ing from 8 to 61% of saturated acids in the total acids), disaturated glycerides may form over 80% of a fat whereas diunsaturated glycerides never exceed 45-50%; conversely monounsaturated glycerides may form over 80%, but monosaturated glycerides never more than 45-50% of a natural fat. Hence, according to Kartha, saturated and unsaturated acids behave entirely differently as regards their distribution in mixed glycerides.

As stated above, no such difference is exposed in studies of fats made by the modern crystallization techniques. What the latter have revealed is that each acid plays an individual part in its distribution in mixed glycerides, that therefore (although no difference in general behavior exists between one acid and another) it is necessary to consider each acid separately, and that it is not sufficient to consider acids in groups (*e. g.*, saturated and unsaturated). Such collective treatment ("GS_3," "GS_2U," etc.) was all that was possible 20 years or so ago, but the later advances in low-temperature crystallization have made it somewhat out of date.

2. In my experience the danger of hydrolysis of azelao-glyceride products of oxidation is likely to operate to the greatest extent during the removal of these from neutral (trisaturated) glycerides when considerable emulsification and interfacial dispersion of the azelao-glycerides takes place. Hydrolysis is more probable at this stage than in the actual oxidation in acetone solution. Will Dr. Vander Wal or Dr. Kartha explain how the presence of acetic acid in the acetone solution during oxidation protects the azelao-glycerides from hydrolysis in the slightly alkaline emulsions produced during their subsequent removal?

Finally, Dr. Vander Wal agrees with me (5) that Kartha's procedure (and also, I feel, the crystallization technique) should receive scrutiny from independent workers in this field. Actually, before my previous letter appeared in the Journal, Luddy, Fertsch, and Riemenschneider (7) had published the results of a study of four fats by both methods. The results were "in fair agreement for lard, chicken fat and cottonseed oil, but not for palm oil." The calculated values for glyceride distribution according to patterns either of random distribution or of distribution on Kartha's hypothesis "however did not agree well with those obtained experimentally by either method, except for one of the four fats, chicken fat."

If the glyceride distribution of natural fats is of any worthwhile interest or value, it is earnestly to be hoped that further work on the lines indicated by Luddy *et al.* will be pursued by them and also by other independent investigators in regard both to Kartha's oxidation procedure and to resolution by crystallization (the latter, of course, as in the work of Luddy *et al.*, carried out on a rational and intensive basis).

As Dr. Vander Wal says, until Kartha's procedure has been thoroughly tested, the theory of glyceride structure dependent upon it cannot be evaluated. For my part, I should be most surprised to find that the whole range of natural fats, so varied in composition and structure, can ever be brought within the scope of a single formula of computation, so mechanical as that proposed by Dr. Kartha. But in my opinion little will result by consuming further time in criticism from one side or the other. Let the facts be ascertained by further scrutiny from competent investigators. The modern "crystallization" techniques will be justified by the results and will doubtless, during the process, be found capable of further development and improvement.

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T. P. HILDITCH
Birkenhead, England

January 31, 1955

ABSTRACTS . . . . R. A. Reiners, Editor

• Oils and Fats

Ralph W. Planck, Abstractor
Dorothy M. Rathmann, Abstractor
Sin'itiro Kawamura, Abstractor

The branched-chain fatty acids of butterfat. 6. Further investigations on the C_{15} saturated acids. F. B. Shorland, T. Gerson, and R. P. Hansen (Fats Res. Lab., Dept. of Scientific and Ind. Res., Wellington, New Zealand). *Biochem. J.* **59**, 350-2 (1955). Two C_{15} branched-chain acids, (+)-12-methyltetradecanoic acid and 13-methyltetradecanoic acid, together with *n*-pentadecanoic acid, have been isolated from butterfat by methods which did not involve hydrogenation. Expressed as a percentage of the total fatty acids, the amounts of (+)-12-methyltetradecanoic acid, 13-methyltetradecanoic acid and *n*-pentadecanoic acid were 0.43, 0.37 and 0.82 per cent, respectively.

The absorption of aliphatic acids from aqueous solution by porous carbons. J. L. Morrison and D. M. Miller (Dept. of Chem., Univ. of Alberta, Edmonton, Alberta). *Can. J. Chem.* **33**, 330-343 (1955). The maximum adsorptions of the lower members of the mono- and di-carboxylic acids from aqueous solutions were determined for coconut charcoals of different degrees of activation. Based on these results, a method for estimating pore size was applied to the more finely porous charcoals. An alternation in the maximum amounts of adsorbed acids was observed with the more active charcoals. Acids with an even number of carbon atoms had larger adsorptions than acids with an odd number. The alternation was much more marked for the di- than for the mono-carboxylic acids. A remarkable correlation between the alternation of absorptions and of melting points of both acid series was observed. The explanation offered is based on rotational motion of molecules in the solid state as against the widely held explanation based on tilting of molecular chains.

Lipids of the female reproductive organs in Ascaris lumbricoides. D. Fairbairn (McGill Univ., Macdonald College, Que.). *Can. J. Biochem. & Physiol.* **33**, 31-7 (1955). The female reproductive organs of *Ascaris lumbricoides* represented one-fifth of the total fresh weight and contained two-thirds of the total body lipids. These lipids consisted of saponifiables (79%) and unsaponifiables (21%). Phospholipids of the lecithin-cephalin type were present, as well as an abundance of triglycerides. The latter contained unusually large amounts of C_2-C_6 saturated volatile acids among which acetic and hexanoic acid predominated. Ascaryl alcohol was the major constituent of the large unsaponifiable fraction, and on the basis of previous chemical analyses and of infrared spectra a hypothetical structure is proposed. A sterol mixture containing significant proportions of both saturated and unsaturated components was also isolated, but not identified further.

The estimation of unsaturated fatty acids by reversed-phase partition chromatography. W. Mary L. Crombie, R. Comber, and S. G. Boatman (Dept. of Botany, Univ. of Southampton). *Biochem. J.* **59**, 309-316 (1955). A method has been devised for the analysis of milligram quantities of fatty acid mixtures containing both saturated and unsaturated acids. The most widely distributed unsaturated fatty acids are separable from each other by the present chromatographic technique but not from certain fatty acids which are eluted at similar rates. The latter are estimated by a second chromatogram following oxidation by alkaline permanganate, which removes the unsaturated material. The amount of unsaturated fatty acids are then determined by difference. The method has been tested on standard fatty acid mixtures, and on the fatty acids from a number of natural oils. It gives good agreement with other techniques.

Antioxidant properties of fish liver oils. I. Antioxidant properties of fatty acids. Shinko Tateno, Haruo Tanaka, and Manabu Kitamikado. *Vitamins* **7**, 633-5 (1954); *Compl. Chem. Abst. Japan* **29**, 52 (1955). The stability of vitamin A in liver oils depends on the degree of unsaturation of fatty acids, free fatty acid content, and peroxides as well as the presence of antioxidant substances. Examination with various liver oils, vegetable oils, and fatty acids showed that vitamin A was far more stable with solid fatty acids than with liquid acids and it was more stable with mixed fatty acids than with stearic acid. The higher the degree of unsaturation of fatty acids, the greater the decomposition of vitamin A. However, the oils with higher iodine no. did not necessarily oxidize vitamin A more rapidly.

II. Unsaponifiable matter and a distillate fraction of liver oil of aizame (Centrophorus atromarginatus). *Ibid.* 636-8, Unsaponifiable matter of vegetable oils had considerable antioxidant properties possibly due to tocopherol. No substance could be observed with sufficient antioxidant property in liver oils, but an active substance soluble in 94% ethanol was noted to exist in a distillate fraction of liver oil of *aizame.*

The reaction of thiobarbituric acid (TBA) with fats in foods. I. The reaction of TBA with horse fat. A new method for detecting horse meat. Masao Fujimaki and Satoshi Odagiri (Univ. Tokyo). *J. Agr. Chem. Soc. Japan* **28**, 963-7 (1954). The TBA (2-thiobarbituric acid) test for the determination of the oxidation of milk fat was applied to horse fat. It was found that horse fat showed stronger color reaction than beef tallow and lard. The color produced with TBA was proportional with horse fat content in the mixture with beef. Linolenic acid showed the highest value in TBA test among C_{18} fatty acids which seemed to concern with color development by horse meat. The absorption spectrum of the color produced by horse fat was similar to that by linolenic acid in the range of 400 to 600 mμ with the maximum at 535 mμ. The TBA color value increased in parallel with peroxide value when linolenic acid was autoxidized, but the TBA color value remained almost constant while peroxide value increased when oleic or linoleic acid was autoxidized.

II. The reaction of TBA with oxidized milk fat. Choten Inagaki, Keiko Tarao, and Masao Fujimaki. *J. Agr. Chem. Soc. Japan* **28**, 967-71 (1954). TBA color values were measured on several milk products. The higher TBA color values of sweetened milk products were due to added sucrose. The influence of storage methods on the oxidation of fat in dry milk enriched with vitamin A was studied.

The action of fat splitting by rice bran. Jun'ichi Kawai (Miyoshi Chem. Co., Tokyo). *J. Oil Chemists' Soc., Japan* **3**, 203-6 (1954). When equal amounts of rice bran and defatted rice bran were mixed, the increase in acid no. of the fat of the former was accelerated by the latter. Similar effect was observed of defatted rice bran when mixed with olive oil, beef tallow, or coconut oil, while only slight fat-splitting effect was observed when mixed with rice oil ethyl ester, sperm whale oil, or Japan wax. The fat-splitting effect was greater with defatted rice bran from the bran with higher acid no.

The stability of natural fats as affected by the interaction of phospholipides, carotenoids, and tocopherols. W. H. Wingerd (Univ. of Illinois, Urbana). *Univ. Microfilms* (Ann Arbor, Mich.). Pub. No. 7009, 74 pp.; *Dissertation Abs.* **14**, 229-30 (1954).

Peanut butter. VIII. Effects of processing and storage on vitamin A incorporated in peanut butter. R. K. Willich, N. J. Morris, R. T. O'Connor, and A. F. Freeman (Southern Utilization Research Br., U. S. Dept. of Agr., New Orleans, La.). *Food Tech.* **8**, 381-384 (1954). In the continuous manufacture of vitamin A-fortified peanut butter 93-5% of the vitamin was retained during processing, the losses being attributed to frictional heat and inclusion of atmospheric oxygen. Losses were slightly lower at processing temperatures of 140-160°F. The vitamin A content of the product dropped but little (76 to 67-72 U.S.P. units/g.) during storage for 6 months at 80° or 100°F.

A rapid test for distinguishing between butter fat and fats from plant and other animal sources. W. L. Nelson (Cornell Univ., Ithaca, N. Y.). *Food Tech.* **8**, 385-386 (1954). The test is based on the fact that milk fats contain short chain fatty esters which will form highly colored water-soluble hydroxamic acid-iron complexes.

The fractionation of seal oil by means of furfural. L. C. Dugal (Gaspe Fisheries Expt. Sta., Grande Riviere, Quebec). *Fisheries Research Board Can., Progr. Repts. Atlantic Coast Stas.* **57**, 3-4 (1953). On cooling a warm solution of seed oil in furfural there separate two layers containing oil of differing iodine values. From a 50% solution of an oil of iodine value 148 there was obtained in the lower layer an oil of iodine value 183.

Organic peroxides. IV. Higher dialkyl peroxides. F. Welch, H. R. Williams, and H. S. Mosher (Dept. of Chem. and Chem. Eng., Stanford University, Stanford, Calif.). *J. Amer. Chem. Soc.* **77**, 551-54 (1955). Several new primary and secondary saturated dialkyl peroxides have been prepared by the direct alkylation of hydrogen peroxide with two equivalents of alkyl methanesulfonate in homogeneous methanol-water-potassium hydroxide solution. These peroxides have been found to be relatively stable to mineral acids but labile to alkali and to resemble di-t-butyl peroxide in their thermal stability and other observed properties.

Cholesterol esterases. VI. Relative specificity and activity of pancreatic cholesterol esterase. L. Swell and C. R. Treadwell (Dept. of Biochem., School of Med., George Washington University, Washington, D. C.). *J. Biol. Chem.* **212**, 141-150 (1955). The synthesis and physical properties of a series of thirteen fatty acid esters of cholesterol were described. The optimal pH for hydrolysis by pancreatic cholesterol esterase was 6.6 for each of the series of esters. In esterifying systems with the same series of acids and free cholesterol the observed optimal pH varied from 6.1 for oleic to 4.7 for acetic.

The synthesis of α-α'-thio-di-n-caproic acid. A. W. Schwab (Northern Utilization Research Branch, Peoria, Ill.). *J. Amer. Chem. Soc.* **77**, 761 (1955). Sulfur compounds of the tridentate class having two carboxy groups in α- or β-position to the coordinating atom have been found to be effective in stabilizing vegetable oils. This paper presented the procedure for the preparation of a new oil-soluble compound which met this structural requirement.

Determination of high molecular weight ketones. L. D. Metcalfe and A. A. Schmitz (Research Division, Armour & Co., Chicago, Ill.). *Anal. Chem.* **27**, 138-39 (1955). A simple rapid method for the determination of high molecular weight ketones used hydroxylamine hydrochloride and a high molecular weight amine in nonaqueous solvents. The method has been used to determine varying amounts of carbonyl compounds in mixtures, and has been used successfully as a control procedure.

Epoxy compounds from unsaturated fatty acid esters. R. J. Gall and F. P. Greenspan (Buffalo Electro-Chemical Co., Div. of Food Machinery & Chemical Corp., Station B, Buffalo 7, N. Y.). *Ind. Eng. Chem.* **47**, 147-48 (1955). A successful procedure for the *in situ* epoxidation of unsaturated fatty acid esters has been developed employing acetic acid and hydrogen peroxide. Hydrogen peroxide was added to an acetic acid solution of the unsaturated fatty acid ester, in the presence of sulfuric acid, at 60° to 70°. Optimum yields of epoxy compound were formed with molar ration of 0.5 acetic acid to 1 of ethylenic unsaturation in the presence of an inert solvent—e.g., benzene; 2% sulfuric acid on the weight of acetic acid—hydrogen peroxide mixture was employed as a catalyst.

The lipids in flour: Oxidative changes induced by storage and improver treatment. T. Moran, J. Pace and E. E. McDermott (Research Assoc. of British Flour Millers, Cereals Research Station, St. Albans). *Nature* **174**, 449-52 (1954). While oxidative deterioration of lipids was the factor limiting the prolonged storage of flour yet some degree of oxidation appeared to be associated with the improvement in baking quality which occured when flour was stored in air or when it was treated with certain chemical improvers. In nine days the peroxide value of the extract of fresh untreated flour increased only slightly; there was a slow increase in the extract of five-week old untreated flour, a more rapid one with an eight-month old untreated flour. The value increased most rapidly in the extracts from flours treated with nitrogen trichloride and chlorine dioxide. One practical application of these observations was that they indicated the basis of a method of deciding whether or not a flour has been treated with one of the gaseous improvers (nitrogen trichloride or chlorine dioxide).

Fat separation in evaporated milk. III. Gravity separation and heat stability. R. B. Maxcy and H. H. Sommer(Dept. of Dairy and Food Industries, Univ. of Wisconsin, Madison). *J. Dairy Sci.* **37**, 1061-70(1954). The fundamental factors governing fat separation were considered in light of the normal commercial processing methods. During sterilization there was an increase in viscosity; this was desirable for preventing fat separation during storage. Sterilization produced an additional reaction, which gave an increased retardation of fat separation. This phenomenon may be explained by assuming an increase in the density of the fat globule mass. In harmony with the preceding supposition, there was considerable doubt about the feasibility of separation of milk for homogenizing the cream alone. The most important factor governing fat separation was effective homogenization. In this respect the condition and temperature of the medium were extremely critical. At higher temperatures, homogenization was more effective. The maximum effectiveness of the homogenizer would be obtained if all known factors were adjusted to ensure complete dispersion of the butterfat. The state of dispersion of the butterfat was of additional importance, since it affected the heat stability during sterilization. This work also showed that under certain conditions of homogenization, there was an increase in the heat stability.

A quantitative study of the autoxidation products of elaidic acid. G. King(Dept. of Biochem., St. Mary's Hospital Medical School, Paddington, London, W. 2). *J. Chem. Soc.*, **1954**, 2114-22. Elaidic acid has been oxidized with gaseous oxygen at 47° and at 78°, with and without a cobalt catalyst. Confirmatory evidence has been obtained for the formation of ketol derivatives, and formic acid has been identified among the volatile autoxidation products. Methods of estimating ketol and other carbonyl compounds have been developed, and the course of oxidation has been followed by the systematic quantitative analysis of the products.

Reduction of serum lipides and lipoproteins by ethionine feeding in the dog. H. Feinberg, L. Rubin, R. Hill, C. Entenman, and I. L. Chaikoff(Dept. of Physiology of the School of Med., Univ. of Calif., Berkeley). *Science* **120**, 317-18(1954). The effects of daily oral administration of 125 mg. of DL-ethionine upon the serum lipides and lipoproteins of dogs were studied. The feeding of the ethionine resulted in a prompt reduction in the levels of serum fatty acids, phospholipides, and cholesterol. At the end of 25 days, negligible amounts of these lipides remained in serum. A reduction in the levels of low- and high-density lipoproteins also resulted from the feeding of ethionine. In general, the extent of reduction in all lipoprotein fractions paralleled that observed in lipides. The removal of ethionine from the diet led to a prompt restoration of the concentrations of all lipide and lipoprotein constituents to normal.

Lauraldehyde. Hemiacetal formation. J. L. E. Erickson and C. R. Campbell, Jr.(Coates Chem. Lab., La. State Univ., Baton Rouge 3). *J. Am. Chem. Soc.* **76**, 4472-73(1954). Lauraldehyde has been reported to exist in two crystalline forms, m. p. 11° and 44.5°. It was shown in this report that the higher melting form was identical with the hemiacetal of lauraldehyde and lauryl alcohol.

Fish processing, expression of oil from dried fish meal. H. Einarsson, R. O. Sinnhuber and O. J. Worthington(Food Tech. Dept., Oregon State College, Corvallis). *J. Agr. and Food Chem.* **2**, 946-50(1954). This work was done to investigate a process of removing oil from fatty fish meal which would not cause gross loss of stickwater soluble nutrients, as the wet-press method does, and would not involve costs of evaporation. The process consisted of drying to 5 to 9% moisture, followed by pressing out the oil to about 6% oil content. The work was done on a laboratory scale with several varieties of fish. The efficiency of oil removal was found to be a function of several variables: temperature; time; pressure, providing piston was large enough to minimize wall effects; age of dried meal; original oil content; and final moisture content. Empirical equations, principally based upon measurements on turbot *(Atheresthes stomias)* meal, permitted the prediction of press efficiency in removing oil. The mathematical relationships in these experiments may be compared with those published for vegetable oil pressing. Oil expressed from dried fish had a lower free fatty acid content than that remaining in the press cake.

Constitution and stereochemistry of the kamlolenic acids. L. Crombie and J. L. Tayler(Dept. of Organic Chem., Imperial College of Science and Tech., South Kensington, London, S.W. 7). *J. Chem. Soc.* **1954**, 2816-19. Kamlolenic acid was determined to be $HO(CH_2)_4(CH{=}CH)_3(CH_2)_7CO_2H$. Infra-red and ultra-violet light absorption data enabled the stereochemistry of α- and β-kamlolenic acid to be equated with that of α- and β- elaeosteric acid. The β-form was the all-trans-compound while the α-form was probably the cis-9 : trans-11 : trans-13-stereoisomer.

Anodic syntheses. Part XI. Synthesis of tariric and petroselinic acid. B. W. Baker, R. W. Kierstead, R. P. Linstead, and B. C. L. Weedon(Dept. of Organic Chem., Imperial College of Science and Tech., South Kensington, London, S.W. 7). *J. Chem. Soc.* **1954**, 1804-08. Dodec-6-ynedioic acid and the corresponding ethylene, intermediates for the synthesis of unsaturated fatty acids, have been prepared from 6-chlorohex-1-yne. Tariric acid has been synthesized by anodic ''crossed'' coupling of methyl hydrogen dodec-6-ynedioate with octanoic acid, and partially reduced to petroselinic acid.

Oxidation of glycerol by periodate in alkaline solution. L. Hartman(Fats Res. Lab., Dept. of Scientific and Ind. Res., Wellington, New Zealand). *J. Chem. Soc.*, **1954**, 4024-25. Previous results implied that the reaction between arsenite and periodate was not quantitative. This could not be confirmed in the present work, and no definite ''regeneration'' of periodate was observed whether the excess of reagent was estimated by the arsenite or by the potassium iodide-sulphuric acid method. It was suggested that the conflicting results were due, at least in part, to the complex mechanism of oxidation by periodates in alkaline solution.

Some thermal properties of 1-monostearin, 1-aceto-3-stearin and 1,2-diaceto-3-stearin. T. L. Ward, E. J. Vicknair, W. S. Singleton and R. O. Feuge(S. Reg. Res. Lab., New Orleans, La.). *J. Phys. Chem.* **59**, 4-7(1955). Pure samples of 1-monostearin, 1-aceto-3-stearin and 1,2-diaceto-3-stearin were examined calorimetrically over the temperature range of −73° to 100°. The properties measured were specific heat, heat of fusion, accumulated heat content and heat of transition upon changing polymorphic form. The presence of an acetate group in the glyceride molecule causes a lowering of the specific heat of the solid. Introduction of one acetyl group into monostearin lowers the heat of fusion to a considerable extent, but the second acetyl group causes no appreciable additional change. Heat of transition could not be accurately measured because in each case the heat content curve was nearly smooth at the transition point. Transitions appear to be first-order phase changes, i. e., changes in lattice structure.

Monolayer structure as revealed by electron microscopy. H. E. Ries, Jr. and W. A. Kimball(Research Dept., Standard Oil Co. [Ind.], Whiting, Ind.). *J. Phys. Chem.* **59**, 94-5(1955). Electron micrographs of monolayers of *n*-hexatriacontanoic acid are shown for films taken at pressure of 15 and 25 dynes per cm. and at collapse. The appearance of these micrographs suggests that as pressure increases, the monolayer rises from the surface along a line of rupture, folds polar face to polar face, and falls over to form long flat structures which are two molecules thick.

Food products containing esters of tricarboxylic acids. C. M. Gooding, H. W. Vahlteich, and C. F. Brown(The Best Foods, Inc.). *U. S. 2,701,203.* The product is a glyceride oil containing at least 0.002 per cent of a monoester of an aliphatic C_6-tricarboxylic acid, containing no functional groups other than $-COOH$, and esterified with $RCOO(C_nH_{2n}O)_x-$ in which R is an aliphatic C_{11-17} hydrocarbon, n is greater than 1 and less than 5, and x is greater than 5.

Stabilized monoester compounds. N. H. Kuhrt(Eastman Kodak Co.). *U. S. 2,701,769.* Monoglycerides are obtained by reacting higher fatty acid triglycerides with glycerine in the presence of an ester interchange catalyst. The product is stabilized by adding glycine and phosphoric acid and heating the mixture at 50° to 90° for some time.

Fatty compositions. N. H. Kuhrt(Eastman Kodak Co.). *U. S. 2,701,770.* The compositions consist of mixtures of fatty triglycerides, fat-forming fatty acids and a minor amount of a premix obtained by stabilizing a higher fatty acid monoester of a polyhydric alcohol by heating with glycine and phosphoric acid at temperatures below 95°.

Refining of glyceride press steamings. M. M. Durkee(A. E. Staley Mfg. Co.). *U. S. 2,701,810.* Refined oil is recovered from refinery press residue by treatment with aqueous sodium silicate.

Vitamin composition. A. Bavley and A. E. Timreck(Chas. Pfizer and Co., Inc.). *U. S. 2,702,262.* A highly stable vitamin composition is prepared by dispersing a solid solution of fat-soluble vitamins and hydrogenated oil (having a melting point of at least 40°) in a matrix of a gelable colloid such as gelatin, agar, pectin, or mixtures of these containing sugar plasticizing material.

Refining of fatty oils and fats. F. E. Sullivan(DeLaval Separator Co.). *U. S. 2,702,813.* Crude oil is treated with 0.1 to 0.4 per cent phosphoric acid by weight until addition compounds have formed. This treatment reduces refining losses in subsequent refining of the oil with caustic soda.

Apparatus for deodorization of fats and oils. Fratelli Gianazza Societa in accomandita semplice. *Ital. 476,541,* (*C. A.* **48,** 13244)

• Biology and Nutrition

F. A. Kummerow, Abstractor
Joseph McLaughlin, Jr., Abstractor

The influence of previous diet on the fasting blood-sugar level and on glucose utilization in the rat and hamster. R. J. Garner and R. Roberts(Vet. Lab., Univ. of Bristol, England). *Biochem. J.* **59,** 224-8(1955). After 17 hr. fasting, blood-sugar levels from rats and hamsters fed on a high-fat diet from weaning are consistantly lower than those from similar animals fed on a high-carbohydrate diet. The reduced tolerance to intravenously injected glucose induced by a high-fat diet has been confirmed using rats. Restriction of the carbohydrate intake by feeding excess fat or protein depresses both glucose uptake and glycogen synthesis by isolated rat diaphragm. The hexokinase activity of kidney homegenates from rats and hamsters is depressed by high-fat diets.

The role of alkaline phosphatase in intestinal absorption. III. The effects of various fatty acids on levels of the enzyme in intestinal mucosa. N. Dickie, Margaret I. Robinson, and J. Tuba(Dept. of Biochem., Univ. of Alberta, Edmonton, Alberta). *Can. J. Biochem. & Physiol.* **33,** 83-88(1955). Fasted rats were used in a study of the effect of fatty acids on intestinal and serum phosphatase. The elevation of intestinal alkaline phosphatase by dietary fatty acids varied inversely with the chain length for: butyric, lauric, palmitic and stearic acid. Oleic acid was a more powerful stimulant for the synthesis of intestinal alkaline phosphatase than the saturated acids. Choline, fed simultaneously with oleic acid, completely obliterated the highly significant effect of the acid on both the intestinal and the serum enzyme. These findings indicate that further consideration should be given to the role of phospholipids in absorption of fatty acids.

Fatty acid dehydrogenase. I. A flavin enzyme in liver which catalyzes the dehydrogenation of fatty acids. Tatsuo Koyanagi and Harunobu Noro(Iwate Univ., Morioka). *J. Agr. Chem. Soc. Japan* **28,** 825-7(1954). Fatty acid dehydrogenase was extracted from pig liver by the method of Lang (1939). Methylene blue was decolorized by this enzyme solution in the presence of Na salt of fatty acids (stearic, oleic, linoleic, palmitic, myristic, lauric, capric, caproic, and butyric acids, in decreasing order of reaction rate), fumarate, and adenosine triphosphate at pH 8. The apoenzyme prepared from this fatty acid dehydrogenase gained its activity when added with riboflavin, riboflavin monophosphate, or flavin adenine dinucleotide. Thus enzyme was presumed to be a flavin enzyme.

II. The co-factor of fatty acid dehydrogenase. Tatsuo Koyanagi and Harunobu Noro. *J. Agr. Chem. Soc. Japan* **28,** 894-7 (1954). Four compounds proposed as the co-factor of this enzyme were compared in its activity for the apoenzyme prepared as described in Part I. Among them co-enzyme I had no activity as the co-factor of fatty acid dehydrogenase (lauric acid served as the substrate). Flavin adenine dinucleotide acted by itself as the co-factor and increased the dehydrogenating power in the presence of adenosine triphosphate and fumaric acid. Adenylic acid could not act without fumaric acid. Hypoxanthine could act as the co-factor by itself and required the addition of neither adenosine triphosphate nor fumaric acid.

Hydrolysis of edible fats with enzyme. Yoshiyuki Ootake and Kiyoshi Sakayori. *Bull. Fac. Agr. Utsunomiya Univ.* **2,** 230-9 (1954); *Compl. Chem. Abst. Japan* **29,** 181(1955). The digestibility with pancreatic lipase was in increasing order of beef tallow, goat milk fat, butterfat, and lard. The low digestibility of beef tallow was attributed to its high content of saturated fatty acids. Volatile fatty acids were more easily digested than nonvolatile ones, and among nonvolatile acids unsaturated acids were more easily digested than saturated ones. Water-insoluble volatile acids were apt to be most easily digested. Coconut oil was also studied.

Present state of the chemistry of liproprotein. Ichiro Hara. *J. Japan Oil Chemists' Soc.,* **4,** 2-9(1955). A review on thromboplastic protein, blood plasma lipoprotein, egg yolk lipoprotein, Mg-ATP, alkali phosphatase in milk, proteolipides, etc. 38 references.

A new compound from rice bran oil and rice germ oil. Ryohei Kaneko and Tomotaro Tsuchiya(Govt. Chem. Ind. Research Inst., Tokyo). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **57,** 526 (1954). A preliminary note on the isolation of a new compound of physiological activity as a vitamin in promoting growth and activity in reproduction organs from rice bran or germ oil. It was named oryzanol, $C_{37}H_{54}O_4$, m.p. 193-4°, extinction coefficient $E^{1\%}_{1\,cm}$ 358.9 (315 mμ). It had OH and CO groups. It gave no reactions for tocopherol, vitamin A, or sterols.

The addition of cultured milk to margarine. I. The effect of the addition. Kimitoshi Nakazawa, Shuji Arai, and Jun Kawai (Nihon Fats and Oils Co., Tokyo). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **56,** 896-8(1953). The addition of cultured milk with composite lactic acid bacteria) had the effect of preventing the oxidation of fats and vitamin A of margarine.

II. Preparation of cultured milk. Kimitoshi Nakazawa, Shuji Arai, and Jun Kawai. *J. Chem. Soc. Japan, Ind. Chem. Sect.* **57,** 690-2(1954). In making cultured milk to be added in margarine there occurred lactic acid fermentation together with citric acid fermentation. The formation was followed of biacetyl, acetyl methyl carbinol, and 2,3-butylene glycol.

The antibacterial activity of certain animal fats. G. Dalla Torre(Univ. Padua, Italy). *Igiene mod.* **47,** 51-61(1954). Samples of fat from the cat, hog, ox, and calf were melted and exposed to sun and air. Assays made at intervals by the agar plate-cup method against 10 bacteria showed that the cat fat had the greatest antibacterial activity and was most effective at 30-40 days. Hog fat was next, followed in order by that of ox and calf. In all cases activity decreased after 50-80 days to zero at 180 days. (*C. A.* **48,** 10111-2)

Nutritive value of buffalo butter fat. M. Narayana Rao(Indian Inst. Sci., Bangalore). *Indian J. Med. Research* **42,** 29-36 (1954). Groups of 6 weanling albino rats were fed diets containing 12% casein, 10% sucrose, 4% salt mixture, 60% cornstarch, and 4% vitaminized starch, to which was added 10% of (a) fresh whole buffalo butter fat with m.p. 35°, sapon. no. 227, I no. 35; (b) a fraction with m.p. 45°, sapon. no. 277, I no. 33.8; (c) a fraction with m.p. 26.2°, sapon. no. 208, I no. 42.6; or (d) a liquid fraction with sapon. no. 247 and I no. 58.5. A 5th group received a fat-free diet. The rats were sacrificed after 6 weeks, and the diets and livers were analyzed for lipides and vitamin A. The largest weight gain was shown for group (d). Group (b) and that on the fat-free diet had the poorest growth. Storage of vitamin A in the liver was improved by the highly unsaturated glycerides fed to the animals in group (d). There were no significant differences in the composition of the liver lipides. (*C. A.* **48,** 10160)

Synthesis of lipides by Oospora lactis in presence of acetate. A. Pittoni and V. Moret. *Atti ist. veneto sci., lettere ed arti, Classe sci. mat. e nat.* **110,** 117-25(1952). The lipide formation by *O. lactis* is greater when NaOAc is supplied as C source in the medium than with glucose, but protein formation is better with the latter. (*C. A.* **48,** 5926)

Phosphorylation reactions associated with fatty acid oxidation. H. A. Lardy(Univ. of Wisconsin, Madison). *J. Lancet* **73,** 254-6(1953). Review.

Influence of some corticosteroids on the intestinal absorption of fats in adrenalectomized rats. V. Capelli(Univ. of Pabia, Italy). *Boll. soc. ital. biol. sper.* **29,** 1994-6(1953). The absorption of olive oil given orally to rats drops after adrenalectomy to 20% of the value found in normal animals. Administration of 1 mg. cortisone produces a recovery to 68%, of 4 mg. deoxycorticosterone to 81%, and of 1 mg. cortisone with 4 mg. deoxycorticosterone to 116%. (*C. A.* 48, 10178)

The penetration of fat and fatty acid into the skin of the rat. E. O. Butcher(New York Univ., New York, N. Y.). *J. Invest. Dermatol.* 21, 43-8(1953). Lanolin, linoleic acid, oleic acid, ricinoleic acid, and squalene were applied to the backs of rats, and biopsies taken at intervals, fixed, frozen, and sectioned. Fluorescent microscopy showed that linoleic acid penetrated the skin and could be found in the capillaries 10 min. after application. Oleic acid penetrated more slowly and little appeared in the capillaries. Lanolin and ricinoleic acid remained in the outer epidermal layers. Temperature (26° to 50°) was without influence; nor did the preliminary cleaning of the skin with ether affect the rate of penetration. (*C. A.* 48, 10223)

Heparin and fat metabolism with particular reference to experimental conditions following a high cholesterol diet. P. F. Baratta(Univ. Modena, Italy). *Arch. studio fisiopatol. e clin. ricambio* 17, 31-7(1953). Histopathological lesions and the blood hypercoagulability found in rabbits with experimental hypercholesterolemic atheromasia are ascribed to a heparin deficiency. (*C. A.* 48, 10159)

Lipolytic and fat utilization potential; its clinical consequences. R. Voet(Inst. gastroenterol. "Bonorindo Udaondo," Buenos Aires, Argentina). *Jornada med.*(Buenos Aires) 7(167), 5-10 (1954). The author defines the term "lipolytic and fat utilization potential" as the maximum amount of fat which can be hydrolyzed and absorbed by any given individual, expressed in terms of moles of fatty acids/kg. of body weight/hour. That potential is calculated by determining the amount of pancreatic juice secreted in a 1-hr. period, by means of the secretin test (Cf. *C. A.* 33, 8650), and the lipase activity present in the pancreatic juice thus collected, by using olive oil substrate and titrating the fatty acids hydrolyzed after 1 hr. at 38°. The lipolytic and fat utilization potential was determined for 2 individuals with normal and for 3 with abnormal pancreatic function with the following results: normal, 0.00365, 0.0041; abnormal 0.00025, 0.00041, and 0.0010. These values served as the basis for the following diets: normal individuals were fed 1250 g. of butter and 1100 g. of lard, respectively, for 2 days, and the abnormal ones fed 266 and 362 g. of butter, and 530 g. of lard, resp., daily for 3 days. Analysis of the feces collected during the feeding trials showed the following % of lipolysis: normal individuals, 98.7, 99.3; abnormal individuals, 90.6, 96.3, 98.0; and the following % of fat absorption (both calculated on basis of fat fed): normal individuals, 97.3, 98.56; abnormal individuals, 85.2, 93.3, 91.2. This indicates that the use of levels of fat normally present in every-day diets is not adequate to determine fat digestive balances which serve as a measure of pancreatic function, since the fat utilization potential greatly exceeds these levels even in the case of individuals having abnormal functions. (*C. A.* 48, 10147)

Influence of lipocaic on the lipides and lipoproteins of blood plasma. S. Briskas, J. Polonovski, and P. Rebeyrotte(Inst. Pasteur, Paris). *Compt. rend. soc. biol.* 147, 1196-9(1953). Oral administration of lipocaic to dogs produced hypolipidemia. The decrease was in neutral fats; phospholipides did not decrease and cholesterol increased slightly. Repeated ingestion of lipocaic by human subjects caused a decrease in blood lipides and increase in blood cholesterol. (*C. A.* 48, 6017)

Density of body fat in man and other mammals. Flaminio Fidanza, Ancel Keys, and J. T. Anderson(Univ. of Minnesota, Minneapolis). *J. Applied Physiol.* 6, 252-6(1953). The average density of human fat at 37° is constant at 0.9000 g./cc. and the modulus of thermal expansion for 15-37° is 9.2×10^{-4} cc./g./°C. The average density of dog, rat, rabbit, guinea pig, steer, pig, lamb internal fat, and butter is different (lowest, dog fat—0.8997; highest, lamb—0.9212). No differences occurred between internal and subcutaneous fats of man, dog, rabbit, and guinea pig, but significant differences, according to location, occurred in the steer, pig, and lamb, and high values of thermal expansion modulus (0.00176, 0.00162, and 0.00138, resp.) were characteristic of the latter species. (*C. A.* 48, 5998)

Body growth of rats on vitamin E-deficient diet supplemented with olive oil. D. Ruccia(Univ. Bari, Italy). *Boll. soc. ital. biol. sper.* 29, 144-6(1953). Rats were maintained for 84 days on an ordinary mixed crude diet, a vitamin E-deficient diet (Evans and Burr No. 232), or the latter supplemented with various types of olive oil. The rats on the vitamin E-deficient diet grew as well or better than those on the crude diet; the addition of olive oil further increased their growth rate until the 50th day. (*C. A.* 48, 5956)

Relationship between body composition and basal metabolism rate in children. S. M. Garn, L. C. Clark, Jr., and Renee Portray(Antioch Coll., Yellow Springs, O.). *J. Appl. Physiol.* 6, 163-7(1953). Fat influences basal O metabolism independently of muscle.

The use of fat supplements in the nutrition of critically ill patients. G. M. Mindrum. *J. Clin. Nutrition* 1, 503-12(1953). Marked improvement occurred in 9 patients suffering from protein depletion due to severe illness, when supplemental calories were administered in the form of fat emulsions. (*C. A.* 48, 5953)

Effect of three levels of fat intake on calcium metabolism. Mary E. Fuqua and Mary B. Patton(Ohio Agr. Expt. Sta., Wooster). *J. Am. Dietetic Assoc.* 29, 1010-13(1953). The 3 levels of fat used had no significant effect on Ca balance of college women. The average Ca requirement for all subjects was approximately 630 mg. The order in which the 3 fat treatments were given had no significant effect on Ca retentions, and basal metabolic rates and Ca retentions were not correlated. (*C. A.* 48, 5949)

Use of food cholesterol in the animal body. Relation of other dietary constituents. Ruth Okey(Univ. of California, Berkeley). *J. Am. Dietetics Assoc.* 30, 231-5(1954). A review.

Effects of antidust oils on stability of carotene in dehydrated alfalfa meal. H. L. Mitchell and R. E. Silker(Kansas Agr. Exp. Station, Manhattan, Kan.). *J. Agr. and Food Chem.* 3, 69-71(1955). Various oils and fatty materials were used as antidust agents for alfalfa meal. Salmon body oil and acidulated cottonseed soapstock at a rate of 16 pounds per ton of meal reduced carotene stability slightly when an antioxidant was not added. Addition of an antioxidant eliminated this effect. At a rate of 80 pounds per ton and in the absence of an antioxidant, cottonseed oil, soybean oil, rice bran oil, and choice white grease appreciably improved carotene stability, while salmon body oil and acidulated cottonseed soap stock had no effect. Use of choice white grease resulted in the greatest improvement in carotene stability, although addition of an antioxidant with the antidust agents eliminated this advantage.

A method for the extraction of steroids from blood. M. E. Lombardo, P. H. Mann, T. A. Viscelli, P. B. Hudson(Inst. of Cancer Research, College of Physicians and Surgeons, Columbia Univ., New York, N. Y.). *J. Biol. Chem.* 212, 345-351(1955). A method has been presented for the extraction of steroids from blood. It combined the process of dialysis and extraction into one operation by utilizing the modified Hershber and Wolfe extractor. The composition of the inside phase of the dialysis system was blood-water-methanol (1:1:1), and the composition of the outside phase was 60 per cent aqueous methanol. Methylene chloride was used as the extracting solvent. The results of recovery experiments with various steroids at different concentrations have been reported.

Fat studies in poultry. 1. Herring oil, santomerse-80 and thyroprotein in the laying ration. J. Biely, B. E. March and D. A. Silvestrini(Paultry Nutrition Lab., The Univ. of British Columbia, Vancouver, Canada). *Poultry Sci.* 33, 1130-35(1954). Six percent of herring oil added to the laying ration did not affect the rate of egg production. The birds which received 6 percent herring oil attained higher weights than the birds receiving the rations without herring oil.

Fat studies in poultry. 2. Fat supplements in chick and poult rations. J. Biely and B. March(Poultry Nutrition Lab., The Univ. of British Columbia, Vancouver, B. C., Canada). *Poultry Sci.* 33, 1220-27(1954). With chicks it was found that the addition of fat to a 19 percent protein diet depressed growth and feed efficiency. When fat was added to a 24 percent or a 28 percent protein diet, growth was unaffected or stimulated and feed efficiency was improved.

Extraction, isolation, and identification of hydrolytic products of triglyceride digestion in man. D. H. Blankenhorn and E. H. Ahrens, Jr.(Hospital of The Rockefeller Institute for Medical Research, New York, N. Y.). *J. Biol. Chem.* 212, 69-81(1955). Methods by which lipides were quantitatively extracted from intestinal contents and further separated into fatty acid, bile acid, and mono-, di, and triglyceride fractions were described. Samples of intestinal contents have been aspirated from two healthy human subjects after test meals containing defined fats, and the various products of fat hydrolysis have been isolated. Diglycerides have been positively identified for the first time as components of intestinal contents during fat digestion in human subjects.

Alfalfa carotene. Quinoline derivatives as antioxidants for carotene. E. M. Bickoff, A. L. Livingston, J. Guggolz, and C. R.

Thompson(Western Utilization Research Branch, Agricultural Research Service, U.S.D.A., Albany 6, Calif.). *J. Agr. and Food Chem.* 24, 1229-31(1954). Because carotene stabilization in alfalfa meal was an important problem and because 6-ethoxy-2,2,4-trimethyl-1,2-dihydroquinoline had proved to be an effective antioxidant, a study was made of the ability of certain related chemicals to inhibit oxidation of carotene. The compounds tested were chosen to permit observation of variation in activity with systematic variation in structure. Several were effective in both dehydrated alfalfa meals and mineral oil solutions.

Phosphatidyl serine. E. Baer and J. Maurukas(Banting and Best Dept. of Medical Research, Univ. of Toronto, Toronto, Canada). *J. Biol. Chem.* 212, 25-38(1955). A method was reported permitting the synthesis of fully saturated α-phosphatidyl serines in any one of the four possible stereoisomeric forms. The method involved three steps: (a) phosphorylation of an α,β-diglyceride with phenylphosphoryl dichloride and pyridine, (b) esterification of the resulting diacylglycerylphenylphosphoryl chloride with N-carbobenzoxyserine benzyl ester, and (c) removal of the protective groups by catalytic hydrogenolysis.

The diazomethanolysis of glycerolphosphatides. A novel method of determining the configuration of phosphatidyl serines and cephalins. E. Baer and J. Maurukas(Banting and Best Dept. of Medical Research, Univ. of Toronto, Toronto, Canada). *J. Biol. Chem.* 212, 39-47(1955). A chemical procedure was reported by means of which phosphatidyl serines and cephalins could be cleaved at the ester bond linking the phosphatidic acid and nitrogenous moieties. This was the first chemical reaction known to effect this cleavage without causing a breakdown of the phosphatidic acid moiety. The cleavage, which was accomplished with diazomethane, proceeded at room temperature and yielded optically pure phosphatidic acid dimethyl esters.

Effect of high fat feedings on viscosity of the blood. R. L. Swank(Div. of Neurology, Dept. of Medicine, Univ. of Oregon Medical School, Portland). *Science* 120, 427-28(1954). Aggregation and adhesiveness of red blood cells were observed to develop about 4 hr. after fat feedings. They reached their maximum intensity 3 to 4 hr. later and then subsided slowly to normal. Hamsters fed a diet containing about 50 percent of their calories as animal fat for 5 to 7 days and then given a single fat meal of 2 to 3 ml. of 35-percent cream almost always exhibited an increased viscosity of the blood. Animals so fed were anesthetized and their blood viscosities and hematocrits were determined after the single cream meals. The blood viscosity began to increase about 3 hr. after the cream feeding and reached its peak in 6 to 9 hr. If it is shown in human beings that large fat meals may be followed by aggregation and adhesiveness of the red blood cells with slowing of the circulation and an increase in the relative viscosity of the blood, Swank believed it will be necessary to consider seriously whether this mechanism is a factor in human disease, particularly in chronic vascular and thrombotic diseases and in multiple sclerosis.

Alfalfa carotene, stability of carotene in dehydrated alfalfa meal with effect of antioxidants, oil and heat. H. L. Mitchell, R. E. Beauchene, and R. E. Silker(Kansas Agricultural Experiment Station, Manhattan, Kan.). *J. Agr. and Food Chem.* 2, 939-41(1954). A study of the ability of certain chemicals to inhibit the oxidation of carotene in alfalfa meal during storage showed appreciable antioxidant activity in compounds related to aniline. The most promising was N,N′-diphenylhexamethylenediamine. Carotene retention during storage was influenced by the amount of oil which was used in applying the antioxidants to the meal. Applications of cottonseed oil at the rate of 80 pounds per ton of meal were more effective than 16 pounds per ton in reducing oxidation. Heating the samples at 100° for an hour after spraying the meal with the oil resulted in a further increase in carotene retention.

Lipogenesis by cells of the cornea. D. G. Cogan and T. Kuwabara(Harvard Medical School, Mass., Eye and Ear Infirmary, Boston). *Science* 120, 321-22(1954). The capacity for neutral fat formation by nonadipose tissue was of possible relevance to the problems of fatty degeneration, atherosclerosis, and certain lipid histiocytoses. In a series of observations on the cornea of the living rabbit and the incubated cornea, it was found that oleic acid and sodium oleate induced sudanophilic fat formation in all the cells of the cornea (epithelium, stroma, and endothelium) so long as serum was present. The oleic acid or oleate salt appeared to be a specific and essential substrate. Of the other aliphatic acids tried unsuccessfully were elaidic acid, undecylenic acid, palmitic acid, arachidic acid, pelargonic acid, *n*-caproic acid, butyric acid, and acetic acid. Stearic acid resulted in a minimal fat formation (possibly attributable to contamination by oleic acid). The lipogenesis did not result from contact with necrotizing agents other than oleic acid and sodium oleate. It did occur, however, abundantly with hydrolyzed rabbit fat and hydrolyzed olive oil. Similar results were obtained with rabbit, beef, cat, and human corneas and with rabbit, horse, or human serum.

Effect of some steroid compounds on ovine rumen function. C. C. Brooks, G. B. Garner, M. E. Muhrer, W. H. Pfander (Depts. of Animal Husbandry and Agr. Chem., U. of Missouri, Columbia). *Science* 120, 455-56(1954). Silbestrol (10 or 20 ppm) increased cellulose digestion by ovine rumen microorganisms *in vitro* and *in vivo* but could not be tolerated by wethers at these high levels. Cholesterol and estrone increased cellulose digestion by rumen microorganisms *in vitro.*

• Drying Oils

Raymond Paschke, Abstractor

The swelling of oil films in water as related to the composition of the oils. R. J. Singer(S. Dyrup & Company, Copenhagen). *Farbe u. Lack* 60, 189(1954). The swelling of linseed oil films in water is reviewed in detail. The current study showed oils of high linolenic acid content absorbed water at the highest rate. Both thermal polymerization as in stand oils, and conjugation, as in tung oil, decreased water absorption. (*C. A.* 49, 638)

Toward a better understanding of the structure of bodied oils. J. Petit(Paint Varnish Research Laboratories, Bellevue, France). *Am. Paint J.* 39, 32(1954). Attention is called to the secondary reactions which take place concurrently with thermal polymerization. Removal of volatile hydrocarbon by vacuum increases the rate of polymerization. The catalysis by boron trifluoride is discussed.

Reactive hydrocarbon-drying oil adducts. C. W. A. Mundy. *Paint Oil Colour J.* 127, 67(1955). Conjugated hydrocarbons are reacted with drying oils at 450°F. by counter-current passage through tall columns. An 80/20 mixture of dicyclopentadiene and methyl dicyclopentadiene gave adducts with the best film-forming properties. The adducts are best suited for alkyd formulations.

Polymerization and drying of oils and esters of fatty acids. XII. Isomeric transformations in polymerization of oils and their study by the methods of spectrum analysis. A. Ya. Drinberg and N. S. Chervinskaya(Lensovet Technol. Inst., Leningrad). *Zhur. Priklad. Khim.* 27, 983-90(1954). Experiments are described in which specimens of tung oil, linseed oil, and cottonseed oil were isomerized by contact with bentonite and the silicate waste from the production of $Al_2(SO_4)_3$ at 250° for a total of about 10 hours under CO_2. The products were examined by infrared analysis of CCl_4 solutions. The spectra of the original and the treated products are shown. The results indicate that the isomerization appears to be caused by migration of hydrogen so that the isolated double bonds are converted to conjugated systems. The process can be controlled by following the infrared absorption in the region of 10 μ, with quantity control by bromine or iodine number. (*C. A.* 49, 1341)

Heptanoic acid in alkyds. H. W. Chatfield. *Paint Oil Colour J.* 127, 153(1955). The inclusion of heptanoic acid in pentaerythritol alkyds facilitates manufacture and improves compatibility with amino type resins. Baked films of excellent gloss, toughness, adhesion, and uniformity are obtained.

Organic driers in organic film forming compositions. C. A. Coffey, R. T. Ryan, and L. N. Whitehill(The Sherwin-Williams Co., Cleveland). *U. S. 2,694,015.* This patent covers a composition of matter which comprises in combination a siccative organic film forming coating composition containing drying oil fatty acid groups and a metal-free drier catalyst, said drier selected from the group of aliphatic aldehydes consisting of 2-ethyl hexaldehyde, cinnamic aldehyde, 3,5,5-trimethylhexaldehyde, octadecenyl aldehyde, n-decyl aldehyde and citronellal.

Interpolymerization products of aromatic vinyl compounds, glyceride oils, and oil-alkyds. H. Ehring and K. Raichle(Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany). *U. S. 2,695,896.* This patent covers the process which comprises interpolymerizing a monomeric aromatic mono-vinyl hydrocarbon with a mixture of an alkyd resin, modified by an unpolymerized glyceride oil having conjugated double bonds, and an unpolymerized, unsaturated glyceride oil selected from the group consisting of animal oil and vegetable oil.

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• Detergents

Lenore Petschaft Africk, Abstractor

Detergents from cottonseed oil. Bahi El Din Aly Gebril(Univ. of Alexandria, Egypt). *Oil and Soap* [Egypt] **1954**(2), 44-45. The first step in the production of non-soap detergents from cottonseed oil is the high-pressure hydrogenation of the oil to yield long-chain fatty alcohols. Effects of temperature, pressure, and catalyst are discussed briefly.

Synthetic detergents and their advantages. R. Pasquali(National Starch Co.). *Oil and Soap* [Egypt] **1954**(3), 41-43. The development and growth of the synthetic detergent industry is reviewed from its birth in 1920 to 1953 when the sale of synthetic detergents first exceeded the sale of soap products. It is predicted that soap powders will disappear soon from retail markets and that soap bars will remain in use for many years.

Surface active agents prepared from benzene or toluene, lower and higher alcohols, and sulfuric acid. Kazuo Fukuzumi, Masateru Mizuta, and Yoshiyuki Toyama. *Research Rept. Nagoya Ind. Sci. Research Inst.* **7**, 36-42(1954). Mixtures of benzene (or toluene), lower alcohol (*n*-propyl, *n*-butyl, or isoamyl), and higher alcohol (dodecyl, tetradecyl, cetyl, or coconut fatty) were sulfonated with fuming H_2SO_4, and the products were examined for surface tension, penetrating power, and stability against $CaCl_2$ solution. Some products were excellent surface active agents.

White curd soap making. H. Zilski. *Soap Chem. Specialties* **31**(1), 81, 83, 85(1955). In the manufacture of pure white curd soap distillate and redistillate must be used separately. All heating of the distillate should be avoided as far as possible because it impairs the color of the final product. Further brightening of the soap in the pressurized kettle of the cooling press by the use of oxygen yielding compounds is rejected. Dyeing with TiO_2 is feasible if the soap is grained "thin" and sufficient quantities of tylose solution are used. Additions of blue or bluish fluorescing dyes improve the color of soap which is already white. Sodium thiosulfate will prevent subsequent darkening and protects the soap against rancidity.

Utilization of synthetic fatty acids in the manufacture of toilet soap. M. N. Zaliopo, L. M. Baranov, and G. A. Borodina. *Masloboino-Zhirovaya Prom.* **19**(6), 17-21(1954). In this process the coconut oil and predominantly C_{10}-C_{13} synthetic fatty acid mixture (I) are saponified separately and grained, and the resulting soap pastes are then combined for the preparation of soap base. It is claimed that this method reduces to a minimum the contamination of glycerol-containing lyes with propionic and C_6-C_9 acids from I when I is utilized for the manufacture of toilet soap. (*C. A.* **49**, 2100)

Analysis of water-soluble synthetic soaps. N. W. Tschoegl (N. S. W. Univ. Technol., Sydney). *Revs. Pure and Appl. Chem.* (Australia) **4**, 171-206(1954). A review with 141 references. (*C. A.* **29**, 2100)

Determination of chloride in alcohol-soluble matter in detergents. J. Pomeranz(Food Testing Lab., Haifa, Israel). *Chemist Analyst* **43**, 89-90(1954). The Cl^- is removed by an anion-exchange resin such as "Dowex-2," then eluted with 400 ml. of *N* NaOH or more if necessary. Determine the Cl^- by titrating with $AgNO_3$ using the Volhard method. (*C. A.* **49**, 2100)

Rancidity in soaps. W. W. Myddleton(County Laboratories, Ltd., Stanmore, Middlesex, England). *J. Soc. Cosmetic Chemists* **5**, 278-83(1954). Development of rancidity in soap due to oxidation is discussed. Points to be considered in the case of soaps include choice of suitable oils and fats, avoidance of metallic contamination during processing, correct processing, careful selection of coloring agents and perfumes, protection of soap from light and dampness during storage and use of antioxidants.

Rating detergent performance. Esther D. McCabe(Colgate-Palmolive Co., Jersey City, N. J.). *Soap Chem. Specialties* **30** (12), 44-4, 81(1954); **31**(1), 42-3, 177(1955). The many factors involved in evaluating detergents based on available methods are discussed.

French synthetic detergents from petroleum. G. C. Inskeep(Am. Chem. Soc., London, Eng.) and A. Mussard(Shell Saint-Gobain, Petit-Couronne, France). *Ind. Eng. Chem.* **47**, 2-10(1955). A new French plant for producing secondary alkyl sulfates by direct sulfation of wax olefins is described. Annual capacity of the unit is 25,000 tons, containing 21% active matter and is run completely on instruments for automatic control. Cracked distillate serves as the raw material for the detergent, Teepol. After sulfation with concentrated sulfuric acid, the material is neutralized and hydrolyzed. Alcohol and gasoline are used in subsequent purification steps. The product is finally concentrated by a four-stage evaporation process, filtered, and loaded out into tanks or drums. The largest market for Teepol is in liquid household detergents.

Calculation of HLB values of non-ionic surfactants. W. C. Griffin(Atlas Powder Co., Wilmington, Del.). *J. Soc. Cosmetic Chemists* **5**, 249-56(1954). Two conditions must be satisfied in choosing a surfactant for a desired formulation. The proper HLB or hydrophilic content of the surfactant must be used, and the proper chemical content of the surfactant must be chosen. By first determining the optimum HLB value and then selecting and testing a variety of chemical types at this particular value a large number of wrong trials can be eliminated. The HLB values may be calculated from analytical or composition data or the system may be used without calculating or determining exact value since it is a method of operation that has some correlation with water solubility of the surfactants.

Effect of surface-active agents on preparation of normal superphosphate. P. G. Arvan, R. P. Langguth and R. R. Eckstein (Monsanto Chem. Co., Dayton, Ohio). *J. Agr. Food Chem.* **3**, 131-5(1955). The effect of anionic and nonionic surface-active agents on the chemical reactions involved in the manufacture of normal superphosphate was studied to establish whether specific benefits could be derived from their use. Within the limits of concentration studied, the surface-active agents increased the rate and degree of conversion of unavailable phosphorus pentoxide to the available forms. Compared on an equivalent available phosphorus pentoxide basis, the free-acid content of the surfactant-contained superphosphate was always greater than the control. The fluorine loss during acidulation of the phosphate rock was not affected by the presence of surface-active agents.

Dishwasher machine detergents. K. Albrecht(Calgon, Inc., Pittsburgh, Pa.). *Soap Chem. Specialties* **31**(1) 33-5, (2) 44-5, 71(1955). By combining sodium tripolyphosphate and chlorinated trisodium phosphate as major constituents, a new class of spray type mechanical washing detergents has been established. New standards of bacteriological cleanliness are possible and substantially higher levels of detergency can be achieved. The new chlorinated detergents have a wider field of application than the older polyphosphate-alkali mechanical dishwashing compounds. These new compounds are effective in both commercial and household applications.

Preparation of detergent compositions. G. G. Lauer(M. W. Kellogg Co.). *U. S. 2,700,052.* Detergent sulfonates of high purity are prepared by treating a feedstock comprising unsaturated and saturated hydrocarbons having from 8 to 18 carbon atoms per molecule with selected sulfonating agents under controlled conditions to form a reaction product comprising a sulfonated oil, next contacting this reaction product with an aqueous solution of a base and a ketone to form a sulfonation salt and removing unreacted hydrocarbons by extracting them with a relatively light hydrocarbon treating agent.

Cleaning compositions and cleaning processes involving their use. N. Salkin. *Brit. 716,641.* An improved cleaning composition is obtained by mixing a water insoluble nonionic detergent having a short polyglycol ether group containing five or fewer alkenoxy units with a water soluble nonionic dispersing agent or detergent containing a polyglycol ether group having six or more alkenoxy units.

Detergent compositions and processes for making them. Colgate-Palmolive-Peet Co. *Brit. 718,559.* A non-caking detergent is prepared by spray drying a wet mixture comprising an organic detergent and a hydrate-forming phosphate material to produce a mass of particles, agitating the particles in the presence of sufficient free moisture to form a stable hydrate of the phosphate material and for a sufficient time to permit the formation of such hydrate and produce free-flowing particles of dry appearance, and packaging the particles while the phosphate material is in the hydrated form.

Continuous soap manufacture. G. Mazzoni and C. Mazzoni. *Ital. 478,301.* Improvements are claimed involving chiefly a continuous vacuum dryer from which a cool deodorized soap powder free of glycerol is obtained. (*C. A.* **49**, 2104)