ABSTRACTS

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

• Fats and Oils

THE CRYSTALLINE STRUCTURE OF FATS AND ITS IMOPRTANCE IN THE DETERMINATION OF THE MELTING POINT. J. Turinski *et al. Bilt. Bil. Ulja Masti* 5(4), 6–10 (1968). The physical structure of vegetable fats is discussed with special reference to the effects of polymorphism during their solidification and tempering. In addition, some results obtained by three different methods for determining melting point are presented. (Rev. Franc. Corps Gras)

EFFECTS OF MOISTURE CONTENT AND ACIDITY OF EARTHS ON BLEACHING ABILITY. J. Lezajic *et al. Bilt. Bil. Ulja Masti* 5 (4), 21–23 (1968). Sunflower oil was treated with BRV bleaching earth containing different amounts of moisture. The optimal bleaching effect was obtained with 10–15% moisture in the earth. The degree of decolorization depends also on the moisture content of the oil. (Rev. Franc. Corps Gras)

FLAVORING OF "DELIKATES" MARGARINE WITH FERMENTED MILK. M. Gams. *Bilt. Bil. Ulja Masti* 5 (4), 3–5 (1968). Preliminary studies indicate that a sufficient concentration of flavor substances is produced in the milk to give the margarine the characteristic aroma of butter. Optimal development of this aroma takes place at an acidity of 28–36° SH. It is not necessary to add artificial flavors to the margarine to supplement this flavor. (Rev. Franc. Corps Gras)

FATTY ACID COMPOSITION AND TOTAL LIPID OF CREAM AND CREAM SUBSTITUTES. Elaine R. Monsen and L. Adriaenssens (Dept. of Nutr., Harvard School of Public Health, and School of Home Ec., Univ. of Washington, Seattle, Wash.). *Am. J. Clin. Nutr.* 22, 458–63 (1969). Nondairy creamers, dry powders, liquids and semisolids, sweetened and soured, which are currently available on the market, were analyzed for total lipid and fatty acid composition. The dry unsweetened powders were 3% or less total fat. The other cream substitutes were 10–55% total fat. The lipid was composed almost exclusively of saturated fatty acids, with C18:0, C14:0 and C16:0 predominating.

THE INTERACTION OF γ-GLOBULIN WITH LIPIDS. G. V. Marinetti and D. Pettit (Biochem. Dept., Univ. of Rochester Med. Cntr., Rochester, N. Y.). *Chem. Phys. Lipids* 2, 17–34 (1968). γ-Globulin interacts with cardiolipin (CL), phosphatidic acid (PA) and phosphatidylserine (PS) to yield an insoluble complex. The bound PA and PS can be nearly all removed by extraction with organic solvents, but about 50% of the bound CL is not extracted. Lecithin and cholesterol alone do not form an insoluble complex with γ-globulin and have either no influence or slightly inhibit the CL-γ-globulin reactions. However, when lecithin and cholesterol are mixed they interact with γ-globulin to yield an insoluble complex. Moreover, the lecithin-cholesterol mixture greatly enhances the CL-γ-globulin reaction. Sphingomyelin can not substitute for lecithin. The bound lecithin and cholesterol in the γ-globulin precipitate are completely extracted by organic solvents.

MYCOPLASMA MEMBRANE LIPIDS: VARIATIONS IN FATTY ACID COMPOSITION. R. N. McElhaney and M. E. Tourtellotte (Dept. of Animal Dis., Univ. of Conn., Box U–89, Storrs, Conn. 06268). *Science* 164, 433–4 (1969). The fatty acid composition of the membrane polar lipids of *Mycoplasma laidlawii B* can be dramatically altered. These variations result in characteristic morphological changes, and in most cases the cells remain viable. This organism should provide a useful system for clarifying the role of fatty acyl chains in biological membranes.

COMPONENTS CONTRIBUTING TO BEEF FLAVOR. NATURAL PRECURSORS OF 4-HYDROXY-5-METHYL-3(2H)-FURANONE IN BEEF BROTH. C. H. T. Tonsbeek, E. B. Keenders, A. S. M. van der Zijden and J. A. Losekoot (Unilever Res. Lab., Duiven, The Netherlands). *J. Agr. Food Chem.* 17, 397–400 (1969). The recent identification of 4-hydroxy-5-methyl-3(2H)-furanone as a flavor component of beef broth prompted an investigation into its natural precursors. When minced lean shin of beef was extracted with water at room temperature, the extract contained no detectable 4-hydroxy-5-methyl-3(2H)-furanone. If it was boiled for 2½ hours, however, the furanone could be isolated, indicating that it is formed from cold water–soluble precursors. These precursors have been identified as ribose-5-phosphate and pyrrolidone carboxylic acid or taurine or both.

FOOD VOLATILES. VOLATILITIES OF ALDEHYDES, KETONES, AND ESTERS IN DILUTE WATER SOLUTION. R. G. Buttery, L. C. Ling and D. G. Guadagni (Western Regional Res. Lab., U.S. Dept. of Agr., Albany, Calif. 94710). *J. Agr. Food Chem.* 17, 385–9 (1969). The volatilities in dilute water solution of some members of homologous series of alkanals, alkan-2-ones, and methyl alkanoates from C_3 to C_9 were studied experimentally by gas chromatography. The results confirm earlier theoretical predictions by other workers that at 25C the higher molecular weight homologs of each series up to C_9 are actually more volatile in dilute water solutions than the lower molecular weight homologs.

ISOLATION AND CONCENTRATION OF VOLATILES IN FOOD ODOR RESEARCH. C. Weurman (Aroma Dept., Central Inst. for Nutr. and Food Res. TNO, Zeist, The Netherlands). *J. Agr. Food Chem.* 17, 370–84 (1969). To gain a complete understanding of an odor a three-sided approach of the analysis is necessary—i.e., the identity and total quantity of the individual volatiles in the food, the composition of the vapors over the food, and the physical structure of the food have to be studied. The techniques used for the isolation and concentration of the volatile compounds in food are mentioned or discussed, and the frequency of their application in practical research has been estimated. It is emphasized that more than one procedure for distillation and extraction is to be applied for optimum odor recovery. Care should be taken to prevent artifact formation. The best sequence in which the various techniques for the isolation and concentration should be used is considered and the advantages of adsorption and freezing procedures are stressed.

LUMINESCENCE ANALYSIS OF FOOD ANTIOXIDANTS; DETERMINATION OF PROPYL GALLATE IN LARD. H. W. Latz and R. J. Hurtubise (Dept. of Chem., Ohio Univ., Athens, Ohio 45701). *J. Agr. Food Chem.* 17, 352–5 (1969). The luminescence properties of the food antioxidants BHA, BHT and PG are presented for the first time. A simple, rapid and accurate fluorometric method is used to determine PG directly in lard in the presence of BHA, BHT or both. Chloroform, used as a solvent, quenches the fluorescence of BHA and BHT as well as the background fluorescence of lard, but not PG. As little as 0.0005% PG can be determined in a lard sample by this method without interference from BHA or BHT.

CHANGES IN CONTENT OF STEROLS, ALKALOIDS AND PHENOLS IN FLUE-CURED TOBACCO DURING CONDITIONS FAVORING INFESTATION BY MOLDS. C. J. Keller, L. P. Bush and C. Grunwald (Dept. of Agronomy, Univ. of Ky., Lexington, Ky. 40506). *J. Agr. Food Chem.* 17, 331–4 (1969). Sterols, alkaloids, and phenols were determined in two samples of flue-cured tobacco (*Nicotiana tabacum L.*) which differed only in that one sample was heavily infested with the molds *Aspergillus niger, A. flavus* and *Penicillium.* Total sterol and total alkaloid contents were higher in the moldy tobacco sample; total phenol content was higher in the nonmoldy sample. Differences in amounts of nicotine, chlorogenic acid, rutin, scopolin, caffeic acid and minor sterol constituents indicated that cured tobacco subjected to conditions favoring mold development may undergo alteration in a number of its chemical constituents.

PROXIMATE AND LIPID ANALYSES OF KRILL (EUPHAUSIA SPECIES) AND RED CRAB (PLEURONCODES PLANIPES). R. W. Pierce, J. Van der Veen and H. S. Olcott (Inst. of Marine Resources, Dept. of Nutr. Sci., Univ. Calif., Berkeley, Calif. 94720). *J. Agr. Food Chem.* 17, 367–9 (1969). Proximate analyses were obtained of several samples of krill (Euphausia species) and one of "red crab" (*Pleuroncodes planipes*) as examples of abundant zooplankton which might be used as food or feed. The krill samples contained, on a dry weight basis, approximately 53% protein, 17% ash and lipid varying from 18–26%. The decapod contained 32% protein, 36% ash, 8% lipid and 11% chitin.

The lipids were hydrolyzed, methylated and subjected to gas chromatographic analysis. Highly unsaturated fatty acids accounted for 36 to 48% of the total.

TURKEY LIPID CHARACTERISTICS: INFLUENCE OF SEX, AGE AND ESTRADIOL-17 BETA-MONOPALMITATE. W. E. Osborn (Ralston Purina Co., Saint Louis, Mo.), R. E. Moreng and T. E. Hartung. *Poultry Sci.* **48**, 274–83 (1969). Turkey sex affected the stability of lipids in skin tissues. Male turkeys evidently were more susceptible to oxidation than females. Fatty acid content of the lipids was one explanation for greater stability in female fat because it contained less linoleic and more oleic acid than males. Implantation of estradiol-17 beta-monopalmitate (EMP) retarded oxidation of lipids deposited in the skin fat of turkeys. Treated turkeys contained less linoleic acid and more oleic acid than control turkeys.

NUCLEAR MAGNETIC RESONANCE MEASUREMENT OF OIL "UNSATURATION" IN SINGLE VIABLE CORN KERNELS. T. F. Conway (George M. Moffett Res. Labs., Corn Products Co., Argo, Ill.) and L. F. Johnson. *Science* **164**, 828–9 (1969). High-resolution nuclear magnetic resonance spectroscopy has been used to demonstrate the feasibility of determining iodine value and average molecular weight of oil in individual corn kernels. The procedure is rapid and nondestructive. Depending on heritability of individual fatty acids, this technique may greatly increase selection efficiency in breeding programs to alter the fatty acid composition of corn oil.

OXIDATION OF CHICKEN TISSUE LIPIDS AS INFLUENCED BY AGE AND SEX. J. E. Marion (Food Sci. Dept., Georgia Experiment Sta., Experiment, Ga. 30212). *Poultry Sci.* **48**, 301–04 (1969). In three experiments with broiler-type chickens, oxidation (TBA) values of tissues from male and female birds showed no significant influence due to sex. Age influenced oxidation rates with the greatest changes being noted between 12 and 20 weeks of age. Generally, TBA values were lower at 20 weeks than at earlier ages.

QUANTITATIVE METHOD OF ESTIMATION OF FATTY ACID WITH GAS-LIQUID CHROMATOGRAPHY BY INTERNAL STANDARD METHOD. CORRELATION OF CALIBRATION COEFFICIENT OF RESPONSE VS. CARBON NUMBER AND RELATIVE RETENTION TIME. Shigeaki Takagi, Mitsuo Waki and Kunitaro Arimoto (Kanagawa Pref. Nutritional Junior Coll., Yokohama). *Yukagaku* **18**, 67–72 (1969). The coefficient k is related to carbon number and to relative retention time (RRT), when hydrogen ionization and thermal conductivity detectors, and diethylene glycol succinate as a packing liquid are used. Straight line relationships were observed between k and carbon number for capric to linoleic acid, while the curved lines were obtained on the relation of k vs. RRT. The following equation is proposed: $S/S_o = k \cdot a/a_o$, where S_o = peak area of internal standard material, S = peak area of each fatty acid, a_o = weight of internal standard material and a = weight of each fatty acid.

BÖMER NUMBER, VIII. DISCRIMINATION OF FOREIGN FATS IN LARD BY TRANSACID. Masao Imamura, Isao Niiya, Kazuko Takagi and Taro Matsumoto. *Yukagaku* **18**, 72–6 (1969). Beef tallow contained 5.1–5.7% elaidic and 1.0% vaccenic acid; mutton tallow contained 10.8% elaidic acid and 1.4% vaccenic acid. Beef tallow and mutton tallow showed numerous unidentified peaks in the pattern from the Apiezon capillary column, and these peaks can be utilized for their detection, together with *trans*-acids. Lard adulterated with as little as 5% of beef tallow can be detected. This method is more precise than the Bömer number. The presence of horse fat in these mixtures cannot be detected.

FERULATES IN RICE-BRAN OIL. II. ANALYSIS OF FERULATES AND THEIR UNSAPONIFIABLE MATTERS MAINLY BY MEANS OF NMR AND MASS SPECTROGRAPHY. Tomio Endo, Osasu Misu and Yanosuke Inaba (Nakataki Pharm. Ind. Co., Tokyo). *Yukagaku* **18**, 63–7 (1969). The presence of campesteryl-, stigmasteryl-, β-sitosteryl-, cycloartanyl-, 24-methylenecycloartanyl- and an unknown triterpenyl-ferulates was confirmed by means of NMR and mass spectrography. Chemical shifts of C-18 and C-19 protons of free triterpenes and triterpenyl parts of the ferulates are not analogous, though the free sterols and steryl parts of the ferulates are coincident.

APPLICATIONS OF SPECTROSCOPY TO STRUCTURE DETERMINATION. III. SATURATED CARBONYL COMPOUNDS AND INFRARED SPECTRA. P. S. Kalski (Chem. and Biochem. Dept., Punjab Agr. Univ., Ludhiana, India). *Perfumery Essent. Oil Record* **59**(11), 786–801 (1968). The use of infrared spectroscopy is reviewed for the characterization of saturated carbonyl compounds especially 5 and 6 membered rings. 100 references.

ANALYSIS OF OILS AND FATS BY GAS CHROMATOGRAPHY, V. FATTY ACID COMPOSITION OF THE LEAF LIPIDS OF MYOSOTIS SCORPIOIDES. G. R. Jamieson and E. H. Reid (Paisley College of Technol., Renfrewshire, England). *J. Sci. Food Agric.* **19**, 628–31 (1968). The fatty acids of the leaf lipids of *Myosotis scorpioides* have been shown to contain relatively large proportions of γ-linolenic and octadecatetraenoic acids as well as the more usual palmitic, linoleic and linolenic acids. Changes in the proportions of all the different classes of fatty acids have been found during the growing season of the plant, and also changes in fatty acid composition depending on the growth locality.

NEW TROPICAL SEED OILS, II. COMPONENT ACIDS OF LEGUMINOUS AND OTHER SEED OILS. F. D. Gunstone, G. M. Taylor, J. A. Cornelius and T. W. Hammonds (Tropical Products Institute, London, England). *J. Sci. Food Agr.* **19**, 706–9 (1968). The component fatty acids of seed oils from over fifty legumes and over fifty other species are reported, and their potential value is discussed.

PROCESS FOR THE PRODUCTION OF CONFECTIONERY FATS. R. O. Feuge, N. V. Lovegren and B. B. Gajee (U.S. Sec'y of Agr.). *U.S. 3,431,116.* A process is claimed for producing confectionery fats using as a starting material the stearine fraction obtained in the solvent winterization of cottonseed oil. The process comprises the steps of selectively hydrogenating cottonseed oil stearine to accomplish the conversion of linoleic acid to oleic acid, the hydrogenation being carried out without the concurrent production of *trans*-isomers. Subsequent to the hydrogenation, saturated glycerides are removed from the selectively hydrogenated product via a fractional crystallization procedure.

METHOD AND APPARATUS FOR THE EXTRACTION OF OIL FROM COTTONSEED. W. Depmer. *U.S. 3,432,529.* A method and an arrangement for the extraction of oil from cottonseed is described, in which the cottonseed kernels are separated from the hulls and linters and flaked, whereas the hulls and linters are pelletized and then mixed with the flaked kernels and oil is extracted from the mixture.

TREATMENT OF TALL OIL FATTY ACIDS. W. C. Doyle, Jr. (Tenneco Chemicals Co.). *U.S. 3,433,815.* A novel method is described for treating tall oil fatty acids containing stilbene impurities to improve their color and remove a substantial portion of the stilbene impurities which impart a reddish color to the fatty acids upon epoxidation. The method involves treating the fatty acids with activated carbon and a boron trifluoride catalyst. After the catalyst and the carbon have been removed by filtration, the filtrate is distilled and a distillate of tall oil fatty acids containing a much reduced amount of stilbene impurities is collected. The carbon-catalyst treatment converts the stilbene impurities to higher boiling derivatives, thus allowing separation by distillation. The activated carbon is essential to prevent the catalyst from causing a large change in the relative amounts of oleic and linoleic acids present in the treated tall oil fatty acids.

EDIBLE DRY MIX COMPOSITION FOR PRODUCING AN AERATED FOOD PRODUCT. M. H. Katz (Pillsbury Co.). *U.S. 3,434,848.* An edible dry mix composition containing less than 8% fat and proteinaceous material and suitable upon hydration and mixing to provide an aerated food product of a fine, smooth, creamy consistency comprises a gelatinized starch and 2–50% of a surfactant composition containing at least one glyceryl fatty acid monoester and at least one propylene glycol fatty acid monoester, the two monoesters ranging in relative ratio from about 1:10 to about 10:1.

SHIELDING COMPOSITION OF CEMENTITIOUS MATERIAL MIXED WITH A METALLIC SATURATED FATTY ACID COMPOUND. R. E. Vogel. *U.S. 3,434,978.* A building material having a shielding effect against radioactive radiations includes as essential constituents: (a) a cementitious material having distributed and intimately mixed throughout its bulk an effective amount of

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(b) at least one compound of a saturated fatty acid being solid at room temperature and having at least nine C atoms, and of at least one metal having a shielding effect against radioactive radiation.

LIQUID SHORTENINGS. G. P. Lensack (Atlas Chemical Industries, Inc.). *U.S. 3,437,492.* Liquid shortenings which are clear, stable, and effective for the production of baked goods of excellent volume and texture consist of a normally liquid edible triglyceride oil containing dissolved 2–12% by wt. of an emulsifier prepared in the following manner: Propylene oxide is reacted with a C_{12}–C_{18} fatty acid in the presence of a sufficient amount of a catalyst selected from the group consisting of potassium hydroxide, potassium salts of weak organic acid and potassium alcoholates, to furnish at least 1.0% of KOH equivalent, based on the weight of fatty acid. The reaction is conducted at 100–160C, until the acid number decreases to less than about 10, at which point unreacted propylene oxide is vented and the catalyst is neutralized to form an insoluble potassium salt, which is finally separated from the reaction product.

• Fatty Acid Derivatives

ALKYL ESTERS OF POLYUNSATURATED ACIDS. P. J. A. Chabardes. *U.S.S.R. 192,690: Soviet Inventions Illustrated 1968, June, Gp 5, 1.* Alkyl esters of undecatriene-2,5,10- or 3,5,10-acids are prepared by condensation of alkyl esters of acrylic or methacrylic acids with a diolefin (molar ratio 1:2) in the presence of a reduced Ni acetylacetonate (metalloorganic complex). The condensation is carried out in an autoclave at 0–25C, in an organic solvent (dry benzene) and an inert gas (N_2). The Ni catalyst, metalloorganic complex of zero valency, is obtained directly in the reaction mixture by reduction of Ni acetylacetonate with triethyl-aluminium or other reducing agents in the presence of electron donors having structures with lone electron pairs, *e.g.,* triphenyl phosphite or triphenylphosphine or diolefin used in the reaction. The main feature of the process by which the existing process is modified is the use of Ni acetylacetonate instead of a trivalent Co-triethylaluminium metalloorganic complex. The products obtained are of use as drying oils, varnishes, and also as intermediates for organic synthesis. The proposed catalyst gives higher yields of the products than the conventional catalysts. The products are also not contaminated with other copolymers as in the existing process. (World Surface Coat. Abs. No. 321)

DIESTER LUBRICITY ADDITIVES AND OLEOPHILIC LIQUIDS CONTAINING THE SAME. M. J. Furey and A. F. Turbak (Esso Research and Engineering Co.). *U.S. 3,429,817.* Lubricity and load carrying ability of a synthetic ester lubricating oil is improved by addition of an ester formed by reacting about two moles of C_2–C_5 glycol with about one mole of C_{36} dicarboxylic acid dimer of a C_{18} unsaturated fatty acid.

STUDY OF EPOXIDATION OF ACETYLATED DERIVATIVES OF CASTOR OIL USING FRACTIONAL FACTORIAL DESIGNS. G. V. Sarma, A. K. Jain and R. K. Bhatnagar. *Indian J. Tech.* 6, 291–5 (1968). The epoxidation of acetylated diricinoleyl ester of pentaerythritol has been studied using fractional factorial designs with the object of determining optimum reaction conditions for achieving maximum epoxidation efficiency. (World Surface Coat. Abs. No. 321)

ESTERIFICATION OF TRIMETHYLOLPROPANE WITH FATTY ACIDS. T. M. Icikson, N. V. Milovidova and I. B. Rapoport. *Khim. Tekhnol. Topl. Masel.* 12 No. 6, 14–6 (1967). Na bisulphate is used as catalyst. (World Surface Coat. Abs. No. 321)

C_{18}-PHOSPHONE FATTY ACID. SYNTHESES AND PROPERTIES FOR SOME ADDITIVES. Satoshi Nakasato and Katsuhiko Higuchi (Gov. Chem. Ind. Research Inst., Tokyo). *Yukagaku* 18, 76–80 (1969). Saturated monoenic and hydroxy C_{18}-phosphono fatty acid esters in which a phosphono group was directly connected to the center of their long alkyl chains were synthesized by the radical addition reaction of diethyl phosphite with methyl oleate, linoleate and acetylated ricinoleate, respectively. Then, all ester linkages of the phosphono fatty acid esters were hydrolyzed with hydrochloric acid. Properties and utilization of these phosphono fatty acids and their derivatives were given.

ETHOXYLATED MONOGLYCERIDES IN BAKED GOODS. R. R. Egan and S. B. Lampson (Ashland Oil & Refining Co.). *U.S. 3,433,645.* Ethoxylated derivatives of a partial glycerol ester of a higher fatty acid comprise a class of dough forming adjuvants whose presence in the dough leads to the preparation of yeast-raised baked goods of improved properties.

WATER SOLUBLE ADDUCT OF A POLYESTER AND AN ETHOXYLATED FATTY COMPOUND. R. C. Hanson (Ashland Oil & Refining Co.). *U.S. 3,437,615.* A water soluble adduct of an alkyd resin and a polyoxyalkylene compound is claimed, in which the alkyd resin is the reaction product of a drying oil, a polyhydric alcohol, a polyoxyethylene glycol, a nonoxidizing monobasic carboxylic acid and a dicarboxylic acid or anhydride, and the polyoxyalkylene compound is the condensation product of a straight chain monohydroxy C_{12}–C_{20} primary alcohol and a mixture of ethylene oxide and propylene oxide such that the product has 12–20 oxyalkylene groups in a ratio of 2:1 to 4.5:1 oxyethylene:oxypropylene groups. The product is useful as a textile finishing agent.

• Biochemistry and Nutrition

THE EFFECT OF 2,4-DINITROPHENOL ON ADIPOSE-TISSUE METABOLISM. R. Rognstad and J. Katz (Cedars-Sinai Medical Center, Los Angeles 90029). *Biochem. J.* 111, 431–444 (1969). The effect of dinitrophenol on the metabolism of glucose labelled with ^{14}C and tritium by epididymal fat-pad segments from fed rats was studied. Dinitrophenol at concentrations of 0.1–0.3 mM had little effect on glucose utilization, depressed synthesis of fatty acids and greatly increased that of lactate, increased the T/^{14}C ratio in fatty acids synthesized from (U-^{14}C, 3-T) glucose and decreased that in fatty acids synthesized from (U-^{14}C, 4-T) glucose and abolished randomization of ^{14}C from (6-^{14}C) glucose in lactate. Dinitrophenol stimulated oxidation of pyruvate and greatly inhibited the oxidation of lactate. It inhibited lipogenesis from pyruvate and lactate. From the isotope data it was calculated that dinitrophenol stimulates oxidation via the tricarboxylic acid cycle three to six fold and dinitrophenol depresses markedly the operation of the pentose cycle and in the presence of dinitrophenol, NADPH formed in the pentose cycle provides all the hydrogen equivalents for fatty acid reduction, otherwise NADPH provides 50–70% of the hydrogen equivalents. In the presence of dinitrophenol, there is an excess of ATP produced in the cytoplasm, which flows into the mitochondria. A reverse flow operates in the absence of dinitrophenol. A balance of formation and utilization of reduced nicotinamide nucleotides in the cytoplasm was established. With dinitrophenol there is some excess of NADH. There are indications that this excess may be transferred into mitochondria in the form of malate. Our results are interpreted to indicate the absence from adipose tissue of the α-glycerophosphate shuttle for transferring reducing equivalents from the cytoplasm to mitochondria.

EFFECT OF BILE SALTS ON THE RATE OF FAT ABSORPTION. W. J. Simmonds (Dept. of Physiol., Univ. of Western Australia, Nedlands, 6009, Western Australia). *Am. J. Clin. Nutr.* 22, 266–72 (1969). Intraluminal and intracellular mechanisms by which bile salts might affect the rate of fat absorption have been briefly discussed, stressing the interdependence of successive steps in absorption. The most significant role is solubilization, when bile salts are above the critical micellar concentration. For some lipids this is virtually essential. For the digestion products of fat, FA and MG, solubilization is necessary for optimal rates of transfer from lumen to absorptive cell.

MORPHOLOGIC ASPECTS OF LIPID ABSORPTION. W. O. Dobbins (Gastrointestinal Res. Lab., Veterans Admin. Hospital, and Dept. of Med., Duke Univ., Med. Center, Durham, N. Car. 27705). *Am. J. Clin. Nutr.* 22, 257–65 (1969). Even though there is extraction of 13–26% of unsaturated neutral lipids and phospholipid during electron microscopic processing of intestinal tissue, morphologic studies of fat absorption can be considered a faithful reproduction of the events taking place. Pinocytosis of fat is not a mechanism of fat absorption. Micelles have not been convincingly demonstrated by morphologic methods. Overwhelming morphologic and biochemical data

show that fat entry into absorptive cells is by passive diffusion of free fatty acids and monoglycerides. During fat absorption, morphologically demonstrable lipid droplets first appear within profiles of the smooth endoplasmic reticulum as chylomicrons. The protein component of chylomicrons is probably manufactured in the rough endoplasmic reticulum. Chylomicrons next appear within Golgi vacuoles and are probably extruded from the absorptive cell by way of the vacuoles by a process of reverse pinocytosis, though this has never been demonstrated. The rate-limiting process of fat absorption is that of exit of fat from the cell and events taking place within the Golgi apparatus may be the specific site of this rate-limiting step. Chylomicron passage to lacteals within the extracellular space is probably controlled by intestinal pressure changes and by muscular contractions of villi. Entry into the lymphatic lumen is largely via gaps in endothelial cells.

RELATION OF LEVELS OF DIETARY FAT TO ATRIAL THROMBOSIS IN R_f MICE. B. R. Clower (Dept. of Anatomy, Univ. of Miss. School of Med., Jackson, Miss.). *J. Atheroscler. Res.* 8, 885–90 (1968). Massive atrial thrombosis developed in R_f mice when fed a lipotropic-deficient diet containing either 40%, 28% or 6% levels of lard as the fat. The protein content was 8% casein. Carbohydrate (sucrose) levels of 45.5%, 57.5%, and 79.5% were used to balance the range in amount of fat. Within the 40% fat group, 65% of the mice developed atrial thrombosis as compared to a 36% and 30% incidence in the 28% and 6% fat level groups. The highest incidence of atrial lesions occurred during 10–12 weeks in the 6% fat group, and during 18–22 weeks in mice fed the 28% and 40% fat levels. After feeding the diets for as long as 20 weeks the incidence of atrial thrombosis decreased rapidly in the 6% and 28% fat level groups. In contrast the incidence did not decline in the 40% group until after 40 weeks.

STUDIES OF THE CHICK EDEMA DISEASE. 7. EFFECTS OF THE ORAL DIURETIC, HYDROCHLOROTHIAZIDE. D. F. Flick and R. G. O'Dell (Div. of Nutr., Bureau of Science, Food and Drug Admin., Washington, D.C. 20204). *Poultry Sci.* 47, 1886–89 (1969). The oral diuretic, hydrochlorothiazide, was fed at dietary levels of 0, 25, 30, 100, 500 and 1,000 mg./kg. along with a toxic fatty material known to produce the chick edema disease. After a three-week feeding regimen, it was found that the higher dietary levels of diuretic were most effective in preventing the formation of edema and had marked effects in preventing the blood dyscrasias which are associated with the disease.

VITAMIN E CONTENT OF MILK, MILK PRODUCTS AND SIMULATED MILKS: RELEVANCE TO INFANT NUTRITION. D. C. Herting and E. E. Drury (Research Labs., Distillation Products Ind., Div. of Eastman Kodak Co., Rochester, N.Y. 14603). *Am. J. Clin. Nutr.* 22, 147–55 (1969). Milk, milk products and simulated milks were analyzed by column chromatography on alumina to establish α-tocopherol levels, and by gas-liquid chromatography to determine polyunsaturated fatty acids. Human milk contained an average of 1.14 mg α-tocopherol/quart whether frozen-fresh, lyophilized, or pasteurized. The α-tocopherol content of homogenized cow's milk varied from about 0.21 mg/quart in early spring to about 1.06 mg/quart in mid-fall. Raw milk showed a similar pattern. Bovine colostrum contained about seven times as much α-tocopherol as milk taken 1 or 2 weeks postpartum. Evaporated, condensed, and nonfat dry milks supplied about 0.66, 1.29 and 0.02 mg α-tocopherol/reconstituted quart, respectively. Vitamin E levels in liquid and powdered simulated milks varied from 3.46 to 6.80 mg/reconstituted quart in standard formulas and from 2.30 to 7.67 mg/reconstituted quart in hypoallergenic formulas, depending primarily on the vegetable oil used and whether or not the product was fortified. Polyunsaturated fatty acid varied from 4% of fatty acids in cow's milk to about 50% of fatty acids in hypoallergenic milks. The adequacy for infant nutrition of the α-tocopherol content in milks, milk products, and simulated milks may depend as much on the relative content of polyunsaturated fatty acids as on the absolute level of α-tocopherol.

INFLUENCE OF ETHIONINE ON CHOLINE-DEFICIENCY FATTY LIVER. H. Sidransky and Ethel Vemey (Dept. of Pathol., Univ. of Pittsburgh, School of Med., Pittsburgh, Pa.). *J. Nutr.* 97, 419–430 (1969). Rats fed *ad libitum* a choline-deficient diet containing 0.25 or 0.5% ethionine for 7 to 21 days did not develop a choline-deficiency fatty liver. Likewise, rats force-fed a controlled intake of choline-deficient diet either supplemented with ethionine or receiving ethionine intraperitoneally for 3 days did not develop fatty liver. Rats force-fed

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• *Industry Items*

BUCKBEE-MEARS COMPANY of St. Paul announced that it has purchased the outstanding stock of BH Electronics, Inc., Clear Lake, Wis. BH Electronics began operations in April, 1969. The firm manufactures small electronic components and serves as consultants to the computer industry. Buckbee-Mears has been a user of BH products and services.

A new source for the design and manufacture of hydrogen plants has been provided by HOWE-BAKER ENGINEERS, INC., of Tyler, Texas. The international engineering-construction firm has purchased the technology of W. F. H. Schultz, Inc. of Doraville, Georgia, a producer of gas production plants since 1927. R. J. Phillips, President of Howe-Baker, said this reservoir of knowledge plus the employment of key personnel from Schultz will give the capability for a complete service of design, engineering, fabrication and construction of units for the production of hydrogen, nitrogen, carbon monozide and other gases. The plants will be furnished to a wide variety of industry customers. Howe-Baker is a wholly-owned subsidiary of Nalco Chemical Company, where know-how in catalyst technology will be very useful in the design of the gas plants. Howe-Baker has already produced one plant, a 2 million cu ft/day hydrogen production unit for a Canadian company.

• *Obituaries*

David C. Porter ('58), Technical Director of the Signal Chemical Division of Wyandotte Chemical Corporation, Aurora, Ohio, has recently passed away.

Paul Neal ('66) died on May 25, 1969. He was an Analytical Chemist for the Division of Food Chemistry of the Food and Drug Administration, Washington, D.C.

William J. Park ('59) died of a heart attack on June 30. He worked for the Purex Corporation, Wilmington, California. In 1966, Mr. Park was Hotel Chairman for the Los Angeles Convention and in 1967, he was Southwest Section Chairman. Mr. Park was to have served as the General Chairman of the 1972 Annual Meeting in Los Angeles.

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the choline-supplemented or choline-deficient diet containing ethionine developed a small increase in liver lipid after 1 day, particularly if prefasted for one day, which diminished after 2 or 3 days. After induction of choline-deficiency fatty liver, the addition of ethionine to the deficient diet slowly decreased the lipid accumulation. The addition of methionine to the choline-deficient, ethionine-supplemented diet partially counteracted the inhibitory effect of ethionine on choline-deficiency fatty liver. Thus, ethionine, a compound which itself induces fatty liver when administered to fasted animals, is capable of inhibiting the induction of fatty liver due to choline deficiency.

LIPIDS OF DROSOPHILA: A NEWLY DETECTED LIPID IN THE MALE. F. M. Butterworth (Dept. of Biology, Oakland Univ., Rochester, Mich. 48063). *Science* **163**, 1356–57 (1969). A thin-layer chromatographic analysis of *Drosophila melanogaster* revealed a lipid found almost exclusively in the adult male. The compound or class of compounds having an R_f close to that of methyl oleate is present in substantial amounts and is located predominantly in the ejaculatory bulb. It appears from genetic studies that the formulation of the lipid is not mediated by the Y chromosome.

THE EFFECTS OF VARYING LEVELS OF HYDROLYZED ANIMAL AND VEGETABLE FAT UPON GROWTH AND CARCASS CHARACTERISTICS OF BROILERS. C. Quarles, T. W. Burr, J. H. MacNeil and G. O. Bressler (Poultry Sci. Dept., Penn. State Univ., Univ. Park, Pennsylvania 16802). *Poultry Sci.* **47**, 1764–67 (1969). An experiment was conducted to measure the effect of feeding broilers 0, 2, 4 or 6 per cent added hydrolyzed animal and vegetable fat upon body weights, feed efficiency, feathering and breast blisters. After slaughter, fat level and storage time effect was measured on flavor, TBA value, tenderness, color and the percentage of skin fat. Addition of dietary fat to the ration resulted in an increase of breast blisters but improved tenderness. Fat levels in the ration had no effect upon quality of meat stored for 0, 5, 9 or 16 weeks.

APPARENT TURNOVER OF MITOCHONDRIAL DEOXYRIBONUCLEIC ACID AND MITOCHONDRIAL PHOSPHOLIPIDS IN THE TISSUES OF THE RAT. N. J. Gross, G. S. Getz, and M. Rabinowitz (Dept. of Med., Biochem., and Pathol., and the Argonne Cancer Res. Hosp., Univ. of Chicago, Chicago, Ill. 60637). *J. Biol. Chem.* **244**, 1552–62 (1969). The apparent turnovers of mitochondrial DNA and of the phospholipids, cardiolipin, lecithin and phosphatidyl ethanolamine, have been determined simultaneously in the mitochondria of rat liver, kidney, brain and heart. The turnover rate of mitochondrial DNA in liver was similar to previously reported turnover rates of other mitochondrial components. Mitochondrial DNA has a half-life of 6.7 days in heart, 9.4 days in liver, 10.4 days in kidney, and about 31 days in brain. The turnover of mitochondrial phospholipids is complex: in the liver and kidney their turnover rates are similar to that of the mitochondrial DNA. In the other organs studied slower and nonexponential turnover of nuclear DNA in liver, kidney, or brain occurred during the experiment. A relatively rapid rate of turnover with a half-life of about 30 days was found for heart nuclear DNA.

COENZYME BINDING TO L-α-GLYCEROPHOSPHATE DEHYDROGENASE. S. J. Kim and B. M. Anderson (Dept. of Biochem., Univ. Tenn., Knoxville, Tenn. 37916). *J. Biol. Chem.* **244**, 1547–51 (1969). The binding of NADH to rabbit muscle L-α-glycerophosphate dehydrogenase is accompanied by a considerable enhancement of the fluorescence of the reduced coenzyme which was used to study the properties of this binding process. Fluorescence titration of the enzyme with NADH indicated the binding of 2 moles of NADH per mole of enzyme (78,000 g). The dissociation constant for the NADH-enzyme complex was determined to be 1.8×10^{-6}M. Adenylic acid, adenosine diphosphate, and adenosine dephosphoribose were shown to be NADH-competitive inhibitors in the L-α-glycerophosphate dehydrogenase-catalyzed reduction of dihydroxyacetone phosphate. A competitive relationship between the binding of adenylic acid and NADH was also shown with fluorescence enhancement techniques. The presence in this enzyme of two identical subunits of 39,000 molecular weight was demonstrated.

EFFECTS OF 4-PENTENOIC ACID ON CARBOHYDRATE METABOLISM IN PIGEON LIVER HOMOGENATE. C. Corredor, K. Brendel and R. Bressler (Dept. of Biochem., Duke Univ. Med. Center, Durham, North Carolina 27706). *J. Biol. Chem.* **244**, 1212–19 (1969). The addition of 4-pentenoic acid to liver homogenates results in a decrease in long chain fatty acid oxidation and in gluconeogenesis. Glycolysis is not affected, whereas lactate oxidation to CO_2 is inhibited. There is an increased formation of alanine and decreased levels of glutamate and aspartate. The inhibition of gluconeogenesis is partially reversed by the addition of short chain fatty acids of (−)-palmitylcarnitine and totally reversed by addition of coenzyme A and carnitine, but not by either one alone. Only the combination of CoA and carnitine partially reversed the inhibition of lactate oxidation. The formation of pentenoylcarnitine and acrylylcarnitine upon incubation with 4-pentenoate has been shown. The data presented suggest that the metabolic effects produced by 4-pentenoate are caused at least partially by accumulation of nonmetabolizable acyl-CoAs and acylcarnitines derived from the acid, thus making both carnitine and CoA unavailable for normal metabolic function.

CONFIGURATION OF THE KETOSIDIC BOND OF SIALIC ACID. R. K. Yu and R. Ledeen (S. R. Korey Dept. of Neurology, Albert Einstein College of Med., Yeshiva Univ., Bronx, N.Y. 10461). *J. Biol. Chem.* **244**, 1306–1313 (1969). The stereochemistry of the ketosidic bond of sialic acid has been elucidated by a study of the two anomeric methyl ketosides. Isomer I was prepared by Koenigs-Knorr synthesis, and isomer II by direct methylation with methanol and an acid catalyst. The configuration of the ketosidic bond of sialic acid in naturally occurring substances, such as gangliosides, glycoproteins and the like, is therefore the less stable anomer, with the ketosidic bond equatorial and the carboxyl group axial to the pyranoid ring. It is assigned the α-D configuration in accordance with the rules of nomenclature.

PARTIAL RESOLUTION OF THE ENZYMES CATALYZING PHOTOPHOSPHORYLATION. V. INTERACTION OF COUPLING FACTOR 1 FROM CHLOROPLASTS WITH RIBONUCLEIC ACID AND LIPIDS. A. Livne and E. Racker (Sect. Biochem., Cornell Univ., Ithaca, N.Y. 14850). *J. Biol. Chem.* **244**, 1332–1338 (1969). A crude extract of chloroplasts protected coupling factor 1 from chloroplasts (CF_1) against heat inactivation at 64C. Two components present in crude extracts appeared to contribute to this stabilization. Polynucleotides as well as lipids purified from chloroplast extracts conferred heat stability on CF_1. In contrast to RND, which protected both CF_1 and the heat-activated ATPase, the protection by lipids was much more pronounced with CF_1 than with ATPase. Moreover, lipids but not RNA protected CF_1 against cold inactivation. Dithiothreitol-activated ATPase of CF_1 was slightly stimulated by lipids. These findings pointed strongly to a lipid component in the chloroplast membrane as one of the reactants with CF_1.

SUBSTRATE SPECIFICITY OF SOYBEAN LIPOXIDASE. R. T. Holman, P. O. Egwim and W. W. Christie (Univ. of Minnesota, Hormel Inst., Austin, Minn. 55912). *J. Biol. Chem.* **244**, 1149–1151 (1969). Purified soybean lipoxidase was used to test the substrate specificity of all *cis,cis*-methylene-interrupted isomers of linoleic acid. The natural 9,12-isomer was found to be the best substrate, and the 13,16-isomer 50% as effective. The presence of calcium ions broadened the pattern of specificity. The rates of reaction of a series of polyunsaturated acids in which chain length, number of double bonds, and positions of double bonds varied were tested with crude lipoxidase in the presence of calcium ion. The substrates which exhibit high rates of reaction all possessed double bonds at the 6th and 9th carbon atoms counting from the methyl group. Thus the terminal structure is critical to the specificity of the enzyme. For enzyme reaction, the carboxyl group must not be sterically hindered, and the unsaturation at the 6th carbon from the methyl end of the chain must be a double bond.

THE METABOLISM OF ISOLATED FAT CELLS. VII. SODIUM-LINKED, ENERGY-DEPENDENT, AND OUABAIN-SENSITIVE POTASSIUM ACCUMULATION IN GHOSTS. T. Clausen, M. Rodbell and P. Dunand (Inst. of Clin. Biochem. Geneva, Switzerland). *J. Biol. Chem.* **244**, 1251–1257 (1969). A method is described for the study of transport processes in ghosts isolated from rat adipose cells. With this procedure it was possible to follow the time course of potassium uptake, potassium release, and sodium release. The uptake of potassium was stimulated by sodium and was inhibited by ouabain at concentrations down to at least 10^{-6}M. It is concluded that potassium is accumulated by ghosts of fat cells via a sodium-linked, energy-requiring process characteristic of an intact plasma membrane.

VIII. AMINO ACID TRANSPORT IN GHOSTS. T. Clausen and M. Rodbell. *Ibid.*, 1258–1262. Ghosts of isolated fat cells take up α-aminoisobutyric acid (AIB) by a saturable and partially energy-dependent transport process. Of several amino acids tested, methionine and alanine were the most effective in

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inhibiting influx and stimulating efflux of AIB, indicating that the transport of these amino acids and AIB is shared by a common carrier-mediated system in the plasma membrane of ghosts. Insulin, adrenocorticotropin and epinephrine did not alter the rate of uptake or the steady state levels of AIB in preparations of ghosts that are sensitive, with respect to glucose transport or metabolism, to the effects of these hormones.

COMPARATIVE CHOLESTEROL-LOWERING ACTIVITY OF CITRUS AND TOMATO PECTIN. T. A. Anderson and R. D. Bowman (Nutritional Res. Lab., H. J. Heinz Co., Pittsburgh, Pa. 15230). *Proc. Soc. Exp. Biol. Med.* 130, 665–6 (1969). The results of this study indicate that citrus and tomato pectin significantly lower both serum and hepatic cholesterol levels in the cholesterol-fed rat. Citrus pectin is the more effective of the two pectins in this regard. Cholesterol-lowering effects of apple and citrus pectins are associated with the methoxyl content. The fact that the methoxyl content of the citrus pectin (9.2%) was somewhat higher than that of the tomato pectin (6.5%) may explain the observed difference in cholesterol-lowering activity.

SERUM CHOLESTEROL AND TRIGLYCERIDE. AN EPIDEMIOLOGICAL AND PATHOGENETIC INTERPRETATION. F. J. Schilling, G. Christakis, A. Orbach and W. H. Becker. *Am. J. Clin. Nutr.* 22, 133–38 (1969). Serum cholesterol and triglyceride levels were determined in 875 male and 989 female urban office workers. The means and standard errors for these lipids are presented by age and sex. Correlation coefficients between serum cholesterol and serum triglyceride indicate a positive relationship for 8 of 10 age categories for male subjects and in 3 of 10 age categories for the female, all 3 occurring after the 5th decade. The relationship of relative weight to each of the lipids is presented. No trend appears to exist. The rate of increase in serum cholesterol and triglyceride by age are interpreted in the light of their possible pathogenetic influence on coronary heart disease.

SEX HORMONE METABOLISM AND SERUM LIPIDS IN MALE SURVIVORS OF MYOCARDIAL INFARCTION. W. I. Morse, R. A. Harkness, K. S. Hoque, A. A. A. Ismail and M. Nickerson (Dept. of Med., Dalhousie Univ. and Camp Hill Hosp., Halifax, N. S., Canada, and the Med. Res. Council Clinical Endocrin. Res. Unit, Univ. of Edinburgh, Edinburgh, Scotland). *J. Atheroscler. Res.* 8, 869–84 (1968). Following the injection of tritiated 17β-estradiol into male survivors of myocardial infarction and men apparently free from complications of atherosclerosis, urine was collected and assayed for estrone, 17β-estradiol, estriol, and ^{3}H associated with these fractions. Estradiol production rate (E_2PR) was derived. Urinary testosterone, total 17-detosteroids, serum cholesterol, phospholipid and plasma triglyceride were determined. The survivors of infarction had significantly higher mean cholesterol, phospholipid and total lipid than the controls. No significant difference was observed between the control and infarction groups in the urinary excretion of estrone, estradiol, estriol, testosterone and 17-detosteroids but the coronary patients had a reduced mean E_2PR. Cholesterol increased with urinary estradiol and E_2PR in the infarction group. Phospholipid increased with testosterone, estradiol and E_2PR in the infarction group. Triglyceride increased with estriol and the sum of the 3 estrogens in the infarction group and with estrone, estradiol, estrone/testosterone ratio and estradiol/testosterone ratio in the control group. The increased serum lipid levels in the infarction group may have contributed to their coronary sclerosis but no evidence was obtained that estrogen tended to normalize the serum lipid pattern.

HUMAN AORTIC ACID MUCOPOLYSACCHARIDES AND GLYCOPROTEINS. CHANGES DURING AGEING AND IN ATHEROSCLEROSIS. T. Nakamura, K. Tokita, S. Tateno, T. Kotoku and T. Ohba (First Dept. of Internal Med., Tohoku Univ. School of Med., Sendai, Japan). *J. Atheroscler. Res.* 8, 891–902 (1968). Acid mucopolysaccharides (MPS) and glycoproteins from the intima and the media of 26 Japanese thoracic aortas were studied with emphasis on ageing and atherosclerosis. Total acid MPS significantly increased with age in the intima and slightly in the media; they decreased in both layers in the presence of atherosclerosis. Cellulose acetate electrophoresis was used to separate acid MPS into three fractions analysis, namely hyaluronic acid, heparitin sulphate and chondroitin sulphates B and/or C. Changes in the compositional pattern of acid MPS with ageing or atherosclerosis were inconclusive. The total carbohydrate fraction of aortic intimal glycoproteins decreased until the age of 60 years, and increased thereafter, while the fraction from the media tended to increase progressively with age. The most conspicuous change in glycoprotein constituents in atherosclerosis was the marked fall in intimal sialic acid. Galactose, mannose and fucose were identified as integral components of vascular glycoproteins in all preparations examined. However, an additional chromatographic spot that corresponded to glucose was detected in 2 cases.

THE EFFECT OF ORAL CALCIUM ON CHOLESTEROL METABOLISM. W. D. Mitchell, T. Fufe and D. A. Smith (Med. Res. Council, Blood Pres. Unit, Western Infirmary, and Gardiner Inst., Univ. Dept. of Med., Glasgow, W. 1, Scotland). *J. Atheroscler. Res.* 8, 913–22 (1968). The effects of calcium on cholesterol metabolism have been examined in 6 patients. The age of the subjects ranged from 61–73 years. Five of the patients were osteoporotic. The calcium was administered as organic salts (calcium glycerophosphate or calcium gluconogalactogluconate) and as dried skimmed milk. The results show that increased calcium in the organic form caused increased excretion of faecal bile acids and faecal total fat. There was no change in faecal neutral steroid output; increased faecal cholesterol was compensated by decreased coprostanol excretion. When the calcium was given in the form of skimmed milk, faecal bile acids and faecal fat remained elevated. Faecal excretion of cholesterol continued to rise and was accompanied by the return of faecal coprostanol output almost to the basal level, resulting in increased total neutral steroid excretion. The serum cholesterol and triglyceride levels showed little change from the basal levels during the calcium supplementation periods.

CHOLESTEROL ESTERIFICATION BY TRANSACYLATION IN HUMAN AND EXPERIMENTAL ATHEROMATOUS LESIONS. Y. H. Abdulla, C. C. Orton and C. W. M. Adams (Dept. of Path., Gut's Hosp. Med. School, London S. E. 1, England). *J. Atheroscler. Res.* 8, 967–73 (1968). *In vitro* cholesterol esterification by either human or rabbit's aorta in the presence of β-fatty acid-labelled lecithin appears to depend on a lecithin:cholesterol fatty acid (acyl) transferase. The activity of this enzyme increased in human fatty atherosclerotic lesions and in atherosclerotic aortas from cholesterol-fed rabbits. Activity decreased in fibrous and calcified human atherosclerotic lesions.

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Committees in San Francisco

Pictured here are some key AOCS Committees in session at San Francisco Annual Meeting, discussing plans for the coming year.

1. **Smalley Check Sample Committee**
2. **Technical Safety Committee**
3. **Fatty Acid Producers Council**
4. **New Governing Board**
5. **Ways & Means Committee**
6. **Communications Committee**
7. **Hydrogenated Oil Subcommittee**
8. **Drying Oil Subcommittee**
9. **New Governing Board**
10. **New Governing Board**
11. **Technical Safety Committee**
12. **Biochemical Methods Committee**
13. **ISF-AOCS Joint Meeting Committee**
14. **Protein Nutrition Committee**
15. **Neutral Oil Loss Committee**
16. **Awards Committee**
17. **Protein Nutrition Committee**
18. **New Governing Board**

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VITAMIN K AND COUMARIN ANTICOAGULANT: DEPENDENCE OF ANTICOAGULANT EFFECT ON INHIBITION OF VITAMIN K TRANSPORT. J. Lowenthal and H. Birnbaum (Dept. of Pharmacol. and Therapeutics, McGill Univ., Montreal 109, Quebec, Canada). *Science* 164, 181–3 (1969). Coumarin anticoagulants inhibit the release of plasma clotting factor VII by vitamin K in liver slices from vitamin K-deficient animals without inhibition of protein synthesis. When the ratio of vitamin K to coumarin anticoagulant is kept constant, but the concentrations are increased, the inhibition disappears. This suggests that the pharmacological action of coumarin anticoagulants depends on irreversible inhibition of normal vitamin K transport to its site of action. At higher concentrations of vitamin K the inhibition can be surmounted, because vitamin K can enter the cell by an alternate route that is not inhibited by coumarin anticoagulants.

MODIFICATION OF LIPEMIC RESPONSES TO AN ALCOHOL-CORN OIL MIXTURE. J. J. Barboriak, A. S. Wilson and R. C. Meade, Wood Veterans Admin. Center, and Depts. of Pharmacology, Psychiatry and Medicine, Marquette School of Med., Milwaukee, Wisc.). *J. Nutr.* 97, 437–40 (1969). Chronic ingestion of 15% (w/v) alcohol in lieu of drinking water in rats fed *ad libitum* failed to modify the usual lipemic response to a single dose of corn oil-alcohol mixture. The rise in plasma triglycerides was associated with an increase in their ^{14}C-specific activity indicating that the additional plasma lipids were derived from the ^{14}C-labeled dietary fat. The lipemic response was, however, markedly reduced by restricting the food intake of the animals to 2 hours/day.

SYNTHESIS OF PHOSPHOLIPIDS AND DEOXYRIBONUCLEIC ACID IN CHOLINE-SUPPLEMENTED AND CHOLINE-DEFICIENT WEANLING RATS. P. F. Parks and R. C. Smith (Dept. of Animal Sci., Agr. Exp. Station, Auburn Univ., Auburn, Alabama). *J. Nutr.* 97, 481–88 (1969). The incorporation of choline-1,2-^{14}C into phospholipid and thymidine-2-^{14}C into DNA of kidneys, liver and several other tissues has been measured in choline-supplemented and choline-deficient male, weanling rats. One hour after injection the kidneys had incorporated eight times as much labeled choline as heart tissue and approximately three times as much as either spleen or intestine (per unit weight). The liver was the most active tissue studied; however, the kidneys incorporated choline into phospholipid at a rate significantly faster than the other nonhepatic tissues measured. In choline-deficient rats, the specific activity of heart, spleen and intestine increased; liver decreased and kidney remained the same. Rats fed a choline-deficient diet incorporated more thymidine per unit weight into the DNA fraction of the kidneys than rats receiving the supplemented diet. The increased incorporation of thymidine in the choline-deficient rats is probably due to increased cellular synthesis as the kidneys become enlarged. The radioactivity in the acid-soluble nucleotide pool in the kidneys was not altered by choline deficiency.

EFFECTS OF ROUGHAGE TYPE OR ADDED BENTONITE IN MAINTAINING FAT TEST. An. N. Bringe and L. H. Schultz (Dept. Dairy Sci., Univ. of Wisc., Madison 53706). *J. Dairy Sci.* 52, 465–71 (1969). Four groups of five cows each were fed the following experimental rations having a grain to dry-roughage ratio of 3 to 1 for an eight-week period: Group I, hay + pelleted concentrate, Group II, same as Group I with addition of 5% sodium bentonite to the pelleted concentrate, Group III, corn silage + pelleted concentrate, Group IV, same as Group III, except for the addition of calcium lactate (equivalent to 5% of silage dry matter as lactic acid) to corn silage. The standard fat-depressing ration based on hay (Ration I) maintained fat test at 50% of normal. Addition of bentonite (Ration II) maintained test at 80% of normal ($P < 0.05$). This was accompanied by a higher rumen acetate/propionate ratio and greater mammary uptake of acetate. Rations III (corn silage) and IV (corn silage + lactate) maintained test at 70 and 50% of normal, respectively.

EFFECT OF CARBOHYDRATE SOURCE ON SERUM AND HEPATIC CHOLESTEROL LEVELS IN THE CHOLESTEROL-FED RAT. T. A. Anderson (Nutritional Res. Lab., H. J. Heinz Co., Pittsburgh, Penn. 15230). *Proc. Soc. Exp. Biol. Med.* 130, 884–7 (1969). The comparative effect of sucrose and complex carbohydrates in the form of corn starch and four different modified food starches was studied in the cholesterol-fed rat. Two separate experiments were conducted, one in which the starch was fed in the cooked form, the second in which the starch was fed raw. Sucrose-fed rats had significantly lower serum and hepatic cholesterol levels ($p < 0.01$) and total hepatic lipid than any of the animals fed modified food starches. This finding held true regardless of whether the starch was cooked or raw; however, cholesterol and lipid levels were markedly higher when raw starch was fed. Feeding unmodified corn starch resulted in serum and hepatic cholesterol levels which were significantly lower than those observed with modified food starch, but not significantly higher than the sucrose-fed controls with the exception of hepatic cholesterol which was significantly elevated when raw corn starch was fed.

EFFECTS OF DIETARY TRIOLEIN, TRIPALMITIN AND L-PHENYLALANINE ON CALCIUM ABSORPTION IN THE RAT. B. Tadayyon and L. Lutwak (Grad. School of Nutr., Cornell Univ., Ithaca, N.Y. 14850). *Proc. Soc. Exp. Biol. Med.* 130, 978–9 (1969). Tracer study showed that 25% dietary triolein caused better absorption of calcium than 25% tripalmitin, 80% as compared to 50%. Including 4% L-phenylalanine in the diet, however, did not influence calcium absorption significantly, regardless of the nature of triglyceride.

HEPATIC LIPIDOSIS ASSOCIATED WITH L-ASPARAGINASE TREATMENT. M. A. Gross, R. J. Speer and J. M. Hill (Dept. of Chem., Wadley Inst. of Molecular Med., Dallas, Texas 75246). *Proc. Soc. Exp. Biol. Med.* 130, 733–6 (1969). Fatty infiltration of the liver following intraperitoneal administration of partially purified *E. coli* L-asparaginase was investigated using mice as experimental animals. Normal male C3H mice given varying dosages of low specific activity L-asparaginase over a 5-day period developed a marked hepatic lipidosis. Quantitative analyses and cytological studies confirmed this abnormal fat accumulation, in the form of triglycerides, compared with con-

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60th Annual Meeting Technical Sessions

AOCS Technical Sessions form the backbone of the Society's Spring and Fall Meetings. Here are pictured some of the fine speakers who contributed to the success of the San Francisco Annual Meeting.

1. **T. Potts and F. Scholnick**
2. **Left to right: J. Dittmer, J. Nevenzel, L. Jackson, P. Albro, A. P. Tulloch, N. Nicolaides, M. N. A. Ansari, P. E. Kolattukudy and Hwei C. Fu.**
3. **B. J. Burns and R. Okey**
4. **F. E. Sullivan**
5. **R. B. Alfin-Slater with speakers of the L. W. Kinsell Memorial Symposium.**
6. **R. Wood, J. F. Mead and F. Snyder**
7. **Speakers for the Membrane Model System and Biological Membrane Symposium.**
8. **J. R. Trowbridge, R. F. Vance, I. R. Schmolka, B. E. Gordon, B. W. Terry and A. W. Leipnitz.**
9. **Grace Y. Sun**
10. **F. Lindgren**
11. **K. W. Ingold**
12. **T. A. Foglia**
13. **C. Litchfield, R. G. Ackman, J. F. Mead, E. A. Moscatelli and G. Rouser.**
14. **R. B. Alfin-Slater and E. L. Bierman**
15. **G. Collacicco and L. McClung**
16. **T. H. Smouse and T. Richardson**
17. **D. W. Urry**
18. **R. Kleiman**
19. **H. J. O'neill**
20. **C. Y. Yang**

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trol animals given physiologic saline. By contrast, enzyme of high specific activity was not steatogenic to mice at the highest dose levels administered. Therefore, pure L-asparaginase does not appear to be steatogenic to mice. Quantitative analyses of liver tissues of a small group of L-asparaginase-treated leukemic patients showed marked hepatic lipidosis, regardless of amount or specific activity of enzyme administered. In fact, the severity of lipidosis seemed quite unrelated to the dose or purity of enzyme used. The limitations and possible implications of these findings are briefly discussed.

EFFECTS OF ETHANOL AND A FAT-FREE DIET ON HEPATIC MITOCHONDRIAL FRAGILITY AND FATTY ACID COMPOSITION. S. W. French, A. Sheinbaum and R. J. Morin (Dept. of Path., UCLA School of Med., Harbor Gen. Hosp., Torrance, Calif. 90509). *Proc. Soc. Exp. Biol. Med.* 130, 781–3 (1969). The effect of EFA deficiency and chronic ethanol ingestion on liver mitochondrial fragility and fatty acid composition was studied using young growing male rats. The results indicated that EFA deficiency (fat-free diet) partially protected the mitochondria from developing the increased fragility caused by ethanol ingestion. The mitochondrial fragility induced by chronic ethanol feeding was not related to changes in the proportions of arachidonic acid or other mitochondrial fatty acids. Additionally, it was found that chronic ethanol feeding partially prevented the changes in the mitochondrial fatty acid composition induced by EFA deficiency.

EFFECT OF HYDROCORTISONE ON AGE-DEPENDENT CHANGES IN LIPID METABOLISM OF PRIMARY HUMAN AMNION CELLS IN VITRO. Grace C. Yuan and R. S. Chang (Dept. of Microbiol., Harvard School of Public Health, Boston, Mass. 02115). *Proc. Soc. Exp. Biol. Med.* 130, 934–6 (1969). Hydrocortisone, a compound capable of prolonging postmitotic life span of primary human amnion cells *in vitro*, was also capable of abolishing the age-dependent increase in lipid/CO_2 ratio of cultures fed with palmitate or oleate, and of delaying the age-dependent increase in incorporation of cholesterol into cell lipids.

METABOLISM OF LECITHIN AND VIRUS-INDUCED CELL FUSION. P. Elsbach, Kathryn V. Holmes and P. W. Choppin (Dept. of Med., N.Y. Univ. School of Med., and The Rockefeller Univ., N.Y., N.Y. 10021). *Proc. Soc. Exp. Biol. Med.* 130, 903–8 (1969). Homogenates of BHK21-F cells which fused rapidly after inoculation with a high concentration of the parainfluenza virus SV5, or which fused more slowly with SV5 infection and virus multiplication, showed no greater breakdown of lecithin than uninoculated control cells. Cellular lecithin did not undergo appreciable hydrolysis in intact cells under conditions in which extensive cell fusion occurred. BHK21-F cells possess lysolecithinase activity, and the ability to convert lysolecithin to lecithin. The cells thus possess the pathways for elimination of the membrane-lytic agent, lysolecithin. No phospholipase activities were found associated with purified SV5 virions. We conclude that the cell fusion induced by this virus is not due to an effect on a major structural lipid such as lecithin.

THE STEREOCHEMISTRY OF DESATURATIONS OF LONG-CHAIN FATTY ACIDS IN CHLORELLA VULGARIS. L. J. Morris, R. V. Harris, W. Kelly and A. T. James (Unilever Res. Lab., Sharnbrook). *Biochem. J.* 109, 673–8 (1968). A study was made of the stereospecificity of hydrogen removal in the sequential desaturations performed by intact cells of *Chlorella vulgaris* in the biosynthesis of oleic, linoleic and α-linolenic acid. By use of *erythro*- and *threo*-9,10-$^2H_2$-, -12,13-$^2H_2$- and -15,16-$^2H_2$-labelled precursors, it was demonstrated that the pair of hydrogen atoms removed from each of these positions had the *cis* relative configuration. That the hydrogen atoms removed in oleic and linoleic acid formation were of the D absolute configuration was proved by use of D- and L-9-^3H- and -12-^3H-labelled precursors. The presence of a substantial kinetic isotope effect of deuterium at both positions of the putative double bond was indicated, suggesting that the mechanism of desaturation involves simultaneous concerted removal of the pair of hydrogen atoms.

OPTIMAL CONDITIONS FOR PALMITATE OXIDATION BY RAT HEART HOMOGENATES. S. Passeron, M. A. Savageau and I. Harary (Univ. of California, Los Angeles, California). *Arch. Biochem. Biophys.* 128, 124–8 (1968). A study of the oxidation of palmitate-1-^{14}C to $^{14}CO_2$ by heart homogenates was undertaken and the optical conditions were determined. The system has an absolute requirement for carnitine, CoA, ATP and Mg^{2+}. The levels of ATP and Mg^{2+} for the optimal rate of palmitate oxidation are interdependent. Excess of ATP or Mg^{2+} inhibits

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Inauguration Luncheon and AOCS Awards Spring Meeting, 1969

1. Outgoing President, J. C. Cowan prepares to introduce his successor, G. C. Cavanagh at the Annual Inaugural Luncheon.
2. G. C. Cavanagh examines the AOCS "Tomahawk" Gavel, as he makes his first official remarks to the Membership.
3. J. C. Cowan presenting Barrow-Agee Cup.
4. Mr. Oxtes receives Honored Student Award from J. C. Cowan.
6. R. T. Doughtie presents Smalley Cup.
7. W. J. Johnson and M. E. Whitter with Smalley Check Sample Program Awards.
8. W. J. Johnson awarded the Smalley Cup.
9. J. C. Cowan presents Mr. Waganer with Honored Student Award.
11. G. C. Cavanagh reads inscription on the "Tomahawk" Gavel, which is an authentic 250-year-old Indian relic, presented to the AOCS by our 14th President, H. B. Battle.
12. S. S. Chang shows obvious pride as he reports the progress of the AOCS Honored Student Program.
13. Raymond Reiser presents J. C. Cowan with the Past Presidents' Key.
14. Mr. Gralled receives Honored Student Award.
15. Mr. Castell also receives Honored Student Award.

Golf Tournament

An exciting event at the Meeting was the Golf Tournament, held at the San Geronimo National Golf Course. Thirty-eight players joined in and enlivened the tournament which ended with the following winners: Low Gross, Don Del Vecchio, Fred Matthews and Dick Thanasse; Long Ball, Don Del Vecchio; Nearest-The-Pin, Tom Fite.

Other participants were: E. S. Pattison, Frank Passalaqua, J. K. Gilpin, L. J. Mandl, E. C. Howe, F. E. Matthews, Orville Privett, J. C. Clouse, D. R. Erickson, W. E. Wimble, T. R. Aylward, F. P. Khym, Howard Cripps, W. H. Walker, Don Del Vecchio, W. L. Farrison, P. J. Tiemstra, W. A. Jacob, W. B. Meldrum, J. D. Jamison, A. V. Graci, W. R. Deutscher, J. A. Ramin, R. J. Pikaar, C. M. Young, K. E. McCaleb, John Hanrahan, S. E. Pack, L. M. Wright, T. F. Fite, R. A. Reck, K. M. Bierman, E. M. Deck, Ted Pella, R. F. Thanasse, Lowell Cummings, F. R. McKenna and A. Bernes.

Pictured are:

5. (Left to right) J. K. Gilpin, J. Clouse, F. Pasalaqua and L. Mandl.
10. S. Matthews
16. Golf prizes, which were generously donated by: Sharples Equipment Div., Pennsalt Chemicals Corp.; Roche Chemical Div., Hoffmann-LaRoche Inc.; Foster Wheeler Corp.; Votator Division, Chemetron Corporation; Glidden-Durkee, Division of SCM Corp.; North American Fibre Co.; Food Materials Corp.; Arthur G. McKee & Co.; and Curtis & Tompkins.

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the production of CO_2. The amount of fatty acid oxidized is dependent on the molar ratio of fatty acid to albumin in the incubation medium; an optimal ratio of approximately 5 was found for all concentrations of fatty acid and albumin tested. A tentative mechanism for the albumin effect is presented.

SITES OF BINDING OF ACETATE, MALONATE AND ACETOACETATE TO THE PIGEON LIVER FATTY ACID SYNTHETASE. C. J. Chesterton, P. H. W. Butterworth and J. W. Porter (Univ. of Wisconsin, Madison, Wis.). *Arch. Biochem. Biophys.* 126, 864–72 (1968). Pigeon liver fatty acid synthetase was incubated with acetyl-1-^{14}C- or malonyl-2-^{14}C-CoA, either separately or with a non-radioactive partner. The radioactive protein was then digested with pepsin and the resultant peptides were separated by high-voltage electrophoresis or peptide mapping. Labeled acetyl, malonyl and acetoacetyl peptides were located by autoradiography or by scanning for radioactivity. The relevance of the results of this work to the mechanism of fatty acid biosynthesis is discussed.

IDENTIFICATION OF α-TOCOPHEROL FROM TISSUES BY COMBINED GAS-LIQUID CHROMATOGRAPHY, MASS SPECTROMETRY AND INFRARED SPECTROSCOPY. P. P. Nair and Z. Luna (Dept. of Medicine, Sinai Hosp. of Baltimore, Baltimore, Md.). *Arch. Biochem. Biophys.* 127, 413–8 (1968). α-Tocopherol (vitamin E) has been isolated from heart muscle and characterized by GLC, infrared spectroscopic and mass-spectrometric criteria.

STIMULATION OF GLUCOSE UTILIZATION AND INHIBITION OF LIPOLYSIS BY POLYENE ANTIBIOTICS IN ISOLATED ADIPOSE CELLS. J. F. Kuo (American Cyanamid Co.). *Arch. Biochem. Biophys.* 127, 406–12 (1968). Polyene antibiotics, such as filipin, pimaricin and nystatin, like insulin, were found to stimulate the uptake and the metabolism of extracellular glucose by isolated adipose cells. Such stimulation, however, was abolished when the polyenes were present at high concentrations. The filipin-stimulated lipogenesis from glucose was inhibited by phlorizin, 3-*O*-methylglucose, 2-deoxyglucose and puromycin. Polyenes neither enhanced nor inhibited the insulin- or the protease-stimulated glucose utilization, but inhibited the deoxyfrenolicin-stimulated process to variable degrees. Like insulin, polyenes stimulated still further the lipogenesis from glucose in the presence of palmitic acid. Polyenes blocked lipolysis mediated by either norepinephrine, corticotropin, caffeine or theophylline. It is suggested that the interactions of polyenes with the phospholipid-cholesterol constituent of the lipoprotein membrane imparted to adipose cells activities characteristic of those of the insulin-treated cells.

HYDROLYSIS OF HIGHER FATTY ACID ESTERS OF P-NITROPHENOL BY RAT LIVER AND KIDNEY LYSOSOMES. S. Mahadevan and A. L. Tappel (Univ. of California, Davis, Calif.). *Arch. Biochem. Biophys.* 126, 945–53 (1968). Esterases, acting on higher fatty acid esters of *p*-nitrophenol, are shown to be concentrated in the lysosomes of rat liver and kidney by the amount of enzyme sedimented with light mitochondria, by the purification of lysosomes, and by the preparation of Triton WR 1339-filled liver lysosomes. Most of the esterase of liver lysosomes is associated with the lysosomal membrane, whereas a major portion of the kidney lysosomal esterase can be solubilized by freezing and thawing. The relative rates of hydrolysis of *p*-nitrophenyl esters containing 8 to 18 C atoms in the fatty acid were determined. The lysosomal esterases are least active on *p*-nitrophenyl caprylate and more active on higher fatty acid esters. The microsomal esterase is most active on *p*-nitrophenyl caprylate and has very little activity on higher fatty acid esters. The properties of lysosomal acid esterase and acid lipase are discussed.

THE FATTY ACIDS OF *PENICILLIUM PULVILLORUM*. S. Nakajima and S. W. Tanenbaum (Dept. of Microbiol., Columbia Univ., New York, N.Y.). *Arch. Biochem. Biophys.* 127, 150–6 (1968). In order to test the hypothesis that unusual fatty acids related biogenetically in structure to pulvilloric acid can be detected, the fatty acid composition of *Penicillium pulvillorum* was determined. The major fatty acids are: linoleic, palmitic, oleic and stearic, followed by pentadecanoic, heptadecanoic, myristic, palmitoleic, isostearic, isopalmitic and linolenic, in order of decreasing concentration. 4-Methylmyristic, 4-methyllauric and 2-methyllauric acids were absent. These data imply that hypothetical single-chain methylated polyketide precursors to pulvilloric acid are not integrated into the fatty acid biosynthetic pathway. D-Mannitol and ergosterol were also isolated from the mycelial extracts. A crystalline, apparently homogeneous material provisionally assigned in structure as glyceride was obtained from the beer when *P. pulvillorum* was grown on a special medium. Saponification followed by GLC analysis of the component fatty acid methyl esters again failed to reveal anticipated novel components.

EFFECT OF PRIOR DIET ON LIPID MOBILIZATION IN RATS DURING STARVATION OR EXPOSURE TO COLD. D. G. Therriault and M. A. Mehlman (Biochem. and Pharm. Lab., U.S. Army Res. Inst. of Environmental Med., Natick, Mass.). *J. Nutr.* 98, 25–32 (1969). Using difference in the lipid content of the epidymal fat pads of the rat as a measure of depot fat changes, an attempt has been made to evaluate the role of previous feeding in the movement of fat out of adipose tissue under the stimuli of fasting or exposure to cold. There was a decreased rate of mobilization when the purified diet, consisting of vitamin-free casein as the protein source, was fed. Rats fed purified diet, however, mobilized fat at a rate equivalent to those fed Purina Laboratory Chow when the animals were exposed to 5C. The results indicate that rats fed a purified diet consisting of vitamin-free casein as the protein source mobilize significantly less adipose tissue fat during starvation than did control animals fed a diet of Purina Laboratory Chow; however, the feeding of the purified diet had no influence on the mobilization of lipid during exposure of the animal to 5C. Accordingly, alterations in adipose tissue metabolism which are insensitive to the effect of fasting appear to result from different mechanisms than those which determine the metabolic changes in this tissue subsequent to exposing the animal to a cold environment. The mechanism responsible for the activation of lipase during starvation remains unexplained.

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Moments of relaxation at San Francisco Meeting

1. Dr. & Mrs. J. C. Cowan
2. Dr. & Mrs. G. C. Cavanagh
3. Dr. & Mrs. S. S. Chang
4. Dr. & Mrs. T. H. Applewhite
5. Mr. & Mrs. L. H. Going
6. J. W. McEwan (2nd from left) and Mrs. T. J. Potts enjoy the Presidents Cocktail Party with two other guests.
7. Just a portion of the tremendous turnout for the Annual Spring Banquet.
8. Left to right: Mr. & Mrs. M. Morino, Mr. & Mrs. F. R. McKenna, and Mr. & Mrs. R. A. Reiners.
9. Left to right: B. Warner, Mrs. R. Reck, M. Scroppo, D. Shew, K. Beerman and Mr. & Mrs. L. I. Jackson.
10. A moment of leisure at the Brinkmeyer Cocktail Party.
11. Mr. & Mrs. J. B. Hetherly and Mr. & Mrs. T. A. Stovall, Jr.
12. Mr. & Mrs. N. T. Joyner
13. Mr. & Mrs. E. R. Hahn
14. I. A. Wolff (left) and Mr. & Mrs. E. L. Griffin.
15. F. P. Khym and R. T. Stovall, Sr. at the Howe-Baker Cocktail Party.
16. Left to right: M. Ott, J. Hanrahan and Dr. & Mrs. J. V. Lack.
17. Dr. & Mrs. T. H. Applewhite
18. Mr. & Mrs. Frank Middleton
19. R. T. Holman and Dr. Ulla Holm from Sweden "talking shop" at Presidents Cocktail Party.
20. Mr. & Mrs. C. M. Lyon and L. A. Goldblatt at the Presidents Cocktail Party.
21. G. Rouser and Dr. A. Horvat take a few moments for business during Presidents Cocktail Party.
22. Mr. & Mrs. E. R. Lowery and Mr. & Mrs. L. H. Going enjoying Sunday evening's Mixer.

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EFFECT OF FREE FATTY ACID ON THE FLUORESCENCE OF BOVINE SERUM ALBUMIN. A. A. Spector and K. M. John (National Heart Inst., Bethesda, Md.). *Arch. Biochem. Biophys.* **127**, 65–71 (1968). The ultraviolet fluorescence emission spectrum of bovine serum albumin was altered when free fatty acid (FFA) was added to the protein. This occurred when FFA was taken up from aqueous soap solutions, n-heptane solutions, rat epididymal fat pads or fat emulsions undergoing enzymatic hydrolysis. As the molar ratio of FFA to albumin increased, the maximum emission was shifted to a shorter wave length (max. shift 7 mμ) and the fluorescence intensity was decreased by up to 50%. FFA shorter than C_{10} produced smaller effects. Little or no change was produced when the pH was less than 5.5 or greater than 10. FFA produced changes in the fluorescence spectrum of porcine albumin but had little effect on that of human, rabbit, equine or canine albumin.

• Drying Oils and Paints

COATINGS. M. H. Swann, M. L. Adams and G. G. Esposito (U.S. Army Coating and Chem. Lab., Aberdeen Proving Ground, Md.). *Anal. Chem.* **41**, 35R-40R (1969). The important contributions to the analysis of coating materials as selected by the reviewers since the previous summary are contained in this biennial review. The period covered extends from December 1966 through December 1968, although a few significant foreign publications, located by abstracts, may predate this coverage.

RAW MATERIALS FOR THE SURFACE COATINGS INDUSTRY—VI. H. A. Bhatt. *J. Col. Soc.* **7**, 9–12 (1968). An outline of drying oil modification by maleinisation, isomerisation, *etc.* is given. (World Surface Coat. Abs. No. 320)

• Detergents

THIN-LAYER CHROMATOGRAPHY AS AN INVESTIGATION METHOD FOR IDENTIFYING COATING MATERIALS. E. Knappe (Central Lab. of the Varnish Plant, M. Winkelmann AG, Hiltrup/Westf., Ger.). *Farbe Lack* **75**(1), 36–44 (1969). Thin-layer chromatography is easy, fast and inexpensive and may be used by small laboratories for the investigation of coating materials and their raw materials. Examples of laboratory practice include the identification of dicarboxylic acids, fatty acids, aromatic monocarboxylic acids and polyalcohols after saponification of polyester and alkyd resins and the investigation of amino resin hydrolyzates. TLC is also suitable for the identification of cyclic di-carboxylic anhydrides via their reaction products with p-anisidine and for the identification of organic peroxides.

FUTURE TRENDS IN THE COATINGS INDUSTRY. A. E. Rheineck (Polymers and Coatings Dept., No. Dakota State Univ., Fargo, No. Dakota). *Farbe Lack* **75**(1), 16–18 (1969). Developments in the coatings field have been substantially influenced by factors outside of the paint and varnish industry. The shortages of certain materials have led to the use of other basic materials, while legislation against air and water pollution has increased the use of solvent free products. Research and development will concentrate on the reduction of manufacturing and processing costs, the application of discoveries in special fields and counteracting rival materials. Several new possibilities have emerged, impregnating wood with low molecular monomers which, after triggering a reaction mechanism, polymerize within the wood, or the use of factory applied coatings on pre-fab concrete parts designed to reduce surface erosion or the washing out of aggregates.

STUDY OF DETERGENCY. VIII. REMOVAL OF NITROGEN-CONTAINING SOIL. Teruo Tsunoda and Yoichi Oba (Hitachi Central Research Lab., Tokyo). *Yukagaku* **18**, 87–90 (1969). Removal of 2 kinds of nitrogen-containing soil from naturally soiled cloth were estimated from peak height in elusion curve of gel filtration. The relation between the amount of soil and detergent efficiency was evaluated by reflectance measurement. It seems unnecessary to assume the specific interaction between proteins and anionic surfactant such as sodium alkylbenzenesulfonate with respect to the mechanism of removal of nitrogen-containing soils.

SYNTHESES AND APPLICATIONS OF POLYALKYLENE GLYCOL DERIVATIVES. SYNTHESIS AND SURFACE ACTIVITY OF HIGHER ALCOHOL-PROPYLENE OXIDE-ETHYLENE OXIDE ADDUCTS. Masanori Matsuda, Kazuo Miyashita, Wataru Yano and Wasaburo Kimura (Suzuka Coll. Tech., Japan). *Yukagaku* **18**, 80–7 (1969). Addition of 3 wt% of KOH or NaOH to alcohol was found to be an effective catalyst for reaction at 150C. In comparison with polyoxyethylene lauryl ethers, lauryl alcohol-propylene oxide-ethylene oxide adducts showed lower surface tension and CMC value, but superior dispersing power while inferior in foaming, wetting and emulsifying powers.

TREND OF SURFACTANT INDUSTRY IN JAPAN. Yasota Kawakami (Kawaken Fine Chem. Co., Tokyo). *Yukagaku* **18**, 57–62 (1969).

WATER DISPERSIBLE COMPOSITION CONTAINING A REACTION PRODUCT OF A MODIFIED DRYING OIL COMPONENT AND AN ALKOXY POLYALKYLENE GLYCOL. H. M. Schroeder and S. E. Walker (Textron, Inc.). *U.S. 3,428,795.* A liquid, water dispersible composition of matter having a viscosity of up to 100 poises is produced by reacting a mixture of 70–90% of a drying oil ester of an unsaturated C_{14}–C_{20} fatty acid and a C_3–C_6 polyhydric alkanol having 3–6 hydroxyl groups. The drying oil ester in the mixture is modified with 5–40% of monomer or 2–10 monomer units polymer of dialkenyl C_4–C_8 hydrocarbon and 10–30% of an alkoxy polyalkylene glycol of the formula: $RO[(CH_2)_2O]_yH$, where y is an integer giving a molecular weight of about 200 to 2,500 and R is an alkyl radical of up to 20C atoms.

AEROSOL DETERGENT COMPOSITIONS. J. H. Pickin (Colgate-Palmolive Co.). *U.S. 3,431,060.* An aerosol detergent composition is described, containing a propellant and a mixture of surface active agent and a textile optical brightening agent. The aerosol detergent composition is useful in pretreating highly soiled areas of textile materials prior to laundering in an aqueous detergent.

PRODUCTION OF SODIUM TRIPOLYPHOSPHATE. R. B. Hudson and R. E. Mesmer (Monsanto Co.). *U.S. 3,431,069.* A sodium tripolyphosphate product is produced, having a 91 to 100% tripolyphosphate content, a Form I to Form II ratio of from 1:5 to 3:1 and a water insoluble content of less than 0.20% by calcining sodium orthophosphate salts at elevated temperatures in the presence of from 0.03% to about 5% of a potassium source. Calcination temperatures are significantly lowered by this procedure.

WATER-INSOLUBLE BACTERIOSTATS IN SOAP AND DETERGENT SOLUTIONS. K. L. Russell (Malmstrom Chem. Corp.). *U.S. 3,431,207.* A shampoo composition consists essentially of: 10–30% by wt. of an organic synthetic detergent, present as an aqueous solution; 1–3% lanolin oil; 0.3–1.5% of a

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Other Committee Sessions ➔ ➔

1. **Publications and Journal Committee**
2. **Biochemical Methods Committee**
3. **Fatty Nitrogen Subcommittee**
4. **Governing Board**
5. **Ways & Means Committee**
6. **Lipids Advisory Board**
7. **Technical Safety Committee**
8. **Neutral Oil Loss Committee**
9. **Hydrogenated Oil Subcommittee**
10. **ISF-AOCS Joint Meeting Committee**
11. **Governing Board**
12. **Governing Board**
13. **Governing Board**
14. **Membership Committee**
15. **Examination Board**
16. **Neutral Oil Loss Committee**
17. **Governing Board**
18. **Uniform Methods Committee**
19. **Governing Board**

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water-insoluble bacteriostat, and 2–5% of a solubilizer for the bacteriostat. The bacteriostat is selected from the group consisting of 3,4,4′-trichlorocarbanilide, mixtures of 5,4′-dibromosalicylanilide with 3,5,4′-tribromosalicylanilide, 2-hydroxy-5-chlorobenzoic acid and 3′,4-dichloroanilide. The solubilizer is selected from the group consisting of polyethoxylated lanolin alcohol, polyethoxylated sorbitan monooleate and polyethoxylated nonyl phenol.

SOLVENT DEGREASING, SELF-EMULSIFYING CLEANING COMPOSITION. M. Rosenfeld (U.S. Sec'y of the Army). *U.S. 3,431,209.* A self-emulsifying cleaning composition for removing undesired coatings from metallic and painted surfaces contains: cyclohexanol; ethylene glycol monobutyl ether; diethylene triamine-diacetone condensate; diglycol oleate; ethanolamine oleate; surface active amine alkyl sulfonate; sorbitan oleate and lauric acid mixed with an organic solvent.

DETERGENT PROCESSES. C. Y. Shen (Monsanto Co.). *U.S. 3,431,210.* Particulate alkali metal tripolyphosphate of improved density is prepared by reacting trimetaphosphate with a strong base in the presence of a foaming agent and in the presence of a water soluble volatile oxygen containing organic compound having a boiling point below the temperature of the reaction medium. The alkali metal tripolyphosphates produced are useful as ingredients of detergent formulations.

QUATERNARY AMMONIUM SALTS OF GLYCERYL SULFATES AND SULFONATES. R. L. Wakeman and J. F. Coates (Millmaster Onyx Corp.). *U.S. 3,431,265.* Quaternary ammonium salts of coconut monoglyceride sulfates and sulfonates, and alkyl glyceryl ether sulfates and sulfonates, having germicidal activity, are described.

PROCESS OF PRINTING ON SOAP. H. Baba (Tokyo International Products, Inc.). *U.S. 3,432,325.* A process for making a soap bar with a relatively permanent, water-impervious graphic design comprises the steps of moistening with water a portion of the bar intended for display of the graphic design, coating this portion with a coat of water-impervious lacquer, printing a graphic design on the lacquer base coat, then applying a second transparent lacquer coat over the printing and finally coating with a substantially transparent paraffin.

DYE LEVELLER CONTAINING AN ANIONIC OR NONIONIC DETERGENT WITH A FOAM DEPRESSANT MIXTURE OF AN ALKYL ESTER OF AN ALKANOIC ACID, AN ALKYL PHOSPHATE, AND A FATTY ACID OR SOAP. W. Dursch, F. Landauer, M. Reuter and G. Weckler (Farbwerke Hoechst A.G.). *U.S. 3,433,574.* The foaming of anionic and nonionic detergents in a reactive dye or vat dye bath is depressed by adding 0.05 to 4 parts of an alkyl ester of an alkanoic acid in which at least one of the alkyl radicals of the ester shows at least one ramification of 1 to 4C atoms, 0.05 to 2 parts of a 4–8 carbon alkyl phosphate and 0.05 to 1 part of a fatty acid or soap per 10 parts of the nonionic and/or anionic detergent.

COCOA-FLAVORED LIQUID OIL COMPOSITIONS. R. R. Cooke and R. M. Roudebush (Procter & Gamble Co.). *U.S. 3,433,649.* A pourable storage-stable composition is described, comprising edible oil and 10–30% cocoa having an average particle size of less than about 40 microns. In a particular application, the composition is packaged as a discrete unit with a dry culinary mix.

DRY CLEANING DETERGENT COMPOSITION. E. A. Knaggs and E. Fischer (Stepan Chemical Co.). *U.S. 3,433,746.* An improved dry cleaning composition and method of using the same comprises an emulsion of water in a volatile dry cleaning solvent with a small amount of a dry cleaning assistant which is a detergent component. The detergent component is generally classified as a neutralized alpha-sulfo fatty ester or amide which is usable by itself in the dry cleaning composition or may be combined with certain minor proportions of sulfated alkyl chalcophenol polyalkoxide condensates and/or with neutralized sulfated alkoxylated fatty alcohols in addition with conventional additives such as lubricants, antistatic agents, etc. *U.S. 3,433,745* describes a similar composition.

BIODEGRADABLE DETERGENT ALKYLATE HAVING IMPROVED DETERGENT PROPERTIES. R. T. Adams, I. E. Levine and W. A. Sweeney (Chevron Research Co.). *U.S. 3,433,846.* A process is described for producing a biodegradable detergent alkylate having improved detergent characteristics and composed of secondary phenyl-n-alkanes in the C_{10}–C_{14} range and having a higher than equilibrium concentration of centrally attached phenyl isomers. A mixture of C_{10}–C_{14} phenylalkanes having at least 15% by wt. of phenylalkanes higher than C_{12} is subjected to fractional distillation to produce a lower boiling product fraction and a higher boiling fraction consisting predominantly of the terminal 2- and 3-phenylalkanes. This higher boiling fraction is subjected to isomerization with a Friedel-Crafts or $AlCl_3$ catalyst, to convert the 2- and 3-phenyl isomers to the midchain phenylalkanes and thereafter returning the isomerized product to the fractional distillation stage. Various process modifications and integration with a Friedel-Crafts alkylation process are described.

CONTINUOUS MANUFACTURE OF DETERGENT LAUNDRY BARS. A. E. Austin and P. P. Lee (Colgate-Palmolive Co.). *U.S. 3,434,974.* Detergent laundry bars are made by continuously mixing sodium alkylbenzenesulfonate or other anionic detergent with

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water and a large amount of a builder salt such as tripolyphosphate and intensively shearing the mix, then (a) extruding strands of the mix, cooling and plodding, or (b) directly extruding a bar. Reaction between builder salt and water to form a hydrate aids in hardening of the bar. The sulfonate salt may be formed *in situ* by reaction between sulfonic acid and sodium carbonate or sodium hydroxide.

COATING COMPOSITIONS COMPRISING THE REACTION PRODUCT OF A DRYING OR SEMIDRYING OIL WITH VINYL BENZYL ALCOHOL. E. C. Chapin (Monsanto Co.). *U.S. 3,434,986.* A process is disclosed for preparing a reaction product of a drying or semidrying oil with vinyl benzyl alcohol, which comprises heating at 100–250C a mixture of 100 parts of the oil and 5–300 parts of the vinyl benzyl alcohol in the presence of up to 5% by wt. of an alkali metal hydroxide, or an oxide or hydroxide of alkaline earth metals and lead.

PROCESS FOR THE PREPARATION OF SURFACTANTS FROM HYDROXYLATED ORGANIC COMPOUNDS, FATTY ACID ESTERS AND ALKYLENE OXIDES. L. Nobile, E. Condorelli, T. LaNoce and A. Poma (Ledoga S.p.A.). *U.S. 3,435,024.* Surfactant products are obtained by simultaneously reacting 10–50 parts by wt. of at least one hydroxylated organic substance (mono-, di-, tri- and tetrahydric alcohols, pentitols, hexitols, di- and trisaccharides), 50–90 parts by wt. of a methyl- or glycerine-ester of C_{10}–C_{20} fatty acids, and 100–300 parts by wt. of at least one alkylene oxide having 2–4 C atoms, in the presence of an alkaline catalyst at 70–200C and at a pressure of between 1 and 50 atmospheres.

HIGH DENSITY SODIUM TRIPOLYPHOSPHATE. J. S. Sproul and W. C. Lapple (FMC Corp.). *U.S. 3,437,434.* Dense granular Form II sodium tripolyphosphate having a size of from about −20 mesh to about +100 mesh and a bulk density of 0.95 to 1.3 g/cc is produced by feeding an aqueous mixture of sodium orthophosphate having an Na/P molar ratio of 1.63–1.70 into a fluidized bed containing discrete particles of sodium tripolyphosphate, maintaining the particles at 220–400C, removing a portion of the fluidized particles from the bed, crushing a portion of the removed particles to a smaller particle size, recycling this mixture back to the bed to replace the number of particles removed and recovering the remaining uncrushed fraction as Form II sodium tripolyphosphate product. *U.S. 3,437,433* describes a similar process.

METHOD OF PREPARING TALL OIL FATTY ACID COMPOSITIONS. A. L. Rummelsburg (Hercules Inc.). *U.S. 3,437,650.* Tall oil fatty acids are heated, in the absence of added water, at 130–160C and in the presence of a crystalline clay catalyst for a period of time sufficient to provide a composition containing 10–30% polymerized fatty acids and 70–90% of monomeric fatty acids.

LOW FOAMING SURFACTANT COMPOSITIONS. J. A. Hodgkiss, J. A. Komor and L. M. Schenck (GAF Corp.). *U.S. 3,437,697.* Novel low-foaming surface active products having good detergency are claimed, having the formula: $R-(OCH_2CH_2)_nCl$, where R represents a branched chain C_8–C_{12} alkyl group, n is an integer having an average value of from 6.67 to 23.6, such that the oxyethylene groups constitute from 66.6% to 83.5% by weight of the composition.

PROCESS FOR THE MANUFACTURE OF SODIUM TRIPOLYPHOSPHATE WITH A HIGH CONTENT OF THE LOW TEMPERATURE MODIFICATION. G. Heymer, H. Harnisch, G. Hartlapp and K. Traulsen (Knapsack A.G.). *U.S. 3,438,725.* Sodium tripolyphosphate containing less than 10% by wt. of the high temperature modification (phase I) is produced through the use of a phosphate solution containing a maximum of 0.26% sulfate ions and a maximum of 0.11% foreign elements, based on total P_2O_5.

IODINE-CONTAINING NONIONIC SURFACTANT COMPOSITIONS. J. L. Duvall (Wyandotte Chemicals Corp.), *U.S. 3,438,906.* Iodine-containing compositions are obtained by mixing elemental iodine with liquid, biodegradable, nonionic heteric surfactants having enhanced detergency. The heteric surfactants are prepared by condensing a mixture of ethylene oxide and propylene oxide in a wt. ratio of 1.3:1 to 6.8:1 with an organic compound having an active hydrogen atom and 8–22 C atoms, the amount of oxide being 67–80% of the total weight of the surfactant. The iodine-containing compositions may then be diluted with water and acidified. The diluted compositions are advantageously used to clean and sterilize metal parts and equipment. Similar compositions are described in *U.S. 3,438,905* and *3,438,907.*