ¼ hour to give a waxy solid with an acid value of 16.1. Other acids such as linseed, wood rosin and phthalic anhydride may be used. The allyl ether of pentaerythritol is also used. (*Chem. Abs.* **46**, 11711)

Improved drying and semidrying oils. *Dutch 69,579.* Improved oils with conjugated double bonds being only slightly polymerized and having enhanced drying power are prepared by heating drying or semidrying oils at a temperature below the usual polymerization temperature with metal catalysts containing several per cent of sulfur. An example of such a catalyst is $NiCO_3$-$NiSO_4$ on kieselguhr having 37% kieselguhr, 60% nickel and 3% sulfur bound on nickel. When linseed oil is heated with 6% of this catalyst at 180° in a stream of carbon dioxide the specific refraction rises from 0.3068 to 0.3118 in two hours; the diene number rises from 2 to 26 and the viscosity from .7 to 1.2 poises. (*Chem. Abs.* **46**, 11711)

Transformation of castor oil gel into viscous liquid. *Indian 43,149.* Castor oil gel plus water are heated to 185-195° in an autoclave for 4½ hours. The gel is converted to a liquid. After evaporating the water, this liquid (12 g.) is heated with ethylene glycol (2 g.) at 180-220° for 8 hours; an elastic mass is obtained. This product with a little turpentine and drier is applied to a glass plate and baked for two hours at 120-130°. The film is absolutely resistant to hot and cold water and dilute mineral acids. (*Chem. Abs.* **46**, 11710)

Waxes

E. F. Guttenberg, Abstractor

The absorption spectra of some components of floor-wax emulsions. Andrew Dingwall. *Proc. Chem. Specialties Mfrs. Assoc.* Dec., 1951, 122-4. Graphs are presented showing the absorption characteristics of several waxes, e.g., carnauba (yellow No. 1, bleached, and refined), prime-quality candellila, refined ouricoury, cardis 319, yellow B-20, Durez 219, crude N.C. No. 3 in isoöctane and CCl_4. The curves indicate that this method can be used for characterizing the different waxes studied. (*Chem. Abs.* **46**, 10646c)

Nature and function of definitions in the field of waxes. L. Ivanovszky. *Fette u. Seifen* **54**, 275-9(1952). It is emphasized that the definition or name should be so chosen as to classify the product. Distinction between wax, resin, fat, and plastic are discussed. (*Chem. Abs.* **46**, 10646)

Carnauba wax. Edward Taube. *Economic Botany* **6**, No. 4, 379-401(1952). A discussion of the history, source, processing, and uses of carnauba wax is presented.

PATENTS

Bright-drying finishing compound. Daniel Schoenholz and Herbert Terry (to Foster D. Snell Inc.). *U. S. 2,596,960.* A finishing compound giving a bright drying film is prepared from an emulsion of polyvinyl resin in water with a water-insoluble solvent plasticizer serving as a film-coalescing agent, an emulsified bright drying wax, such as carnauba, candelilla, montan, and mixtures thereof, a noncationic surface-active agent that is soluble in water, and a retarder of evaporation of water, such as triethanolamine. Modification to include resins, such as copal and shellac which are dispersible in hot soapy water, is noted. (*Chem. Abs.* **46**, 10640)

Wax composition. Louis M. Sesso and Anna Mae Jordan (to S. C. Johnson & Son, Inc.). *U. S. 2,598,666.* An aqueous wax composition was prepared from 3 to 14% by weight of a wax selected from the group consisting of ouricury, carnauba, beeswax, paraffin, and mixtures thereof, 3 to 30% of a material selected from the group consisting of monohydroxy aliphatic alcohols having 1-4 C atoms, acetone, dioxane, ethylene glycol monoethyl ether, ethylene glycol monomethyl ether, ethylene glycol diethyl ether and mixtures thereof, an emulsifying agent, and water, constituting the major portion by weight. (*Chem. Abs.* **46**, 10649e)

Metal-working lubricant. Edward J. Jahn (to Shell Development Co.). *U. S. 2,605,224.* A roll lubricant, which is stable, noncorrosive, and resists the washing action of water sprayed under pressure, non-staining, and easily removed from the surface, is made by adding to a H_2SO_4-treated light liquid hydrocarbon, boiling at 300-700°F., 3-10% lanolin, oleyl alcohol, olein, or a mixture thereof. Staining, as in Al rolling, can be further prevented by adding 0.01-0.10% of Ca, Mg, Ba, Sr, Cu, Zn, Co, Mn, Al, Pb naphthenates or oleates, or by adding an alkylated phenol or an organic amine, such as 2,4-dibutyl-6-methylphenol, 2,4-dimethyl-6-tert-butylphenol, 2-ethyl-4-octylphenol, etc. These lubricants can be fortified by introducing in them less than 1% of any of the following list of animal, vegetable, and marine oils, naturally occurring high molecular weight fatty acids, their esters with mono- and polyhydric alcohols, S-containing materials, such as dibenzyl disulfide, halogen-containing materials, such as chlorinated paraffin waxes, and natural or synthetic waxes. (*Chem. Abs.* **46**, 10086)

Purification of raw lanolin. Aktien-Gessellschaft der Vöslauer Kammgarn-Fabrik. *Austrian 172,073.* Raw lanolin from wool washing is purified by treating with alcoholic NH_3 and separating the resulting soaps by simultaneously adding petroleum ether and EtOH. The petroleum ether-fat solution (I) is washed with 70% EtOH. I is then dehydrated over SiO_2 gel in a continuous process. When decolorizing the petroleum ether with active charcoal in regeneration, a selective solvent for lanolin dyes (e.g., C_5H_5N) is added. (*Chem. Abs.* **46**, 10649f)

Wax alcohol with a high melting point from crude rice wax. Yasota Kawakami, Yasushi Murakoshi, Minoru Nishimura, and Ryotaro Inamura. *Japanese 2389('50).* Crude rice wax (acid no. 81.9, saponification no. 154) hydrogenated with Cu-Cr oxide two hours at 300° and 130-250 kg./sq. cm. gives a product with acid no. 0.18 and saponification no. 0.1; this is distilled in vacuo to give 26.8% higher alcohol, b.p. 150° 0.1 mm., m.p. 50°, and a residue of wax alcohol (25.5%), m.p. 79°. (*Chem. Abs.* **46**, 10649e)

Pigment and Japan wax from Rhus succedanea seeds. Shuji Mochizuki. *Japanese 3132('50).* Crushed seeds are extracted with aqueous alkali to obtain the pigment, which is recovered by acidifying the solution. The extracted seeds are pressed to obtain Japan wax. (*Chem. Abs.* **46**, 10649d)

Chemical bleaching of Japan wax. Kazutsugu Ikeda. *Japanese 42('51).* The wax is emulsified with a K soap of the wax and treated with aqueous $KMnO_4$, which is decomposed with HCl and H_2O_2. The process is repeated. (*Chem. Abs.* **46**, 10649b)

Detergents

Lenore Petchaft, Abstractor

Synthesis of tensioactive agents from derivatives of ethylene and propylene. F. Aftalion. *Chimie & Industrie* **67**, 593-6 (1952). An outline of the possibilities in France for creation of industries based on ethylene and propylene derivatives from the largely expanded petroleum industry. (*Chem. Abs.* **46**, 10646)

Electrolytes in soap making. Anon. *Soap Sanit. Chemicals.* **28**, No. 12, 95(1952). Electrolytes are nearly always present in soap, being added either directly during manufacture, or indirectly through impurities of the alkalies used in the saponification process. The main reason for using electrolytes is separation of the neat soap from the paste soap in order to break down the soap paste into neat soap and subjacent lye. The use of electrolytes is not only important for the complete salting out but also for the finishing of soap.

Toxicity of soap and detergents. Dr. Louis C. Barail. *Soap Sanit. Chemicals* **28**, No. 12, 48-51, 77(1952). The tests devised to detect the irritating and sensitizing properties of detergents are reviewed. To determine skin irritation, five tests may be used, screening methods on animals and humans, the U. S. Public Health Service patch test, eye irritation tests, skin painting test, and hand soaking tests. The internal toxicity of detergents and sanitizers can be tested by intravenous injection, by introperitoneal injection and by animal feeding tests. It has been found that detergents and sanitizers can be classified into groups according to their action on the skin as follows: detergents and keratin solvents, desiccators and anhydrides, protein precipitants and skin coagulants, hydrolytic or electrolytic materials, oxidizers, keratogenic and neoplastic agents, reducers and allergens. The toxic properties of various industrial products, anionics, nonionics, cationics, household cleaners and sanitizers are discussed.

Factors affecting the sequestering action of polyphosphates. Lawrence C. Dormuth (Pennsylvania Salt Mfg. Co., Philadelphia, Pa.). *Proc. Chem. Specialties Mfrs. Assoc.* Dec. 1951, 114-15. A limited study was made to determine to what extent several factors affected the Ca sequestering action of detergents containing polyphosphate (I), e.g. $(NaPO_3)_6$, Na tetraphosphate, $Na_5P_3O_{10}$, and $Na_4P_2O_7$. The results show that the Ca sequestering value of I varies with the composition of I and is reduced by the presence of alkalies containing Ca-precipitating ions, this reduction being increased as the concentration of the alkali increases. Of the alkalies commonly used in detergent formulations, e.g., Na_3PO_4, Na_2CO_3 and Na metasilicate, Na_3PO_4 exhibits the greatest adverse effect. As the concentration of I increases, the Ca sequestering value decreases. (*Chem. Abs.* **46**, 10646)

Some physico-chemical aspects of detergents. K. S. G. Doss (Indian Institute of Sugar Technology, Kanpur, India). *Indian Soap J.* **18**, 12-16(1952). The various factors in surface chemistry are reviewed. These include the effect of molecular structure, mechanism of wetting action, effect of salts on wetting action, adhesion tension, spreading co-efficiency and surface tension, protective colloid action and effect on electrical double layer capacity.

The laundering of wool: effect of detergents and washing methods on fabric properties. Margaret S. Furry and Elinor M. O'Brien. *Am. Dyestuff Reptr.* **41**, 763-59(1952). This study determined the effect of repeated laundering under varying washing conditions using different detergents, on shrinkage, breaking strength, elongation, color difference, and indigo carmine absorption in a lightweight wool test fabric. The six detergents selected for the study included both alkaline and non-alkaline products. The fabric was laundered by five washing methods in which agitation and temperature were varied. Under the conditions of this study, agitation was a more important factor than temperature of the wash in producing fabric changes. It was also found that temperature of the wash had a greater effect on color difference and indigo carmine absorption than had agitation of the fabric. The alkaline detergents, soaps and built synthetic detergents caused considerable color change on repeated launderings. The unbuilt synthetics caused little color change. Dye absorption values, besides indicating the extent of modification caused by alkaline detergents, showed that long soak washes may be more injurious to wool than short washing methods involving mild agitation.

The cleaning efficiency of detergents and washing methods in laundering wool. Margaret S. Furry and Elinor M. O'Brien (U. S. Dept. of Agriculture, Washington, D. C.). *Am. Dyestuff Reptr.* **41**, 861-2(1952). This paper is an evaluation of detergents and washing methods for cleaning efficiency on laundering unsoiled and soiled wool fabrics not previously treated for shrinkage control. With suitable wool test fabrics, five detergents were tested for their soil-removing and whiteness-retention by washing methods in which agitation and temperature were varied. Agitation of the test samples was for the most part, more effective than temperature of the washing in removing soil and retaining whiteness. In general, in distilled water, the unbuilt soap and unbuilt and built synthetic detergent 1 (sodium lauryl sulfate products) removed the most soil; built synthetic detergent 2 (nonionic polyglycol ester) was next; unbuilt synthetic 2 (sulfated glycol ester) was least effective of the detergents tested.

Antiseptic soaps. William S. Gump and Arthur R. Cade (Sindar Corp., New York, N. Y.). *Soap Sanit. Chemicals* **28**, No. 12, 52-3, 113-14(1952). Soaps containing various phenolic antiseptics such as p-chlorothymol, 2,4-dichloro-m-xylenol, p-chloro-m-xylenol, Santophen, etc., have been evaluated by in-vitro and in-vivo methods. There is a fairly good correlation between the results obtained by the two methods. Only G-11 and substances structurally related to it were found to show high bacteriostatic potency and effective skin-degerming action when added to soaps.

Continuous processes in the soap and detergent industry. L. Habicht (Palmolive-Binder u. Ketals, G.m.b.H., Hamburg, Ger.). *Fette u. Seifen.* **54**, 217-21(1952). A review. (*Chem. Abs.* **46**, 10646)

The growing importance of liquid detergents. J. S. Meredith. *Perfumery Essent. Oil Record* **43**, 404-7(1952). The new liquid detergents based on sodium secondary alkyl sulfates derived from petroleum and non-ionic ethylene oxide products are reviewed. Their advantages especially in dishwashing are discussed.

Foam formation in mixtures of surface-active colloids. II. Foam formation in mixtures of different soaps. A. M. Shkodin and G. P. Tikhomirova (Sci. Research Inst. Food Ind. Kharkov). *Kolloid Zhur.* **14**, 279-82(1952). Addition of 0.5-1 part of commercial Na ricinoleate (I) to 1 part of Na oleate (II) in 0.1% solution lowered the volume and duration of foam (formed by pneumatic method) to about one-half, whereas commercial Na abietate (III) had no effect on the foaminess of II. This was not due to any displacement in the adsorption layer but rather to change in the pH of the solution. The pH of 0.1% II was 8.3 and was not affected by III, whereas 5 ml. 2% I for 100 ml. 0.1% II lowered pH to 7.7. The foaminess of II solutions had a maximum between pH 9 and 10 and was almost zero at pH 7.5. When the pH of 0.1% I was increased from 6.7 to 8.4, I ceased to affect the foaminess of II. (*Chem. Abs.* **46**, 9379)

Surface-active agents and detergents. H. Stupel (Hochdorf, Switz.). *SVF Fachorgan Textilver.* **7**, 154-7, 219-24(1952). A review of the technical production of commercially available surface-active agents and detergents is given, followed by a discussion of the influence of water hardness, pH, complex phosphate, inorganic electrolytes, CMC, and optical bleaches on detergents with respect to constitution. Possible skin irritations are also discussed. (*Chem. Abs.* **46**, 10647)

The sorption of synthetic surface-active compounds by textile fibers. A. S. Weatherburn and C. H. Bayley. (National Research Council of Canada, Ottawa, Ca.). *Textile Research J.* **22**, 797-804(1952). Data are given relating to the sorption of a variety of surface-active compounds from aqueous solution by cotton, viscose rayon, acetate rayon, nylon, and wool fibers. In general, cationic compounds were found to be sorbed to the greatest extent and nonionic compounds the least, the anionic compounds occupying an intermediate position. The addition of sodium sulfate to solutions of sodium alkyl sulfate resulted in an increase in the sorption of the latter compounds in every case. The sorption of nonionic di-isobutyl cresol-ethylene oxide compounds was found to decrease slightly with increasing length of the polyethylene oxide chain. Sorption is attributed primarily to the hydrophilic-hydrophobic nature of the surface-active molecules or ions, micelles taking little part in the sorption process, although there is some evidence that positively charged micelles of cationic compounds are sorbed to a slight extent. The degree of sorption may also be influenced by superimposed effects of electrostatic interaction, electrophoretic charges, and the presence of chemically reactive groups in the fibers. Wide variations were found in the sorption capacities of the different fibers; and the arrangements of the fibers in order of increasing sorption varied with each type of surface-active compound studied.

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Surface-active agents from acidic oil of low-temperature carbonization oil. Yoshio Ishii and Mikiko Nishiyama (Univ. Tokyo). *J. Oil Chemists' Soc., Japan* **1**, 129-32(1952). Xylenol fraction, boiling at 110-116°/20 mm. Hg, was alkylated with lauryl alcohol to give dodecylxylenol, which was sulfonated and then the sulfonate was neutralized. The product showed comparable surface activity with Monsanto's soapless soap. Various fractions of acidic oil of low-temperature carbonization oil before and after dodecylation were reacted with 8-15 moles of ethylene oxide, and the products were nonionic surface-active agents.

Gelation properties of soaps. Keinosuke Satô. *J. Oil Chemists' Soc., Japan* **1**, 119-24(1952). Various soaps (experiments with Ca and Na soaps) form associated molecules with alcohols and acids (polar substances with OH or COOH group), and such associated molecules are suitable sources in forming stable gels, when the concentrations of both substances are in suitable ranges. Intermolecular attraction of soaps or fatty acids, and dipole moments of various soaps were discussed and calculated.

Methods of testing detergency. I. The conditions of preparing artificially soiled cotton cloth. 1. Akihiko Yabe and Hisako Nishimura (Ochanomizu Women's Univ., Tokyo). *J. Oil Chemists' Soc., Japan* **1**, 124-9(1952). Cotton cloth was artificially soiled in soiling liquid containing carbon black in a flat vat. The effects of the quality of carbon black, surface condition of cotton cloth, organic solvent (CCl_4 was superior to C_6H_6), and added oils (olive oil and liquid paraffin), on the degree of detergency with water and standard soap, were compared. The suitable soiling liquid consisted of a commercial carbon black (lampblack of anthracene oil or naphthalene) 0.8 g., olive oil 0.2 g., liquid paraffin 0.4 g., and CCl_4 400 g. Cotton cloth was soiled in this liquid for 1 min. at 12-15°. The average reflection rate was about 30%.

PATENTS

Tack-free alkaryl sulfonate detergent. Vincent J. Keenan (Atlantic Refining Co.). *U. S. 2,617,772.* A detergent composition is prepared comprising the water-soluble salt of an alkyl aryl sulfonic acid in which the alkyl radical contains from 8 to 15 carbon atoms, said salt being present in an amount ranging between 15% and 65% of the total weight of the detergent, and lecithin (added to improve extrudability and tackiness) in amount ranging between 20% and 70% by weight.

Detergent mixtures containing beta amino propionates. Arthur F. Isbell (General Mills, Inc.). *U. S. 2,619,467.* A detergent composition is prepared comprising a mixture of a beta-amino propionate compound having the formula $RNHCH_2CH_2COOX$ in which R is an aliphatic hydrocarbon group containing from 12 to 18 carbon atoms and X is a cation which renders the compound water-soluble, and a detergent compound having greater hydrophilic properties than the beta-amino propionate, said detergent compound being selected from the group consisting of water soluble salts of alkylaryl sulfonates in which the alkyl group contains from 1-6 carbon atoms, ethylene oxide derivatives of alkylphenol and beta-amino propionates having the above formula in which R is an aliphatic hydrocarbon group containing from 6-10 carbon atoms.

Synthetic detergent milled flakes. Robert Franklin Heald (Colgate-Palmolive-Peet Co.). *U. S. 2,619,469.* A synthetic detergent in the form of thin flakes which will not crumble and which can be milled is prepared from the water-soluble salt of an organic sulfuric acid reaction product having in its molecular structure an alkyl radical of 8 to 22 carbon atoms, about 50% to 70% of inorganic sulfate having the same cation as the organic salt, and about 1% to 5% of a softening agent from the group consisting of polyhydric alcohols, fatty acids and monoesters of polyhydric alcohols and fatty acids.