• *Letter to the Editor*

Laboratory Device for Metering Liquids

There were times that I felt like a fool,
Perched so high on a laboratory stool,
Meticulously adding dribbles of stuff
To judge the quality of shortening fluff,
All for the lack of a tool!

THE PRINCIPLE of the ancient clepsydra[1] can be used in the laboratory to dispense a liquid slowly at a constant rate. The device utilizing this principle can be made with a large burette fitted with a capillary tube discharge (A) and a submerged air inlet (B) near the bottom of the burette. The rate of flow is dependent upon a) the hydrostatic pressure, b) the viscosity of the liquid, and c) the dimensions of the capillary tube.

Since the air inlet is submerged, the incoming air acts against the pressure of the liquid level above the inlet point. This in turn results in a partial vacuum in the space C, thus reducing the effective head pressure of the liquid by a like amount. It is possible to view these pressure and vacuum factors in many ways; but the important over-all result is that the effective head pressure of the system is as though the liquid level in the burette were at the level of the air inlet. To increase the hydrostatic pressure it is necessary to lower the discharge tube with respect to the air inlet, *i.e.*, increase the vertical distance between A and B.

All factors influencing viscosity (*e.g.*, temperature, dissolved solids) influence flow rate and must be held constant. Rate of flow is also controlled by the size of the capillary discharge tube. Flow may be reduced with tubes of smaller diameters or longer lengths; flow may be increased with tubes of greater diameters or shorter lengths. The filling mechanism is not necessary but is a desirable adjunct. The liquid is forced into the top of the burette (D) by a pump (G) or by gravity flow. When the burette is over-filled, the excess liquid is siphoned off, bringing the level to the zero mark (E) and creating the desired partial vacuum in the remaining head-space (C).

When this equipment was used to add water to fat in evaluating water-binding properties of cream whips, the hydrostatic head (distance between air inlet B and capillary discharges A) was about 50 cm.; the capillary tube, 1 mm. I.D. and 10 cm. long, and the water at 25°C. gave flow rates of 15 to 30 ml. per minute. Others will likely require different head pressures and capillary tubes. The air inlet tube (F) is a thin capillary to minimize volume changes in the burette. The capillary discharge tube is connected to the burette by a flexible Tygon hose for convenience.

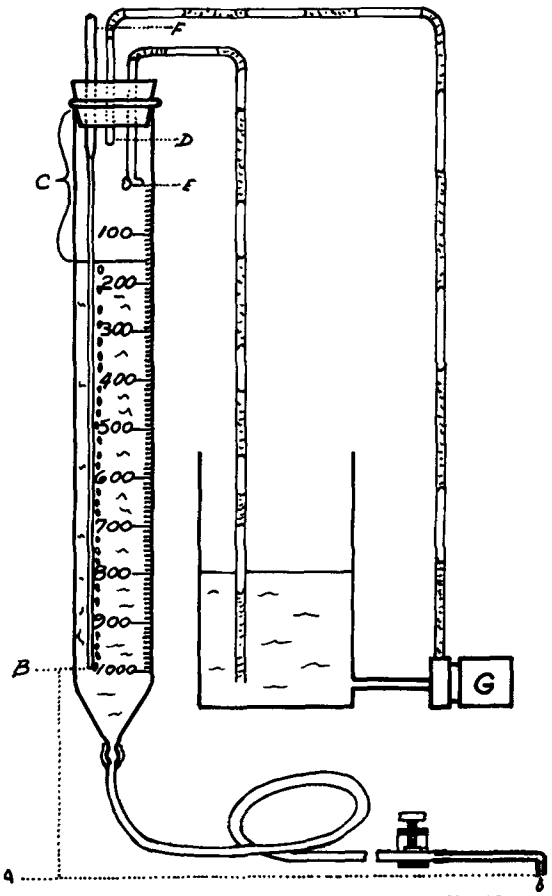

FIG. 1. Laboratory device for metering liquids.

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[1] Water clock.

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

ABSTRACTORS: S. S. Chang, Sini'tiro Kawamura, F. A. Kummerow, H. S. Liles, Louise R. Morrow, and E. G. Perkins

• Fats and Oils

TRISATURATED GLYCERIDES OF MILK FAT. Carolyn Boatman, A.E. Decoteau, and E.G. Hammond (Dept. of Dairy and Food Industry, Iowa State Univ. of Sci. and Tech., Ames). *J. Dairy Sci.* 44, 544–51 (1961). A number of samples of milk fat have been analyzed for trisaturated glyceride by the mercaptoacetic acid method. The amount of trisaturated glyceride varied from 21.5 to 32% by weight. The amount of trisaturated glyceride was found to agree well with the amount calculated by random distribution. The fatty acid composition of the trisaturated glyceride was determined by gas phase chromatography and compared with that of the whole fat. The results show that there is no preferential selection or exclusion of any of the major saturated fatty acids from the trisaturated glycerides. These and other recently determined structural features of milk fat can best be explained in terms of the limited random distribution theory of Vander Wal. It was also found that the relation among the melting point of a fat and the melting point and amount of trisaturated glyceride, which has been found to hold for many fats, does not hold for milk fat. It is shown that this means that the heat of fusion of the last glyceride in the fat to melt changes from sample to sample.

INVESTIGATION OF THE LINEARITY OF A STREAM SPLITTER FOR CAPILLARY GAS CHROMATOGRAPHY. L.S. Ettre and W. Averill (The Perkin-Elmer Corp., Norwalk, Conn.). *Anal. Chem.* 33,

680–84 (1961). When using capillary columns in gas chromatographs, an indirect sample procedure is used by splitting the injected sample volume into two parts, and introducing the smaller part into the column. It is absolutely necessary that this splitting device should not be discriminatory for any sample component—i.e., it should be linear. The criteria of the linearity of the splitting device are discussed. A system is described, and its linearity is demonstrated over a wide range.

THE LIPID COMPOUND OF ELASTIN. F.J. Loomeijer (Inst. of Physiology, Dept. of Physiological Chem., Univ. of Groningen, The Netherlands). *J. Atheroscler. Res.* 1, 62–66 (1961). By several methods of hydrolysis a fluorescent polar organic acid can be disconnected from the peptide chains of elastin. The compound is a saturated acid with a carbon chain of about 12 atoms and possibly with ketonic functions. Its connection to the peptide chains suggests the presence of lipopeptide units.

DETERMINATION OF ACRYLATE AND MALEATE ESTERS IN POLYMERS BY COMBINED ZEISEL AND GAS CHROMATOGRAPHIC ANALYSIS. D.L. Miller, E.P. Samsel, and J.G. Cobler (Special Services Lab., The Dow Chemical Co., Midland, Mich.). *Anal. Chem.* 33, 677–80 (1961). Methods have been developed for the determination of alkoxyl groups (methyl through butyl) in polymers and copolymers containing alkyl acrylates and maleates. First the total alkoxyl is determined using a modified Zeisel hydriodic acid hydrolysis method. Secondly, the various alkoxyl groups, after being converted to the corresponding alkyl iodides, are collected in a cold trap and separated by gas chromatography. These methods have also been used for the determination of ester plasticizers in various plastic formulations. Ester plasticizers such as ethyl phthalyl ethyl glycolate, and dibutyl sebacate have been determined in the presence of each other.

DETECTION OF LYCOPENE IN PINK ORANGE FRUIT. S.P. Monselise and A.H. Halevy (Faculty of Agri., Hebrew Univ., Rehovoth, Israel). *Science* 133, 1478 (1961). Lycopene is shown to be the pink coloring pigment in Sarah—a pink sport of the Shamouti (Jaffa) orange—together with other unidentified carotenoids. This is a condition similar to that found in pink and red grapefruits, while the red pigments of blood oranges are anthocyanins.

QUANTITATIVE FATTY ACID ANALYSIS OF MILK FAT BY GAS-LIQUID CHROMATOGRAPHY. L.M. Smith (Dept. of Food Sci. and Tech., Univ. of Calif., Davis). *J. Dairy Sci.* 44, 607–22 (1961). A procedure was developed for quantitative analysis of the fatty acids of milk fat. Methyl esters of the acids were prepared by methanolysis, extracted with ethyl chloride, and separated by gas-liquid chromatography (GLC), with diethylene glycol succinate as liquid phase. Known mixtures of methyl esters were used in determining factors for correction of peak areas for losses from evaporation of short carbon chain esters and/or variations in relative detector response among the esters under the conditions of the actual analysis. Replicate samples of milk fat esters were analyzed and compared with data obtained by spectrophotometry and with results of others determined by ester distillation and GLC techniques. All the major and many of the known minor fatty acids of milk fats were determined. Advantages and limitations of the method are discussed.

ANALYSIS OF GAS-LIQUID CHROMATOGRAMS BY A PUNCHED CARD TECHNIQUE. R.K. Tandy, F.T. Lindgren, W.H. Martin, and R.D. Wills (Donner Lab. of Med. Phys. and the Lawrence Radiation Lab., Univ. of Calif., Berkeley, Calif.). *Anal. Chem.* 33, 665–69 (1961). A method is described whereby gas-liquid chromatograms may be analyzed using a punched card technique. Although the application presented involves analysis of fatty acid methyl esters in which a *beta* particle ionization detector is used, with minor revisions this method has potential applications to all gas-liquid chromatographic work. The advantages of this technique are: elimination of nearly all manual arithmetic calculations, equivalent or greater accuracy to existing manual techniques, and ease of data manipulation and storage.

HYDROGENATING COTTONSEED OIL AT RELATIVELY HIGH PRESSURE. J. Wisniak and L.F. Albright (Purdue Univ., Lafayette, Ind.). *Ind. Eng. Chem.* 53, 375–380 (1961). Hydrogenation runs were made in the present investigation over a wide range of operating variables. The over-all rate of hydrogenation was directly proportional to the degree of unsaturation and to the amount of nickel catalyst; the rate increased with pressure and temperature. The reaction on the catalyst surface is apparently between chemisorbed hydrogen atoms and physically adsorbed unsaturate groups in which the surface reaction is controlling. Selectivity and isomerization decreased with pressure but were little affected by temperature and catalyst concentration when mass transfer resistances were eliminated.

EFFECT OF SOME ENVIRONMENTAL FACTORS ON THE MILK FAT AND SOLIDS-NOT-FAT CONTENT OF COW'S MILK. K.R. Johnson, D.L.Fourt, R.A. Hibbs, and R.H. Ross (Dept. of Dairy Sci., Univ. of Idaho, Moscow). *J. Dairy Sci.* 44, 658–63 (1961). Two-day composite samples of milk were collected monthly from 243 Holstein and 276 Jersey cows for the first 305 days of lactation. The milk samples were analyzed for percentage of milk fat and solids-not-fat (SNF). The effects of lactation number, calendar year, stage of lactation, and month of year were determined. Age, stage of lactation, and month of year appeared to be major sources of variation in milk fat and SNF percentage. The percentage of milk fat and SNF tended to decrease as lactation number increased. Both breeds reached a low in percentage of milk fat and SNF 60–90 days after parturition, and both increased thereafter until the end of lactation. The two breeds also decreased in percentage of these two milk constituents with age.

THE AEROBIC OXIDATION OF UNSATURATED FATTY ACIDS AND THEIR ESTERS: COBALT STEARATE-CATALYZED OXIDATION OF LINOLEIC ACID. F.W. Heaton and N. Uri (Ministry of Agriculture, Fisheries and Food; Food Science and Atomic Energy Division, Aberdeen, Scotland). *J. Lipid Research* 2, 152–160 (1961). The connection between metal catalysis and the initiation step in autoxidation is emphasized. The formation of free radicals occurs in reactions involving not only various valency states, but also oxygen-complexes of the catalyst. The kinetics of the initial phase of the metal-catalyzed aerobic oxidation of linoleic acid are examined in detail, and a number of mechanisms postulated. The rate constants for certain initiation reactions are evaluated together with the corresponding activation energies. The observed values are found to be in fair agreement with theoretical considerations and, in general, the evidence lends further support to the hypothesis that trace-metal catalysis and the initiation of autoxidation are intimately connected.

NATURALLY OCCURRING EPOXY ACIDS: II. DETECTION AND MEASUREMENT OF LONG-CHAIN EPOXY ACIDS BY NEAR INFRARED SPECTROPHOTOMETRY. L.J. Morris and R.T. Holman (Hormel Inst. and Dept. of Physiological Chem., Univ. of Minn., Austin). *J. Lipid Research* 2, 77–82 (1961). A new method for the detection and estimation of long-chain epoxy acids in seed oils is described. It depends on the measurement of increased absorption at 2.795 μ in the near infrared spectrum caused by chlorohydrins produced from epoxides by treatment with anhydrous ethereal hydrogen chloride. The method is sensitive to approximately 0.2% of epoxy acid in an oil and is specific for epoxides. Hydroxy components of a sample do not interfere since the strongly associated hydroxyl band of chlorohydrins is normally clearly resolved from other OH absorption. The presence of large amounts of vicinally unsaturated hydroxy acids, however, results in large changes in absorption intensity in the 2.8 μ region on HCl treatment and in these cases epoxide concentration cannot be accurately measured but must be estimated. These reactive hydroxy acids, which lead to spurious epoxide values by the conventional methods, lose hydroxyl during the acid treatment, and measurement of the decrease in their absorption at 2.762 μ means that their concentration may be estimated concurrently with that of epoxy components. Other reactive acids, such as cyclopropenoid acids, which result in high epoxide values by the usual methods, do not interfere. Results obtained by this spectrophotometric method are compared, for some oils, with those obtained by the usual chemical methods of epoxide determination.

THE USE OF PANCREATIC LIPASE FOR DETERMINING THE DISTRIBUTION OF FATTY ACIDS IN PARTIAL AND COMPLETE GLYCERIDES. F.H. Mattson and R.A. Volpenhein (The Procter and Gamble Co., Miami Valley Labs., Cincinnati 39, Ohio). *J. Lipid Res.* 2, 58–62 (1961). The method of digestion with pancreatic lipase for determining the position of fatty acids in triglycerides has been modified to increase its accuracy and ease of applicability. Moreover, by acylation of partial glycerides with a "marker" fatty acid, the method can be used for determining the structure of mono- and diglycerides. Evidence is presented which demonstrates that acylation of partial glycerides with fatty acid chlorides can be carried out without causing rearrangement of the partial glycerides.

STUDY OF DIFFERENT METHODS FOR MEASURING LINOLEIC AND LINOLENIC ACIDS IN OILS. J.P. Wolff (Laboratoire Wolff). *Rev. Franc. Corps Gras* 8(2), 68–84 (1961). A detailed study was made of the reliability and accuracy of the following techniques for determination of linoleic and linolenic acids in oils: alkaline isomerization-u.v. spectrophotometry carried out (1) in air and (2) under N_2; GLC, using a Jobin et Yvon appara-

tus with katharometer detector and columns of polyglycol adipate or diethylene glycol succinate. Three different methods of measuring peak areas for quantitative evaluation of GLC chromatograms were compared. It was shown experimentally that reproducibility of GLC analyses is good, provided that analyses are carried out by the same operator, the chromatogram has symmetrical peaks, and it is not necessary to change the sensitivity during the analysis. Accuracy of analysis is markedly affected by the method used to determine peak areas, by human error in measuring peak areas, and by necessity for changing sensitivity when small amounts of a component must be determined. A modification of the internal standard technique is described which enhances accuracy of GC analyses. Analytical data for linoleic and linolenic acids in natural oils obtained by the GC and u.v. methods are compared critically. Either method can be used, but the u.v. technique has greater precision for analysis of oils containing only linoleic acid or only minor amounts of linolenic acid in comparison with linoleic. In analysis of linseed oils, GC gives less accurate values for linolenic acid but more accurate values for linoleic than u.v. GC is much more snsitive than u.v. for determining small amounts of linolenic acid in oils which have been decolorized. It also permits a total analysis of the oil.

A NEW METHOD FOR THE ANALYSIS OF COMPONENT MONO-, DI-, AND TRIGLYCERIDES. O.S. Privett and M.L. Blank (The Hormel Institute, University of Minnesota, Austin). *J. Lipid Research* 2, 37–44 (1961). A new micromethod is described for the determination of component mono-, di-, and triglycerides. The basic procedure involves ozonization of the double bonds and catalytic reduction of the ozonides followed by separation and quantification of the glyceryl residues by thin-layer chromatography. The potentialities of the method are demonstrated by the analysis of soybean oil and lard as well as standard mixtures of synthetic mono-, di-, and triglycerides. Procedures for the analysis of the four monoglyceride types, six of the seven possible diglyceride types, and four of the six possible triglyceride types are demonstrated.

SEPARATION OF LIPID CLASSES BY CHROMATOGRAPHY ON FLORISIL. K.K. Carroll (Collip Med. Res. Lab., Univ. of Western Ontario, London, Ontario, Canada). *J. Lipid Research* 2, 135–41 (1961). Chromatography on Florisil (activated magnesium silicate) was used to separate model compounds representative of hydrocarbons, cholesterol esters, triglycerides, free sterols, diglycerides, monoglycerides, and free fatty acids. The order of elution was the same as that observed in silicic acid chromatography except that free fatty acids were eluted after monoglycerides. Recoveries were nearly quantitative and the positions of individual compounds on the chromatograms were highly reproducible. Phospholipids were not eluted under the conditions used for separating the above compounds, and were eluted less readily from Florisil than from silicic acid with methanol. Florisil had definite advantages over silicic acid for the separation of lipid classes by column chromatography. It required no prewashing or other pretreatment except deactivation with water. Columns were quickly and easily packed, and the relatively coarse mesh of the Florisil permitted rapid flow rates. Separations could be achieved in much shorter times with smaller volumes of eluting solvents. Preliminary experiments indicated that chromatography on Florisil gave good separations of liquid classes of naturally occurring lipids extracted from liver and blood.

DETERMINATION OF TRANS-FATTY ACIDS BY INFRARED SPECTROSCOPY. A. Jart (Dansk Fedforskninginstitute, Copenhagen). *Oleagineux* 16, 101–109 (1961). The author has presented infrared spectra of 35 different fatty materials, including triglycerides, both saturated and unsaturated, normal and hydroxylated), free fatty acids, and methyl esters. Extinction coefficients of these materials are also listed to aid in the determination of *trans* unsaturation in them.

C_{20}- AND C_{22}-POLYENOIC ACIDS OF THE GLYCEROPHOSPHATIDES OF BOVINE ADRENALS. E. Klenk and D. Eberhagen (Physiologisch-Chemisches Institut der Universität, Köln, Köln-Lindenthal, Joseph-Stelzmann-Strasse 52, Germany). *Hoppe-Seyler's Ztschr. Physiol. Chem.* 322(3–6), 258–266 (1961). The total fatty acids from phosphatides of bovine adrenals were fractionated by low temperature crystallization from acetone. Composition of each fraction was determined by gas-liquid chromatography (GLC) of Me esters on a 20% Reoplex 400-Celite column at 200°. Chromatograms before and after hydrogenation are shown of the highly unsaturated esters from the fraction still soluble at −70°, which contained the bulk of the polyenoic acids. In further studies, individual polyenoic acids were isolated from this fraction by standard techniques, including distillation and countercurrent distribution. The purity of each was determined by GLC of the esters in the column used for the total fatty acid ester analyses and resulting chromatograms are shown. Final characterization of the polyenoic acids was effected by ultraviolet spectroscopy, alkali isomerization, hydrogenation, and identification of ozonolysis degradation products by GLC. With the exception of a C_{20}-dienoic acid, all polyenoic acids were positively identified by the foregoing techniques. Acids found were: Δ5,8,11- and 8,11,14-eicosatrienoic acid; arachidonic acid; Δ5,8,11,14,17-eicosapentaenoic acid; Δ7,10,13,16-docosatetraenoic acid; Δ7,10,13,16,19-docosapentaenoic acid.

THE OZONOLYSIS OF OLEIC ACID. Naudet and J. Pasero (Lab. I.T.E.R.G., Marseille). *Fette Seifen Anstrichmittel* 62, 1110–1112 (1960). The authors discuss the ozonolysis of oleic acid, and propose that, because of the high viscosity of the ozonides, the ozonolysis of oleic acid be carried out in the presence of solvent. The decomposition of the raw material gives a high yield of technical azelaic and pelargonic acids at a low production cost. Extra ester bonds formed by a molecular rearrangement during the ozonolysis can be determined. The percentage of ester formation is higher using technical grade oleic acid which contains a higher percentage of polyunsaturated fatty acids.

NEW RESULTS IN THE ISOLATION AND ANALYSIS OF PHOSPHATIDES AND GLYCOLIPIDS. H. Wagner (Inst. Pharm. Arzn., Univ. Munich). *Fette Seifen Anstrichmittel* 62, 1115–1123 (1960). The author has shown that, with the aid of thin layer chromatography and paper chromatography and applying countercurrent distribution and infrared spectroscopy, phosphatides can be isolated and identified with a great degree of certainty, in both a quantitative and qualitative manner. Some of the compounds studied were phosphatidylserine, mono- and diphosphoinositides, lecithins, cephalins, cerebrosides, sphingomyelin, and cardiolipin.

FURTHER OBSERVATIONS ON THE PARAFFINS AND PRIMARY ALCOHOLS OF PLANT WAXES. J.D. Waldron, D.S. Gowers, A.C. Chibnall, and S.H. Piper (Univ. of Cambridge). *Biochem. J.* 78, 435–442 (1961). A number of the *n*-paraffin and primary-alcohol fractions of plant waxes characterized earlier by Chibnall and his colleagues have been re-examined by mass spectroscopy. Contrary to the earlier suggestion that the *n*-paraffin fractions comprised exclusively the odd-number members of the series, it has now been shown that in some cases the even-number members may be present in minor components. The same conditions exist also for the primary-alcohol fractions. *iso*-Paraffins were found in rose-petal wax and tobacco-leaf wax but in no other wax examined.

COMPLEX EPOXY FATTY ESTERS. F.E. Kuester and T.W. Findley (Swift & Co.). *U.S. 2,978,463.* The process for the preparation of oxirane-containing fatty acid esters comprises: mixing together two different esters, substantially all carboxyl groups of which are entirely esterified and one ester being an ester of an oxirane-containing fatty acid; adding to the mixture a small amount of an alkaline interesterification catalyst; and adjusting the temperature of the mixture to about 50 to 130°. Interesterification is thus effected to produce an oxirane-containing fatty ester substantially all carboxyl groups of which are entirely esterified.

POLYMERIZATION, CONDENSATION, AND REFINING OF FATTY ACIDS. B.L. Hampton (Glidden Co.). *U.S. 2,978,468.* A mixture of unsaturated fatty acids rich in oleic and linoleic is heated at a temperature of from 110 to 240° with a catalytic quantity of zinc chloride or bromide in admixture with a catalytic quantity of an acid catalyst such as HCl or HBr. The polymer recovered from this treatment includes the product formed by the reaction of a carboxylic acid group of a fatty acid molecule with a double bond of another fatty acid.

BLOOM INHIBITED CHOCOLATE AND METHOD OF PRODUCING SAME. W.N. Duck. *U.S. 2,979,407.* A bloom inhibited chocolate product consists of edible chocolate and from 0.5% to 5% by weight of a stabilizing material. This material is a mixture of triglyceride esters based on the ratio of 2 moles of lauric acid, 1.2 moles of myristic acid, and 2 moles of palmitic acid; the melting point of the stabilizer is in the range of 104–118°F.

DEHYDRATION OF FLUID FATTY MIXTURES. C. Greenfield. *U.S. 2,979,408.* In a process of dehydrating a fluid system consisting of a mixture of fat, non-fat solids, and water by heating the continuous fluid system at sub-atmospheric pressures, the system is normally characterized by gel-like formation at some point in the dehydration. However, if a fat liquid medium is added to the mixture so as to obtain a minimum ratio of total fat to non-fat solids of about 2 and the concentration of discrete non-fat solids in the continuous fluid system is increased, gel formation is prevented.

CONTINUOUS PURIFICATION AND DECOLORIZING OF OILS. R. Raffaeta. *U.S. 2,980,717.* A fluid mixture of crude stock and a bleaching adsorbent is subjected to a sudden rise in temperature by bringing the mixture, while falling in subdivided state, into contact with a separate hot mixture of crude stock and a bleaching adsorbent. The separate hot mixture had been heated to a temperature which was insufficient to cause polymerization of the fat content of the crude stock, and the commingling is made at sub-atmospheric pressure and a temperature of about 140–220°. The commingled materials are allowed to continue to fall and a rising stream of superheated steam is passed in countercurrent contact with the falling materials.

METHOD OF DEGUMMING SOYBEAN OIL. G.C. Cavanagh and R.S. Bean (Ranchers Cotton Oil). *U.S. 2,980,718.* A miscella of soybean oil (at least 65%) and a suitable solvent is heated to a temperature of at least 130°F. and treated with 1½ to 2½% each of water and alcohol (ethyl, methyl, or isopropyl). The mixture is stirred vigorously to develop a curdy break, treated with 1–2% water, mixed to form a break-free degummed oil, and the water, alcohol, gums, and solvent removed from the degummed oil. All of the steps in the procedure are performed in the absence of alkali metal hydroxides and their metallic ions. Exposure of the oil and the miscella to air and light prior to degumming is limited so as not to exceed 6 hours for either.

METHOD OF TREATING COCONUT JUICE. L.T. Wen. *U.S. 2,981,627.* To prepare a spreadable and reconstitutable emulsified product, the fatty component of the juice of the fresh coconut is isolated by gravitational separation of the aqueous medium to retain the fatty components in the dispersed phase in a quantity of the aqueous medium entrained as a natural component and then chilling to below 21° and above 0°.

FATTY ACID PROCESSING. N.E. Ward (Procter & Gamble Co.). *U.S. 2,981,744.* A process for removing odorous substances from distilled fatty acids produced from the hydrolysis of fats or fatty oils consists of converting the fatty acids with acetic anhydride into the corresponding fatty anhydrides which have a lower volatility than the odorous substances. Then the acetic acid which is formed, any excess acetic anhydride, and the odorous substances are distilled off.

FLAVOR STABILIZED SALTED MARGARINE AND PROCESS OF PRODUCING THE SAME. D. Melnick (Corn Products Co.). *U.S. 2,983,615.* An edible citric acid component and an edible ethylenediaminetetraacetic acid component are combined with salted margarine.

SOYBEAN-OIL DRESSINGS OF THE NONPOURABLE TYPE AND METHOD OF MAKING THE SAME. D. Melnick and J. Akerboom (Corn Products Co.). *U.S. 2,983,618.* A mayonnaise consists essentially of a soybean salad oil as substantially the total salad oil phase and about 0.0004% to about 2% of an EDTA component. When the soybean oil has an iodine value of 100–120 it constitutes 75% to 100% of the total salad oil phase; when it has an iodine value of 122-142 it constitutes 50–100% of the total salad oil phase.

• Fatty Acid Derivatives

PREVENTION OF CASING STICKING TO MEATS. G.E. Brissey and R.C. Hill, Jr. (Swift & Co.). *U.S. 2,982,660.* A boneless cured meat product is coated with an acetylated mono- or diglyceride or mixtures of the glycerides in an amount of at least 0.2% by weight. The meat is then enclosed in a permeable artificial casing and heated to suitable cooking temperatures.

PROCESS OF PREPARING BATTERS ADAPTED FOR REFRIGERATED STORAGE. W.M. Cochran, R.E. Lutz, and D.E. Miller (Glidden Co.). *U.S. 2,982,662.* The ingredients for the described batter consists of flour, aqueous liquid, dicalcium phosphate dihydrate as the sole acidic leavening agents, if any is used, and shortening which contains 5–15% of an emulsifier. The emulsifier is a lower hydroxy-carboxylic acid-fatty acid ester of an edible polyhydric alcohol having 3–6 hydroxyl groups and has (a) between 0.5 and 2 mols of lower hydroxy-carboxylic acid and at least 1 mol of fatty acid of 12–22 carbons esterified per mol of polyhydric alcohol, (b) an average of 1.5 hydroxyls per molecule of polyhydric alcohol esterified, and (c) been treated to remove water-soluble materials. All of the wet and dry ingredients of the batter (except soda, if any is used) are mixed together and homogenized. The mixture is then aged under refrigeration at temperatures between 38 and 45°F. for a period of at least 3 days. The soda is then added and the resulting batter mixed under aerating conditions to produce an aerated batter having a specific gravity below about 0.8. The batter is packaged and stored at temperatures below 45°F. until it is to be used to prepare a baked product.

LUBRICATING GREASES THICKENED WITH MIXTURES OF LITHIUM FATTY ACID SOAPS AND LITHIUM DILINOLEATE. G.W. Eckert and P.R. Thomas (Texaco, Inc.). *U.S. 2,983,680.* A shear stable and substantially water insoluble lubricating grease composition consists of a lubricating oil thickened to a grease consistency with a mixture in about 1:2 to 2:1 ratio by weight of a lithium soap of a high molecular weight fatty acid and lithium dilinoleate.

• Biology and Nutrition

CHANGES IN THE COMPOSITION OF PHOSPHOLIPIDS AND OF PHOSPHOLIPID FATTY ACIDS ASSOCIATED WITH ATHEROSCLEROSIS IN THE HUMAN AORTIC WALL. C.J.F. Böttcher and C.M. van Gent (Dept. of Physical Chem., Leiden Univ., The Netherlands). *J. Atherosclr. Res.* 1, 36–46 (1961). The increasing percentage of sphingomyelins in the phospholipids of human aorta (intima plus media) with increasing degree of atherosclerosis has been confirmed. A method combining silicic acid chromatography and differential hydrolysis is described which enables the fatty acid composition of seven phospholipid fractions (two "cephalin" fractions, ethanolamine plasmalogens, lecithins, choline plasmalogens, sphingomyelins, and lysolecithins) to be determined. It has been established by this means that the different fractions have characteristic fatty acid compositions and that these compositions change in the direction of increasing saturation with increasing degree of atherosclerosis. This is to be attributed mainly to a decline in the percentages of polyunsaturated acids, especially arachidonic acid. Possible reasons for these changes are discussed.

SERUM FREE CHOLESTEROL AND ATHEROMA IN YOUNG COCKERELS. C.T. Caldwell (Nutrition and Metabolic Diseases, Upjohn Co., Kalamazoo, Mich.). *Proc. Soc. Exp. Biol. Med.* **106**, 893–895 (1961). Relationship between serum free cholesterol not combined upon incubation and atheroma development has been studied using sera from normal and cholesterol-fed young cockerels. Original free cholesterol uncombined after incubation of serum from normal, mild spontaneous, and severely atherosclerotic birds is 9, 14, and 67 mean mg. %, respectively. Amounts combined upon incubation show smaller differences (17, 13, and 23 mean mg. %) for the 3 series. Corresponding ranges of per cent original free cholesterol not combined are 17 to 45 for normal, 45 to 56 for mild spontaneous, and 57 to 87% for severe cholesterol-induced atherosclerosis. Results of this study indicate that there is a relationship between serum free cholesterol not combined upon incubation and development of atheroma in young cockerels.

CHOLESTEROL CONTENT OF HUMAN LIVER AFTER FEEDING OF CORN OIL AND HYDROGENATED COCONUT OIL. I.D. Frantz, Jr. and J.B. Carey, Jr. (Depts. of Med. and Physiological Chem., Med. School, Univ. of Minn., Minneapolis). *Proc. Soc. Exp. Biol. Med.* **106**, 800–801 (1961). Three ounces of corn oil daily were added to the diets of 6 men for a period of month. Three ounces of hydrogenated coconut oil daily were added to the diets of a similar group of controls. Serum cholesterol concentration fell an average of 9% in the men fed corn oil, but did not change significantly in the controls. Liver cholesterol concentration, as measured by liver biopsy, fell an average of 25% in the men fed corn oil. No consistent effect was observed in the controls. It is concluded that the fall in serum cholesterol produced by corn oil feeding in man is probably not due to a shift of cholesterol from the blood to the liver.

ROLE OF INTERNAL MUCOID SUBSTANCES IN THE PATHOGENESIS OF ATHEROSCLEROSIS. I. COMPLEX FORMATION IN VITRO BETWEEN MUCOPOLYSACCHARIDES FROM ATHEROSCLEROTIC AORTIC INTIMAS AND PLASMA β-LIPOPROTEINS AND FIBRINOGEN. S. Gerő, J. Gergely, T. Dévényi, L. Jakab, J. Székely and S. Virág (Third Med. Clinic, Univ. of Budapest, Hungary). *J. Atherosclr. Res.* 1, 67–74 (1961). The interaction between mucopolysaccharides (MPS) isolated from atherosclerotic human aortic intima and the β-lipoprotein fraction of human plasma has been investigated. Paper electrophoresis of mixtures of the aortic MPS with pure human β-lipoprotein or with fresh human plasma showed that β-lipoprotein migrates together with the aortic MPS component of lower mobility. This phenomenon points to the formation of specific MPS-β-lipoprotein complexes. A similar complex-formation takes place between intimal MPS and human plasma fibrinogen. It is concluded that the deposition of both these plasma components in the intima

may have a common cause: chemical or physicochemical changes in the MPS composition of the intimal ground substance which facilitate the formation of specific MPS-β-lipoprotein and MPS-fibrinogen complexes.

EFFECT OF PYRIDOXINE DEFICIENCY ON FATTY ACID COMPOSITION OF CARCASS AND BRAIN LIPIDS IN THE RAT. Patricia V. Johnston, Krystyna C. Kopaczyk and F.A. Kummerow (Dept. of Food Tech., Univ. of Ill., Urbana, Ill.). *J. Nutrition* **74**, 96–102 (1961). Female rats were fed diets containing 10% of corn oil with or without added pyridoxine. Signs of severe pyridoxine deficiency were observed after 10 weeks in rats that received the diets deficient in pyridoxine. The fatty acid composition of the carcass and brain lipids was determined. Under *ad libitum* feeding conditions the percentage of stearic acid was higher and of linoleic acid lower in carcass fats of the deficient animals compared with fats of the supplemented controls. When the feed consumption of both groups was the same, the carcass fat of the deficient animals contained a higher percentage of stearic acid and a lower percentage of palmitoleic acid than the carcass fat of the controls, but the degree of unsaturation of the fat from rats in both groups was the same.

OXIDATION OF ERGOSTEROL BY RAT AND MOUSE LIVER MITOCHONDRIA. D. Kritchevsky, E. Staple, and M.W. Whitehouse (The Wistar Inst. of Anat. and Biol. and Dept. of Biochem., School of Med., Univ. of Penn., Phila.). *Proc. Soc. Exp. Biol. Med.* **106**, 704–708 (1961). Oxidation of ergosterol-28-C^{14} and of ergosterol-U-C^{14} by mitochondrial preparations from rat or mouse livers has been investigated. Either substrate yielded $C^{14}O_2$. Ergosterol-U-C^{14} yielded radioactive neutral and acidic products, while ergosterol-28-C^{14} gave only neutral radioactive material. Among the acidic products obtained from ergosterol-U-C^{14} was a radioactive acid with R_f close to that of trihydroxycoprostanic acid. Similarities between the oxidation of cholesterol and ergosterol by liver mitochondria *in vitro* suggest that enzyme systems involved are closely related to each other, if not identical.

AUTOXIDATION OF MILK LIPIDS. II. THE RELATIONSHIP OF SENSORY TO CHEMICAL METHODS FOR MEASURING THE OXIDIZED FLAVOR OF MILK FATS. D.A. Lillard and E.A. Day (Dept. of Food and Dairy Tech., Oregon State College, Corvallis). *J. Dairy Sci.* **44**, 623–32 (1961). Sixteen milk fat samples were collected from mixed herd milk over a 6-mo. period. Each sample was oxidized to a different stage yielding peroxide values ranging from 0 to 64 for the 16 samples. The TBA number, peroxide value, total saturated and unsaturated carbonyls, volatile saturated and unsaturated carbonyls, individual volatile monocarbonyls, and the absolute flavor threshold of each sample were determined. Statistical analyses of the data revealed that all chemical tests were highly correlated with each other. From 97 to 99% of the carbonyl-reactive material in oxidizing milk fats was nonvolatile. Relatively large amounts of nonvolatile carbonyls also were observed in fresh milk fat. The mean percentage of saturated carbonyls in the volatile monocarbonyls of 16 oxidized fats was 88.72.

SYNTHESIS OF MILK FAT IN THE BOVINE MAMMARY GLAND. J.R. Luick (Dept. of Animal Husbandry, Univ. of Calif., Davis). *J. Dairy Sci.* **44**, 652–57 (1961). Milk fat synthesis was studied in normal lactating dairy cows following the intra-mammary infusion of C^{14}-labeled glycerol, glucose, acetate, propionate, or butyrate. The metabolite under investigation was infused into one quarter (or half) of the udder and a comparison was made of the C^{14} content of milk fat glycerol obtained from the infused and uninfused quarters. Results indicate that glycerol is synthesized in the mammary gland from glucose but not from acetate, propionate, or butyrate. The newly formed glycerol is incorporated into milk fat. This strongly implies that one pathway of milk fat formation involves its *de novo* synthesis in the mammary gland from pools of free fatty acids and glycerol.

EFFECT OF OLEYL ALCOHOL ON ESTERIFICATION OF CHOLESTEROL IN A PANCREATIC EXTRACT. P.W. O'Connell (Res. Lab., The Upjohn Co., Kalamazoo, Mich.). *Proc. Soc. Exp. Biol. Med.* **106**, 848–851 (1961). Addition of oleyl alcohol to a pancreatic extract capable of cholesterol esterification resulted in esterification of the aliphatic alcohol and stimulation of cholesterol esterification. Correspondingly, the extent of the oleyl alcohol reaction was greater in presence of cholesterol. Some possible relationships of the findings to *in vivo* processes are discussed.

FATTY-ACID DISTRIBUTION IN THE LIPID FRACTIONS OF HEALTHY PERSONS OF DIFFERENT AGE, PATIENTS WITH ATHEROSCLEROSIS AND PATIENTS WITH IDIOPATHIC HYPERLIPIDAEMIA. W. Schrade, R. Biegler, and E. Böhle (First Med. Clinic, Univ. of Frankfurt on Main, Ger.). *J. Atheroscler. Res.* **1**, 47–61 (1961). The lipids extracted from the blood serum of 30 healthy male subjects of different ages, of 20 male atherosclerotic patients with hyperlipidaemia and of 17 patients with idiopathic hyperlipidaemia were separated into cholesterol esters, phospholipids, glycerides, and non-esterified fatty acids. Results showed that there was a more marked rise in the percentage of glycerides than of cholesterol esters and of phospholipids. In all fractions from hyperlipidaemic subjects the relative proportions of palmitic, palmitoleic, and oleic acids are greater and those of linoleic and arachidonic acids smaller than they are when the serum lipid content is normal. It seems therefore that in cases of hypercholesterolaemia, hyperphospholipidaemia and hyperglyceridaemia there appear in the serum additional esters which contain more saturated and monounsaturated and fewer polyunsaturated fatty acids.

EFFECT OF METHYL ARACHIDONATE SUPPLEMENTATION ON THE FATTY ACID COMPOSITION OF LIVERS OF PYRIDOXINE-DEFICIENT RATS. Mary Ann Williams and Genevieve E. Scheier (Dept. of Nutrition, Univ. of Calif., Berkeley, Calif.). *J. Nutrition* **74**, 9–15 (1961). The effect of vitamin B_6 deficiency on the ability of the rat to deposit dietary arachidonate in the liver has been investigated. Vitamin B_6-deficient young male rats, in which the liver arachidonate had been depleted by feeding a fat-free diet, were fed daily for 6 days a supplement of 40 mg. of methyl arachidonate and 360 mg. of cottonseed oil, with and without the addition of 3 μg of pyridoxine per day. The lipid supplement increased the percentage of liver arachidonate equally in the vitamin B_6-deficient and the vitamin B_6-supplemented groups although the net gain in liver arachidonate by the former group was less because of the smaller liver size.

FAT SYNTHESIS IN CELL-FREE PREPARATIONS OF THE LOCUST FAT-BODY. Alisa Tietz (Israel Institute for Biological Research, Ness-Ziona, Israel). *J. Lipid Research* **2**, 182–187 (1961). It was shown that cell-free preparations of the fat-body of the migratory locust, *Locusta migratoria*, incorporated acetate into fatty acids in the presence of ATP, CoA, glutathione, Mg^{++}, TPN, malonate, α-ketoglutarate, and $KHCO_3$. The major fatty acid component synthesized was palmitic acid. The newly synthesized acids were esterified by the system with glycerol as glycerides and phospholipids. Mitochondria were not required for synthesis. Fat-body homogenates could also activate and decarboxylate malonate and form malonic acid by CO_2 fixation.

PROPIONIC ACID AS A PRECURSOR IN THE BIOSYNTHESIS OF ANIMAL FATTY ACIDS. E.J. Marsoro and Edith Porter (Dept. of Physiology, Tufts Univ. School of Med., Boston 11, Mass.). *J. Lipid Research* **2**, 177–181 (1961). The carboxyl carbon of propionate was found to be a poor precursor for the synthesis of fatty acids in the rat. The data indicate that propionate as a three-carbon unit is not incorporated into long-chain fatty acids by the intact rat to any appreciable extent. The results also suggest that the conversion of propionate to long-chain fatty acids in surviving adipose tissue occurs primarily by a mechanism involving the decarboxylation of the propionate. These data are consistent with the concept that the major pathway of lipogenesis in adipose tissue is not different from pathways described for the liver. A small fraction of the propionate is converted to long-chain fatty acids in adipose tissue *in vitro* by a mechanism that involves the use of propionate as an intact three-carbon unit, but in any case, its significance in the intact animal would appear to be negligible.

THE UPTAKE OF AMINO ACIDS BY LIPIDS OF PSEUDOMONAS AERUGINOSA. R. Silberman and W.L. Gaby (Department of Microbiology, Hahnemann Medical College and Hospital, Philadelphia 2, Penna.). *J. Lipid Research* **2**, 172–176 (1961). The lipids of intact *Pseudomonas aeruginosa* resting cells were extracted and the weights of the lipid fractions determined. The phospholipids were found to comprise a major portion (80%) of the ether-soluble lipids. Chromatograms of the phospholipid complex on silicic acid-impregnated paper revealed at least six fractions. Two dimensional chromatograms of the aqueous acid hydrolyzate of the phospholipids indicated the presence of at least 13 ninhydrin positive compounds. There was a correlation between the uptake of DL-alanine-1-C^{14}, DL-leucine-1-C^{14}, and DL-phenylalanine-3-C^{14} by phospholipids of the resting cells and utilization of these amino acids by the cell as indicated by manometric studies.

ABSENCE OF LIPEMIA CLEARING FACTOR LIPASE IN HUMAN ADIPOSE TISSUE. H. Engelberg (Div. of Laboratories, Cedars of Lebanon Hosp., Los Angeles 27, Calif.). *J. Lipid Research* **2**, 169–171 (1961). Clearing factor lipase activity was present in abundance in chicken adipose tissue extracts. No such activity was demonstrable in seven of nine samples of human adipose

tissue removed at surgery. Slight lipolytic activity was found in the other two instances.

RECOMBINATION WITH LIPIDS OF THE LIPID-FREE PROTEIN FROM CANINE SERUM (d 1.063–1.21, α_1) LIPOPROTEIN. A. Scanu and I.H. Page (Res. Div., Cleveland Clinic Found. and the Frank E. Bunts Educational Inst., Cleveland 6, Ohio). *J. Lipid Research* 2, 161–168 (1961). The protein (αP) was prepared by delipidation of canine serum α_1 lipoprotein (αLP). When P-I^{131} was added to serum injected into dogs, the radio-activity promptly appeared only in the LP fraction, indicating a preferential interaction of the labeled protein with its own lipoprotein class. The nature of this interaction was not established. Mixing of P-I^{131} with the low density lipoprotein class (αLP), in absence of serum, yielded two radioactive fractions, floating at d 1.063 and d 1.21. These two fractions had electrophoretic mobility similar to radioiodinated native βLP and αLP. In the absence of serum, αP-I^{131} reacted also with chylomicrons from serum or chyle. When the radioactive chylomicrons thus formed were injected into dogs, their disappearance from circulation paralleled that of an injected Lipomul (artificial triglyceride emulsion) -αLP-I^{131} complex. In both instances the disappearance of triglycerides was accompanied by appearance of radio-activity in the αLP fraction of plasma. When Lipomul was given intravenously to dogs injected with αLP-I^{131}, it combined with a small amount of this labeled lipoprotein. The possible participation of αLP in the metabolism of triglycerides is briefly discussed.

THE LIPID RESIDUES IN CYTOLIPIN H. M.M. Rapport, V.P. Skipski, and C.C. Sweeley (Department of Biochemistry, Albert Einstein College of Medicine, Yeshiva University, New York 61, N.Y.). *J. Lipid Research* 2, 148–51 (1961). The individual fatty acids in two preparations of cytolipin H and the lipid bases in one preparation were analyzed. A number of fatty acids were present, lignoceric acid predominating. No 2-hydroxy fatty acids were present. Of the lipid bases, 93% was sphingosine and 7% was a more unsaturated residue (dehydrosphingosine?). No dihydrosphingosine was present. Analyses of a number of cytolipin preparations showed them to be similar to cerebrosides derived from non-nervous animal tissues in having a nonuniform distribution of normal saturated fatty acids: C_{24}, C_{22}, and C_{16} acids were present in high concentration, and C_{20}, C_{18}, and C_{14} acids were present in very low concentration.

A FLUORIMETRIC MICRO GLYCEROL METHOD AND ITS APPLICATION TO THE DETERMINATION OF SERUM TRIGLYCERIDES. D. Mendelsohn and A. Antonis (Dept. of Pathology and Microbiology, Div. of Chem. Pathology, Univ. of the Witwatersrand, Johannesburg, South Africa) and Ernest Oppenheimer. *J. Lipid Research* 2, 45–50 (1961). A fluorimetric method has been developed for the estimation of glycerol in aqueous solution. It utilizes a series of reactions in which glycerol is heated with *o*-aminophenol in the presence of concentrated sulfuric acid and an oxidizing agent, to form 8-hydroxyquinoline which produces fluorescence on chelation with a divalent metal ion in alkaline solution. Experimental details are given for the estimation of serum triglycerides on phospholipid-free serum lipid extracts. The method can also be used for the estimation of phosphatide glycerol.

MEASUREMENT OF LIPOPROTEIN LIPASE ACTIVITY IN POST HEPARIN PLASMA: DESCRIPTION OF TECHNIQUE. F. Kern, Jr., Laura Steinmann, and B.B. Sanders (Dept. of Med., Univ. of Colorado Med. Center, Denver 20). *J. Lipid Research* 2, 51–57 (1961). A method has been described for the quantitative assay of lipoprotein lipase activity in post heparin plasma. The conditions of the assay were subjected to critical study. The technique described permits the reaction to proceed in the test tube as a zero order reaction. It is believed that this technique will permit accurate quantitative study of lipoprotein lipase activity in different groups of patients. The rate of lipolysis was compared with the rate of clearing of lipemic plasma. The ratio of the rate of lipolysis to the rate of clearing was quite variable in normal subjects. This suggests that the use of the clearing technique to study lipoprotein lipase activity in different groups of patients, or under different experimental conditions, may give misleading results.

THE IN VIVO EFFECT OF DIGITOXIN ON RAT HEART PHOSPHATIDES. G.V. Marinetti, K. Temple, and E. Stotz (Dept. of Biochem., Univ. of Rochester School of Med. and Dentistry, Rochester 20, N.Y.). *J. Lipid Research* 2, 188–190 (1961). Digitoxin was shown to increase the specific activity of heart ventricle phosphatides in rats receiving simultaneously radioactive orthophosphate and digitoxin as compared to control rats not receiving digitoxin. The increase in specific activity was demonstrated in both lecithin and phosphatidyl ethanolamine. The other heart muscle lipids were not investigated. Glycerol and ethanol, which are constituents of the vehicle in which the digitoxin is dissolved, do not alter the specific activity of the heart muscle phosphatides. The vehicle itself (without digitoxin) has some activity.

DEPENDENCE OF THE LIPOLYTIC ACTION OF EPINEPHRINE IN VITRO UPON THYROID HORMONE. A.F. Debons and I.L. Schwartz (Med. Res. Center, Brookhaven Nat. Lab., Upton, Long Island, New York). *J. Lipid Research* 2, 86–89 (1961). The influence of thyroid hormone on the epinephrine-induced release of free fatty acids (FFA) from rat epididymal adipose tissue was studied *in vitro*. Untreated tissue from euthyroid animals released only small amounts of FFA. However, the tissues responded to treatment with epinephrine with a significant increase in the rate of release of FFA, confirming observations previously reported by others. In the case of fat pads removed from hypothyroid animals, no increase in the rate of release of FFA was observed after epinephrine; in the case of fat pads removed from hyperthyroid animals, the epinephrine-induced release of FFA was markedly exaggerated. This thyroidal enhancement of epinephrine action on the fat pad was not evident when tissues were removed from euthyroid animals 3 hours after intraperitoneal injection of triodothyronine, but it was maximal in tissues removed after 15 hours from animals that had received repeated intraperitoneal injections of triiodothyronine. When triidothyronine was added *in vitro* to fat pads from euthyroid rats, the basal release of FFA was not affected nor was the normal response to epinephrine altered. These studies show that the thyroid hormone is essential for the epinephrine-induced release of FFA from adipose tissue

ON THE TURNOVER OF LONG-CHAIN FATTY ACIDS IN PLASMA. V.P. Dole and M.A. Rizack (The Rockefeller Institute, New York 21, N.Y.). *J. Lipid Research* 2, 90–91 (1961). The turnover of fatty acids released by lipolysis in the body was estimated by measuring the lipolytic activity of plasma and the rise in fatty acid concentration after an injection of heparin. The mixture of fatty acids liberated endogenously appeared to be cleared at the same rate as has been previously reported for albumin-bound, C^{14}-labeled fatty acids.

COMPOSITION OF ALDEHYDES DERIVED FROM SOME BOVINE LIPIDS. J.C.M. Schogt, P. Haverkamp Begemann, and J.H. Recourt (Unilever Research Laboratory, Vlaardingen, The Netherlands). *J. Lipid Research* 2, 142–147 (1961). The compositions of the aldehydes derived from phosphorus-free lipids of milk fat and ox heart, as well as from phosphatides of butter and ox heart, were investigated. In addition to normal aldehydes, considerable amounts of branched aldehydes were found, in which the branching occurred at carbon atoms situated α, β, and, in a few cases, γ to the terminal carbon.

PLASMA FREE FATTY ACIDS IN FASTING VITAMIN C-DEPRIVED GUINEA PIGS. P.S. Mueller and P.V. Cardon, Jr. (Lab. of Clinical Science, Nat. Inst. of Mental Health, Nat. Institutes of Health, Bethesda 14, Maryland). *J. Lipid Research* 2, 83–85 (1961). Plasma concentrations of free fatty acids (FFA) were measured in normal and scorbutic guinea pigs. In animals deprived of vitamin C for 15 or 25 days, FFA concentrations were higher than normal after a 5-hour fast. Conversely, they were lower than normal after a 29-hour fast. Plasma FFA concentrations were normal after a 29-hour fast in animals deprived of vitamin C for 25 days, but then given vitamin C at the beginning of the fasting period.

ON THE OCCURRENCE OF VITAMIN E IN THE LIVER OF DYSTROPHIC AND ANTIOXIDANT-FED RABBITS. A.S. Csallany and H.H. Draper (Univ. of Illinois, Urbana). *Arch. Biochem. Biophys.* 92, 462–466 (1961). A revised procedure for the determination of α-tocopherol which involves chromatography on paraffin-coated kieselguhr column and elution with aqueous ethanol was applied to the livers of rabbits in the vitamin E deficient state and also after regeneration with vitamin E or the synthetic antioxidant N,N'-diphenyl-p-phenylenediamine. No α-tocopherol was detected in the tissues of the deficient animals or of those cured of dystrophic symptoms with DPPD. The authors feel that these results provide evidence for the nonspecificity of the vitamin E requirement of animals and relegate against a possible role for tocopherols as cofactors in enzymic reactions.

THE PHOSPHOLIPIDS OF THE ERYTHROCYTE "GHOSTS" OF VARIOUS SPECIES. R.M.C. Dawson, Norma Hemington, and D.B. Lindsay (A.R.C. Institute of Animal Physiol., Babraham, Cambridge). *Biochem. J.* 77, 226–230 (1960). The composition of the phospholipid of erythrocyte ghosts and plasma from 6 species (man, pig, horse, cow, sheep, and goat) were measured. The percentage of lecithin in the nonruminant ghosts was over 3 times as high as that found in ruminants. The concentrations of sphingomyelin and choline plasmalogen were higher in ruminant ghosts, and consequently there were no significant differ-

ences between the concentrations of total choline-containing phospholipid in the various species. Phosphatidylethanolamine was markedly higher in the ghosts of omnivores than herbivores. Choline-containing phospholipids (mainly lecithin) accounted for over 94% of the plasma phospholipid of all species. Of the possible acidic phospholipids in the ghosts, phosphatidylserine was present at a concentration of 8.9–16% in all species, phosphatidylinositol varied from 1.6% in man to 5.8% in the goat, and phosphatidic acid was below 1.5% in all species.

THE INTRACELLULAR DISTRIBUTION OF FATTY ACIDS IN RAT LIVER. THE FATTY ACIDS OF INTRACELLULAR COMPARTMENTS. G. S. Getz and W. Bartley (University of Oxford). *Biochem. J.* **78**, 307–312 (1961). The fatty acid composition of rat-liver homogenates and subcellular fractions prepared by differential centrifuging has been measured. The mean fatty acid contents (expressed as μ moles of fatty acid/g. dry wt. of tissue) were: liver pulp 363, nuclei 265, mitochondria 384, fluffy layer 464, microsomes 525, supernatant 106. The composition of the different fractions was very similar with the main fatty acids being palmitic, stearic, oleic, linoleic, arachidonic, and docosahexanoic. Mitochondria contained the highest proportion of polyunsaturated fatty acids (43.6%). The fatty acid composition of the supernatant fat after removal of particulate material was similar to that of the food and similar to that of the adipose tissue.

THE OCCURRENCE OF UNUSUAL FATTY ACIDS IN FAECAL LIPIDS FROM HUMAN BEINGS WITH NORMAL AND ABNORMAL FAT ABSORPTION. A.T. James, Joan P.W. Webb, and T.D. Kellock (Central Middlesex Hosp., London). *Biochem. J.* **78**, 333–340 (1961). Human faecal lipids of subjects both with normal and abnormal fat absorption were found to have a fatty acid composition very different from that of the ingested fats. A variety of isomeric octadecenoic acids were present, with the double bond in positions 4, 5, 6, 7, 8, 9, 10, 11, and 12. Approximately half of these oleic acid isomers possess the *trans*-configuration. Subjects with steatorrhea did not excrete increased amounts of *trans*-acids on changing the dietary fat from butter (2–3% linoleic acid) to corn oil (51% linoleic). No support was found for the theory that *trans*-octadecenoic acids are produced by bacterial hydrogenation of linoleic acid. A new major component of faecal lipids has been shown to be 10-hydroxystearic acid, together with 6-, 7-, 8-, and 9-hydroxystearic acids as minor components. The authors suggest that these hydroxy acids are intermediates in the formation of monounsaturated octadecanoic acids from stearic acid.

DISTRIBUTION OF UNSATURATED FATTY ACID IN PYRIDOXINE-DEFICIENT HYPERCHOLESTEROLAEMIA. A. Goswami and D.P. Sadhu (Bengal Veterinary College, Calcutta 37, India). *Biochem. J.* **78**, 732–735 (1961). Pyridoxine deficiency induced a significant degree of hypercholesterolaemia in rats and there was deposition of cholesterol in aortae (thoracic and abdominal). The tetraenoic fatty acid level of serum was lowered in pyridoxine-deficient hypercholesterolaemia, but the unsaturated fatty acid spectrum of aortae was not significantly altered. The authors conclude that the hypercholesterolaemia was probably due to increased mobilization of cholesterol from the liver.

STUDIES ON VITAMIN E. 6. THE DISTRIBUTION OF VITAMIN E IN THE RAT AND THE EFFECT OF α-TOCOPHEROL AND DIETARY SELENIUM ON UBIQUINONE AND UBICHROMENOL IN TISSUES. E.E. Edwin A.T. Diplock, J. Bunyan, and J. Green (Walton Oaks Exp. Sta., Vitamins Ltd., Tadworth, Surrey). *Biochem. J.* **79**, 91–105 (1961). The distribution of vitamin E, vitamin A, ubiquinone, and ubichromenol has been studied in 14 tissues of the rat. High concentrations of vitamin E and ubiquinone were found in adrenal gland, heart, uterus, and nerve. Tissues lost their vitamin E at different rates during depletion; adrenal gland and nerve retained high concentrations of tocopherol, while uterus and liver readily lost their tocopherol. Female rats contained higher amounts of the 4 substances than male rats of the same age. Vitamin E-deficient rats had lower concentrations of ubiquinone in their tissues than either the corresponding animals whose diets had been supplemented with vitamin E or animals on the stock diet. Oral administration of vitamin E increased the ubiquinone concentration in their tissues, often accompanied by a decrease in ubichromenol concentration. Dietary selenium increased the concentration of ubiquinone in the same way as did α-tocopherol.

STUDIES ON VITAMIN E. 8. VITAMIN E, UBIQUINONE AND UBICHROMENOL IN THE RABBIT. J. Green, A.T. Diplock, J. Bunyan, and E.E. Edwin. *Ibid.*, 108–111. Four groups of female rabbits were maintained on various diets in order to study the distribution of vitamin E in their tissues. After 15 weeks, skeletal muscle in the rabbit contained little tocopherol and became depleted to exceptionally low levels. This has been related to the muscular dystrophy that occurs in rabbits. In contrast to rat uterus, the uterus in the rabbit is little affected by tocopherol. VitaminE-deficient rabbits have lower concentrations of ubiquinone in heart, liver, and skeletal muscle than animals on the same diet supplemented with α-tocopheryl acetate. In most tissues except nerve and brain, ubichromenol was also lower. Administration of single doses of vitamin E to deficient animals increased ubiquinone in all tissues except fat and also decreased ubichromenol. Even after 15 weeks on the vitamin E-deficient diet, the rabbits still contained large reserves of vitamin E in their adipose tissue.

DISTRIBUTION OF FATTY ACIDS IN LIPIDS OF RAT BRAIN, BRAIN MITOCHONDRIA, AND MICROSOMES. L.A. Biran and W. Bartley (University of Oxford). *Biochem. J.* **79**, 159–176 (1961). Lipids from all 3 tissue fractions were similar in their content of different lipid classes and in the fatty acid distribution both in total-lipid extracts and in individual lipid classes. Proteolipids resembled total-lipid extracts in their fatty acid distribution.

PROCESS AND COMPOSITION FOR LOWERING BLOOD SERUM CHOLESTEROL AND CHYLOMICRON LEVELS. L. Freedman and S.L. Shapiro. *U.S. 2,978,381.* The described composition has the following formulation (parts by weight): vitamin B_{12}, 1; desiccated liver, 87; *dl*-methionine, 110; inositol, 40; choline bitartrate, 233; safflower oil, 415; *dl*-d-tocopherol acetate, 4; pyridoxine HCl, 2.1; excipients and fillers.

CONTROLLING THE BLOOD CHOLESTEROL LEVEL BY ADMINISTRATION OF DIIODOTYROSINE POLYPEPTIDE. J. Stambul. *U.S. 2,980,585.* The oral administration of solid diiodotyrosine polypeptide (containing about 1 to 1.5 mg. of iodine) controls the cholesterol content of human blood by decreasing the concentration of *beta*-lipoproteins and increasing the *alpha:beta* lipoprotein ratio.

DRY STABLE VITAMIN A AND/OR D PREPARATION AND METHODS OF PRODUCING SAME. E.J. Ten Ham and P.L. Kring (North American Philips Co., Inc.). *U.S. 2,980,587.* A dry, free-flowing, mineral-stable vitamin preparation consists of vitamin A and/or D, a jellifiable, film-forming colloid, a carbohydrate, and, as a stabilizer, 4-methyl 2,6-ditertiarybutylphenol, in an amount of at least 2 grams per 100 S.U. of vitamin present.

MULTIVITAMIN PREPARATION AND METHOD OF MAKING SAME. R. Larde (Les Laboratoires Français de Chimiothérapie, Paris). *U.S. 2,980,588.* A process is described for the production of a concentrated, stable, readily water-dispersible multivitamin preparation containing fat-soluble and water-soluble vitamins. When diluted with water, the preparation forms an extremely fine dispersion of the fat-soluble vitamins which is readily assimilated by the body. A mixture of colloidal silica in a pharmaceutically acceptable vegetable oil is heated to a temperature of at least 100° and then cooled to cause gelling. The water-soluble vitamins are incorporated into the gelled mixture. A solution of fat-soluble vitamins in a liquid produced by partial alcoholysis of Rosaceae kernel oil with polyethylene glycol is also added to the gelled mixture.

ANTIOXIDANT COMPOSITION. L.A. Hall (The Griffith Labs., Inc.). *U.S. 2,981,628.* The described composition is a solution of ditertiary-butyl-*para*-cresol together with lecithin citrate in an edible oil.

STABLE VITAMIN A COMPOSITIONS AND METHODS FOR MAKING SAME. W.A. Winsten. *U.S. 2,982,691.* New stabilized vitamin A compositions in finely divided rough-shaped non-spherical form consist of a source of vitamin A, a waxy solid, a vegetable flour, and a polyethylene gelling resin having a molecular weight in the range of 2,000–24,000.

PROCESS OF MODIFYING PHOSPHATIDES. J. Eichberg (American Lecithin Co.). *U.S. 2,983,612.* Commercial phosphatides are mixed with 1 to 4 times their weight of water, treated with 2% of dried active yeast, and heated for 2 to 4 hours at 80–130°F.

• Drying Oils and Paints

PAPER CHROMATOGRAPHY IN THE AREAS OF FATS. XLII. A CONTRIBUTION TO THE ANALYSIS OF ALKYD RESINS. H.P. Kaufmann and F.J. Buscher (Deut. Inst. Fettforschung, Münster). *Fette, Seifen, Anstrichmittel* 62, 1141–1143 (1960). The authors describe the first results of the applications of qualitative and quantitative paper chromatographic analysis to the investigation of various alkyd resins. Several different alkyd resins were saponified on paper and the resulting fatty acids separated paper-chromatographically. Quantitative estimations

were done photometrically after developing the spots with copper acetate and an alcoholic solution of rubeanic acid. The hydrogenation difference method using colloidal palladium was not successful for the determination of critical fatty acid pairs.

PAINT LATICES FROM SUPER BODIED OILS. C.E. Penoyer (Sherwin-Williams Co.). *U.S. 2,978,346.* The disperse phase of the oil-in-water emulsion consists of a vacuum and heat-bodied linseed oil, free from gel particles having a viscosity of greater than 50 minutes but less than 75 minutes which has been reduced to not less than 80% non-volatile content with a volatile hydrocarbon containing a minor amount of an oxyalkylated monoalcohol with 1 to 3 carbons. The continuous aqueous phase of the emulsion consists of water, from 1 to 5% of a nonionic emulsifying agent having a hydroxyl number between 39 and 43, and 6–10% by weight of oil of an alkali metal salt of a polymerized drying oil fatty acid. The emulsion also contains an alkali metal phosphate in a quantity sufficient to maintain the pH between 8.0 and 9.5. The disperse oil phase is present in the range of 40 to 60% by weight of the total product.

INCORPORATING OIL IN HARDBOARD. H.H. Young and E.J. Majka (Swift and Co.). *U.S. 2,978,382.* A method of manufacturing an oil-tempered fibrous hardboard consists of the following steps: (1) forming a water slurry of fibrous material with a binder dispersed throughout; (2) precipitating the binder onto the fibrous material; (3) forming a non-emulsion suspension by suspending in the water slurry a finely divided fat-retaining material containing a substantial amount of a drying oil; (4) felting the fibrous material and the oil-soaked fat-retaining material onto a screen to form a fibrous mat; (5) hot pressing the fibrous mat to substantially remove the excess water and to distribute the drying oil throughout the mat; (6) heating the mat for a period of time sufficient to polymerize the drying oil.

METAL PRIMERS AND COATING COMPOSITIONS MODIFIED WITH LOWER ALKYL ESTERS OF UNSATURATED ALIPHATIC ACIDS. K.F. Atwood, A.K. Long, and O.F. Shobe (Glidden Co.). *U.S. 2,978,424.* A coating composition adapted for use as a protective coating in direct contact with corroded metal such as rusty ferrous metal consists of: (1) an organic-solvent solution of film-forming weather-resistant material of the air-drying type; (2) dispersed pigment including anti-corrosive pigment in an amount sufficient to bring the pigment volume into the range of 25 to 60% of the total volume; and (3) a liquid wetting additive in an amount corresponding to 5–10% of the composition. The wetting additive is at least one ester of an aliphatic or cycloaliphatic monohydric alcohols having up to 8 carbon atoms and a monocarboxylic acid of the drying or semi-drying oil type.

ALKYD RESINS MODIFIED WITH 2,4-DICHLOROBENZOIC ACIDS. R.L. Heinrich, D.A. Berry, and R.J. Dick (Esso Res. & Eng. Co.). *U.S. 2,979,472.* The described resin is the intercondensation product of about 3.1 to 3.4 mol equivalents of a polyol containing an average of 2.5 to 4.5 hydroxyl groups per molecule with from 2 to 2.5 mol equivalents of a polycarboxylic acid modified with 0.5 to 1 mol equivalents of a material consisting of 50 to 60 mol % of an unsaturated glyceride oil fatty acid and 50 to 40 mol % of 2,4-dichlorobenzoic acid. *U.S. 2,979,473* and *2,979,474* describe similar resins in which the modifiers are 2,4-dimethyl benzoic acid and *p*-bromobenzoic acid, respectively.

COATING COMPOSITIONS COMPRISING AN OIL-MODIFIED ALKYD RESIN AND AN ETHERIFIED MELAMINE-FORMALDEHYDE RESIN. H.M. Culbertson and B.L. Williams, Jr. (Monsanto Chemical Co.). *U.S. 2,980,636.* A protective coating composition consists of an organic solvent solution of a ternary mixture of (1) an oil-modified alkyd resin, (2) an etherified formaldehyde condensate of melamine and (3) an N-substituted melamine or an unetherified formaldehyde condensate of an N-substituted melamine. COATING COMPOSITIONS CONTAINING AMINOPLAST RESINS. *U.S. 2,980,637* describes a composition which is a mixture of (1) an oil-modified alkyd resin, (2) an etherified formaldehyde condensate of an N-substituted melamine and (3) an etherified formaldehyde condensate of melamine.

ALUMINUM-CONTAINING NON-LEAFING ALKYD RESIN PROTECTIVE COATING. W. Polovina (General Electric Co.). *U.S. 2,980,638.* The described coating consists of the product obtained from reacting 10–20% by weight of glycerin, 30–40% by weight of phthalic anhydride, 18–30% by weight of rosin, and 15–25% of drying oil to which is added from 1 to 3 pounds of finely divided non-leafing aluminum particles per gallon. The aluminum particles should be of a size to pass through a 300-mesh screen.

ALKYD RESINS MODIFIED WITH 2,5-DIHYDROXYBENZOIC ACID. R.L. Heinrich, D.A. Berry, and R.L. Christian (Esso Res. & Eng. Co.). *U.S. 2,981,705.* An alkyd resin composition consists of the intercondensation product of 3.1 to 3.4 mol equivalents of a polyol containing an average of 2.5 to 4.5 hydroxyl groups per molecule with 2 to 2.5 mol equivalents of a polycarboxylic acid and, correspondingly, from 1 to 0.5 mol equivalent of a modifier component consisting of about 35–45 mol % of an unsaturated fatty acid and about 65–55 mol % of 2,5-dihydroxybenzoic acid. Patents *2,981,706–2,981,708* describe resins modified with *p*-hydroxyphenylacetic acid, 5-bromosalicylic acid, and 3-hydroxy-2-naphthoic acid, respectively.

CATALYZED UREA COATING COMPOSITION. N.I. Gaynes. *U.S. 2,982,745.* A coating composition capable of forming a rapidly air-drying film consists of about 40% of an alkyd resin derived from dehydrated castor oil, about 40% of an amino urea-formaldehyde resin, 0.6% of an ethyl acid phosphate, 9.7% butanol, and about 9.7% xylol. The composition will withstand lengthy storage in the liquid state without deterioration and after application will show no loss of gloss, hardness, toughness, chemical resisting properties, color retention or weatherability as compared with a film formed with a freshly manufactured composition.

PROCESS FOR PREPARING POST-FORMED STYRENATED OIL-MODIFIED ALKYD RESINS UTILIZING MOLTEN PHTHALIC ANHYDRIDE. W.F. Hart (American Cyanamid Co.). *U.S. 2,982,746.* A polymerizable styrene is heated and polymerized in the presence of a material such as a drying or semi-drying glyceride oil, glyceride fatty acids or their monoglycerides, and a polymerization catalyst until polymerization is substantially complete. A saturated aliphatic polyhydric alcohol having a hydroxy average functionality greater than 2 is added and the mixture heated until an acid number below 20 is obtained. Molten phthalic anhydride is added while holding the charge at a temperature between 220–240° and the heating continued to a temperature of 260–280° until an acid number between 5 and 20 is reached.

MODIFICATION OF ALKYD RESINS WITH 4-BIPHENYL BENZOIC ACID. R.L. Heinrich, D.A. Berry, and R.J. Dick (Esso Res. & Eng. Co.). *U.S. 2,982,747.* The described resin comprises the intercondensation product of about 3.1 to 3.4 mol equivalents of a polyol containing 2.5–4.5 hydroxyl groups per molecule with 2 to 2.5 mol equivalents of a polycarboxylic acid and from 1 to 0.5 mol equivalents of a modifier component. This modifier consists of about 30 to 60 mol % of an unsaturated glyceride oil fatty acids portion and, correspondingly, about 70 to 40 mol % of an aromatic monocarboxylic acid component containing from 40 to 100 mol % of 4-biphenyl carboxylic acid. *U.S. 2,982,748* describes a similar alkyd in which the modifier contains *m*-bromobenzoic acid.

MODIFIED POLYESTER RESINS DERIVED FROM (1) ETHYLENICALLY UNSATURATED ALIPHATIC DICARBOXYLIC ACIDS AND POLYHYDRIC ALCOHOLS ESTERIFIED WITH AT LEAST ONE SUBSTANTIALLY PURE FATTY ACID OF 6 TO 12 CARBON ATOMS AND THEN (2) CROSSLINKED WITH A VINYL MONOMER. G. Wetroff and I. Raitzyn (Pechiney Compagnie de Produits Chimiques et Électrométallurgiques). *U.S. 2,983,695.* A modified and crosslinked polyester resin is obtained by (1) forming a polyester resin by first condensing (a) an ethylenically unsaturated aliphatic dicarboxylic acid with (b) a preformed monoglyceride ester of a fatty acid of 6 to 12 carbon atoms so that at least 1 hydroxyl radical is esterified with the fatty acids and then (2) catalytically crosslinking the formed polyester resin with a vinyl monomer.

PAINT VEHICLE WITH FUNGICIDAL PROPERTIES. L.A. Goldblatt and L.L. Hopper, Jr. (Secretary of Agriculture, U.S.A.). *U.S. 2,984,632.* A drying oil, drying oil fatty acids, or mixture of drying oils and fatty acids is heated with hexachlorocyclopentadiene and a film-forming resin containing hydroxyl groups reactive with the acid groups in the drying oil-fatty acid mixture.

NOVEL FATTY ACID VARNISHES. F.J. Hahn (Monsanto Chemical Co.). *U.S. 2,984,633.* An air-drying ester is formed by the reaction of one mole of an essentially linear polymer containing hydroxyl groups and at least 1.5 moles of unsaturated monobasic fatty acids containing at least 12 carbon atoms and having an iodine number of at least 85. The polymer is prepared by subjecting a binary interpolymer of at least 60% of an *alpha, beta* ethylenically unsaturated aromatic hydrocarbon (styrene, *alpha*-alkyl ring substituted alkyl styrenes) and not more than 40% of an *alpha, beta* ethylenically unsaturated aldehyde (acrolein, methacrolein) to reducing conditions of sufficient severity to reduce all of the carbonyl groups of the interpolymer to hydroxyl groups.

COPOLYMERS OF VINYL ALCOHOL AND VINYL ESTERS OF LONG-CHAIN FATTY ACIDS AND PROCESSES FOR PREPARATION THEREOF. E.F. Jordan, Jr., W.S. Port, and D. Swern (Secretary of Agri-

culture, U.S.A.). *U.S. 2,984,652.* The described process comprises heating a coplymer of vinyl formate and a vinyl ester of a saturated fatty acid having 12–18 carbons with a reagent selected from the group consisting of dilute aqueous acid, water in the presence of an emulsifying agent, and alcohol in the presence of an acid catalyst, to remove all of the formate groups from the treated copolymer without affecting significantly the ester groups of the fatty acid. The copolymer thus prepared exhibits improved water resistance.

• Detergents

EFFLORESCENCES FROM CONCENTRATED TRANSLUCENT SOAPS: STUDY OF THIS PHENOMENON BY GAS CHROMATOGRAPHY. A. Prevot and F. Cabeza (Laboratorie J. Ripert, Inst. des Corps Gras, Paris). *Rev. Franc. Corps Gras* 7(5), 262–266 (1960). On standing, cakes of concentrated translucent soap may become coated with an undesirable white fluffy coating resembling a mold several millimeters thick. Microscopic examination shows a fibrous, hair-like structure, removable only by shaving the soap. The efflorescent material appears to be a dry, practically pure soap with lower m.p. than that of the main body of the soap. To determine the identity of the coating, samples of the efflorescent layer, the surface to which it was attached, the area immediately below, and the heart of the cake of soap were converted to the fatty acids, the latter were methylated and samples of the Me esters were analyzed by GLC. Analytical conditions: Jobin & Yvon type "Bretagne" instrument, sample size 1 microliter, column 4 m., packed with 25% diethylene glycol succinate on C-22 Sil-O-Cel, temp. 225°, He flow rate 2.8 l./hr., initial pressure 1.200 g./ sq. cm. and exit pressure 0. Chromatograms of the efflorescent material and of the heart of the soap are reproduced. Amounts of fatty acid esters in each were determined quantitatively from peak areas. Results showed the efflorescent material was enriched in unsaturated esters and contained virtually no saturated esters. Causes of the phenomenon are discussed.

THE CHEMISTRY AND MANUFACTURE OF SOAP. J.P. Wallis (27 Windmill Way, Tring, Herts). *Research (London)* 14, 188–192 (1961). The article describes in general terms the theory and practice of soap making. Discussed are raw materials, tests for fatstocks and methods of manufacture for household soaps, toilet soaps, soap powders, soap flakes, shaving soaps and creams, and shampoos.

SCORCH-RESISTANT TEXTILE SOFTENING FINISH COMPOSITION. A.W. Lanner and R.A. Olney (Procter & Gamble Co.). *U.S. 2,978,408.* The described composition consists of (1) from 10 to 50% by weight on total composition of a mixture of high molecular weight fatty mono-, di-, and triglycerides; (2) from 10 to 50% on triglyceride mixture of a water-soluble soap of high molecular weight fatty acids; (3) at least one water-soluble heat labile acid-forming salt selected from the group consisting of ammonium salts and amine salts at 0.2 to 3% of the glyceride and soap mixture, and in an amount sufficient to lower the pH of the textile finish to less than 9 when the finish is subjected to elevated temperatures.

GUANIDINE SOAPS AS DRY CLEANING DETERGENTS. R.J. Chamberlain (American Cyanamid Co.). *U.S. 2,978,415.* Soiled fabrics are washed in a dry cleaning solvent containing detergent quantites of the guanidine soap of a fatty acid mixture containing about 30–60% of oleic acid, about 30–60% of linoleic acid, and not more than about 15% of saturated fatty acids.

CONCENTRATED AQUEOUS DETERGENT COMPOSITION. M.M. Fein and C.A. Friedman (Allied Chemical Corp.). *U.S. 2,978,416.* The detergent composition consists of (1) about 30% of a mixture of the sodium salts of higher alkylbenzene sulfonic acids having an average of 12 to 16 non-aromatic carbon atoms; (2) about 5% of the sodium salt of toluene sulfonic acid; and (3) 1 to 2% of a polyethylene glycol selected from the group consisting of diethylene glycol, triethylene glycol, and mixtures of polyethylene glycols which have an average molecular weight of 200 to 1250 and a major proportion of which have molecular weights within the required range.

LIQUID WASHING COMPOSITION. W. Silberman. *U.S. 2,979,466.* A liquid washing composition contains the following constituents: 4.5–6.0% by weight of sodium orthosilicate containing about 42% Na_2O, 20% SiO_2, and 38% H_2O; 2.5–3.5% of sodium metasilicate pentahydrate containing about 29% Na_2O, 29% SiO_2, and 42%H_2O; 5–7% of potassium tripolyphosphate containing about 47% P_2O_5; 14–18% of an alkali metal salt of an aryl sulphonate; 70–80% water; and 4–6% of an organic wetting agent consisting of (1) 65–75% by weight of a condensation product of ethylene oxide and polyoxypropylene with an average molecular weight of the polyoxypropylene constituent of 1500–1800 and with an average polyoxyethylene content of 20%, (2) 8–12% of a condensation product of ethylene oxide and polyoxypropylene with an average polyoxyethylene content of 10%, and (3) 15–20% of iso-octyl phenyl polyethoxy ethanol.

NITROGEN-CONTAINING POLYOXYALKYLENE DETERGENT COMPOSITIONS. L.G. Lundsted (Wyandotte Chemicals Corp.). *U.S. 2,979,528.* A surface active mixture of conjugated polyoxyalkylene compounds consists of oxypropylene groups, oxyethylene groups and the nucleus of a nitrogen-containing reactive hydrogen compound having not more than 6 carbon atoms per molecule (ammonia, primary alkyl amines, alkylene polyamines, alkanolamines, piperazine, alkyl piperazines, hydroxylamine, aminophenol). The structure of the compounds is such that all of the oxypropylene groups are present in oxypropylene chains that are attached to the reactive hydrogen compound and all of the oxyethylene groups are present in oxyethylene chains that are attached to the ends of the oxypropylene chains.

POLYOXYALKYLENE ETHER SURFACE ACTIVE COMPOSITIONS. H.A. Bruson and T.P. O'Day (Olin Mathieson Chemical Corp.). *U.S. 2,979,533.* A water-dispersible product has the formula $[R-(OCH_2CH_2)_nO]_2CH-Y$. R is a hydrophobic organic radical (an aliphatic saturated hydrocarbon radical containing 13 carbons or a phenyl radical having an alkyl substituent containing 4 to 9 carbons); Y may be hydrogen, methyl or ethyl radical; and n is a number from 5 to 10.

SPOTTING COMPOSITION. M. Bittenfield. *U.S. 2,980,621.* A spotting composition for use in cleaning of garment material consists of, in % by liquid measure per gallon: sulphonated castor oil, 12 to 50%; 28% acetic acid, 10 to 25%; 26% ammonia, 5 to 38%; and soap solution, 15 to 65%. The soap solution, contains (by weight to a gallon of water): laundry soap, 1 to 4 oz.; sodium perborate 1 to 3 oz.; and table salt, 1 to 8 oz.

DRY CLEANING COMPOSITIONS. J.P. Miller III (General Aniline & Film Corp.). *U.S. 2,980,624.* The surface active agent mixture contains at least 15% of a polyoxyalkylated fatty amine containing from 14 to 53% alkylene oxide and at least 35% octadecadienyl amine. The balance of the composition is a mixture of an anionic and an alkyl aryl polyoxyalkylene glycol ether nonionic surface active agent, the components of the mixture being present in the ratio of from 1:9 to 1.5:1. The anionic surface active agent is selected from the group consisting of the sulfate and phosphate esters of alkyl aryl polyoxyalkylene glycols.

DETERGENT COMPOSITION. W.C. York and L.L. Osipow (W.R. Grace & Co.). *U.S. 2,291,691.* A detergent composition consists essentially of urea and a mono fatty acid ester of diglucose ureide in which the acyl moiety attached to the glucose group of the ester contains from 8 to 24 carbon atoms in a 1 to 49:1 weight ratio respectively.

DETERGENT COMPOSITIONS. H.S. Stillo, R.S. Kolat, and W.R. Nummy (Dow Chemical Co.). *U.S. 2,981,692.* The described composition consists of a synthetic anionic or nonionic synthetic organic detergent and as an anti-redeposition agent a composition selected from the group consisting of a polymeric monovinyl ether of diethylene glycol having a free hydroxyl content between 9 and 12.8% and a viscosity between 1.5 and 20 centipoises (10% solution in water) and mixtures of the ether (at least 8 weight %) with a detergent grade sodium carboxymethyl cellulose. The ratio of the anti-redeposition agent to the detergent ranges between about 1:10 and 1:80.

DETERGENT MILLED BAR AND PROCESS OF PREPARING SAME. J. Blinka and P.W. Grounds, Jr. (Procter & Gamble Co.). *U.S. 2,982,735.* A detergent milled bar having a characteristic soaplike feel contains 10–35% of a normally solid, water-soluble sodium soap and 15–40% of a normally solid anionic synthetic detergent comprising a water-soluble, alkali metal salt of an organic sulfuric reaction product and a gelatinized nonwaxy starch. The gelatinized starch is characterized by the disappearance of anisotropy and constitutes not less than 15% nor more than 70% of the bar.

DETERGENT BARS. F.E. Boettner and J.L. Rainey (Rohm & Haas Co.). *U.S. 2,982,737.* About 50 to 70 parts by weight of urea and 20 to 30 parts of N-methyl-N-sorbityl lauramide or N-methyl-N-sorbityl myristic acid amide are heated together until a reaction takes place and a clear melt is formed. About 30 to 40 parts of sodium lauryl sulfate is mixed with the reaction product to again form a clear melt. The mixture is cooled and kneaded until it becomes sufficiently stiffened to be formed into the desired bar shape.