number 69.4). The unsaturated alcohols recovered from fractions III and IX had refractive indexes of 1.4587 and 1.4623 at 25°. Attempts were made to prepare the alpha napththyl-urethan and the 3,5-dinitrobenzoyl ester of the unsaturated alcohols separated from fraction III and VIII, but in each case the derivatives formed were liquid at room temperature. Portions weighing about 2 grams of fractions II, III and VII of the acetates were hydrogenated. The saturated alcohols were recovered in the usual manner and were fractionally crystallized from alcohol. Two main crops of alcohol crystals were obtained from fraction II, which melted at 67.0° and 66.0°, respectively. Levene and Taylor (J. Biol. Chem. 59, 905-921, 1924) reported that pure synthetic eicosanol melts at 65.5 to 66.5°. Attempts to separate an alcohol of lower molecular weight from this fraction were unsuccessful as were attempts to prepare an alpha-naphthyl-urethan from the alcohol remaining in solution after the separation of the eicosanol described above. The alcohols fractionally crystallized from fraction III melted rather indefinitely at 68.4° and probably consisted chiefly of eicosanol along with some dicosanol. The main crops of crystals separated from fraction VII melted at 72.2°. Levene and Taylor (loc. cit.) reported that pure synthetic dicosanol melts at 70.5-71.5°. The alcohol recovered from fraction X after saponification was found to be solid at room temperature. It was fractionally crystallized from ethyl alcohol, giving crystals which melted sharply at 42.0°. The acetyl value of this alcohol was 118.2, and its iodine number (Rosemund-Kuhnhenn) was 68. The calculated acetyl value for hexacosenol is 117.3 and the iodine number 66.8.

From the results of this investigation of the alcoholic and acidic fractions, the quantities of the constituents identified were calculated. The results are given in Table VI.

TABLE VI

	Per cent
Saturated Acids	1.64
Palmitoleic Acid	0.24
Oleic Acid	0.66
Eicosanoic Acid	30.30
Dicosanoic Acid	14.20
Eicosanol	14.60
Dicosanol	33.70

It has been shown that jojoba oil, from the seed of Simmondsia californica, is not a glyceride fat but a liquid wax, composed almost entirely of esters of high molecular weight, mono-ethylenic acids and alcohols.

The unsaturated acids consist of a mixture of eicosanoic and dicosanoic acids, along with small quantities of palmitoleic and oleic acids. The unsaturated alcohols are a mixture of eicosanol and dicosanol, along with a little hexacosanol and a small quantity of alcohols of lower molecular weight. Its composition indicates that it is somewhat similar to sperm oil.

This oil, on account of its unique composition and properties, could probably be used for several different purposes. When heated to about 300° C. for a short time it becomes colorless. For some months two chemists have used it in place of sulphuric acid in their melting point apparatus.

It would appear useful as an ingredient in prepared waxes, as a lubricant and for the treatment of leather. The sulphonated product might also have some industrial use.

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Oils and Fats

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Fat-extraction Apparatus for Feeds. C. E. Weakley, Jr. *Ind. & Eng. Chem.* **28**, 388-389. A description.

Oil Extraction by the Diffusion Process. A. Pfänder. *Fette und Seifen* **43**, 137-9 (1936).—Steam, power and solvent economy are discussed.

Reducing the Oil Content in Cottonseed Press Cake. A. Goldovskiĭ. *Masloboĭno Zhirovoe Delo* **12**, 227-32 (1936).—The successive steps in the extn. of cottonseed oil, such as rolling, roasting and pressing, are discussed. The efficiency of oil extn. depends primarily on the degree of rupture of cell walls. Contrary to American investigators (Thornton, cf. *C. A.* **25**, 1402, 1403, and Woolrich and Carpenter, *C. A.* **28**, 225^1, 3258^8) the breaking down of cells is chiefly effected in rolling of seeds and not during roasting. In the roasting the rupture of cell walls is completed. (*Chem. Abs.*)

Antioxidants and the Autoxidation of Fats. VI. Inhibitols. H. S. Olcott and H. A. Mattill. *J. Amer. Chem. Soc.* **58**, 1627-1630 (1936).—The unsaponifiable lipid fractions of many vegetables and vegetable oils contain compounds which are active antioxidants to lard and which are here named inhibitols. The inhibitols from wheat germ and cottonseed oils may be concentrated by processes of crystallization and distillation similar to those used for obtaining vitamin E concentrates from which the inhibitols have not been separated. The preparation of inhibitol concentrates from palm oil is aided by the destruction by hydrogenation of the accompanying pro-oxygenic carotenoids. Inhibitol concentrates are transparent oils which have resisted crystallization. Some chemical and physical properties are outlined. The inhibitols are destroyed by reagents which attack a hydroxyl group or saturate a double bond. Inactive esters may be hydrolyzed to regenerate the activity. They are resistant to hydrogenation. Chlorine or bromine addition products can be reactivated with zinc and hydrochloric acid. The concentrates have a strong absorption band at 2940 A. roughly proportional to their activity. The inhibitol concentrates have been assayed by an oxygen absorption method. They are shown to be much more effective antioxidants in lard than any edible compounds which have been suggested for use as commercial antioxidants. The inhibitols protect purified fatty acids and esters but do not protect the vegetable oils from which they are obtained.

Action of Microorganisms on Fat. I. Hydrolysis of Beef Fat by Some Bacteria and Yeasts Tolerating Low Temperatures. J. R. Vickery. *J. Council Sci. Ind. Research* **9**, 107-12 (1936).—The lipolytic activity of several strains of Achromobacter and Pseudomonas, and also of asporagenous yeasts, all of which were capable of comparatively vigorous growth on beef fatty tissue store at —1°, was tested on a synthetic medium

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contg. 80 per cent beef fat in water-in-oil emulsion. All the strains of yeasts and Pseudomonas tested were responsible for appreciable lipolysis, but only 1 strain of Achromobacter had this power to a slight degree. The contention that the level of free acidity of beef fat may be used as an index of spoilage occurring in beef fatty tissues during storage could not be confirmed as applying generally. Where Achromobacter slime is present on storage fatty tissues there is little lipolysis even where off-flavors and off-odors have developed. (*Chem. Abs.*)

Animal and Vegetable Oils. Viscosity-Temperature Characteristics. A. R. Rescorla and F. L. Carnahan. *Ind. & Eng. Chem.* **28**, 1212-1213.—Viscosities in centistokes at 100 and 210° F. were determined for some thirty animal and vegetable oils of various types. Other properties of the samples are listed. In general these products show high viscosity indices and low gravity indices.

The Differentiation of Refined and Unrefined Rendered Fats. J. F. Reich and C. P. van Dijk. *Chem. Weekblad* **33**, 501-2 (1936).—Thirty g. of the fat is shaken for 5 min. with 100 cc. of hot cond. water. After cooling for 30 min., the ext. is filtered and its cond. is measured on a Kohlrausch bridge. With H_2O of cond. $\times 10^6$ of about 2, the exts. of unrefined and refined fats average around 19 and 4, resp. Ashing of the fat and extn. of the ashes give about the same cond. (*Chem. Abs.*)

Comparing Various Iodine Number Determination Methods. N. N. Godbole. *Fette u. Seifen*, **43**, 155 (1936).—Data from tests on various oils are tabulated. Conclusions: Hubl method requires too much time. In the Wijs method the halogens are too active and some substitution occurs. The methods of Hanus and Kaufmann give results which agree with each other and are not appreciably affected by substitution when a longer time is allowed for the halogens to react. With the Kaufmann method at room temps. of 30-36°, the I uptake is completed at 30 min. with a low I no. oil and at 45 min. with the high I no. oils.

A New Measuring Apparatus for Hydrogen Value of Fats and Oils. Tsutomu Maruyama. *J. Agr. Chem. Soc. Japan* **12**, 395-400 (1936).—A new app. for measuring H value consists of a buret, a reaction bottle and a H_2 gas generator. The sample was made to react with 10 cc. of alc. and 0.0263 g. of Pt black in H_2. The H_2 gas was purified by passing through Cu wire gauze heated at 800° to remove O and As. A correction formula was given. (*Chem. Abs.*)

A Simple Method for the Determining of Oil in Sulfonated Oil. D. Burton and C. F. Robertshaw. *Fette u. Seifen* **43**, 152-5 (1936).—55 cc. CCl_4, 100 cc. distd. H_2O and 50 cc. HCl (sp. gr. 1.19) are placed in a separatory funnel (always add the CCl_4 first). A 5 gr. sample of sulfonated oil is now poured into the funnel and stirred well. Shake well about 40 times; let stand 30 min. and again shake. Run the CCl_4 layer into tared container, wash the funnel contents with small portions of CCl_4, adding all washings to the tared container. The CCl_4 is evaporated off on a steam bath and the remainder dried in a 100° drying oven for 20 min., cooled and weighed.

A New Method for the Estimation of Rape or Mustard-Seed Oils, and for the Detection of Oils Used to Adulterate Them. S. Neogi. *Analyst* **61**, 597-601. U. suggests that the percent erucic acid be used as a new constant to characterize rape and mustard-seed oils. The deviations of this value from normal with small quantities of adulterants are very marked, while the other values, *i.e.*, sapon. no., I no., may be near the standard limits. Procedure for method is presented.

The Influence of Vitamins A, B or D, Anemia or Fasting Upon the Rate of Fat Absorption in the Rat. M. H. Irwin, H. Steenbock and A. R. Kemmerer. *J. Nutr.* **12** (Oct. 1936), 357-364.—Avitaminotic A, B or D animals absorb fat less rapidly than normal animals, which effect is not specific for any one of the vitamins tested. The addition of vitamins A, B or D to a fat had no effect upon its rate of absorption by normal rats. Anemic animals, those fasted 6 days or those fed a limited quantity of a complete diet, also absorbed fat less rapidly than controls. As the experiments on anemia and semi-starvation showed that the rate of fat absorption was influenced by the nutritional state of the animal, it cannot be concluded that the vitamin deficiency experiments revealed any specific effects of vitamins on fat absorption.

The Influence of Certain Hydrotropic and Other Substances Upon Fat Absorption. M. H. Irwin, J. Weber and H. Steenbock. *J. Nutr.* **12** (Oct. 1936), 365-371.—The influence of water, bilo salts, sodium benzoate, ethyl alcohol, peptone, sucrose, KCl, $CaCl_2$, NaH_2PO_4, glycerol and sodium glycerophosphate on the rate of absorption of fats has been determined. In general the feeding of small amts. of any one of these substances had little or no effect, but larger amts. invariably decreased the rate of fat absorption.

Cholesterol Feeding and Fat Metabolism. R. P. Cook. *Biochem. J.* **30**, 1630-6 (1936).—The growth curves show that cholesterol feeding of rats maintained on synthetic diet has a deleterious effect. This action is found only when the diet contains fat. On fat free diets there is no effect either beneficial or otherwise; this has been shown to be due to absence of absorption of cholesterol. On a fat and cholesterol contg. diet the growth rate is decreased and fatty liver develops. On a normal stock diet cholesterol is without action. The action of cholesterol in synthetic diet appears in part to be in mobilizing the fat in the liver.

Respiration and Ketogenesis in the "Cholesterol" Fatty Liver. R. P. Cook and W. L. Edson. *Biochem. J.* **30**, 1637-9 (1936). Rats which received the stock diet and the fat-free diet failed to develop fatty infiltration in spite of cholesterol feeding. The livers of these animals gave a normal respiration. The liver tissue of rats fed on the normal synthetic diet plus cholesterol for a long period had a significantly lower respiration than controls.

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Change in Fat of Hibernating Bat. Hans Mann. *Fette u. Seifen* **43,** 155-6 (1936). Analyses were made on bats at the beginning of hibernation and bats after about 100 days of hibernation. The results from male and female bats are tabulated. The following points were noticed. The per cent of fat remaining in the female was larger than that in the male. The m.p. of fat and unsapon. increases; I no., sapon. no. and ester no. decrease and the acid no. remains practically the same during hibernation. All changes are greater in the male animals.

The Preparation of Nickel-Kieselguhr Catalyst. W. Normann. *Fette u. Seifen* **43,** 133-5 (1936). Work of Moschkin and Kasokowa on ppt. Ni for catalyst with $NaHCO_3$ was tested. N. finds considerably lower temp. necessary for $NaHCO_3$ ppt. catalyst, but refutes the claim that washing out of sulfates is unnecessary. The superiority of bicarbonate over the carbonate ppt. catalyst was not demonstrated.

Refining of "Dark" Oils for Hydrogenation. I. Zubov. *Masloboĭno Zhirovoe Delo* **12,** 248-9 (1936).—The difficulties of hydrogenation of "dark" oils were entirely eliminated in the lab. and factory production by the methods of refining. Linseed oil was neutralized with 10-12° Bé. NaOH. After washing with hot water, drying, stirring in the presence of 1 per cent askonite with an air current for 20-30 min. and filtering, the oil was hydrogenated as usual, giving fat mixts., m. 45-8°. Control hydrogenation without refining with askonite gave nonsolidifying fat mixts. Because askonite is commercially unavailable, other methods of refining were developed. A mixt. of 7.5 t. of dark linseed oil at 70° was stirred with 100 l. of 5 per cent H_2SO_4 for about 1 hr. After settling and withdrawing of the sediment, the oil was treated first with 12° Bé. and then with 8° Bé. NaOH, washed, dried, reworked with 0.5 per cent kieselguhr and filtered. The oil was hydrogenated, giving fat mixts. m. 59.4-60.5°. Rapeseed oil treated as above with askonite gave neg. results. Rapeseed oil, acidity 2.3 per cent, I no. 107.3, refined with H_2SO_4 as above, gave fat mixts., m. 38.3-46.4°. Since the treatment of rapeseed oil with NaOH gave a fine, difficultly settling soapstock, the hydration was modified with equally good results by using water in place of dil. H_2SO_4. The oil at 35-50° was stirred with 3 per cent water for 40-50 min. and then treated as above. (*Chem. Abs.*)

The Power of Kieselguhr to Take Up Oil. Franz Krczil and Herbert Wejroch. *Seifensieder-Ztg.* **63,** 352-4 (1936).—The abilities of various kieselguhr prepns. (Filter-Cel, etc.) to retain oil were tested by detg. (1) the amt. of oil taken up before the sample appeared wet and (2) the increase in wt. of the sample when used on a suction filter for oil. The results were calcd. as g. of oil retained per 10-g. kieselguhr sample and varied from 19.15 to 17.10 (Method 1) and from 16.95 to 11.2 (Method 2). Samples, which took up larger amts. of peanut oil, also took up larger amts. of soybean oil. The kieselguhrs giving most rapid filtration retained the smallest amts. of oil. (*Chem. Abs.*)

PATENTS

Apparatus for Deodorizing Oil and Fat. H. Lambert. German 630,159 Cl. 23a, Gr. 3. The app. has special means for stirring and injecting deodorization vapor or gas.

Bleaching of Fatty Acids, Oils and Fats. L. Mellerish-Jackson. British 444,813. Fat acids, oils and fats are bleached with alkali hypochlorites by adding successive increments of the reagent soln. to the warm charge, allowing it to cool and settle after each addn.; after sufficient bleaching has occurred the charge is again heated and allowed to cool and settle.

Fatty Acid Distillation. R. H. Potts and J. E. McKee (Armour & Co.). U. S. 2,054,096. Structural features of still are presented.

Treatment of Fatty Animal Raw Material, Particularly Whale Blubber, in Pressure Steam Digesters. H. P. Christensen. British 444,619. Fatty animal material, particularly whale flesh after being ground, is supplied to digesters under pressure, the introduction being under pressure by pumping same through a non-return valve.

Lowering the Oil Content of Castor-Oil and Sunflower-Oil Press Cakes. V. G. Leites. Russ. 41,100, Jan. 31, 1935. The oil content of the press cakes is lowered, and their cohesion is increased by first heating to 40° and then adding 2 per cent of electrolyte (NaOH, ammoniacal Na_3PO_4, and ammoniacal NaF). (*Chem. Abs.*)

Emulsification Process. R. Hueter (Deutsche Hydrierwerke Aktiengesellschaft). U. S. 2,054,257. Alkyl piperidinium salts are used as emulsifiers.

Margarine. Akt. fur Medzinische Produkte. German 628,250 Cl. 53h 1.03. Addn. to 615,025. Instead of adding vitamin, lecithin and cholesterin mixts., an oil is used which has been extd. with alc. and still contains the vitamin lecithins and cholesterols.

Hydrocarbons and Alcohols from Fats. Ger. 629,244. Cl. 12o Gr. 1.01. Deutsche Hydrierwerke A.-G. (Walter Schrauth). Prepn. of materials of hydrocarbon or alcohol character from esters of high mol. wt. acid by hydrogenation using hydrogen at 60 to 300 atm. pressures and temps. above 250°.

Oxidized Oil Production. George W. Seymour (to Camille Dreyfus). Can. 360,252, Sept. 1, 1936. Oil contg., as catalyst, 4 per cent whale oil based on the wt. of the oil to be oxidized, is sprayed into a stagnant atm. of a gas contg. O at 120° and a pressure of 48-50 lb./sq. in. An app. is described. (*Chem. Abs.*)

Conversion Products of Fatty Oils. I. G. Farbenind. A.-G. (Georg Knöffler, inventor). Ger. 632,478, July 9, 1936 (Cl. 12*o*. 21). Fatty acid glycerides contg. OH groups, particularly castor oil, are heated with a bleaching earth to a temp. at which the oils are normally stable, e.g., to 140° *in vacuo*. Dehydration products which have drying properties and are sol. in mineral oils are obtained. Examples are given. (*Chem. Abs.*)