ABSTRACTS

R. A. REINERS, Editor. ABSTRACTORS: N. E. Bednarcyk, J. G. Endres, J. Iavicoli, K. Kitsuta, F. A. Kummerow, Gladys Macy, E. G. Perkins, T. H. Smouse, J. A. Thompson and R. W. Walker

• Fats and Oils

ION EXCHANGES ON BLEACHING EARTHS. THEIR INFLUENCE ON THE CHARACTERISTICS OF THE TRIGLYCERIDES. R. Guillaumin and J. -F. Pertuisot (Paris Laboratories, Inst. de Corps Gras). *Rev. Franc. Corps Gras* **15**, 587–596 (1968). The conjugated polyenoic systems which are formed in oils after bleaching are initiated by the protons of the bleaching earths used. The authors have found that removing the protons from activated Montmorillonite clays by ion exchange minimized the formation of conjugated polyenoic systems while maintaining good bleaching power. This method worked best for oils such as peanut and soybean but not for rapeseed oil which contains a relatively large amount of chlorophyll. The best results were obtained with Li, Na, Ca, and Mg, with decreases in conjugated triene of 80% or more being obtained. Two conclusions were drawn: 1) the greater the ionic radius of the exchange ion and the smaller the quantity of polyenoic systems, the weaker is the bleaching; 2) the critical radius for the exchange ion is about 1 Å.

SOME CHARACTERISTICS OF CIS-OCTADECENOIC ACIDS. J. M. Roulet (Inst. for Fat Utilization Res., Paris). *Rev. Franc. Corps Gras* **15**, 611–620 (1968). In this review, the author discusses the following subjects: 1) natural octadecenoic acids; 2) formation of isomers during chemical or physical treatments (hydrogenation, heating); 3) physical properties of the different isomers (crystal structure, melting points); 4) chemical properties dependent on the position of the double bond and of the *cis-trans* isomer; 5) analysis of the *cis*-octadecenoic acids by chemical (hydrogenation, hydroxylation, oxidative cleavage) and physical methods (column chromatography, GLC, TLC, IR and NMR spectrometry). The evaluation of the chromatographic constants, specifically R_f values and their relationship to the number of carbon atoms, and the position of the double bond, is described in detail from the most recent data.

DETERMINATION OF SQUALENE IN OLIVE OILS BY GAS CHROMATOGRAPHY. F. Mordret and C. DeHaut (Inst. for Fat Utilization Res., Paris). *Rev. Franc. Corps Gras* **15**, 605–609 (1968). Determination of the squalene content of an oil generally involves separating the unsaponifiable matter and fractionating it by several long and delicate steps. The authors present a rapid analytical method using gas chromatography of the methyl esters and an internal standard inserted before transesterification. A non-polar column coated with SE-30 at 230C was used. When applied to olive oil, this method gave better results than the A.O.A.C. method.

COMPARISON BETWEEN TWO METHODS FOR COLOR DETERMINATION AFTER SAPONIFICATION OF FATS. A. Prevat and L. Garber (ITERG Laboratories, Paris). *Rev. Franc. Corps Gras* **15**, 597–604 (1968). The color of fatty acids after saponification gives an index of the degree of deterioration of the raw material. Two methods used to measure this color are iodine dilution and a potassium chloroplatinate color scale. Descriptions of these two procedures are given. The two methods are complementary and are used for slight and intermediate colorations of the oils. For these types of oils, comparison of the colors may be made visually. Plotting the color curves in trichromatic coordinates has confirmed the accuracy of the results obtained. Some values for tallows of different quality are given.

EXTRACTION OF OLEAGINOUS RAW MATERIALS: A STUDY OF THE TRANSFER MECHANISM OF FATS. PART B, EXPERIMENTAL. O. M. Angelidis (Phrynis 7, Athens (503), Greece). *Oleagineux* **23**, 587–595 (1968). This article describes the experimental part of a study of which the first part was reported in *Oleagineux* 23, 535–540 (1968). The experiments were directed toward investigating the extraction of oil from seeds. Cottonseeds and olive presscake were extracted with hexane and trichlorethylene. Thin layers of seeds of known thickness were extracted at different temperatures and concentrations of oil in the solvent, in order to obtain the coefficient of diffusion. The seeds were also extracted in the same manner as they are treated industrially. The extraction curves follow the expression: $\log E = a_0 + a_1 t$ ($E = c/c_0$ where c is the concentration of oil at time t and C_0 is the original concentration of oil in the seed). Typical values of a_0 are 0.25–0.50; those of a_1 are 0.25–0.26.

VAPOR-PROGRAMMED THIN-LAYER CHROMATOGRAPHY, A NEW TECHNIQUE FOR IMPROVED SEPARATIONS. R. A. de Zeeuw (Lab. of Pharm. and Anal. Chem., State Univ., Antonius Deusinglaan 2, Groningen, Netherlands). *Anal. Chem.* **40**, 2134–38 (1968). To obtain full benefit of the influence of vapor in TLC a new development chamber has been designed. This chamber provides full vapor control over the entire plate. Optimum conditions can be established by vapor programming and the migration rate of each individual spot can be guided. Thus, more efficient separations are obtained, particularly of chemically related substances which are inadequately separated with the classical TLC techniques. The properties of the vapor-programming chamber are discussed and results are shown in separations of dyes and sulfonamides.

SIMPLE TECHNIQUE FOR EXTRACTING FLAVOR COMPOUNDS FROM FATTY FOODS. N. P. Wong and O. W. Parks (Dairy Products Lab., USDA, Washington, D.C.). *J. Dairy Sci.* **51**, 1768–9 (1968). A method for extracting flavor compounds from cheese with acetonitrile is described. Two of the unique advantages of the method are that it does not extract fat and the first few drops of the extract are sufficiently concentrated to permit gas-chromatographic analysis without solvent evaporation. The effectiveness of extraction is demonstrated on Cheddar cheese, Blue cheese, and heated milk fat. The recovery efficiency is exemplified by 103% recovery of added benzoic acid.

VOLATILE COMPONENTS OF MILK FAT STEAM DISTILLATES IDENTIFIED BY GAS CHROMATOGRAPHY AND MASS SPECTROMETRY. T. J. Siek and R. C. Lindsay (Dept. of Food Sci., Oregon State Univ., Corvallis, Oregon). *J. Dairy Science* **51**, 1887–96 (1968). Vacuum steam distillates of butteroil, fresh raw cream, fresh pasteurized cream, and pasteurized stored cream were analyzed by packed column and open-tubular column gas chromatography in conjunction with mass spectrometry. High-temperature (210C) distillations of different butteroils yielded over 120 volatile compounds. Identification (or tentative identification) of more than 100 of these compounds was made from mass spectral-gas chromatographic data. Over 30 volatiles not previously reported in milk products were encountered. Many of the volatile compounds were obviously heat-produced, as the number of them was small in fresh, raw cream compared to heated cream and butteroil. However, aromatic compounds and some aliphatic hydrocarbons not previously reported were found in fresh, raw cream. Control experiments were conducted to determine laboratory contaminants and distillation artifacts.

2,6-DICHLOROQUINONE 4-CHLOROIMIDE AS A REAGENT FOR AMINES AND AROMATIC HYDROCARBONS ON THIN-LAYER CHROMATOGRAMS. J. H. Ross (Indiana Univ., South Bend, Ind. 46615). *Anal. Chem.* **40**, 2138–43 (1968). The range of utility of 2,6-dichloroquinone 4-chloroimide as a spray reagent for organic compounds on silica gel TLC plates was surveyed. A variety of intense colors was produced with primary, secondary and tertiary aromatic amines, carbazoles, primary and secondary aliphatic amines, aromatic hydrocarbons and an enol (2,4-pentanedione). Amides, amine oxides and other oxidized nitrogen compounds gave weak or negative tests, as did aromatic compounds with electron attracting groups. The relationship of amine structure to color formation and the mechanism of reaction are discussed. The effects of some chromatographic variables on color formation with the reagent are reported. R_f values with neutral solvents are given.

OCCURRENCE OF γ-TOCOPHEROL AND VARIATION OF α- AND γ-TOCOPHEROL IN BOVINE MILK FAT. C. Kanno, K. Yamauchi and T. Tsugo (Dept. of Agricultural Chem., Univ. of Tokyo, Tokyo, Japan). *J. Dairy Sci.* **51**, 1713–19 (1968). It was confirmed that γ-tocopherol in addition to α-tocopherol occurred in milk fat as a normal component. γ-Tocopherol, separated from milk fat, was identified by thin-layer and gas-liquid chromatography, ultraviolet and infrared absorption spectra, and coupling reaction. The mean values of α- and γ-tocopherol

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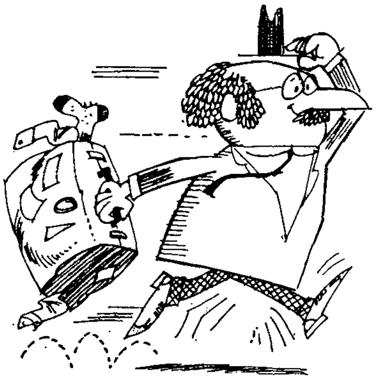

Meetings

AOCS National Meetings

1969—San Francisco, San Francisco Hilton, April 20-24. Minneapolis, Leamington Hotel, Oct. 5-8.
April 26-30, 1970—New Orleans, Jung Hotel.
Sept. 27-Oct. 1, 1970—Chicago, Conrad Hilton Hotel.

AOCS Section Meetings

North Central Section—March 26, 1969, Swedish Club, Chicago.

Northeast Section—April 15, 1969, Military Park Hotel, Newark, N. J.; June 3, 1969, Whyte's Restaurant, New York City.

Other Organizations

* March 10-15, 1969—Symposium of the Working Group Mass Spectrometry, Gesellschaft Deutscher Chemiker, Heidelberg, West Germany.
* March 13, 1969—Synthetic Organic Chemical Manufacturers Association, Hotel Roosevelt, New York, N.Y.
March 20, 1969—Organic Chemistry Symposium, Trent University, Peterborough, Ontario, Canada.
May 5-6, 1969—International Symposium on the Chemistry and Metabolism of Sphingolipids, Kellogg Center of Michigan University, Michigan.
May 8, 1969—Society of Cosmetic Chemists Semi-Annual Scientific Meeting, Americana Hotel, New York, N.Y.
May 12-15, 1969—Twentieth Annual Mid-America Symposium on Spectroscopy, Sheraton-Chicago Hotel, Chicago, Ill.
May 18-23, 1969—Mass Spectrometry Symposia, Sheraton-Dallas Hotel, Dallas, Texas.
May 21-23, 1969—IMPI's Fourth Annual Microwave Power Symposium, University of Alberta, Edmonton, Alberta, Canada.
May 25-28—52nd Canadian Chemical Conference and Exhibition, Queen Elizabeth Hotel, Montreal, Quebec, Canada.
June 4-6, 1969—First Technicon International Congress on Automated Analysis, Conrad Hilton Hotel, Chicago, Ill.
June 22-26, 1969—23rd Congress International d'Esthetique et de Cosmetologie (Vienna Congress), Wiener Hofburg, Vienna.
Aug. 17-24, 1969—3rd NMR Symposium, Physical Chemistry Division and University of Toronto, Toronto, Ontario, Canada.
Sept. 7-11, 1969—XIIIth International Conference on the Biochemistry of Lipids, Athens, Greece.
Sept. 8-9, 1969—Society of Cosmetic Chemists National Seminar, Riverfront Inn, St. Louis, Mo.
Nov. 2-7, 1969—Society of Cosmetic Chemists Arden House Conference, Joint Sponsorship with Columbia University College of Pharmacy, Arden House, Harriman, N.Y.
Dec. 2, 1969—Society of Cosmetic Chemists Annual Scientific Meeting and Medal Award Dinner Dance, Americana Hotel, New York City.

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* Additions to previous calendar

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content in mixed milk estimated by the thin-layer chromatographic method for a year were 28.3 (range, 17.0-39.3) and 1.5 (range, 0.5-2.9) μg per gram of fat, respectively. Throughout seasons, α-tocopherol varied from 29.2 to 39.3 (mean, 33.8) in summer (May-October), and from 17.0 to 28.0 (mean, 21.6) μg per gram of fat in winter (November-April). γ-Tocopherol varied from 1.0 to 2.5 (mean, 1.8) in summer and from 0.3 to 2.9 (mean, 1.1) μg per gram of fat in winter. Tocopherols other than α- and γ-tocopherol were not detected in any samples analyzed.

Resolution and optimization in gel filtration and permeation chromatography. J. C. Giddings (Dept. of Chem., Univ. of Utah, Salt Lake City, Utah 84112). *Anal. Chem.* 40, 2143-49 (1968). A theoretical study is presented of resolution in exclusion chromatography and the factors which influence it. Optimum parameters are suggested on the basis of general chromatographic theory and a recent entropy-based formulation for partition coefficients. It is concluded that highest resolution and speed will be associated with long, narrow columns with fine particles and high pressure drops. Temperature and solvent should be chosen to minimize viscosity. Pores should be relatively small, leading to early elution, and their total volume should be large. Grounds are presented for optimizing pore shape as well as size. Finally, these results are used to predict the size and molecular weight increments needed for satisfactory resolution in columns of different efficiencies.

Solvent extraction of aflatoxins from oilseed meals. H. K. Gardner, Jr., S. P. Koltun and H. L. W. Vix (S. Reg. Res. Lab., New Orleans, La. 70119). *J. Agr. Food Chem.* 16, 990-3 (1968). Aflatoxin can be removed or significantly reduced in cottonseed and peanut meals by extracting with a tertiary solvent system of 54% acetone, 44% hexane and 2% water (by weight) or a binary solvent system of 90% acetone and 10% water (by weight). The tertiary solvent system simultaneously removes oil and aflatoxin from prepressed cake containing 12 to 15% oil, resulting in residual lipids content of approximately 1% and aflatoxin levels of less than 40 p.p.b. The binary solvent system has reduced the aflatoxin content of prepressed cottonseed and peanut meals to less than 10 p.p.b. in small scale batch extractions and less than 40 p.p.b. in continuous pilot plant extractions. Both solvent systems offer economically feasible methods for reducing the aflatoxin in cottonseed and peanuts to a level of 30 p.p.b. or below.

Autoxidation of saturated fatty acids. M. H. Brodnitz (International Flavors & Fragrances, Inc., 1515 Highway 36, Union Beach, N.J. 07735). *J. Agr. Food Chem.* 16, 994-999 (1968). Saturated fatty acids and their esters are known to undergo thermal oxidation. Farmer's hydroperoxide theory is, however, not applicable for these compounds. Several theories regarding the products and location of the initial oxidative attack are briefly reviewed. Recent work identifying monohydroperoxides as the initial products of autoxidation of methyl palmitate is described in some detail. The oxidation does not occur selectively at a single location along the ester and does not require the presence of unsaturation in the molecules. The effect of purity and temperature on the products of autoxidation of saturated fatty acids and its possible implications of these reactions for flavor chemistry are also discussed.

The chemistry of castor oil. A review. R. Rondeau (Documentation Ser. ITERG, Paris, Fr.). *Rev. Franc. Corps Gras* 15, 529-537 (1968). An extensive review of the most common chemical reactions is presented. Special emphasis is given to the reaction of the ester, double bond and hydroxy group.

Dependence of yield and composition of pilot plant extracted rapeseed oil upon harvesting time and method. C. Defromont and M. Chanet (Inst. of Fats and Oils, Paris, Fr.). *Rev. Franc. Corps Gras* 15, 517-527 (1968). Two different times and three different methods have been used. Extraction yields are correlated with seed maturity and harvesting method. These two factors affect the quantity of solid particles (foots) extracted with the oil during pressure extraction. Refining losses are affected. Fatty acid composition is not altered, however, free fatty acids, phosphorus, chlorophyll, unsaponifiable, sterols, iodine value and color are modified. Proteins, glycosides and thioglucosides contained in the meals were examined, but changes from the norm were not reported.

The change in the glyceride structure of rapeseed oil as a result of the interesterification reaction. J. Marcinkiewicz and H. Niewiadomski (Dept. of Chem. and Technol. of Fats and Oils, Tech. Univ., Gdansk, Poland). *Rev. Franc. Corps Gras* 15, 511–515 (1968). The glyceride composition of natural and interesterified rapeseed oil has been determined using lipase hydrolysis. As a result of these changes, the content of trierucic glycerides increased from 0.5% in the natural oil to 9.1% in the interesterified oil.

Comparison of methods used to determine unsaponifiable matter. F. Mordret. *Rev. Franc. Corps Gras* 15, 389–397 (1968). The normal methods of determining the unsaponifiable matter of fat forms the subject of detailed and revealing comparisons (choice of the solvent, loss of the polar compounds through washing). Other processes to obtain this matter are examined. The possibilities and the limits of the other methods are poorly defined. Several modes of saponification, extraction and washing were evaluated so as to determine the qualitative (by TLC) and quantitative effect of modifications as compared to the normal method. Methods of enrichment in minor components were examined, i.e. molecular distillation, low temperature crystallization and extraction with a countercurrent apparatus. A hot liquid-liquid extractor is described.

Study of unsaponifiable alcohols. Application to the study of vegetable oils. A. Karleskind (Wolff Lab., Paris, Fr.). *Rev. Franc. Corps Gras* 15, 379–387 (1968). Previously the author had reported on the aliphatic alcohols and the triterpenic alcohols in the unsaponifiable fraction from vegetable oils. In this paper, additional data are given from the examination of different samples. Further details are given on the identification of the triterpenic alcohols.

Research on polyunsaturated fatty acid autoxidation. I. Study on autoxidation of pure linoleic acid at 20C and 40C. M. Loury and M. Forney (Inst. of Fats and Oils, Paris, Fr.). *Rev. Franc. Corps Gras* 15, 367–377 (1968). Linoleic acid which appears as a normal component of most vegetable oils and animal fats is uncommonly sensitive to the action of atmospheric oxygen. This acid, besides being a promoter of autoxidation, gives birth to polymerization and degradation reactions. Such reactions lead to the formation of products which alter fat flavor. Among these, the authors have identified volatile esters of formic acid. Based upon their previous work, the authors propose a theory. The complex character of the reactions initiated by the autoxidation of fatty acids is outlined. The authors comment upon the large number of impurities formed and the need to understand the effect of these impurities from the nutritional point of view.

Economic and technical considerations in commercial fatty acid and triglyceride chemistry. J. P. Helme (Robbe Freres, Dieppe, Fr.). *Rev. Franc. Corps Gras* 15, 355–366 (1968). Economic considerations are the foundation for the whole field of lipid chemistry. Two considerations are of primary importance: the cost of raw materials as they relate to petro- and carbochemical derivatives and the specificity or unique character of the modified triglyceride. Raw materials are used as triglycerides or are converted to fatty acids. Fatty acids are further converted into fatty alcohols, amines and amides or other condensation products. Utilization ranges far and wide from soaps to food products and involves surfactants, lubricants, coating products, plastics and synthetic elastomers. An extensive review of the major chemical reactions used in industrial applications is presented.

Influence of antioxidants upon increasing the stability of liquid butter. A. N. Valeeva *et al. Piscev. Tehnol.* 6, 23–25 (1967). In unrefrigerated storage, the stabilizing action of antioxidants upon liquid butter was in the following order: propyl gallate, octyl gallate, BHT, dodecyl gallate and NDGA. BHA and ascorbic acid have little antioxidant effect. Adding propyl or octyl gallate to butter increased the shelf life to 2 years. In refrigerated storage (−3 to 13F) the addition of propyl gallate, BHT, octyl gallate and dodecyl gallate preserved the yellow color. (Rev. Franc. Corps Gras)

Antioxidant properties of the esters of alpha tocopherol and certain amino acids. J. Janicki *et al. Przem. spoz.* 22, 25–26 (1968). Amino acids can form esters with *alpha*-tocopherol. The esters are good antioxidants for lard. (Rev. Franc. Corps Gras)

Hydrogenation of sunflower seed oil on a stationary Ni-Cr catalyst in ethanol by the method of "l'ecoulement." D. V. Sokol'skij *et al. Piscev. Technol.* 6, 64–66 (1967). The hydrogenation of sunflower seed oil in ethanol

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A. E. Rheineck Named 1969 Faculty Lecturer

Selected from among the more than 400 faculty members at North Dakota State University, A. E. Rheineck ('42), chairman and professor of the Department of Polymers and Coatings, has been named the Thirteenth Annual Faculty Lecturer.

Presentation of the Thirteenth Annual Faculty Lecture by Dr. Rheineck will come February 18 at Askanase Hall. In a speech, "Coatings: From the Caveman to Apollo 8," Dr. Rheineck will review the history of polymers and coatings.

Dr. Rheineck in his 10-year career at NDSU has developed one of the few university undergraduate curriculums in polymers and coatings in the country. He currently has $146,000 in federal, state and industry-sponsored research projects under way in his laboratories.

Dr. Rheineck with Clarence Evjen, a junior in chemistry from Williston, and other graduate and undergraduate students.

Dr. Rheineck has published eleven papers this year, and at the October meeting of the Federation of Societies for Paint Technology in New York received the Roon Award for original research in polymers and coatings. The paper was co-authored by P. R. Sampath, a graduate student.

In 1966 he received the Distinguished Service Award from the Northwestern Society for Paint Technology, and the National Coil Coaters Society recently honored him with a plaque for his efforts on behalf of that group.

Dr. Rheineck has published 60 research publications, and has 20 U.S. patents, in addition to patents in Great Britain, France, Italy, Germany, the Netherlands, Denmark, Norway, Belgium and Sweden. He is a member of numerous professional and honorary societies.

He lives with his wife, Helen, at 923 Fourteenth St. S. The Rheinecks have a son living in Minneapolis, and two daughters, one living in Illinois and the other in Virginia, and four grandchildren.

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proceeds as a first order reaction. The energy of activation within the temperature range of 30–60C is 2 ± 1 kilocalories per mole. The value of the displacement of the potential E of the stationary Ni-Cr catalyst for an optimal quantity of hydrogen does not vary with the pressure and depends upon the unsaturation of the medium and the other conditions of hydrogenation. (Rev. Franc. Corps Gras)

The fatty acids of liquid butter stabilized with antioxidants after substantial storage. A. N. Valeeva *et al.* *Piscev. Tehnol.* **7**, 41–44 (1968). The stability of liquid butter stabilized with BHT or propyl gallate was compared to that of unstabilized liquid butter during unrefrigerated storage. Fatty acid composition was determined before and after storage. BHT or propyl gallate in a concentration if about 0.01% stabilized the higher unsaturated acids of milk fat. BHT was more effective than propyl gallate. However, antioxidants did not stabilize the less unsaturated fatty acids. (Rev. Franc. Corps Gras)

Spectrophotometric determination of linoleic and linolenic acids in walnut oil. V. I. Dorodneva *et al.* *Piscev Technol.* **7**, 171–172 (1968). Walnut oil does not contain the isomers of linoleic and linolenic acids since there was no absorption in the region of 233 and 268 mμ. On the other hand, the oil is distinguished by the rather high amount of linoleic acid (46.84%). (Rev. Franc. Corps Gras)

• *AOCS Past Presidents Series*

R. C. STILLMAN, 1964

Ronald C. Stillman, the 55th President of the American Oil Chemists' Society, was born in 1908 in Brookfield, N. Y. He received his Bachelor of Arts Degree from Marietta College in 1929. He started with Procter and Gamble on July 1, 1929 and as of this date is still there.

R. C. Stillman

His activities at Procter and Gamble include: 1929–31, Process Development; 1931–38, Special Analytical; 1938–45, Research; 1941–62, Factory Service; 1962–66, Instrumentation; and 1966, Operations and Planning Technical Service.

His publications include Analytical Methods, Analysis of Unusual Oils, research papers on solid soap phases, chapters in books and Society procedures for the complete analysis of soaps and synthetic detergents, as well as numerous AOCS Committee Reports, especially on Color.

His committee activities in the AOCS have been substantial, viz: Soap in Refined Oil, 1937; Olive Oil, 1938; Color, 1941 (Chairman 1953–64); Spectroscopy Chairman, 1945–53; Fat Analysis Committee, 1945 (Chairman 1961–65); Soap and Synthetic Detergents, 1954; Examination Board 1954; Secretary, 1959–60; Governing Board, 1957, 1958, 1961, 1963–67; Executive Committee, 1964–65; Awards Committee, 1966.

Ron states that the most significant items of interest during his administration were the introduction of the Executive Committee to handle the immediate problems of the Society and the establishment of a continuous Presidential record which is passed from President to President.

Ron and Margaret have four children and two grandchildren and reside in Cincinnati, Ohio.

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Regarding hydrogenation in a rotary apparatus. B. N. Tjutjunnikov *et al.* *Piscev. Technol.* **7**, 94–96 (1968). The hydrogenation of oils in a rotary apparatus procedes with a high degree of selectivity and without the formation of isooleic acid. (Rev. Franc. Corps Gras)

Use of the Zenith process in refining oil with a very high free fatty acid content. H. Niewiadomski and J. Marcinkiewicz. *Przemysl Spozywczy* **1967**, No. 1, 11–3. During investigations of the deacidification of FFA oil (free fatty acid content), performed in the laboratory, 580 g of crude oil with a sap. val. of 303.6 and A.V. of 220.0 was neutralized, the following parameters being used in the experiments: alkali concentration 16, 24, 32, 40 g/l; temperature of the process 40, 50, 60, 70, 80C. Best results were obtained with an alkali concentration of 24 g/l and temperature of 60–70C. Oil of a sap. val. of 221.1 and A.V. of 0.5 was obtained after neutralisation. By the Zenith method, therefore, the A.V. of an oil may be reduced in one stage from 220 to <1. The losses in natural oil during the deacidification process by the Zenith method are lower than the losses reported when using the conventional alkali method for neutralization of fats with a high FFA content. (Rev. Current Lit. Paint Allied Ind. No. 316)

Isolation and analysis of two types of diester waxes from the skin surface lipids of the rat. T. Nikkari and E. Haahti (Dept. of Med. Chem., Univ. of Turku, Turku, Finland). *Biochim. Biophys. Acta* **164**, 294–305 (1968). Two types of aliphatic diester waxes have been isolated from the skin surface lipids of the rat using silicic acid chromatography. The isolated material and its alkaline hydrolysis products were characterized using infrared spectrometry, thin-layer and gas-liquid chromatography. One type appears to be a diester of a 2-hydroxy fatty acid (C_{14-22}) with 1 molecule of unsubstituted fatty acid (C_{14-28}) and 1 molecule of monohydric alcohol (C_{14-32}). The other type represents a diester of an alkane-1,2-diol (C_{14-24}) with 2 molecules of fatty acid (C_{14-28}). The molecular sizes of both types range from C_{48} to C_{68} with a maximum content at C_{51-58}.

Studies on the thermal polymerization of vegetable oils. VI. A study of the structure of polymer acids. E. Fedeli, F. Camurati and G. Jacini (Center for Lipochemistry, Milan, Italy). *Riv. Ital. Sostanze Grasse* **45**, 663–7 (1968). Two classes of polymer acids, dimeric and trimeric, are formed during the thermal polymerization of vegetable oils. These two classes can be isolated by chromatographic techniques. Each fraction obtained, however, is not homogeneous, but it is composed of a series of individual compounds not separable from one another by any known means. Treatment of these fractions by ozonization and the study of ozonolysis fragments provide some information on the structure of these polymer acids.

Dilatometric properties of liquid and hydrogenated soybean oil blends with coconut oil admixture. A. Yaron, B. Turzinski and A. Letan (Israel Inst. of Tech., Haifa, Israel). *Riv. Ital. Sostanze Grasse* **45**, 668–72 (1968). The dilatometric properties of ternary blends of coconut oil, unhardened soybean oil and hardened (m.p. 42C) soybean oil have been investigated for the purpose of selecting suitable compositions for margarine oils. It was concluded that satisfactory table margarine can be prepared, without the use of coconut oil, from an appropriate blend of hardened and unhardened soybean oil. Even better dilatometric properties were obtained by transesterification of selected binary mixtures of the two soybean oil fractions.

The composition of neutral lipids and their fatty acids in the whale brain. P. Lesch and K. Bernhard (Univ. of Basel, Basel, Switzerland). *Helv. Chim. Acta* **51**, 652–60 (1968). Pure lipids from five regions in the brains of six whales were separated into various fractions as cerebrosides, sphingomyelins, lecithins, ethanolamine cephalins, cholesterol and free fatty acids. The white matter was found to contain mostly cholesterol and cerebrosides, the grey matter glycerophosphatides. The fatty acid composition of the cerebrosides from all regions is about the same. The fatty acids from sphingomyelins, lecithins and ethanolamine cephalins show significant differences in relation to their origin.

High-order compositeness in randomly distributed natural fats: glyceride structure of an arecanut fat. A. R. S. Kartha (Indian Agr. Res. Inst., New Delhi, India). *J. Sci. Food Agr.* **19**, 286–8 (1968). A specimen of arecanut fat, containing 78% (molar) saturated acids, was found to contain 54.9% fully saturated triglycerides (GS_3), 8.1% triunsaturated glycerides (GU_3), 32.5% GS_2U and 4.7% GSU_2

(all molar percentages), as compared with 46.7, 1.1, 40.5 and 11.7% respectively expected for random distribution. The maximum proportions of GS_3 and GU_3 possible by any mechanism of esterification are shown to be the same as the random distribution values. The unusual structure of the fat is therefore due to 'high-order compositeness', i.e. it is produced by admixture of fats of widely differing saturated acid contents from different cells of the same tissue. Published data on the biogenesis of fat in ripening arecanut support this concept. This heterogeneity was not evident from examination of the tissues.

INFLUENCE OF DIETARY LINOLEIC ACID ON EGG FATTY ACID COMPOSITION IN HENS DEFICIENT IN ESSENTIAL FATTY ACIDS. D. Balnave (Guy's Hospital Med. School, London, England). *J. Sci. Food Agr.* **19**, 265–72 (1968). The effect on egg yolk lipids of adding linoleic acid in the form of corn oil to the diet of hens depleted of essential fatty acids over a prolonged period was examined. There was an immediate increase in the amount of linoleate deposited in all yolk lipid fractions. The addition of 8% corn oil resulted in a maximum value of about 20% linoleic acid in the egg yolk fatty acids being attained over a period of fourteen days, accompanied by a reduction in the level of oleic acid. Minor adjustments in the other egg fatty acids accompanied these major changes.

CHANGES IN THE LIPIDS OF TURKEY MUSCLE DURING STORAGE AT CHILLING AND FREEZING TEMPERATURES. M. J. Fishwick (Agr. Res. Council, Cambridge, England). *J. Sci. Food Agr.* **19**, 440–5 (1968). Diced turkey leg and breast muscle stored for 22 days at 0 and −3C, and for up to one year at −10, −20 and −60C was examined at intervals for lipid composition. Free fatty acids increased at all temperatures except −60, with a Q_{10} of 3–4 between 0 and −20; 90% of the fatty acids liberated were unsaturated, matching in composition the unsaturated acids of the muscle glycerophospholipids. The existence of linear relationships between increase in free fatty acids and decrease in phosphatidylethanolamine or increase in lysophosphatidylcholine confirmed phospholipase A^2 as the enzyme mainly responsible. The composition of fatty acids liberated at 0 and −3 showed that both lipase and phospholipase were active. A slight decrease in extractability, resulting in an apparent loss of phospholipid-P, was observed after storage at low temperatures.

ALL-PURPOSE SHORTENING. N. B. Howard and J. B. Martin (Procter & Gamble Co.). *U.S. 3,402,050.* An all-purpose plastic shortening composition for frying and baking having a smoke point higher than 375F and capable of producing cakes of high volume and fine texture consists of fatty glycerides containing admixed 0.5 to 10 ppm of methyl silicone having a viscosity of 50 to 1,000,000 centistokes, and 0.25–4% of a material selected from the group consisting of (a) condensation products of dicarboxylic acid and fatty acid monoester of straight chain C_3-C_5 aliphatic diol, (b) condensation products of dicarboxylic acid and partial fatty acid glyceride containing an average of 1 to 2 fatty acid radicals, (c) acid anhydrides of the above consendation products, and (d) mixtures of all the above, the dicarboxylic acids having 3–6 C atoms and the fatty acid radicals 12–22 C atoms.

ANALYSIS OF RICINOLEIC ACID MONOGLYCERIDES BY COLUMN CHROMATOGRAPHY AND NUCLEAR RESONANCE SPECTROSCOPY. M. Teupel and J. Pollerberg (Henkel & Cie. G.m.b.H.). *Tenside* **5**, 275–8 (1968). By a combination of column chromatographic methods and nuclear resonance spectroscopy quantitative determinations of monoglycerides in technical ricinoleic acid monoglycerides have been carried out. The method consists of partially separating the mixture of the substance to be analyzed using Sephadex LH-20 and column chromatography. This is followed by acetylation of the separated fractions, solution in carbon tetrachloride and determination of the nuclear resonance spectrum.

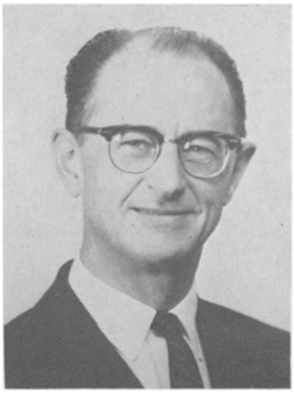
IDENTIFICATION AND DETERMINATION OF PHTHALIC ACID IN EDIBLE OILS. P. Giannessi (Agr. Chem. Exper. Stat., Rome, Italy). *Riv. Ital. Sostanze Grasse* **45**, 628–33 (1968). A new method for the separation and identification of phthalic acid in edible oils is presented. The method is based on the different solubility of dimethyl phthalate with respect to fatty acid methyl esters. The compound thus separated can be analyzed quantitatively by gas chromatography. The method is described as simple and very sensitive.

STUDIES ON POSITION AND GEOMETRIC ISOMERS OF C_{18} UNSATURATED FATTY ACIDS. U. Pallotta (Univ. of Bologna, Bologna, Italy). *Riv. Ital. Sostanze Grasse* **45**, 643–56 (1968). The geo-

(Continued on page 91A)

North Central Section To Present Bailey Award to Harold S. Olcott

H. S. Olcott, Professor of Marine Food Science, University of California, Berkeley, is to be the ninth recipient of the Alton E. Bailey Award. This award was established in 1959 by the North Central Section to honor scientists who have made outstanding contributions to our knowledge of lipids and associated products. The award will be presented at the North Central Section meeting on March 26, 1969, at the Swedish Club in Chicago, Illinois.



H. S. Olcott

The diversity of Dr. Olcott's interests are indicated by his educational background. He took a Bachelor's Degree in Chemical Engineering from the University of Denver, followed this immediately with a Master's Degree in Physical Chemistry, then took his Doctorate in Biochemistry in 1931 under Professor H. A. Mattill at the University of Iowa.

Upon graduation, Dr. Olcott accepted a National Research Council Fellowship at Yale University, then returned to the University of Iowa as Research Fellow. With Professor Mattill and others, Dr. Olcott demonstrated that tocopherols were the active antioxidants in most vegetable oils; he first described the powerful antioxidants peculiar to sesame oil and showed that cephalin was an active antioxidant.

In 1937 Dr. Olcott joined the Mellon Institute as a Research Fellow. Working on cottonseed, he examined the composition of cottonseed proteins, showed the effect of cooking on oil yield, on the nutritive value of the protein and on the toxicity of the meal. After transferring in 1941 to the Western Regional Research Laboratory, Dr. Olcott continued his investigations in protein chemistry, particularly the proteins of wheat.

In 1955 Dr. Olcott became Professor of Marine Food Science at the University of California. His interest in lipid and protein chemistry resulted in a series of excellent papers on fish composition. His earlier specialty, antioxidants, has not been neglected either; he has published fine papers on the mechanism by which amines function as antioxidants. Dr. Olcott has published more than 160 papers. He is an outstanding biochemist who has contributed substantially to our knowledge in the field of lipids, proteins and their biochemistry.

The following companies have contributed to support the Bailey Award: Anderson Clayton & Co. (Food Div.); Ashland Chemical Co.; Cargill, Inc.; Central Soya (Chemurgy Div.); Corn Products Co.; De Laval Separator; Durkee Famous Foods; General Mills, Inc.; Johnson's Wax Fund, Inc.; Mead Johnson & Co.; National Dairy Products Corp.; Oscar Mayer & Co.; and Sargent-Welch Scientific Co.

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Turn to page 99A, *this issue, for*

COMPLETE PROGRAM
AOCS SPRING MEETING,
SAN FRANCISCO HILTON HOTEL
SAN FRANCISCO, CALIF.,
APRIL 20-24, 1969

(Continued from page 85A)

metric isomers of C_{18} unsaturated fatty acids have been separated and identified by thin-layer chromatography, gas chromatography, I.R. and U.V. spectroscopy. By a combination of gas chromatography and mass spectrometry it was also possible to detect the double bond position in some monounsaturated fatty acids present in vegetable oils. Analytical methods suitable for detecting the presence of some of these types of fatty acids in edible oils have been developed.

THE INFLUENCE OF DIET ON THE COMPOSITION OF THE FATTY ACIDS OF LARD. L. J. Bastijns (Labor. Oleotest, Antwerp, Belgium). *Chem. Ind. (London)* 1968, 721–2. Analysis of back fat, breast fat and leaf fat of pigs reared on a special diet including considerable quantities of beef offal such as stomachs, intestines, etc., revealed considerably higher levels of C-14:1 acid (0.12% vs. 0.03%) and of C-15 branched acid (0.05% vs. 0) than in the case of pigs whose diet did not include beef offal. The validity of tests to investigate lard adulteration based on these two acids is therefore questionable.

DETERIORATION OF β-CAROTENE IN CERTAIN HYDROGENATED FATS. I. INCIDENCE OF GREEN DISCOLORATION DURING STORAGE D. J. McWeeny (Ministry of Agr., Food Standards, Norwich, England). *J. Sci. Food. Agr.* 19, 250–3 (1968). An investigation on the stability of β-carotene in 111 samples of hydrogenated edible fats revealed that during storage in the 20 to −20C temperature range, green discoloration of the yellow fats occurred in 38 samples during the first year of storage. The discoloration was found mostly in hydrogenated palm kernel and coconut oil; hydrogenated marine and soybean oil samples were much less susceptible to color change. The rate of color change was generally a maximum in the temperature range +6 to −6C and decreased rapidly as the temperature was raised.

II. PRODUCTS OF β-CAROTENE DETERIORATION AND NATURE OF THE GREEN PIGMENT. *Ibid.*, 254–8. The unsaponifiable fraction from a sample of hardened palm kernel oil which had developed a green discoloration was examined and found to contain a number of β-carotene oxidation products including a number of β-carotene epoxide derivatives. A major component was similar to, but not identical to, mutatochrome (β-carotene 5,8-epoxide) and a compound believed to be β-apo-3-carotenal was also found. It is suggested that the green discoloration of the carotenized fat was due to oxidation of β-carotene to epoxide derivatives by traces of peroxyacids and the conversion of these epoxides into green-blue ionized forms by the action of an acidic material present in the fat.

III. FACTORS AFFECTING THE RATE AT WHICH GREEN DISCOLORATION OCCURS. *Ibid.*, 259–65. The influence of a variety of additives and thermal treatments upon the rate at which green discoloration develops in β-carotene-hydrogenated fat systems is reported. The observed effects are discussed in relation to the hypothesis that the color change is associated with the production of β-carotene epoxides from the oxidation of β-carotene by peroxyacids which are formed by the interaction of aldehydoglycerides with dissolved oxygen. Possible methods which might be employed to avoid the incidence of discoloration include suitable choice of oil, the use of certain additives, notably commercial food grade lecithin, adequate tempering of the finished fat and care in the use of cool and cold storage.

APPLICATION OF THE ANALYSIS OF UNSAPONIFIABLE MATTER TO THE DETERMINATION OF FAT COMPOSITION. J. P. Wolff (Ecole Superieure d'Application des Corps Gras, Paris, France). *Riv. Ital. Sostanze Grasse* 45, 634–42 (1968). Considerable progress has been made in the past five years in analyzing the unsaponifiable matter of a number of different natural fats and oils. This, coupled with the fact that oil refining does not appear to affect the composition of the unsaponifiables, provides a useful tool for identifying fats and oils of unknown origin or for analyzing oils suspected of contamination. For example, the presence of marine oils is evidenced by a high

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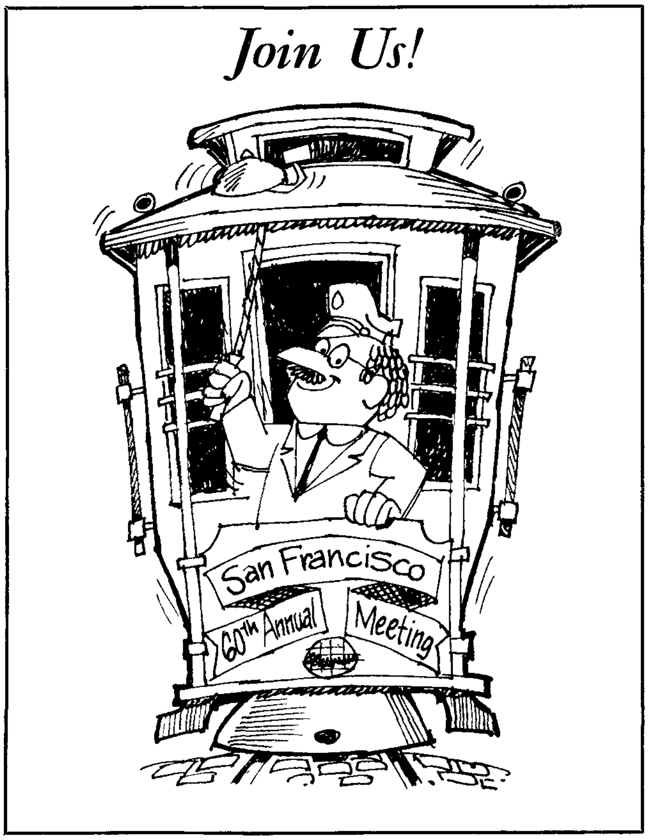
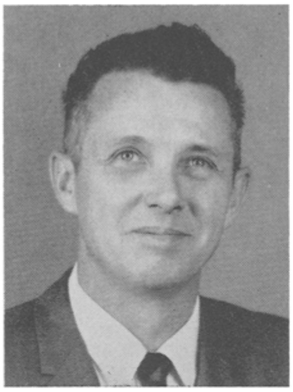
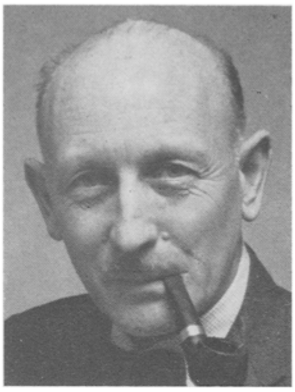


San Francisco Convention Finance Committee

The finances of the Convention Committee are handled by the General Chairman and the Treasurer. A principal function of the General Chairman is to prepare a budget and to maintain periodic checks to insure that each committee is operating within its respective limits.



T. H. Applewhite
General Chairman



F. L. Avera
Treasurer

The handling of all money is accomplished by the Treasurer. Each committee chairman who handles money is responsible directly to the Treasurer who, in turn, reports to the General Chairman. The treasurer deposits all receipts, pays all outstanding bills, and submits a final report of all receipts and expenditures.

Turn to **page 99A**, *this issue, for*

COMPLETE PROGRAM
AOCS SPRING MEETING, SAN FRANCISCO HILTON HOTEL
SAN FRANCISCO, CALIF., APRIL 20–24, 1969

• *San Francisco, Ladies Program . . .*

(Continued from page 86A)

9:30– 1:00 PM—Conducted Walking Tour of Union Square. Shopping in San Francisco is a woman's dream! The City is so compact most of our loveliest shops are located within a four-block radius of Union Square. Arrangements have been made for a "behind the scenes" excursion to some of these diversified showplaces.

After breakfast those who join this tour will divide into small groups and leave for the first shop. So that you will enjoy every minute, do wear comfortable shoes. There will be no opportunity to make purchases during the tour (husbands, please note!) but we hope the ladies will return during their free hours, if they so wish.

The afternoon is left free for relaxing, hair appointments, or additional browsing.

8:00 PM—Banquet, Continental Ballroom, The San Francisco Hilton.

Wednesday, April 23

9:15 AM—Continental Breakfast, California Room.

10:00 AM–3:45 PM—Tour of "Acres of Orchids" followed by Luncheon at the Alta Mira Hotel in Sausalito.

This is an exceptionally exciting day! Buses will take us to South San Francisco where we will tour one of the largest orchid collections in the world. During our tour we will see every kind of orchid imaginable. Truly, this will be an experience never to be forgotten.

From the nursery we will go over the Golden Gate Bridge to the artistic community of Sausalito. Luncheon will be served at the Alta Mira Hotel with a magnificent view overlooking the Bay and San Francisco.

Following luncheon an hour has been set aside for browsing in the fascinating shops at Village Fair and the unique little shops for which Sausalito is noted.

We will bus back between 3:30 and 3:45 PM.

Thursday, April 24

9:00–11:00 AM—Coffee, California Room.

The Committee felt it advisable to leave this day free for your own personal pleasure, a day for that last sightseeing trip, a visit to your favorite shop or museum. Our hostess in the Hospitality Room will gladly assist you in making suggestions for this day.

You might consider. . .

* Browsing among the antique shops on Union Street.
* Exploring the shops and then lunching in picturesque Ghirardelli Square.
* Looking at the decorators' salons in Jackson Square, and viewing the Golden Gateway Center.
* Picking up delightful children's gifts in Chinatown.
* Viewing the Brundage Collection of Asian Art in the DeYoung Museum, Golden Gate Park.
* Indulging in the bargains at Cost Plus, then lunching at nearby Fisherman's Wharf.
* Shopping or browsing in the famous shops in the downtown Union Square.

This is what we've planned for you. We hope to see you in San Francisco in April.

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cholesterol level, the absence of triterpenic alcohols indicates absence of animal fats and a low ratio of *beta*-sitosterol to campesterol + stigmasterol reveals the presence of 5–10% soybean or corn oil in olive oil.

IMITATION CREAM CHEESE SPREAD CONTAINING POLYUNSATURATED FAT. G. D. Elenbogen and M. Baron (Vitamins, Inc.). *U.S. 3,397,994.* A dietary spread resembling cream cheese and containing 15–40% of a highly unsaturated fat, 5–13% phosphoprotein solids and water is made by homogenizing the three ingredients at 160F. A lactic acid producing culture is added and incubated to pH 4.6. The mixture is heated to 165F, a vegetable gum is added and the mixture is again homogenized.

EDIBLE DIETARY SPREAD AND METHOD OF MAKING SAME. G. D. Elenbogen (Vitamins, Inc.). *U.S. 3,397,995.* A method is described for producing an emulsified edible spread resembling cream cheese, homogeneous at room and refrigerator temperatures, uniformly spreadable and having a ratio of polyunsaturated to saturated fats of 3:1 to 9:1. The method includes admixing homogeneously 15–40% by wt. of fat, 0.1–2% of a stabilizing vegetable gum, 5–13% of phosphoprotein solids and 0.2–3% of lactic acid, the balance being water.

OLEAGINOUS GEL COMPOSITION. C. H. Japikse (Procter & Gamble Co.). *U.S. 3,397,997.* An oleaginous gel composition having a stable beta crystalline phase with a solids particle size up to about 10 microns is prepared by rapidly crystallizing triglyceride solids to beta phase by rapidly chilling to below 85F in less than 60 seconds a melted mixture of 92–99% of liquid glyceride oil having an I.V. of 107 or greater and 1–8% of solid triglyceride having an I.V. not exceeding 12 and consisting of a 1:4 to 4:1 blend of a beta-phase-tending hardstock and a non-beta-phase-tending hardstock.

METHOD FOR PRODUCING POURABLE REFRIGERATED MARGARINE. W. E. Fricks (Fricks Foods, Inc.). *U.S. 3,397,998.* A method of converting conventional margarine which is normally solid at room temperature into a form which is pourable at less than 40F comprises mixing for 1–10 minutes equal amounts of conventional margarine, solid at 40F, and of edible vegetable oil, liquid at 40F, and refrigerating the mixture thus formed to 38–40F.

LIQUID SHORTENING. R. G. K. Strobel (Procter & Gamble Co.). *U.S. 3,404,985.* A liquid shortening useful for baking contains about 0.5–15% by wt. of an alpha phase crystal tending emulsifier such as propylene glycol monostearate and about 0.25–2% of preformed oil-soluble stannous or polytitanyl salts of saturated fatty acids having 14 to 22 C atoms.

EMULSIONS OF FATTY ACIDS. H. P. Taylor and B. A. Pethica (British Bewoid Co. Ltd.). *U.S. 3,404,991.* A composition of matter is claimed, consisting essentially of a stable pourable oil-in-water emulsion of a straight or branched chain, saturated or unsaturated aliphatic C_8 to C_{22} fatty acid, the emulsion containing at least 10% by wt. of the fatty acid and including as an emulsifier a minor proportion of a soap of a rosin Diels-Alder adduct.

CHROMATOGRAPHIC SEPARATION OF GAMMA-LINOLENIC ACID ESTERS. J. E. Pike (The Upjohn Co.). *U.S. 3,405,151.* A process for the separation of gamma-linolenic acid lower alkyl ester from its mixture with associated unsaturated fatty acid lower alkyl esters of substantially the same molecular weight but different number of double bonds, comprises contacting 1 part by wt. of the mixture with 3–10 parts by wt. of an adsorbent impregnated with 5–40% by wt. of silver nitrate, based on the weight of the adsorbent, and eluting the gamma-linolenic acid lower alkyl ester from the adsorbent.

• Fatty Acid Derivatives

THE ALTERNATING PROPERTIES OF ALIPHATIC AMINES. II. POTENTIOMETRIC TITRATION FOR THE ANALYSIS OF HIGH MOLECULAR WEIGHT ALIPHATIC AMINES. H. Kraus and G. Glastetter (VEB Deutsches Hydrierwerk, Rodleben, Germany). *Tenside* **5**, 283–7 (1968). The potentiometric titration method for analyzing high molecular weight aliphatic amines with respect to their contents of primary, secondary and tertiary amines is described. Mathematical treatment and graphic methods are also discussed.

SULFIDES OF HIGHER FATTY ACIDS. G. M. Calhoun (Shell Oil Co.). *U.S. 3,400,139.* Novel oil soluble dithioethers of an ester of a diol, such as polyethylene glycol and 2,2′-thiodiethanol, and a fatty acid such as oleic are excellent lubricating oil additives.

Emulsions of fatty acids and acrolein polymers and sizing paper therewith. S. P. Malchick (Nalco Chemical Co.). *U.S. 3,402,100.* Stable aqueous emulsions of liquid fatty acids and water-soluble acrolein polymers are shown to be effective sizing agents for paper.

Polymerization of unsaturated fatty acids employing a synthetic lithium modified magnesium silicate catalyst. S. E. Miller and D. H. Wheeler (General Mills, Inc.). *U.S. 3,405,150.* A process for polymerizing unsaturated higher fatty acids comprises heating the fatty acids to a polymerizing temperature in the range of 160 to 300C in the presence of a synthetic lithium-magnesium silicate catalyst.

• Biochemistry and Nutrition

Blood Lipid Changes in cows of different breeds fed rations depressing milk fat test. P. N. Varman and L. H. Schultz (Dept. of Dairy Science, Univ. of Wis., Madison). *J. Dairy Sci.* **51**, 1597–1605 (1968). Blood lipid changes in response to a high-grain ration that depressed milk fat test were studied in four cows each of the Guernsey, Holstein, and Jersey breeds. Milk fat percentage decreased from 4.9 to 3.7 in Guernseys, 3.3 to 2.2 in Holsteins, and 5.3 to 4.3 in Jerseys. Protein content of the milk increased. Although there were some significant breed differences in levels of the blood lipid components, within-breed variations were considerable. Plasma levels of phospholipids, cholesterol esters, free cholesterol, free fatty acids and acetate decreased during the experimental period in all the breeds. Over-all mean arteriovenous differences exceeded 10% of the arterial level only in acetate, triglyceride and ketone bodies. Arteriovenous differences for acetate decreased significantly during the experimental period to almost one-third of the original level, whereas the uptake of triglycerides and ketone bodies was not changed significantly. Levels of blood plasma acetate and triglycerides and blood ketone bodies during the post-experimental period exceeded the original levels and were accompanied by arteriovenous differences exceeding the original levels. The milk fat test recovered to the original levels 3 wk after returning to a normal ration. Higher levels of propionate and lower levels of acetate in the rumen during the experimental period appeared to be the key factors responsible for the observed changes.

Investigation of the component reactions of oxidative sterol demethylation. A. C. Swindell and J. L. Gaylor (Graduate School of Nutr., Cornell Univ., Ithaca, N.Y. 14850). *J. Biol. Chem.* **243**, 5546–55 (1968). The participation of 3-ketosteroids in the biosynthesis of cholesterol was investigated with preparations of rat liver microsomes. Without exogenous NADPH, microsomal enzymes catalyze the demethylation of one methyl group from 4,4-dimethyl-5α-cholest-7-en-3β-ol to yield carbon dioxide and 4-methyl-5α-cholest-7-en-3-one. Equal molar quantities of the two products are formed when either the amount of microsomal protein or the length of incubation is varied. This evidence supports the conclusion that 4-monomethyl and 4-dimethyl ketones are obligatory intermediates of cholesterol biosynthesis. Dimethyl and trimethyl ketones probably are in equilibrium with the corresponding 3-alcohols, but the C_{29}- and C_{30}-ketones probably are not obligatory intermediates of C_{27}-sterol biosynthesis.

Structure of human serum lipoproteins: Nuclear magnetic resonance resonance supports a micellar model. J. Steim, O. Edner and F. Bargoot (Chem. Dept., Brown Univ., Providence, R.I. 02912). *Science* **162**, 909–11 (1968). High-resolution proton nuclear magnetic resonance spectra of low- and high-density lipoproteins from human serum closely resemble those of dispersions of lipoproteins lipids in water. Linewidths of hydrocarbon proton absorptions are not increased in the lipoproteins. In contrast, apolar binding of lysolecithin on serum albumin causes extensive line-broadening and an upfield chemical shift of the hydrocarbon proton resonances of lysolecithin. The results are consistent with a

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predominantly micellar structure for the lipoproteins rather than with extensive hydrophobic association of lipid and protein.

Stereospecificity and other properties of highly purified β-hydroxy-β-methylglutaryl coenzyme A cleavage enzyme from bovine liver. L. D. Stegink and M. J. Coon (Dept. of Biol. Chem., Univ. of Michigan, Ann Arbor, Mich. 48104). *J. Biol. Chem.* **243**, 5272–79 (1968). The β-hydroxy-β-methylglutaryl coenzyme A cleavage enzyme has been obtained in a highly purified but unstable form from bovine liver. A study of the stoichiometry of the enzyme-catalyzed reaction indicated that equimolar amounts of acetoacetate and acetyl coenzyme A are formed, and that only half the synthetically prepared substrate undergoes cleavage. From a consideration of this and other metabolic reactions in which β-hydroxy-β-methylglutaryl coenzyme A participates, it is concluded that, of the two possible diastereomers, only the one having the S configuration at the β carbon atom is active. The enzyme exhibits an absolute requirement for a divalent metal and a thiol (dithiothreitol, cysteine or glutathione), and preincubation with the thiol is necessary for optimal initial reaction rates. The K_m of the active isomer of the substrate is 8.0×10^{-6} M with Mg^{++} ions present, and 1.2×10^{-5} M with Co^{++} ions. The apparent molecular weight of the enzyme is 48,000, and the turnover number at 37 C and pH 9.5 (the optimal pH) is 3,600 moles per mole of enzyme per min.

Endotoxin and the liver. I. Toxicity in rats with choline deficient fatty livers. J. P. Nolan and M. V. Ali (State Univ. of N.Y., Health Sci. Ctr., School of Med., Dept. of Med., Buffalo, N.Y. 14203). *Proc. Soc. Expt. Biol. Med.* **129**, 29–31 (1968). Suppression of the intestinal bacterial population by orally administered antibiotics has been shown to prevent or retard the development of cirrhosis in rats on choline deficient diets. It has been further demonstrated that this protective effect is abolished by the addition of endotoxin to the drinking water of these animals. The present study was undertaken to test the sensitivity of rats on the choline deficient diet to the lethal effect of bacterial endotoxin, and to the hepatotoxic effects of sublethal doses of the lipopolysaccharide.

Effect of metaraminol on lipolysis in isolated rat fat cells. J. Nakano, T. Ishii, R. D. Oliver and B. Cole (Depts. of Pharmacol. and Med., Univ. of Okla. School of Med., Oklahoma City, Okla. 73104). *Proc. Soc. Expt. Biol. Med.* **129**, 223–6 (1968). It has been well established that metaraminol releases norepinephrine (NE) at the adrenergic nerve endings, thereby exerting indirectly sympathomimetic actions. Metaraminol was found to displace endogenous NE and to be stored at the NE binding sites in the nerve endings, and to be released as a false transmitter upon sympathetic nerve stimulation. Recently, Lundborg and Callingham and Burden found that metaraminol inhibits the uptake of NE-H^3 *in vitro* in the cow adrenal medullas and in isolated rat heart. Tyramine also releases endogenous NE, thereby causing a rise in plasma free fatty acid (FFA) levels. It is known that adipose tissues contain abundant adrenergic nerve fibers which are capable of binding NE and metaraminol. Hence, it would be reasonable to assume that metaraminol may increase lipolysis through an indirect pharmacodynamic mechanism similar to that for tyramine. The present study was undertaken to investigate the direct effect of metaraminol on lipolysis, the influence of metaraminol on NE-induced lipolysis and the effect of adrenergic blocking drugs, propranolol and phenoxybenzamine, on metaraminol-induced lipolysis in isolated rat fat cells.

Specific and nonspecific physicochemical interactions of glucocorticoids and related steroids with rat thymus cells in vitro. A. Munck and T. Brinck-Johnsen (Dept. of Physiol., Dartmouth Med. School, Hanover, N.H. 03755). *J. Biol. Chem.* **243**, 5556–65 (1968). Binding of glucocorticoids and related steroids to rat thymus cells *in vitro* has been measured by equilibrium and kinetic methods. Results are interpreted in terms of the previously established specific and nonspecific metabolic activities of glucocorticoids. Equilibrium binding, which is proportional to nonspecific activity, is largely accounted for kinetically by a fraction which at 37 C dissociates with a time constant under 15 sec. A minor fraction, with a time constant of about 3 min, appears to consist of molecules responsible for specific glucocorticoid activity.

Some properties of a testosterone-binding component of human pregnancy serum. Jean L. Gueriguian and W. H. Pearlman (Dept. of Biol. Chem. and the Dept. of Surgery, Harvard Med. Sch., and Peter Bent Brigham Hospital, Boston, Mass. 02115). *J. Biol. Chem.* **243**, 5226–33 (1968). Human pregnancy serum was previously reported to exhibit a high binding affinity for testosterone; steroid binding was measured by a semimicrotechnique, based on the principle of equilibrium dialysis but utilizing Sephadex G-25 in a batchwise fashion. This property may be ascribed to a testosterone-binding component, presumably a protein, present in very low concentration in serum. The testosterone-binding component was readily separated from corticosteroid-binding globulin (both steroid-binding proteins are present at elevated levels in late pregnancy) by column chromatography of pooled pregnancy serum on microgranular diethylaminoethyl cellulose. Stepwise elution furnished four major fractions; γ-globulin, β-globulin, albumin, and α-globulin, in that sequence. The testosterone-binding component appeared in the β-globulin fraction, whereas the corticosteroid-binding globulin (measured by its cortisol- and progesterone-binding activities) appeared in the albumin fraction; the latter fraction also exhibited considerable testosterone-binding activity, attributable to albumin itself and, in part, to corticosteroid-binding globulin. A portion of the β-globulin fraction (after precipitation in 50% ammonium sulfate) was chromatographed on a column of Sephadex G-100; the testosterone-binding protein was thereby separated from the bulk of the protein (the former emerged last from the column). Considerable losses in testosterone-binding activity were, however, encountered at each stage of purification, and so the over-all increase in specific binding activity (i.e. testosterone-binding activity per g of total protein) was only about 4-fold.

Fatty acid synthesis in adipose tissue incubated in tritiated water. R. L. Jungas (Dept. Biochem., Harvard Med. Sch., Boston, Mass. 02115). *Biochemistry* **7**, 3708–17 (1968). Measurements have been made of the amount of radioactivity incorporated into fatty acids during their synthesis in adipose tissue incubated in a medium containing tritiated water and (U-^{14}C) glucose. The incorporation of tritium was proportional to the total rate of fatty acid synthesis as estimated by the tissue net gas exchange. Tritium appeared only in those fatty acids which also contained ^{14}C. With insulin present in the medium glucose acted as the only important precursor for fatty acid synthesis and the ratio of tritium to ^{14}C incorporation was constant and equal to 0.87. Degradation of the fatty acids revealed that the tritium incorporation was not uniform along the carbon chain. Even-numbered positions contained 0.96 tritium atom/^{14}C atom and odd numbered positions 0.71. When the H_2O of the medium was replaced by D_2O, the tritium incorporation was increased to 1.28 atoms/^{14}C atom. The additional tritium appeared mainly at the even-numbered positions which now contained 1.8 tritium atoms/^{14}C atom. From these data it was estimated that in the absence of an isotope effect 23 of the hydrogen atoms of palmitate would be derived from water. Measurement of the incorporation of deuterium from D_2O into fatty acids confirmed this conclusion. The glyceride glycerol of tissue incubated with tritiated water, (U-^{14}C) glucose, and insulin contained 1.10 tritium atoms/atom of ^{14}C. It is proposed that the incorporation of ^3H into fatty acids can be used as a reliable measure of the total rate of fatty acid synthesis in both control and insulin-treated adipose tissue.

Turnover of plasma palmitate in fed and fasted lactating cows. H. D. Jackson, A. L. Black and F. Moller (Dept. of Physiological Sciences, School of Veterinary Med. Univ. of Calif., Davis, Calif). *J. Dairy Sci.* **51**, 1625–32 (1968). Palmitate-9,10-T was injected intravenously as a single dose into three normal, fed, lactating cows and later into the same cows after they had been carried through a four-day fast. The tritium concentration was measured at frequent intervals in plasma nonesterified fatty acids (NEFA) and in body water. Tritium from the palmitate-9,10-T appeared very rapidly in the plasma water, being present in significant amounts within 1 min after intravenous injection. The standardized specific activity of the plasma water was greater in fasted cows, reflecting greater palmitate oxidation which supports the conclusion that there was a more rapid utilization of NEFA palmitate due to the energy stress of fasting.

Utilization of glucose, octanoate and palmitate by normal rat aorta, and the effect of these acids and of albumin on glucose metabolism. S. Hashimoto and S. Dayton (Res. Service and Med. School, Wadsworth Hosp., Veterans Ad. Center, Los Angeles, Calif. 90073). *Proc. Soc. Expt. Biol. Med.* **129**, 35–41 (1968). Influence of free fatty acids (FFA) on glucose metabolism by heart tissue has been studied intensively. It has been demonstrated that glycolysis is inhibited, resulting in diminished oxidation of glucose to CO$_2$ and a decrease in glucose uptake by this tissue. Aortic tissue, however, appears to resist the influence of palmitate on glucose utilization. One cannot be sure from these data whether or not this is a general effect of fatty acids. This study examines the utilization of glucose, octanoate and palmitate by normal rat aorta and the effect of these acids on glucose uptake, the conversion of glucose to lipid and to CO$_2$ and oxygen consumption.

Studies on $\Delta 5 \rightarrow 4$–3-oxo steroid isomerases. I. An extraction model for enzymatic activity. Francoise Falcoz-Kelly, Etienne-Emile Baulieu, and Annette Alfsen (Lab. de Chim. Biologique, Faculte de Medecine (A.A.), Paris 6e, France). *Biochemistry* 7, 4119–125 (1968). *Pseudomonas testosteroni* $\Delta 5 \rightarrow 4$–3-oxo steroid isomerase has been tested for by analyzing the enzyme-substrate or inhibitor complex formation in terms of an extraction process of steroid from the aqueous medium by the hydrophobic part of the protein. 5-Androstene-3,17-dione, 5-estrene-3,17-dione, and 5-pregnene-3,20-dione have been used as substrates, and 19-nortestosterone, 4-estrene-3,17-dione, progesterone and 19-norprogesterone as competitive inhibitors, varying the methanol concentration of the reaction medium. Various 19-nor-Δ4-3-oxo steroids have been used at a given methanol concentration. Among the structural features of the steroid molecule which interfere in steroid-protein interaction, the substitution of the C$_{19}$ methyl group by hydrogen could increase the affinity by favoring enol formation.

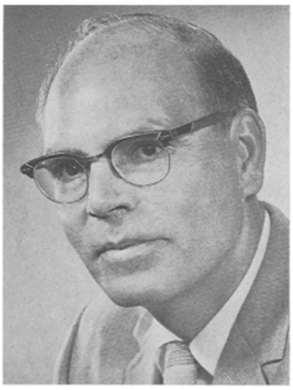
Steroid-protein interaction at sites which influence catalytic activity. A. W. Douville and J. C. Warren (Dept. of Biochem., Univ. of Kansas School of Medicine, Kansas City, Kansas). *Biochemistry* 7, 4052–59 (1968). The effects of 14 steroids (representing major classes in terms of chemical structure and biological activity) on the catalytic activity of 6 enzymes have been studied. Activities of fumarase, lactate dehydrogenase, and isocitrate dehydrogenase were essentially unchanged ($<5\%$) in the presence of steroid concentrations as high as 1.3×10^{-4} M. On the other hand, activities of bovine liver glutamate dehydrogenase, glucose 6-phosphate dehydrogenase from bovine corpus luteum and rabbit liver aldehyde dehydrogenase were inhibited by a variety of steroids. Determination of K_a values of the several steroids tested indicates that the sensitive sites of glutamate dehydrogenase have the highest affinity for estradiol-17β while those of glucose 6-phosphate dehydrogenase have the highest affinity for Δ^5-3β-hydroxy steroids and those of aldehyde dehydrogenase have the highest affinity for 3-keto steroids.

Similarities between postheparin lipase and postheparin phospholipase. W. M. Doezaki and L. Zieve (Lab. for Cancer Res. and Dept. of Med., Minneapolis Vet. Hosp., Univ. of Minn., Minneapolis, Minn. 55417). *Proc. Soc. Expt. Biol. Med.* 129, 182–7 (1968). The presence in human postheparin plasma of an enzyme with phospholipolytic activity, which appeared to be unique in its attack on PE, was first reported by Vogel and Zieve. Subsequent studies have shown that PC can also be hydrolyzed by postheparin plasma under suitable conditions. The postheparin plasma enzyme was distinguishable from pancreatic phospholipase by its properties and by the site of attack on the phospholipid molecule. Although the lipolytic and the phospholipolytic activities of postheparin plasma could not be separated from each other by physical fractionation methods, Vogel *et al* have suggested that the postheparin plasma enzyme action on phospholipids was due to a phospholipase which is specific for the α′-carbon atom. However the similarities reported herein between the properties of postheparin plasma phospholipase and postherparin plasma lipase suggest that the lipolytic and the phospholipolytic activities in postheparin plasma may be mediated by the same enzyme, and that the latter is a lipase.

Stability of the bovine erythrocyte membrane. Release of enzymes and lipid components. S. P. Burger, T. Fujii and D. J. Hanahan (Dept. of Biochem., Univ. of Washington, Seattle, Wash. 98105). *Biochemistry* 7, 3682–99 (1968). During the process of hemolysis and subsequent washings, bovine erthrocytes release a considerable portion of their acetylcholinesterase (acetylcholine acetylhydrolyase, EC 3.1.1.7) activity as well as membrane lipids in a soluble form. Hemoglobin and certain glycolytic enzymes are solubilized prior to the release of the acetylcholinesterase and lipid. The release of acetylcholinesterase from bovine erythrocytes is almost completely prevented if a divalent cation such as Ca^{2+}, Mg^{2+}, Ba^{2+}, or Sr^{2+}, in 1–5 mM concentration, is added to the hemolyzing mixture. The stroma thus prepared maintain their expected morphological shape and total acetylcholinesterase and lipid levels (of the original cells) even after contact with a hypotonic buffer for several days. The membrane fragment solubilized in the absence of any added divalent cation during hemolysis behaves as a lipoprotein. This latter component is easily sedimented by ultracentrifugation and contains a higher proportion of lipids and acetylcholinesterase of significantly higher specific activity (five-to-sixfold increase) than found in the intact membrane. No glycolytic enzyme activity is detectable in this latter fraction. A similar membrane fragment can also be liberated from intact bovine erythrocytes by a short-term treatment with hypertonic saline. The magnesium(calcium) content of bovine erythrocytes is significantly lower than that of human erythrocytes. These data suggest a less cohesive structure for the bovine erythrocyte membrane as compared with the human erythrocyte membrane.

Short Course on Oil Seed Proteins

N. H. Kurht, AOCS Education Committee Chairman, announces a Joint AOCS-AACC (Oil Seed Division) Short Course entitled "Oil Seed Proteins—Chemistry, Technology and Economics," to be held July 14–16, 1969, at the French Lick Sheraton Hotel, French Lick, Indiana.



N. A. Kurht

L. H. Going

Internationally prominent speakers from the scientific and industrial communities of both Societies will present a comprehensive look into the current knowledge of food and feed ingredients, and their future dietary potential. The course should provide new and pertinent information to protein chemists, bio-chemists, nutritionists, oil seed processors, food and feed product developers and equipment suppliers.

L. H. Going is the Short Course Chairman and is in charge of local arrangements. F. E. Horan is Co-Chairman and is responsible for developing the program. Other committee members from the two Societies are M. W. Formo, D. W. Johnson, C. F. Mattil, E. W. Meyer, R. A. Reiners and K. J. Smith.

Further details on the program and registration materials will follow in later Journal issues.

Stimulation of fatty acid synthesis in vitro by gonadotrophin-induced testicular ribonucleic acid. A. Goswami, J. K. Skipper and W. L. Williams (Univ. of Georgia, Athens, Ga.). *Biochem. J.* 108, 147–52 (1968). RNA from testes of hypophysectomized rats treated with follicle-stimulating hormone and luteinizing hormone markedly stimulates *in vitro* the incorporation of acetate and malonate (as CoA derivatives) into polyunsaturated fatty acids. The system *in vitro* contains the components necessary for both protein and fatty acid synthesis. That the RNA is a hormone-induced messenger type that causes enzyme synthesis that then causes fatty acid synthesis is supported by the following observations: (1) the stimulation of RNA synthesis by the hormones is decreased by injection of the animals with actinomycin D; (2) puromycin in the system *in vitro* decreases the synthesis of polyunsaturated acids; (3) the activity of the RNA preparation is destroyed by digestion with ribonuclease; (4) protein that might be denatured enzyme is virtually absent from the effective RNA preparations.

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• Detergents

HEAVY METALS IN SOAP. I. INFLUENCE OF HEAVY METALS UPON THE RANCIDITY OF SOAP. A. Popov *et al. Maslosap. Prom.* 3(3), 17–25 (1967). Autoxidation of soap is examined as a free radical process. The important role of heavy metals upon the acceleration of the process is shown. A bibliography is given which shows the maximum tolerable levels of iron and copper in various types of soap. (Rev. Franc. Corps Gras)

II. COLORIMETRIC METHOD FOR THE DETERMINATION OF IRON, COPPER AND NICKEL IN SOAP. *Ibid.* 3(4), 13–19. A rapid and convenient method for the determination in soap of the level of the more frequently occurring metals is given. Sulfuric acid is used to solubilize the metals in the sample. A colorimetric method is used to determine the level of metal; to determine iron, sulfosalicytic acid is used; to determine copper, diethyldithiocarbamate is used; and to determine nickel, dimethylglyoxime is used. (Rev. Franc. Corps Gras)

ANALYSIS OF THE CONCENTRATION DEPENDENCY OF MASS TRANSFER OF SURFACE ACTIVE SUBSTANCES ACROSS FLUID PHASE BOUNDARIES. K. Winkler (German Acad. of Sci., Berlin, Germany). *Tenside* 5, 259–66 (1968). During the mass transfer of sodium alkyl sulfates in the system iso-amyl alcohol (A)—water (B), in the direction A → B, there is found to exist a condition of hydrodynamic instability. This causes an increase in the rate of transfer as compared to that predicted by pure diffusion kinetics. Mass transfer is accelerated by tracer quantities of $^{14}CH_3OH$ which are simultaneously carried over the phase boundary. Regression analysis for the experimentally determined mass transfer coefficients as a function of concentration results in an acceptable model containing the equilibrium concentration of the organic phase. The relation between primary and simultaneous mass transfer is briefly discussed.

THE SELECTIVE ESTERIFICATION OF D-MANNITOL: PREPARATION OF SURFACE ACTIVE D-MANNITOL PARTIAL ESTERS OF HIGHER FATTY ACIDS. E. Reinefeld and G. Klauenberg (Tech. Hochschule Braunschweig, Germany). *Tenside* 5, 266–70 (1968). The two primary alcoholic groups of D-mannitol are clearly more easily acylated than the others. The ratio of 1-ester to 1,6-ester, which are both obtained when an excess of hexite is present, can be displaced towards the monoester by means of compounds with a low acylation potential. The homologous series of surface active mono- and diesters of higher fatty acids was prepared in crystalline form. With dicarboxylic acids, it is possible to obtain 1,1′-di-D-mannitol esters. Among the monoesters, D-mannitol-1-caprate lowers the surface tension of water the most (to 35.5 dynes/cm at 50C).

ANTAGONIST TITRATION OF SODIUM CARBOXYMETHYL CELLULOSE. W. Hansi, W. Klaus and K. Mercator (Kalle A. G., Wiesbaden-Biebrich, Germany). *Tenside* 5, 281–3 (1968). The method of antagonist titration for carboxymethyl celluloses opens up several possibilities for the rapid determination of degree of substitution and active content and can be suitably used in conjunction with well-known gravimetric methods.

THE ANALYSIS OF FATTY AMINE ETHOXYLATES BY COLUMN CHROMATOGRAPHY. K. Bürger (Farbwerke Hoechst A. G., Gendorf/Obb., Germany). *Tenside* 5, 278–81 (1968). By using cascade chromatography, a new kind of column chromatography, it is possible to qualitatively and quantitatively determine the molecular weight distribution of ethoxylated fatty amines, their degree of ethoxylation and contents of free polyglycols and other foreign substances. Samples weighing 250 to 2,500 mg can be analyzed by this method.

CONTRIBUTIONS TO THE PREPARATION OF POLYETHYLENE GLYCOL ESTERS OF INDUSTRIAL FATTY ACIDS, II. F. Wolf, G. Geipel and K. Löffler. *Tenside* 5, 270–4 (1968). The occurrence of side reactions during the ethoxylation of fatty acids was studied in the case of a stearic acid-10 ethylene oxide adduct, by varying the reaction conditions. Such side reactions are apparent by the formation of diacyl derivatives and of free polyethylene glycols. Using an analytical method due to Malkemus and Swan, the appearance of free polyethylene glycols and diesters was quantitatively determined.

THE RECIPROCAL ACTION BETWEEN SODIUM CARBOXYMETHYL CELLULOSE AND SURFACTANTS. M. J. Schwuger and H. Lange (Henkel & Cie., G.m.b.H.). *Tenside* 5, 257–9 (1968). Determinations of surface tension, viscosity and solubility agree with theoretical statement that the reciprocal action between anionic surfactants and sodium carboxymethyl cellulose is explainable as an effect of oppositely charge ions. The quantitative agreement of the results by the three methods is reflected by the figures obtained for critical micelle concentration. No surfactant/polymer complexes are formed.

SURFACTANT STRUCTURE AND PERFORMANCE. G. M. Gantz (Geigy Dyestuffs). *Am. Dyestuff Rept.* 57, P885–892 (1968). The classes of surfactants and their applications are reviewed.

STABILIZED POLYPHOSPHATE PRODUCTS. K. J. Shaver (Monsanto Co.). *U.S. 3,397,947.* A dense granular sodium tripolyphosphate having at least 75% Form I crystals, a bulk density between 0.7 and 1.3 and particle size larger than 100 mesh, contains dispersed throughout at least 0.1% of stabilizing cations selected from the group consisting of potassium and alkaline earth metal cations.

POLYPHOSPHATE PROCESSES AND PRODUCTS. R. E. Mesmer (Monsanto Co.). *U.S. 3,397,948.* A stabilized, dense granular sodium tripolyphosphate having at least 75% Form I crystals, a bulk density between 0.7 and 1.3 and particle size larger than 100 mesh contains dispersed throughout at least 0.1% of sulfate ions as a stabilizer.

SODIUM TRIPOLYPHOSPHATE. E. J. Griffith (Monsanto Co.). *U.S. 3,397,949.* A process for producing anhydrous sodium tripolyphosphate from sodium tripolyphosphate hexahydrate comprises dehydrating sodium tripolyphosphate hexahydrate in the presence of an effective amount of a nitrogenous degradation inhibitor. Examples of suitable cyclic and acyclic nitrogenous inhibitors are given.

DEFOAMING AGENT. H. D. Hathaway and B. J. Heile (Procter & Gamble Co.). *U.S. 3,399,144.* A defoaming agent suitable for use in detergent compositions consists of 5–95% mineral oil and 5–95% of monoalkyl or dialkyl acid phosphates in which each alkyl chain contains from 16 to 20 C atoms.

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