ABSTRACTS . . . . R. A. REINERS, Editor

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• Fats and Oils

Preparation of methyl esters of fatty acids for gas-liquid chromatography. Marie L. Vorbeck, L. R. Mattick, F. A. Lee, and C. S. Pederson (N. Y. State Agri. Exper. Station, Cornell Univ., Geneva, N. Y.). *Anal. Chem.* 33, 1512–14 (1961). A quantitative comparison of four methods for the preparation of methyl esters of fatty acids for gas chromatography has been made. The reagents used were: diazomethane, methanol-hydrochloric acid with sublimation, methanol-hydrochloric acid on ion exchange resin, and methanol-boron trifluoride. The data show that the choice of a methylation procedure depends on the nature and composition of the sample. A method is presented for the analysis of complex mixtures containing low and high molecular weight fatty acids. The standard deviation of the method is ±0.72%.

Composition of Argentine cottonseed oils. P. Cattaneo (Facultad de Ciencias, Universidad de Buenos Aires, Buenos Aires, Argentina), G. N. C. Karman, N. C. Costanzo, M. H. Bertoni, and J. M. Canal. *Revista Argentina de Grasas y Aceites* 3, 7–15 (1961). A total of 39 cottonseed oils, grown in various parts of Argentina, were analyzed for fatty acid composition, iodine value, and tocopherol content. Variations in composition with area of origin, climate, and botanical variety are discussed.

A method for measuring the amount of stearine in cottonseed oil. R. Aldo Macchi and F. Crespo (Centro de Investigacion de Grasas y Aceites, Chile 1192, Buenos Aires, Argentina). *Revista Argentina de Grasas y Aceites* 3, 3–6 (1961). To measure the quantity of stearine in cottonseed oil, 5 ml of the oil was mixed with 10 ml of hexane and the mixture placed at 0 C for 20 hours. The formation of a precipitate indicated that the oil contained more than 5% stearine.

The bitter glucoside in olives. I. Preliminary note. A. Vasquez, M. L. Janer, and F. Gonzalez (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites* 12, 19–22 (1961). "Oleuropeina" (a bitter glucoside of unknown structure in olives) was isolated and characterized: M. P. = 79–82 C. $[\alpha] = -138°$, ultraviolet spectrum. Results agreed with previous workers, but paper chromatography showed that the glucoside was actually a mixture of three different substances.

Laboratory tests for bleaching earths. R. de Castro (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites* 12, 23–32 (1961). A review of laboratory tests for evaluating the quality and efficiency of bleaching earths.

Sunflower. I. Mizuno and A. Guerrero (Facultad de Agronomia y Veterinaria, Universidad de Buenos Aires, Buenos Aires, Argentina). *Revista Argentina de Grasas y Aceites* 3, 39–44 (1961). A review of the various products produced from sunflower seed.

Partition chromatography of short chain fatty acids. A. L. Gordillo and A. L. Montes (Facultad de Ciencias, Universidad de Buenos Aires, Buenos Aires, Argentina). *Revista Argentina de Grasas y Aceites* 3, 31–38 (1961). A method for separating formic through capric acids by means of column partition chromatography is described. Silicic acid was used as a support for a propylene glycol stationary phase. Acids were eluted with mixtures of *n*-butanol and petroleum ether.

Measuring the fatty acid content of soapstock. H. E. Bastanski (Gobecia, S. A., San Isidro, Buenos Aires, Argentina). *Revista Argentina de Grasas y Aceites* 3, 27–29 (1961). To measure the fatty acid content of soapstock, a 5-gram sample was dissolved in ether-alcohol, acidulated with a known amount of 1 *N* HCl, and then titrated to a bromphenol blue endpoint with 1 *N* NaOH. The solution was then titrated to a phenolphthalein endpoint with further 1 *N* NaOH. From this titration data, the amounts of fatty acid occurring free and combined as soap could be determined.

Experimental oil mill of the Instituto de la Grasa. J. M. Martinez (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites* 12, 1–9 (1961). Various commercial machines for the extraction of olive oil were evaluated: an expeller, 3 types of centrifuges, and one mill-mixer combination. Performance data for each machine is given.

Refining oils by esterification of free fatty acid with glycerol. III. Laboratory and pilot plant tests. J. Ruiz and F. Ramos (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites* 12, 16–18 (1961). Olive oil fatty acids and high FFA olive oils were esterified with glycerol to reduce FFA content. The reaction was carried out for 5 hours at 195 C, 10 mm Hg, with 0.2% Zn catalyst. Both laboratory and pilot plant tests produced an oil which, after normal refining, bleaching, and deodorization, was approximately equivalent to normal refined olive oil.

Determination of isolated trans unsaturation by infrared spectrophotometry. D. Firestone and Maria DeLa Luz Villadelmar (Division of Food, Food and Drug Administration, Wash. 25, D. C.). *J. Assoc. Offic. Agr. Chemists* 44, 459–65 (1961). A study was made of the A.O.C.S. tentative method for isolated *trans* isomers by infrared spectrophotometry. The findings of Kaufman and coworkers, who observed that triglycerides yield high results due to absorption at 10.3 microns were verified. However, it was found that corrections can be applied for triglyceride absorption. Determinations were made of the precision attainable with the method, and results obtained with three instruments were compared. The *trans* content of a number of fats and oils was determined. No *trans* components were found in pork fat, horse fat, and a number of vegetable oils, but small amounts were found in beef fat and butter oil. An estimation was made of the amount of partially hydrogenated stabilizer added to a commercial peanut butter. It was recommended that additional applications of infrared spectrophotometry to the analysis of fats and oils be investigated and that collaborative work on the method be deferred until additional work has been completed on applications of the procedure, and until the A.O.C.S. has approved the procedure in its final form.

Crude fat in expanded dog food. H. H. Hoffman (Florida Dept. of Agric., Tallahassee, Fla.). *J. Assoc. Offic. Agr. Chemists* 44, 556–58 (1961). During the past year, a manufacturer of dog food claimed the AOAC method does not correctly measure the crude fat of expanded dog food. He requested that the official method for crude fat in baked dog food (AOAC 22.035) be amended to include the expanded food. This problem was then studied collaboratively by sending prepared samples of typical processed dog food to eleven collaborators. Each was asked to determine moisture by two official methods and to determine fat by the official method (22.033) and by the method to be amended to include expanded dog food (22.035). Upon examining the reported results statistically, it was found that there was a significant drop in the fat extractable by ethyl ether after expansion in the 22.033 method, but none as measured by 22.035. Thus it has been requested to amend 22.035 to cover expanded dog food. It was also recommended that the method 22.033 be studied to see if it should be replaced as a fat procedure for usual feed ingredients and mixtures.

A note on a rapid method for the determination of lipids in brewing adjunct cereals. G. J. Haas and A. I. Fleischman (Desitin Chemical Company, Providence, R. I.). *Cereal Chem.* 38, 198–202 (1961). A rapid method has been reported which reduced the extraction time from two hours to 2.5 minutes without the pregrinding of the sample as is the case when the official 2-hour Soxhlet extraction is performed. This new method requires mixing the sample with solvent in a Servall Omnimixer for 2.5 minutes. The extract is gravity-filtered into a tared flask, solvent evaporated, dried at 103–105 C for 75 minutes, cooled and weighed. Complete extraction was performed in 2.5 minutes and in some cases within one minute. This method was compared with two other methods and no significant difference could be obtained at the 1% level.

Paper chromatography of fats: Qualitative and quantitative paper chromatographic analysis of wax acids. H. P. Kaufmann and B. Das (Inst. for Ind. Fettforsch, Munster). *Fette Seifen Anstrichmittel* 63, 614–616 (1961). A procedure for the paper chromatographic separation of even numbered wax acids is described, acids up to 36 carbon atoms were identified. Paper was impregnated with 10% of a petroleum fraction (b 230 C) in petroleum ether, and dried. The chromatograms were developed with a mixture of isopropanol (99.5%), ethanol (96%), acetic acid (100%), and water in ratios of 8:2.5:4:1.25, saturated with the reversed phase material. The chromatograms were developed at 42–42.5 F for about 14 hours. Using this method, the acids of carnauba, montan, and beeswax were determined. The percentages were respectively for stearic, 3.3, —, —; arachidic, 9.9, —, 0.8; docosanoic, 9.3, 2.2, 1.2; tetracosanoic, 34.7, 8.3, 16.3; hexacosanoic, 15.8, 16.5, 6.4; octacosanoic, 23.1, 30.5, 6.0; triacontanoic, 3.9, 26.2, 4.7; dotriacontanoic, —, 12.0, 2.7; tetratriacontanoic, —, 4.3, 2.9.

ACTION OF AMINO ACIDS IN OXIDATION OF FATS. R. Marcuse (Schwedischen Inst. Konservierungforsch, Göteborg). *Fette Seifen Anstrichmittel* 63, 547–549 (1961). A series of amino acids: methionine, alanine, proline, valine, glycine, asparaginine, serine, phenylalanine, arginine, lysine, threonine, tryptophane, and histidine, corresponding to the free amino acids in fish fleshwere investigated with respect to their action on the oxidation of hrring oil emulsions by measuring oxygen uptake by the Warburg method. All of the above amino acids with the exception of cysteine were able to decrease the oxidation of herring oil in low concentrations. This influence increased in the presence of phosphate. Cysteine acted as a pro-oxidant in the system studied.

PRO- AND ANTIOXIDANTS AND FATS. III NATURALLY OCCURRING ANTIOXIDANTS. H. P. Kaufmann and H. Garloff (Deut. Inst. Fettforsch, Münster). *Fette Seifen Anstrichmittel* 63, 509–519 (1961). Primarily a review which deals with the knowledge of the system of unsaturated fatty acids—sulfhydryl compounds; unsaturated acids—ascorbic acid, vitamin A, and carotenoids; unsaturated acids—vitamin B and iron porphyrin compounds. Some research is reported and deals with the effects of various materials as antioxidants for potassium linolenate in a phosphate buffer. Some of these compounds are: adrenalin and noradrenalin bitartrates, 3- hydroxy-tyramine hydrochloride, serotonin creatininsulfate, dihydroxyphenylalanine, and cytochrome C.

SEPARATION OF DOG SERUM LIPOPROTEINS BY ULTRACENTRIFUGATION, DEXTRAN SULFATE PRECIPITATION AND PAPER ELECTROPHORESIS. Oshio Sakagami and D. B. Silversmit (Div. of Physiology, Univ. of Tenn., Memphis 3, Tenn.). *J. Lipid Research* 2, 271–277 (1961). The separation of dog serum lipoproteins by ultracentrifugation at a density of 1.063 is hindered by the failure of the high density fraction to accumulate in the bottom of the centrifuge tube, which interferes with the quantitative recovery of pure low density lipoproteins. Dextran sulfate precipitation was suitable for the quantitative separation of β-lipoproteins. The dextran sulfate precipitate of β-lipoprotein was shown to be free of α-lipoprotein by paper electrophoresis.

DIELS-ALDER REACTION IN THE FIELD OF FATS. H. P. Kaufmann, H. Gruber and H. Brüning (Deut. Inst. Fettforsch.). *Fette Seifen Anstrichmittel* 63, 633–637 (1961). The preparation of the Diels-Alder adducts of sorbic acid methyl ester with *p*-benzoquinine, 1,4-naphthoquinone and acrolein, of β-elaeostearate with acrylic acid, crotonaldehyde, ethyl crotonate, and diethyl acetylene dicarboxylate and of β-licanic acid methyl ester with acrolein, acrylic acid, crotonaldehyde, ethyl crotonate, and methyl vinyl ketone is described.

PREPARATION OF CARBONIC ACID ESTERS OF TERTIARY ALCOHOLS. J. Balter and O. Wechmann (Lab. Fettehemie, Brinkman and Mergell, Gmb.H., Hamburg). *Fette, Seifen, Anstrichmittel* 63, 601–603 (1961). A new procedure for the preparation of the esters of tertiary alcohols consists of quantitative alcoholysis of fatty acid esters of primary or secondary alcohols with tertiary alcohols. Alkali-tertiary alcoholates serve as catalysts which are either introduced or produced *in situ*. The following esters were prepared: t-butylcaprylate, laurate, and stearate, di-t-amyl sebacate, di-t-butylterephthalate, and methyl t-butylterephthalate.

THE PROGRESS OF HYDROGENATION OF UNSATURATED FATTY ACID ESTER WITH HYDRAZINE. K. Schilling (Danish Fat Res. Inst., Copenhagen). *Fette Seifen Anstrichmittel* 63, 421–425 (1961). The hydrogenation of methyl linoleate with hydrazine hydrate was investigated. Reaction products were separated by countercurrent fractionation of the mercury adducts. In the case of methyl linoleate, it was shown that this was a suitable method for the preparation of definite esters, since the position and configuration of the remaining double bonds remain unchanged.

CATALYTIC ALKALI ISOMERIZATION OF POLYENE COMPOUNDS. I. A NEW PROCEDURE FOR CONVERSION OF NONCONJUGATED INTO CONJUGATED FATTY ACIDS. J. Balter, F. Weyhorst, and O. Wechmann (Lab. Fettchemie, Brinkman and Mergell, Gmb.H., Hamburg). *Fette, Seifen, Anstrichmittel* 63, 413–420 (1961). An exhaustive theoretical treatment of alkali isomerization is presented followed by several examples in which time, temperature, and yields of product are given. Esters of linoleate, linolenate and other fats were examined.

FATTY ACIDS IN ELEVEN BRANDS OF MARGARINE. Rosemarie Ostwald (Univ. of California, Berkeley). *J. Am. Dietet. Assoc.* 39, 313–16 (1961). The fatty acid composition of eleven commercial margarines has been determined. The linoleic acid content varied from 8 to 34 gm. per 100 gm. of margarine. The author recommends that the labels of margarines give a statement of their fatty acid composition.

EMULSIFIED WAX COMPOSITIONS. L. B. Rockland. *U. S. 3,000,753.* A method of preparing a decorative candle consists of the following steps: (1) coating the candle with a layer of a fluid, high solids emulsified wax composition which is a mixture of 35%–60% by weight wax, at least two nonpolar surface active agents (10%–5%) and water (60%–30%); (2) removing the aqueous phase at ambient temperature to produce a dry wax layer on the candle; (3) applying a second layer of the emulsified wax composition; (4) applying decorative material to the second layer prior to drying so that the second layer acts as an adhesive base for the decorative materials; and (5) drying the second layer. One of the nonpolar surface active agents should be a polyoxyethylene derivative of sorbitan esters of fatty acids having from 12 to 18 carbon atoms; the other should be a sorbitan ester of fatty acids of 12 to 18 carbons.

STABILIZER FOR EDIBLE FATS. A. W. Williams, R. H. Beckman, and D. E. Mook (The Borden Co.). *U. S. 3,001,878.* A dry mixture is formed of 0.2–25 parts by weight of protein, 0.2–50 parts of sugar, and 100 parts of a fatty glyceride. The mixture is then heated in vacuo at about 300–500 F in a current of steam so as to remove heat volatilizable materials and cause charring of the mixture. A fat soluble reaction product is formed which dissolves in the fatty glyceride. The resulting solution of the stabilizer in the glyceride is then filtered from the remaining fat-insoluble material.

IMITATION ICE CREAM CONTAINING HIGHLY UNSATURATED VEGETABLE OIL. R. M. Peat (Frozen Dessert Co.). *U. S. 3,003,882.* A frozen stabilized dessert composition contains (a) 2–22% by weight of a vegetable oil having a pour point lower than the freezing point of water and an unsaturated fatty acid content of more than 70%; (b) 2–15% of nonfat milk solids or non-milk protein solids; (c) 10–25% of sugar solids other than lactose of non-fat milk solids; and (d) 45–75% water.

WATER-SOLUBLE VEGETABLE OIL STEROL DERIVATIVES. M. H. Stern (Eastman Kodak Co.). *U. S. 3,004,043.* The described derivative is a water-soluble polyethylene glycol ester of a phytosteryl acid ester of a dicarboxylic acid having the formula (S)OOCRCOO(PEG) in which (S) is a phytosterol moiety (sitosterol, stigmasterol, or campesterol) joined to the dicarboxylic acid at the 3-position of the steroid nucleus, R is an alkylene radical having 2 to 6 carbon atoms, and (PEG) is a polyethylene glycol moiety having a molecular weight of 400 to 6000.

METHOD FOR PREVENTING COLOR REVERSION OF FATTY MATERIAL. J. W. Copenhaver, J. Kwiatak, and H. R. Davis, Jr. (M. W. Kellogg Co.). *U. S. 3,004,048.* The fatty material is treated with 0.005 to 0.3% of at least one member of a group of mercaptans consisting of 2-mercaptoethanol, thiophenol, thiocresol, benzyl mercaptan, or their homologs and between 0.005 and 0.3% of orthophosphoric acid. Residual mercaptans and acid are washed out with alkali solution in the soap-making process.

REFINING OF FATTY OILS. A. U. Ayres (Sharples Corp.). *U. S. 3,004,050.* Aqueous alkaline reagent is mixed with the oil in a concentration and quantity such that upon subjecting the reaction mass to centrifugation, three layers are formed. The lightest layer is oil, the next heavier layer is reaction products mixed with reagent, and the heaviest layer is reagent. In the zone of centrifugation a balanced relationship is maintained between the oil layer and the reaction product layer dependent upon their specific gravities. The reagent layer is discharged outwardly from the periphery of the zone of centrifugation as rapidly as it is formed.

Method of preparing an animal feed of high fat content. D. E. Rothschild. *U. S. 3,004,852.* Cooked, dehydrated quantities of meat, bones, fat, muscles and sinews are deposited in a grinder and at the same time is also deposited a separate non-toxic addition agent having a high coefficient of fat absorption. The mass is ground to a chosen particle size and the product of desired size is removed. The mass is then recycled until all of the ground products have reached the chosen particle size and have been removed.

Shortening composition and emulsifier system therefor. P. L. Julian, H. T. Iveson, S. B. Radlove, R. Slutkin, and P. F. Davis (Glidden Co.). *U. S. 3,004,853.* The described composition consists of (a) from 3 to 5 parts by weight of an ester of glycerine containing for each mole of glycerine from 0.5 to 3 moles of lactic acid residues and 1 mole of fatty acid residues of C_{12} to C_{20} fatty acids at least half of which are palmitic acid residues; and (b) from 0.2 to 5 parts of an acidic emulsifier such as acidic cetyl citrate, an acidic stearyl lactyl tartrate in which at least 1 of the acid radicals of tartaric acid is esterified with stearyl alcohol and at least 1 of the hydroxy groups of the tartaric acid is esterified with lactic acid, an acidic stearyl alcohol ester of diacetyl tartaric acid, or an acidic ester of a monoglyceride of a C_{18} aliphatic hydrocarbon monocarboxylic acid having a molecular weight of at least 282 and diacetyl tartaric acid.

Process for the bleaching of waxes or other wax-like materials by oxidation and the new compositions of matter thus obtained. F. Zinnert. *U. S. 3,004,856.* The described composition consists of bleached products of homogeneous mixtures of an ester wax of natural origin and an oxidation product of aliphatic hydrocarbons that are solid at room temperature. The oxidation product has an acid number between 10 and 80 and is present at a concentration of 5 to 80% of the weight of the mixture. Bleaching is carried out at a temperature of at least 90 C by means of chromosulfuric acid, and the bleached products consist essentially of long-chain aliphatic carboxylic acids.

Process for the separation of waxy components from sterol-containing materials. S. E. Miller, C. M. Berry, and R. W. H. Chang (General Mills, Inc.). *U. S. 3,004,992.* A mixture containing sterols and waxy constituents from tall oil or crude cane oil is dissolved in ethylene dichloride. The solution is concentrated and substantially all the water present is removed. The solution is cooled to precipitate the waxy constituents while leaving the sterols in solution.

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• Fatty Acid Derivatives

Preparation of lubricating greases from unsaturated fatty acid materials. L. A. Clarke and G. W. Eckert (Texaco, Inc.). *U. S. 3,000,823.* A high molecular weight fatty acid containing an olefinic double bond or its ester is epoxidized so as to convert at least a major portion of the double bonds to oxirane groups. The resulting epoxidized material is hydrogenated under mild conditions so as to convert the oxirane to hydroxyethane groups. The product is then saponified with a metal compound and used to thicken an oleaginous liquid lubricating base to a grease consistency.

Liquid polyamide composition and process for preparing same. A. G. Hovey (Olin Mathieson Chemical Corp.). *U. S. 3,001,960.* The method of forming a polyamide of relatively high amine number comprises reacting a copolymer formed as the reaction product of a conjugated alicyclic diene monomer and an alkali refined natural glyceride oil of polyunsaturated fatty acids having an iodine number greater than 130 (vegetable drying or semi-drying oils, marine oil) with an alkylene polyamine having at least 3 amino nitrogens and at least 4 carbons.

Anti-tack composition. R. Kern, H. Scheurer, and G. Ultsch (Rhein-Chemie G.m.b.H.). *U. S. 3,002,840.* A water-soluble anti-tack composition for preventing adhesion of contacting surfaces at least one of which is of adherent quality, consists of a mixture of at least one water-soluble salt of a fatty acid having between 8 and 30 carbon atoms, and a mixture of at least 2 water-soluble salts of carboxymethyl cellulose one of which has a viscosity of 15-50 centipoise and the other a viscosity of between 150 and 500 centipoise. The salts are mixed in such proportions that the ratio of the fatty acid salt expressed in parts by weight of fatty acid equivalents to the combined carboxymethyl cellulose salts is between 15:1 and 5:3.

Preparation of fatty acid salts. L. M. Kebrich (National Lead Co.). *U. S. 3,002,943.* A stabilizer for resin compositions containing vinyl chloride is a mixture of at least 2 basic lead soaps, the fatty acid radicals in the mixture being selected from the group consisting of stearic, palmitic, and oleic acids. The soaps contain in excess of one mole of lead calculated as PbO for each two mols of fatty acid radicals calculated as the fatty acids.

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• Biology and Nutrition

The energy value of fats and fatty acids for chicks. I. Metabolizable energy. R. J. Young (Procter and Gamble Co., Miami Valley Lab., Cincinnati 39, Ohio). *Poultry Sci.* **40**, 1225-33 (1961). Absorbability of the individual fatty acids in the various fats and fatty acid mixtures was determined by gas phase chromatography of the methyl esters of fatty acid in the dietary and fecal fats. It was observed that the utilization of palmitic and stearic acids when fed in mixtures of free fatty acids was significantly improved as compared to the zero absorbability of these fatty acids when fed singly. The degree of utilization of these saturated fatty acids was greater in mixtures containing higher amounts of the unsaturated fatty acids.

The vitamin A requirements of breeding turkeys and their progeny. G. S. Stoewsand and M. L. Scott (Dept. of Poultry Husb., Cornell Univ., Ithaca, N. Y.). *Poultry Sci.* **40**, 1255-62 (1961). About 1,2000 USP units of stabilized vitamin A per pound of turkey breeder diet were sufficient for optimum egg production, hatchability of fertile eggs and maintenance of the breeding hens; however, a vitamin A level of approximately 2,400 USP units per pound of starter diet was needed in order to produce satisfactory liver storage of vitamin A and minimum blood uric acid levels.

Relation of serum vitamin A activity levels of hens to reserves in their progeny. R. L. Squibb (Disease and Environmental Stress Lab., Rutgers, The State Univ., New Brunswick, N. J.). *Poultry Sci.* **40**, 1197-1203 (1961). Data are presented on the vitamin A reserves of newly hatched chicks. The rate of mortality of chicks fed a deficient ration indicated considerable variation in vitamin A reserves among individuals hatched from eggs obtained from the same flock. This same high variability was apparent when the studies were extended to individual observations on chicks from different hens and among chicks of the same hen.

Effect of molecular weights of colloidal dextran on human serum lipids. Z. Pucar and M. Keler-Bacoka (Clinic for Internal Diseases Rebro, Faculty of Medicine, Zagreb, Yugoslavia). *Science* **134**, 1369 (1961). When 6% colloidal solutions of dextran (molecular weights, 10,000 to 500,000) are mixed with human serum in vitro, a new dextran-lipid fraction appears in paper strip electrophoresis between the starting point and the gamma globulins. The intensity of this dextran-lipid fraction increases with the progressive increase of molecular weight of the dextran used, and this increased intensity of the dextran-lipid fraction migrating with the *beta* globulins. The intensity of the α-lipoproteins and the neutral fats adsorbed at the starting point seems unaltered by the application of dextran in colloidal solution regardless of the molecular weight of the dextran used. No change of the protein patterns was observed.

Fatty acid components of rat liver lipids: effect of composition on the diet and of restricted access to food. Ruth Okey, Angela Shannon, Joan Tinoco, Rosemarie Ostwald, and P. Miljanich (Dept. of Nutrition, Univ. of California, Berkeley). *J. Nutrition* **75**, 51-60 (1961). The composition of the fatty acid moieties of the principal liver lipid fractions were determined for groups of young rats fed *ad libitum* and with access to food for only two one-hour periods daily. Plasma lipid data for the same rats were reported previously. It was evident that linoleic acid must be selectively retained in liver. Linoleic acid percentages in the liver cholesterol ester of coconut oil-fed animals were higher than in coconut oil itself even when time of access to food was limited and cholesterol was fed. Lauric and myristic acids, which constitute over 60% of the fatty acids in coconut oil, were present only in small amounts either in liver or plasma.

Effect of direct steam heating and vacuum treatments on the chemical composition of milk with especial reference to substances involved in oxidized flavor development. D. H. Kleyn and W. F. Shipe, Jr. (Dept. of Dairy and Food

Science, Cornell Univ., Ithaca, N. Y.). *J. Dairy Sci.* **44**, 1603–1620 (1961). Milk was heated with live steam to from 190 to 240 F and subjected to vacuum treatments of approximately 9 in. of mercury in one vacuum chamber and 20 in. of mercury in a second vacuum chamber. The direct steam heating and vacuum equipment were used in conjunction with a H.T.S.T. pasteurizing system and a homogenizer. A high retention of ascorbic acid was observed in milk subjected to direct steam heating and vacuum treatment. This effect, along with resistance to oxidized flavor development, was noted even in milks to which copper was added. The removal of oxygen by the vacuum treatment and the activation of sulfhydryl groups by the heat treatment were considered to be contributing factors. Homogenization was also shown to contribute to the stability of ascorbic acid and flavor. However, homogenization alone was less effective than the combination of homogenization with steamheating–vacuum treatment.

INFLUENCE OF DIETARY TALLOW ON THE UTILIZATION OF CALCIUM BY THE LAYING HEN. J. R. Hunt, J. R. Aitken, and W. G. Hunsaker (Canada Dept. of Agri., Ottawa, Ont.). *Poultry Sci.* **40**, 1193–96 (1961). Shell quality, indicated by specific gravity of the eggs, was not affected by the addition of tallow to the diet at levels up to 12%. Shell quality was depressed by low dietary calcium, but tallow did not augment this effect. Calcium retention in laying hens was reduced more by 6% calcium soap in the diet than by 12% tallow, but in neither case did the reduction prove to be statistically significant.

REINVESTIGATION OF THE VITAMIN A REQUIREMENTS OF LAYING AND BREEDING HENS AND THEIR PROGENY. F. W. Hill, M. L. Scott, L. C. Norris, and G. F. Heuser (Dept. of Poultry Husb., Cornell Univ., Ithaca, N. Y.). *Poultry Sci.* **40**, 1245–54 (1961). The minimum requirements of laying hens for maximum egg production, maintenance of body weight and health, and minimum incidence of the blood spotting defect was 1,200–1,600 USP units of vitamin A per pound of diet.

EFFECT OF TRYPSIN SUPPLEMENTATION ON THE UTILIZATION BY THE CHICK OF DIETS CONTAINING RAW SOYBEAN OIL MEAL. S. Grambila, M. C. Nesheim, and F. W. Hill (Dept. of Poultry Husbandry and Grad. Sch. of Nutrition, Cornell Univ., Ithaca, N. Y.). *J. Nutrition* **75**, 13–19 (1961). Four experiments were conducted in an attempt to determine the effect of trysin supplementation on the metabolizable energy of diets containing raw soybean oil meal for the chick. The results indicated that trypsin supplementation would not overcome the growth-depression properties of raw soybean oil meal.

ELIMINATION OF PINK WHITE DISCOLORATION IN STORED EGGS FROM HENS FED TREATED COTTONSEED MEAL OR STERCULIC ACID. A. J. Deutschman, B. L. Reid, H. W. Kircher, and A. A. Kurnick (Dept. of Poultry Sci. and Agri. Biochem., Univ. of Arizona, Tucson). *Poultry Sci.* **40**, 1305–10 (1961). Storage of eggs from hens fed 20% cottonseed oil meal under air, oxygen, carbon dioxide or nitrogen failed to either accelerate or decrease the incidence of pink whites. The treatment of cottonseed meal with SO_2 appeared to destroy both the pink white discoloring capacity and the olive yolk effect of cottonseed meal.

PHAGOCYTIZED PLATELETS: A SOURCE OF LIPIDS IN HUMAN THROMBI AND ATHEROSCLEROTIC PLAQUES. A. B. Chandler and R. A. Hand (Med. College of Georgia, Augusta). *Science* **134**, 946–47 (1961). Phagocytosis of lipid-rich platelets by monocytes and the transformation of such cells into lipophages containing fat was observed in human thrombi. The lipophages are similar to lipophages in atherosclerotic plaques. This observation supports the idea that some atherosclerotic plaques are organized mural thrombi.

PHOSPHOLIPID PATTERNS IN THE BLOWFLY, PHORMIA REGINA (MEIGEN). L. L. Bieber, E. Hodgson, V. H. Cheldelin, V. J. Brookes, and R. W. Newburger (Dept. of Chem. and Entomology and the Sci. Res. Inst., Oregon State College, Corvallis). *J. Biol. Chem.* **236**, 2590–95 (1961). The phospholipids of three developmental stages of *Phormia regina* have been examined by chromatography on silicic acid. The major constituents are similar in the egg, larva, and young adults and consist of ethanolamine and choline phospholipids. Ethanolamine phospholipids comprise 60% or more of the total phospholipid of each growth stage analyzed, and lipids of the lecithin type less than 25%. In this respect the blowfly differs markedly from vertebrates. Serine and inositol phospholipids comprise a relatively small part of the total. Sphingomyelin was not detected in any of the developmental stages under the conditions employed. The quantities of total phospholipid in the three stages are different, being highest in the adult and lowest in the egg.

AN IMPROVED TEST FOR CAROTENOID EPOXIDES. A. L. Curl and G. F. Bailey (Western Regional Res. Lab., Albany 10, Calif.). *J. Agr. and Food Chem.* **9**, 403–05 (1961). An improved hydrochloric acid color test for carotenoid 5,6- and 5,8-epoxides has been developed in which the reaction is carried out in ether-methanol. Diepoxides give greenish blue colors; monoepoxides, usually yellow-green; while two monoepoxides of unknown structure, persicaxanthin and sinensiaxanthin, give red-violet colors. A modified test, using citric acid instead of hydrochloric acid, can be used to detect the presence of 5,6-epoxides. Both of these tests can be readily followed spectrophotometrically. Contrary to earlier reports, neither β-apo-2-carotenal nor capsorubin gave a blue color in the hydrochloric acid–ether test.

LIPID COMPONENTS OF THE FAT-GLOBULE MEMBRANE. M. P. Thompson, J. R. Brunner, C. M. Stine, and Karin Lindquist (Dept. of Food Sci., Michigan State Univ., E. Lansing). *J. Dairy Sci.* **44**, 1589–96 (1961). Lipid components were extracted from fat-globule membranes prepared by two procedures. One method (Scheme I) started with cold, pooled milk, whereas in the other procedure (Scheme II) freshly drawn, uncooled milk served as the source. The lipids obtained were resolved by gradient elution from a silicic acid chromatographic column. The following lipid classes were identified as components of the fat-globule membrane: carotenoids, a squalene-like compound, cholesterol esters, cholesterol, a unique triglyceride mixture similar to the high-melting glyceride fraction, mono-diglycerides, phospholipids and, from some preparations, unesterified fatty acids. The minor differences in composition between the membrane lipids reflected the age of the milk and the method of preparation. Membranes isolated from the pooled milk by Scheme I contained lower concentrations of phospholipids and associated proteins. Carotenoids, cholesterol ester, and the squalene-like component were removed from the membranes by washing with ethyl ether.

MIGRATION OF PHOSPHATIDES IN PROCESSING DAIRY PRODUCTS. G. R. Greenbank and M. J. Pallansch (Dairy Prod. Lab., Eastern Utilization Res. and Development Div. USDA, Washington, D. C.). *J. Dairy Sci.* **44**, 1597–1602 (1961). The effect of stirring, pasteurization, homogenization, and condensing on the migration of the phosphatides from the fat globule membrane to the skimmilk has been studied. Any form of agitation apparently causes a migration. The greatest change in the distribution of the phosphatides occurs during condensing, where the turbulence encountered is great and prolonged. Homogenization at or below 2,000 p.s.i. causes a migration of phosphatides way from the fat globule surface, but at higher pressures the migration is reversed until at a pressure of 8,000 p.s.i. the amount of phosphatide associated with the fat phase is approximately equal to that in the untreated milk.

POLYNUCLEAR AROMATIC HYDROCARBONS, STEROIDS AND CARCINOGENESIS. N. C. Yang, A. J. Castro, M. Lewis, and Ting-wa Wong (Dept. of Chem., Univ. of Chicago). *Science* **134**, 386–7 (1961). In addition to the electronic factors, there is a steric factor responsible for the carcinogenicity of polynuclear aromatic hydrocarbons. A carcinogenic polynuclear aromatic hydrocarbon must bear steric resemblance to steroids. One possible implication to this requirement for carcinogenicity is that these hydrocarbons may act on the same sites as steroid hormones.

THE SYNTHESIS OF A METABOLITE OF PYRIDOXAMINE. C. J. Argoudelis and F. A. Kummerow (Dept. of Food Technology, Univ. of Illinois). *J. Org. Chem.* **26**, 3420–22 (1961). A metabolite of pyridoxamine, 2-methyl-3-hydroxypyridine-5-carboxylic acid, was synthesized. The key step in this synthesis involved the hydrolysis with 10% aqueous sodium hydroxide of 2-methyl-3-amino-5-cyano-6-chloropyridine to 2-methyl-3-amino-6-chloropyridine-5-carboxylic acid. Hydrolysis of the same compound with concentrated hydrochloric acid gave 3-carboxy-5-amino-6-methyl-2(1) pyridone. A mechanism is proposed for this hydrolysis.

THE FORMATION OF DOUGH AND BREAD STRUCTURES. I. THE ABILITY OF STARCH TO FORM STRUCTURES, AND THE IMPROVING EFFECT OF GLYCERYL MONOSTEARATE. G. Jongh (Institute for Cereals, Flour and Bread T. N. O., Wageningen, The Netherlands). *Cereal Chem.* **38**, 140–64 (1961). Dough prepared from starch instead of flour behaves like a concentrated stable suspension; it shows, among other properties, dilatancy. If small amounts of glyceryl monostearate (GMS) are added (e.g. 0.1%), such a dough acquires plastic properties. By the addition of 0.1% GMS, a loose crumb with a fine and regular structure is obtained while without it a stiff crumb with irregular and very coarse structure arises. This is explained by assuming the GMS is adsorbed on the starch granules' surface and hence, transforming a stable system into a flocculated one. The GMS addition is thought to decrease the rigidity of the crumb by weakening the bindings between the swollen starch granules.

SUBACUTE TOXICITY OF THE NON-ADDUCTING FATTY ACIDS OF A FEED BY-PRODUCT. J. I. Munn, S. A. Koch, O. G. Fitzhugh, and D. Firestone (Food and Drug Administration, Washington 25, D. C.). *J. Assoc. Offic. Agr. Chemists* **44**, 615–19 (1961). A "tarry" by-product obtained from the manufacture of oleic and stearic acids that was known to be toxic was saponified, and the unsaponifiable materials were extracted. The soaps were acidified and the free fatty acids extracted and isolated from the solvent, then esterified and allowed to react with urea. The non-adducting fatty acids were segregated by acidification and extraction, dried, and stored under N_2 at −10 C. It was then fed to weanling rats (21 days) at five different levels for 12 weeks. The animals fed the highest concentration had a decreased food consumption and an indication of growth depression; increased liver, kidney, and heart weights per body weight, and decreased hemoglobin and hematocrit. The alkaline phosphatase activity was also increased in the rats with the higher non-adducting fatty acid diet.

HISTOCHEMICAL CHARACTERIZATION OF WHEAT AND WHEAT PRODUCTS. IV. MAPPING THE FREE FATTY ACIDS IN GERMINATING WHEAT. Y. Pomeranz and J. A. Shellenberger (Dept. of Flour and Feed Milling Industries, Kansas State Univ., Agric. Exp. Sta., Manhattan). *Cereal Chem.* **38**, 122–32 (1961). Changes in free fatty acid content of various tissues of wheat germinated for 8 days were followed by a histochemical method using the base of acridine orange in xylol. Various substrates showed the staining method to be specific for fatty acids. Halved kernels stained and viewed under ultraviolet radiation indicated the scutellum as the main site of lipase activity. As the germination period increased, zones farther from the scutellum tissue gradually increased in fatty acids until after about 8 days, measurable quantities of free fatty acids were present throughout the kernel.

A METHOD FOR THE ESTIMATION OF BLOOD GLYCERIDES EMPLOYING FLORISIL. D. H. Blankenhorn, G. Rouser, and Trucilla J. Weimer (Univ. of Southern California, School of Med., Los Angeles, and Biochem. Dept., City of Hope Medical Center, Duarte, Calif.). *J. Lipid Research* **2**, 281–283 (1961). A rapid method for the direct determination of glycerides in human blood is described. A column of Florisil is employed to remove phospholipids from a lipid extract of plasma or serum; the glycerides are then saponified, and glycerol determined by periodate oxidation.

THE FREE FATTY ACIDS BOUND TO HUMAN SERUM ALBUMIN. A. Saifer and L. Goldman (Dept. of Physical Chem., Isaac Albert Res. Inst. Jewish Chronic Disease Hosp., Brooklyn 3, N. Y.). *J. Lipid Research* **2**, 268–270 (1961). The fatty acid composition of human serum albumin was determined by gas liquid chromatography. Forty-three peaks were observed; 26 were identified by various methods. Eight of the identified peaks constituted abut 90% of the total free fatty acids and 65% of the total were unsaturated acids. The patterns of those acids bound to albumin were essentially the same as those found in plasma. Quantitative differences were observed in the percentage of 18 carbon acids in the free fatty acids of human serum albumin samples as compared to plasma.

EFFECT OF MEVALONATE ANALOGUES UPON CHOLESTEROL BIOSYNTHESIS. H. Weiss, E. Schiffmann, and E. Titus (Lab. of Chem. Pharmacol., Natl. Heart Inst., N.I.H., Bethesda 14, Md.). *J. Lipid Research* **2**, 258–262 (1961). Three analogues of mevalonic acid have been found to inhibit cholesterol biosynthesis in liver homogenates in the following order of efficacy: 3-methyl-3-hydroxy pentanoic acid >, Δ^2-3-methyl pentenoic acid >, Δ^3-3-methyl pentenoic acid. The hydroxy acid produces half the maximum inhibition at a concentration of 5 μ moles/ml of homogenate. This corresponds to a ratio of 100 μ moles of inhibitor to 1 μ mole of substrate.

NEW INVESTIGATIONS ON THE CLEARANCE FACTOR. M. Eggstein (Med. Univ. Clinic, Marburg/Lahn). *Fette, Seifen, Anstrichmittel* **63**, 603–608 (1961). The regulation of heparin during the clearing reaction in biological processes, especially the transition of blood fats in tissue fats was investigated. The effects of heparin injections on the content of fat, phospholipid, and cholesterol was investigated as a function of time. The results indicated that the presence of a lipoprotein lipase could be responsible for hyperlipemia.

THE METABOLISM OF PALMITIC ACID-1-C^{14} IN FUNCTIONALLY HEPATECTOMIZED RATS. Bent Bergström and Thomas Olivecrona (Dept. of Physiol. Chem., Univ. of Lund, Lund, Sweden). *J. Lipid Research* **2**, 263–267 (1961). Normal carbohydrate fed rats and rats on which a functional hepatectomy had been performed by ligating the vessels of the *porta hepatis* were injected with C^{14}-labeled palmitic acid bound to albumin and the distribution of activity studied. The concentration of free fatty acid (FFA) in plasma rises rapidly after the hepatectomy. In the normal rat, a considerable fraction of the injected FFA is recirculated in the blood in glycerides and to a lesser extent in phospholipids. This recirculation is almost completely abolished after hepatectomy, indicating that the liver is the chief organ for plasma lipoprotein synthesis. The peripheral tissues are capable of esterifying the FFA but do not release any esterified fatty acids into plasma, with the possible exception of adipose tissue.

WHEAT FLOUR LIPIDS: II. ISOLATION AND CHARACTERIZATION OF THE GLYCOLIPIDS OF WHEAT FLOUR AND OTHER PLANT SOURCES. H. E. Carter, K. Ohns, S. Nojima, C. L. Tiptin, and N. Z. Stanacev (Dept. of Chemistry, Univ. of Ill., Urbana, Ill.). *J. Lipid Research* **2**, 215–22 (1961). Methods involving solvent fractionation and silicic acid column chromatography have been developed for isolating monogalactosyl- and digalactosylglycerol lipids and cerebrosides from the benzene extracted lipids of wheat flour. A comparative study has been made of the composition of the lipid mixtures obtained from bleached and unbleached wheat flours. The lipids from bleached flour were found to contain covalently-bound chlorine, apparently resulting from reaction with chlorine bleaching. A preliminary study of the occurrence of galactosylglycerol lipids in other plant materials is reported.

III. STRUCTURE OF THE MONO- AND DIGALACTOSYLGLYCEROL LIPIDS. H. E. Carter, R. A. Hendry, and N. Z. Stanacev (Dept. of Chemistry, Univ. of Illinois, Urbana, Ill.). *Ibid.*, 223–227. Determination of the structure of the mono- and digalactosylglycerol lipids of wheat flour is reported. Methylation, saponification, and periodate oxidation yielded formaldehyde, establishing the presence of two vicinal hydroxyls in the glycerol residue and indicating that two acyl groups are attached to these hydroxyls in the original lipid. This was confirmed by acidic hydrolysis studies. The monogalactosylglycerol derivative gave 2,3,4,6-tetra-O-methyl-D-galactose plus glycerol, the digalactosylglycerol derivative yielded in addition 2,3,4-tri-O-methyl-D-galactose. The structure of the galactosylglycerol lipids was thus clearly defined on a 2,3-diglyceride with a carbohydrate moiety attached in the 1 position. Infrared data suggested the D-configuration for the glycerol residue.

BIOCHEMISTRY OF THE SPHINGOLIPIDS: XII. CONVERSION OF CEREBROSIDES TO CERAMIDES AND SPHINGOSINE; STRUCTURE OF GAUCHER CEREBROSIDE. H. E. Carter, J. A. Rothfus, and Rey Gigg (Dept. of Chemistry, Univ. of Illinois, Urbana, Ill.). *J. Lipid Research* **2**, 228–234 (1961). An improved procedure for the conversion of cerebroside to ceramide and sphingosine has been devised, consisting of periodate opening of the glycosidic ring, reduction with sodium borohydride, and mild acid hydrolysis to produce ceramide. Alkaline hydrolipic of ceramide gives erythro-sphingosine in good yield. Application of this procedure to Gaucher cerebrosides has shown it to contain "normal" erythrosphingosine.

CHROMATOGRAPHY OF SPHINGOLIPIDS OF HUMAN BRAIN. H. P. Schwarz, L. Dreisback, M. Barrionuevo, A. Klischick, and I. Kostyk (Div. of Biochemistry, Philadelphia General Hospital, Philadelphia 4, Pa.). *J. Lipid Research* **2**, 208–214 (1961). Sphingolipids of the brain were prepared by solvent extraction of the tissues or from mixed brain extract subjected to mild alkaline hydrolysis, and separated on silicic acid column, using chloroform-methanol mixtures. Recoveries of hexose and alkali stable phosphorus were high. Pure galactocerebrosides were isolated and characterized. Results obtained indicated that cerebrosides containing normal acids are eluted earlier than those containing hydroxylated acids. A ceramide was detected in the brain from a patient with multiple sclerosis and significant amounts of glucocerebrosides were found in the brain of an old patient. Pure sphingomyelins were isolated from brain tissue.

ALTERATIONS IN THE BLOOD FATTY ACIDS IN SINGLE AND COMBINED DEFICIENCIES OF ESSENTIAL FATTY ACIDS AND VITAMIN B_6 IN MONKEYS. L. D. Greenberg and H. D. Moon (Univ. of California School of Medicine, San Francisco). *Arch. Biochem. Biophys.* **94**, 405–16 (1961). Fatty acid patterns of plasma and erythrocytes were studied with the aid of gas chromatography. Essential fatty acid deprivation alone or combined with vitamin B_6 deficiency led to marked increases in the monounsaturated fatty acids, palmitoleic and oleic, in both plasma and erythrocytes. In general, levels of stearate, linoleate, and arachidonate of both plasma and erythrocytes were significantly decreased under the same conditions. An uncharacterized peak which appeared on the erythrocyte chromatogram after 4 months of essential fatty acid deprivation and increased progressively for several months, has been identified as eicosatrienoate. The fatty acids patterns of vitamin B_6 deficient monkeys were the same as the controls.

REAGENT FOR DETERMINING THE AMOUNT OF CHOLESTEROL IN SERUM AND METHOD OF PREPARING SAME. Q. R. Hopper. *U. S. 3,001,950.* The described reagent consists of (1) between 4.5 and 22.5% reagent grade sulfuric acid by volume, (2) 1% reagent grade glacial acetic acid, and (3) at least 40% reagent grade acetic anhydride.

LIPID-MOBILIZING COMPOSITION. J. Seifter and D. H. Baeder (American Home Products Corp.). *U. S. 3,002,888.* A composition suitable for parenteral injection when dissolved in water and having the property of mobilizing fat from the fat depots into the blood stream is the dialyzate of the blood plasma of nonspecifically stressed mammals, the stress being such as to cause hyperactivity of the posterior pituitary gland. The composition is free of proteins, ACTH and steroids and contains inert salts and an active constituent designated as L.M.-α. L.M.-α is a white crystalline solid polypeptide, soluble in water and dilute ethanol, insoluble in nonpolar organic solvents, and yields on hydrolysis alanine, glycine, leucine, glutamic acid, and lysine.

FAT EMULSION AND PROCESS OF PRODUCING SAME. J. G. Hainsworth, H. Hershenson, and W. O. Pool (Don Baxter, Inc.). *U. S. 3,004,892.* A stable, sterile, nonpyrogenic, nontoxic fat emulsion for intravenous injection consists of: 10 to 35% w./v. of a low-melting, nontoxic, vegetable fat and a soybean phosphatide fraction in an amount of 6.7 to 9.3% by weight of the fat. The phosphatide fraction has a choline to phosphorus molar ratio of 0.65 to 0.85, an ethanolamine to phosphorus ratio of 0.14 to 0.28, and serine to phosphorus ratio of not more than 0.026; it is prepared by extracting soy phosphatide having a choline to phosphorus ratio of 0.3 to 0.6 with alcohol to form an extract containing 25 to 50% w./v. solids, cooling the extract to a temperature of −10 to 10 C, and separating the supernatant solution which contains the desired phosphatide fraction.

EMULSIONS OF PHOSPHATIDES IN AQUEOUS ALCOHOL AND THEIR PREPARATION. C. H. Buer. *U. S. 3,004,922.* A phosphatide containing naturally associated neutral fat in an amount of about 0.5 to 5% by weight of the phosphatide is stirred into an aqueous solution having a temperature of 70–80 C and containing 5–25% ethyl alcohol and a carbohydrate. The carbohydrate is present at a concentration of 6–35% by weight and the phosphatide at 5–15% by weight of the emulsion.

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• Drying Oils and Paints

THIXOTROPIC OLEAGINOUS COMPOSITIONS CONTAINING THE REACTION PRODUCT OF AN ABIETYL AMINE AND AN ORGANIC PHOSPHATE. R. J. Eisenhauer and S. J. Zajac (Standard Oil Co.). *U. S. 3,000,820.* A thixotropic oleaginous composition consists of a major amount of an oleaginous base and a minor amount of the reaction product formed by reacting an abietyl amine with an organic phosphate selected from the class consisting of dialkyl phosphate, diaryl phosphates and alkyl aryl phosphates having from 1 to 20 carbon atoms in each alkyl and aryl substituent and a fatty acid having from about 10 to 18 carbon atoms, at a temperature in the range of 80 F and 190 F.

MODIFYING DRYING OIL. A. Schwarcman (Spencer Kellogg and Sons, Inc.). *U. S. 3,001,958.* Castor oil is heated at an elevated alcoholizing temperature with from 1 to 20% by weight of a glycol having 2 to 4 carbon atoms until ester interchange substantially complete. The alcoholized oil in an inert organic solvent is then reacted with an amount of an organic di-isocyanate stoichiometrically equivalent to the hydroxyl groups of the glycol added for alcoholysis plus twice the amount of di-isocyanate equivalent to the hydroxyl groups of the initial castor oil. After the reaction has proceeded and before formation of film from the thus treated oil, about 6% by weight of the castor oil and glycol of an *N*-substituted diethanolamine is added.

COATING COMPOSITION. A. Heck (Reichold Chemicals, Inc.). *U. S. 3,001,959.* A solution of aluminum isopropylate chelated with ethyl acetoacetate is mixed into a solution of an ester which is diglycidyl ether of diphenylol propane esterified with soybean oil or tall oil acids, the ester having an acid number in the range of 3.8 to 5.2. Gel particles form, and the resulting mass is agitated until the gel particles are dissolved. The aluminum metal is present in the ratio of 0.3 to 1.0 to 100 parts of ester.

WATER DISPERSIBLE OIL MODIFIED ALKYD RESINS CONTAINING OXYALKYLATED GLYCOLS AND METHOD OF MANUFACTURE OF THE SAME. F. Armitage and L. G. Trace (Sherwin-Williams Co.). *U. S. 3,001,961.* Production of emulsion coating compositions characterized by their stability in the absence of protective colloids consists of the following: reacting at temperatures between 350 and 600 F a mixture comprising 35 to 80% (by weight of total reactants) of a drying oil fatty acid radical containing alkyd modifying agent selected from the group consisting of drying oil fatty acids, drying oil fatty acid monoglycerides, drying oil fatty acid diglycerides, drying oil fatty acid triglycerides and the drying oil fatty acid total and partial esters of equivalent polyfunctional polyols; an alkyd-forming organic dicarboxylic acid (single ring containing aromatic dicarboxylic or difunctional aliphatic dicarboxylic acid); and a combination of at least two different polyols, one monomeric and the other polymeric. Esterification is continued until the final product has a hydroxyl value of not more than 60 nor less than 10 and an acid value of less than 75 but not less than 5.

PROCESS OF PREPARING ALKYD RESINS INVOLVING THE ACIDOLYSIS OF THE TRIGLYCERIDE OILS AND PHTHALIC ANHYDRIDE. E. F. Carlston (California Res. Corp.). *U. S. 3,001,962.* An oil-modified alkyd resin is prepared by heating to a temperature between 465 and 500 F a mixture of a triglyceride oil, phthalic anhydride, and at least 1 mol but less than 3 mols of a fatty acid per mol of the glyceride oil, the fatty acid having 8 to 22 carbon atoms. A saturated aliphatic polyhydric alcohol is then added slowly to the heated mixture to avoid incompatible gel formation; heating is continued to effect esterification and to produce a resin having an acid number below 25. The polyhydric alcohol is present in an amount sufficient to react with all of the carboxyl groups and the phthalic anhydride up to a 25% stoichiometric excess over the phthalic anhydride; the triglyceride is present at 20 to 90% of the total resin weight.

A COATING COMPOSITION COMPRISING A CELLULOSE DERIVATIVE, AN EPOXIDIZED OIL, AND AN AMINE-ALDEHYDE RESIN. K. R. Coney, R. B. Pyewell, and W. B. Webb, Jr. (E. I. du Pont de Nemours & Co.). *U. S. 3,003,978.* The coating composition consists of an organic solvent solution of (a) a cellulose derivative film-former, (b) an epoxy composition such as the epoxidized triglyceride of soy bean oil or the epoxidized acetylated triglyceride of castor oil, and (c) a curing agent for the epoxy composition such as an alkanol-modified urea-formaldehyde, melamine-formaldehyde, or benzoguanamine-formaldehyde resin. The ratio of (b) to (a) should be about 50–100/100 and the ratio of (c) to (a) about 8–50/100.

SURFACE TREATMENT OF MAGNESIUM METAL ARTICLES. H. J. Palumbo (Johns-Mannville Corp.). *U. S. 3,004,869.* The magnesium metal article is coated with a substantially anhydrous mixture consisting of 90 to 10% by weight of a hydrocarbon or fatty acid ester oil and 10 to 90% of a hydroxy compound such as glycols, carbohydrates, or hydroxyl group containing ethers. The metal article is kept in contact with the layer of the liquid mixture for about 1 hour at a temperature of between 150 and 350 F.

DRIER COMPOSITION. A. Bloom (General Aniline & Film Corp.). *U. S. 3,005,789.* A coating composition consists of a film-forming material containing drying-, semi-drying oils, or mixtures of the two, and up to about 2% (on weight of oil) of a diazine compound.

ROAD MARKING PAINT. J. F. Wynn and H. N. Huntzicker (American-Marietta Co.). *U. S. 3,005,790.* A reflective highway marking paint consists of a drying oil base varnish vehicle with between 0.5 and 8 lb. of a suspended mixture of glass particles per gallon of glass-free paint. The varnish vehicle may also be a vegetable oil modified alkyd resin of phthalic anhydride and glycerin which is dispersed in an organic solvent.

• Detergents

DETERGENT COMPOSITIONS. M. E. Tuvell (Monsanto Chemical Co.). *U. S. 3,000,831.* A built detergent composition consists of (1) 20 to 60 parts by weight of an alkali metal polyphosphate; (2) 10 to 25 parts of an alkaline material such as sodium carbonate, sodium bicarbonate, or sodium sesquicarbonate; (3) 2 to 9 parts of a water-soluble silicofluoride; and (4) 5 to 35 parts of a surface-active agent, anionic or nonionic. The detergent composition is characterized by stability against the formation of insoluble compounds when subjected to storage conditions and high temperatures, and by fredom from corrosion of soft metals.

DETERGENT COMPOSITIONS. P. L. Kooijman, C. Kortland, and P. W. Slokker (Shell Oil Co.). *U. S. 3,000,832.* A detergent composition forming cold stable aqueous solutions of 10% to 50% detergent content consists of an alkyl aryl hydrocarbon monosulfonic acid water-soluble salt having an alkyl group of 8 to 9 carbon atoms together with a secondary alkyl sulfate salt having at least 8 to 9 but not more than 18 carbon atoms per molecule, and an alkyl phenol polyethylene glycol monoether having 7 to 9 carbon atoms in the alkyl group and 8 to 10 ethylene glycol units in the molecule. The sulfonate and alkyl sulfate salt are present in a weight ratio of 60:40 to 20:80: the ether amounts to 2% to 30% of the total weight of the detergent composition.

DEFOAMER COMPOSITION AND METHODS FOR USING SAME. R. L. Mayhew and N. F. Ottley (General Aniline & Film Corp.). *U. S. 3,000,835.* The described composition is a mixture of a fatty oil containing at least 25% doubly unsaturated fatty acids and a polyoxyalkylated derivative thereof containing from 6 to 20 moles of oxyalkylating agent per mole of fatty oil, the ratio of the oil to the polyoxyalkylated derivative being in the range of 4:1 and 1:4. The addition of 0.5% to 2% of such a composition reduces undesirable foam in aqueous systems.

CONTROLLING VISCOSITY OF SYNTHETIC DETERGENT-SOAP SHAMPOOS. L. Wei (Colgate-Palmolive Co.). *U. S. 3,001,944.* An aqueous liquid shampoo consists of (1) a soap of fatty acids of 10 to 18 carbon atoms in which the cation is sodium, potassium, or triethanolamine; (2) a non-soap detergent such as a water-soluble salt of sulfated or sulfonated synthetic organic anionic detergents, the ratio of soap to synthetic detergent ranging from 9:1 to 1:9, the total amount of soap and detergent being 5 to 50% of the shampoo; (3) 0.01 to 1% of a soluble aliphatic polyoxyalkylene compound of the formula $R(OC_nH_{2n})_xOR'$ in which R and R′ are hydrogen or lower aliphatic hydrocarbon radicals of up to 6 carbon atoms, $(C_nH_{2n})_x$ is a chain of monooxyalkylene groups of up to 6 carbon atoms, n is the average number of carbon atoms in the constituents of the chain, from 2 to 3, and x, the total number of lower monooxyalkylene groups, is such as to give a product of average molecular weight of about 400.

LIQUID DETERGENT COMPOSITION. H. F. Drew and R. E. Zimmerer (Procter & Gamble Co.). *U. S. 3,001,945.* A clear homogeneous liquid detergent consists of (1) from 2–20% of an amine oxide having the general formula $R_1R_2R_3N \rightarrow O$, in which R_1 contains from 10 to 16 carbon atoms with at least 50% containing 12 carbons, and R_2 and R_3 are each selected from a group consisting of methyl and ethyl radicals; (2) from 10–45% of an alkali metal salt of aminopolycarboxylate selected from the group consisting of ethylenediaminetetraacetate, N-(2-hydroxyethyl)-ethylenediaminetriacetate, nitrilotriacetate, and N-(2-hydroxyethyl)-nitrilodiacetate; (3) an amount of an alkali metal salt of a hydrotrope anion sufficient to render the liquid detergent homogeneous at room temperature, but not to exceed 12%, selected from the group consisting of benzene-, toluene-, and xylene sulfonate; and (4) from 40–80% water. The sum of the amine oxide and the aminopolycarboxylate salt is less than 55%.

AQUEOUS AMMONIUM HYDROXIDE DETERGENT COMPOSITION. A. Stahler and L. Stahler. *U. S. 3,001,947.* The described composition consists of the following: (1) 1–26% by weight ammonium hydroxide; (2) at least 0.1% of a water-dispersible anionic surface-active detergent having foaming properties (the alkali metal salt of higher alkyl sulfates or sulfonates, alkylaryl sulfonates, alkylaryloxy sulfates or sulfonates); (3) a water-soluble dye consisting of a mixture of a phthalein dye and a basic triphenylmethane dye, the dye components being present in a weight ratio of 2:1 in an amount sufficient to visually tint the detergent composition; (4) a colloidally dispersed, water-insoluble terpene compound characterized by substantial vapor pressure at ordinary temperatures, a boiling point above 100 C, and fragrant odor; (5) 0.1% of a water-dispersible, non-ionic surface-active agent (higher fatty acid esters of a polyhydric alcohol, polyoxyalkylene derivatives of higher fatty acids, alcohols, etc.).

SYNTHETIC DETERGENT BAR. E. Clippinger (California Res. Corp.). *U. S. 3,001,948.* A synthetic detergent bar consists of (1) ammonium *n*-alkyl sulfonate; (2) an alkali or alkaline earth metal *n*-alkyl sulfonate to enable milling and molding at a concentration of 10 to 75 weight per cent based on the total of (1) and (2); and (3) 1–10% water. The alkyl groups in each of the sulfonates are primarily straight-chain radicals of 8 to 20 carbon atoms and averaging 12 to 16 carbons.

SHAMPOO COMPOSITION. K. R. Hansen (Colgate-Palmolive Co.). *U. S. 3,001,949.* The described composition consists of about 5 to 35% of a water-soluble higher fatty acid monoglyceride monosulfate detergent having 8 to 18 carbon atoms in the fatty acid group and a small amount of water-soluble polyacrylamide in an aqueous medium. The polyacrylamide is present in an amount sufficient to form a stable shampoo of increased viscosity.

PRODUCTION OF ESTER TYPE ANIONIC SURFACE-ACTIVE AGENTS. L. M. Schenck (General Aniline & Film Corp.). *U. S. 3,004,049.* At least 1 mole of an aliphatic or alicyclic monocarboxylic acid of 8 to 22 carbon atoms is heated with 1 mole of an isethionate of the formula $HO{-}CHR{-}CHR{-}CO_3M$ in which R is hydrogen or a lower alkyl radical and M is a cation of an alkali or alkaline earth metal. The reaction is conducted at an acidic pH at a temperature of 140 to 320 C in the presence of a catalytic amount of hypophosphorous acid or its metal, ammonium or amine salt.

SURFACE-ACTIVE COMPOSITIONS. L. G. Nunn, Jr., and S. H. Hesse (General Aniline & Film Corp.). *U. S. 3,004056.* One mole of P_2O_5 is reacted with 2 to 4.5 moles of a nonionic surface-active agent having the molecular configuration of a condensation product of at least 1 mole of ethylene oxide with 1 mole of a compound containing 6 to 150 carbon atoms and a reactive hydrogen atom and selected from the group consisting of phenol, alkyl phenols, aliphatic alcohols, fatty acids, fatty amines, fatty amides, rosin amines, long-chain sulfonamides, long-chain-substituted aryl sulfonamides, and high molecular weight mercaptans. The reaction is conducted under substantially anhydrous conditions at a temperature below 110 C down to about room temperature. In *U.S. 3,004,057*, the reaction is conducted in the presence of catalytic amounts of hypophosphorous acid or its salts, or phosphorous acid or its salts or esters.