

ABSTRACTS R. A. REINERS, Editor

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Fats and Oils

β -OXIDATION IN THE ACTION OF PERMANGANATE ON FATTY ACIDS. O. Neunhoeffer and J. Rath (Humboldt Univ., Berlin). *J. prakt. Chem.* [4] 2, 84-6 (1955). Butyric acid oxidized with potassium permanganate at pH 10 gave acetic acid and acetone; similarly n -C₆H₁₃CO₂H gave acetic acid and butyric acid; n -C₈H₁₇CO₂H gave acetic acid, propionic acid, butyric acid and pentanoic acid. The results indicate that β -oxidation occurred. (*C. A.* 53, 21630)

BEHAVIOR OF FATTY ACIDS IN A PROCESS OF LIQUID PHASE OXIDATION. I. V. Berezin and A. M. Ragimova. *Doklady Akad. Nauk Azerbaidzhan. S.S.R.* 15, 219-23 (1959) (in Russian). Behavior of fatty acids, as an oxidation by-product, in a medium of oxidizing octadecane was studied with acids labeled with C¹⁴ in a carboxyl group. It was found that the acids, from the moment of their introduction into the reaction medium, were subjected to oxidizing decarboxylation. The rate of this process, although appreciable in the beginning, becomes negligible with time. This decrease in the reaction rate is attributed to the inhibiting action of the oxidation products and to the decrease in activity of free radicals, which restrict the oxidation of the reaction products. An equation expressing the rate of reaction, involving the constant of free radical concentration and the constant of free radical recombination is derived. (*C. A.* 53, 21630)

THE STRUCTURE OF SYNTHETIC FATTY ACIDS OBTAINED BY THE OXIDATION OF LIQUID PARAFFIN HYDROCARBONS. A. I. Levin. *Khim. i Tekhnol. Topliv i Masel* 4(5), 33-7 (1959). A fraction boiling at 240-350° is obtained in the production of low-temperature diesel fuel by carbamide deparaffinization. It consists of normal hydrocarbons and served as raw material for a study of oxidation to fatty acids. Of a total yield of 76%, C₅-C₆ acids made up 3.4%, C₇-C₈ 15.7%, C₁₀-C₁₆ 24.7%, C₁₇-C₂₀ 16.6%, and residue 15.6%. Acid numbers (mg. potassium hydroxide) were, respectively, 476.0, 387.9, 382.5, 208.0, and 25.0. Melting points ranged from -21 to 75°. (*C. A.* 53, 21631)

HYDROGENATION OF LINOLENIC ACID BY HYDRAZINE HYDRATE. C. V. N. Rao (Univ. Nagpur, India). *J. Sci. Ind. Research (India)* 18B, 131-2 (1959). Linolenic acid was hydrogenated by N₂H₄·H₂O according to the procedure of Aylward and Rao (*C. A.* 51, 3445e, 11735i) at 50° using a mole ratio of 5:1 of N₂H₄·H₂O to acid. It was found that no appreciable amounts of *trans* acid were produced during the hydrogenation. (*C. A.* 53, 21631)

ACETYLENIC ACIDS FROM THE FATS OF SANTALACEAE AND OLACACEAE. SEED AND ROOT OILS OF EXOCARPUS CUPRESSIFORMIS. H. H. Hatt, A. C. K. Tirfett, and P. C. Wailes (Commonwealth Sci. Ind. Research Organization, Melbourne). *Australian J. Chem.* 12, 190-5 (1959). *E. cupressiformis* yielded a seed oil containing ximenynic acid and a root oil containing octadec-*trans*-13-en-9,11-diyonic acid as 60 and 59%, respectively, of the acids present as glycerides. Octadec-*trans*-13-en-9,11-diyonic acid was also isolated from the root oil of *E. strictus*. Ultraviolet absorption spectra indicated the presence of octadec-*trans*-13-en-9,11-diyonic acid in the root oil of *Ximenia americana* and of ximenynic acid in the seed oil of *E. strictus*. (*C. A.* 53, 21632)

PRIORITY OF E. E. WAGNER IN ESTABLISHING THE STRUCTURE OF OLEIC ACID. N. P. Bulatskii. *Trudy Odessk. Gosudarst. Univ. im. I. I. Mechnikova, Sbornik Khim. Fak.* 4, 109-10 (1954). According to Bulatskii, the structure of oleic acid was first established by Wagner [*Ber.* 21, 3354 (1888)] and not by Baruch [*Ber.* 27, 172 (1894)], contrary to information found in the literature. (*C. A.* 53, 21633)

APPLICATION OF DIFFUSION (RAMAN) SPECTRA TO THE STUDY OF THE STRUCTURE OF ISOÖLEIC ACIDS FORMED DURING HYDROGENATION OF VEGETABLE OILS. P. A. Artamonov. *Primenenie Metodov Spektroskopii v Prom. Prodovol'stven. Tovarov i Sel'sk. Khoz., Leningrad Gosudarst. Univ. im. A.A. Zhdanova, Materialy Soveshchaniya, Leningrad 1955*, 103-9 (Pub. 1957). The spectra of isoöleic acids studied contain Raman frequencies

corresponding to the >C:C< vibration of the *trans* form, i.e. 1669-1675 cm.⁻¹ as compared with frequencies of the *cis* form (1655-1659 cm.⁻¹). Consequently, all the isoöleic acids studied have the *trans* configuration. This conclusion was confirmed by the determined equilibrium constants for the reaction with iodine. (*C. A.* 53, 21633)

ADDITION OF PERCAPRIC ACID TO METHYL OLEATE. D. Lefort and Janine Sorba (C.N.R.S. Labs., Bellevue, France). *Bull. soc. chim. France* 1959, 606-7. Treatment of capric acid with 50% hydrogen peroxide and concentrated sulfuric acid gave percapric acid, melts at 40.5-41°. To a chilled mixture of 16.45 g. percapric acid and 2.0 g. capric acid was added dropwise 24.58 g. methyl oleate, then 0.5 g. concentrated sulfuric acid, and the mixture was heated 10-12 hours at 100°. Methyl hydroxycaproxystearate, *n*^{20/D} 1.460, *d*^{20/23} 0.936, was obtained as a residual oil after heating under 1-mm. pressure. (*C. A.* 53, 21654)

SOME NEW ANIL DERIVATIVES OF GOSSYPOL. Peggy W. Alley and D. A. Shirley (Dept. of Chem., Univ. of Tennessee, Knoxville, Tenn.). *Org. Chem.* 24, 1534-6 (1959). The scope of the reaction of Schiff base (anil) formation between gossypol and primary amines has been investigated. Seventeen primary amines of widely varying types were reacted with gossypol and the anil derivatives isolated.

TALL OIL. ISOLATION AND IDENTIFICATION OF N-HEPTADECANOIC ACID. N. J. Cooke and R. P. Hansen (Fat Research Lab., Dept. of Scientific and Ind. Research, Wellington, New Zealand). *Chem and Ind.* 1959, 1516-7. The isolation and identification of trace amounts of the normal odd-numbered fatty acid, *n*-heptadecanoic (margaric) acid, is reported. The weight of *n*-heptadecanoic acid isolated represents approximately 0.01% of the total weight of the tall oil.

OXIDATION OF SYNTHETIC SOFT PARAFFIN TO FATTY ACIDS. Ministry of the Petroleum Industry. *Jan Liao Hsueh Pao* 4, 15-32 (1959). The Fischer-Tropsch synthesis was applied to oxidize synthetic soft paraffin to fatty acids with a cobalt catalyst on a laboratory and a pilot plant scale. The optimum conditions for producing fatty acids were as follows: Boiling point range of paraffin, 320-450°; catalyst, 0.13% potassium permanganate + <0.2% sodium carbonate; reaction temperature, 110°; duration of oxidation, 15 hours; flow rate of air, 24 l./100 g. paraffin/hour; end point of oxidation, acid number 70-80 mg. potassium hydroxide. Under these conditions, total yield averaged 93%. The oxidized paraffin contained 30-5% fatty acids, of which 60-70% was C₁₅-C₂₀ acids suitable for soap manufacture. The acid number of the fatty acid obtained was around 200, and saponification number 240. The recovered paraffin could be mixed with fresh paraffin and oxidized successively to five satisfactory products at a slower rate of oxidation than that with fresh paraffin alone. 18 tables, 12 figures. (*C. A.* 53, 21631)

APPLICATION OF INFRARED SPECTROSCOPY TO THE STUDY OF INITIAL STAGES OF OXIDATION OF FATTY ACIDS. A. N. Mironova. *Primenenie Metodov Spektroskopii v Prom. Prodovol'stven. Tovarov i Sel'sk. Khoz., Leningrad Gosudarst. Univ. im. A. A. Zhdanova, Materialy Soveshchaniya, Leningrad 1955*, 94-102 (Pub. 1957). Absorption bands in the 1240-1260 cm.⁻¹ region are used to identify the formation of oxides. The formation of oxides is more rapid in the case of *cis* isomers than *trans*. Their formation is also slowed when the double bond is shifted from the 9-10 position. Besides oxides, ketones can also be formed, which can be of two types, -CH₂COCH:CHCH₂- and -CH₂COCH:CHCOCH₂-, as revealed by ultraviolet spectroscopy. The formation of ketones is also indicated by some increase in intensity of the CO band (1724 cm.⁻¹) of the oxidized monounsaturated acids. Oxidation of oleic acid gives primarily ketones, while oxidation of stearic acid produces mostly aldehydes, since the infrared absorption increases on the short wave side of the CO band. (*C. A.* 53, 21633)

EFFECT OF ANTIOXIDANTS AND METAL INACTIVATORS IN TOCOPHEROL FREE SOYBEAN OIL. E. N. Frankel, P. M. Cooney, H. A. Moore, J. C. Cowan, and C. D. Evans (Northern Regional Research Laboratory, Peoria, Illinois) *Fette Seifen Anstrichmittel* 61, 1036-39 (1959). The authors report the effects of

removal of part or all of the natural tocopherols from soybean oil. The evidence obtained indicated that the concentration of natural tocopherols in soybean oil was too high for optimum oxidative and flavor stability, and gave a pro-oxidant effect. The authors also reported that the synergistic effect of citric acid on tocopherol decreased at high concentrations of tocopherol. This was explained to be as a result of its metal inactivating action.

QUALITATIVE AND QUANTITATIVE PAPER CHROMATOGRAPHIC ANALYSIS OF DEHYDRATED CASTOR OIL. D. K. Chowdhury (Dept. of Chemistry, Sureddranath, College, Calcutta). *Fette Seifen Anstrichmittel* 61, 924-27 (1959). For their separation and identification, the mixed fatty acids of dehydrated castor oil were acetylated, reacted with maleic anhydride, and subsequently hydrogenated. At all three stages the products were subjected to paper chromatographic analysis and the chromatogram evaluated quantitatively. The results obtained by these methods were compared with those obtained by other methods.

PAPER CHROMATOGRAPHY IN FAT CHEMISTRY XXXVII. STUDIES ON FATTY ALDEHYDES VI: ISOLATION OF FATTY ALDEHYDES FROM BRAIN PHOSPHOLIPIDS AND THEIR CHROMATOGRAPHIC IDENTIFICATION. H. P. Kaufmann and H. Kirschnick (Deut. Inst. für Fettforschung, Münster, Westf.). *Fette Seifen Anstrichmittel* 61, 1119-24 (1959). The authors describe a method which makes it possible to separate the higher fatty aldehydes from biological material and to analyze them chromatographically. The fatty aldehydes were isolated from brain phosphatides as their dinitrophenylhydrazine derivatives and identified as palmit-, stear-, and oleic aldehydes. The absence of higher unsaturated homologues of the fatty aldehydes was of special interest.

THE DIELECTRIC AND REFRACTODENSIMETRIC BEHAVIOR OF LIQUID FATS DURING AGING. K. H. Ludde (Weimar). *Fette Seifen Anstrichmittel* 61, 1157-63 (1959). The author reports that it is possible to determine the age of fatty oils by determination of their dielectric and refractodensimetric constants. Since these constants undergo little change during the preliminary stages of peroxidation, they can be made use of in determining the degree of adulteration of oils. The author points out that it is possible to determine the type of aging (polymerization or autoxidation) in combination with the iodine value. It is claimed that a relationship exists between the iodine number and the "trommel" number in the case of fresh oils as well as those that have reached the stage of maximum peroxidation.

ELECTROCHEMICAL SYNTHESIS OF DICARBOXYLIC ACIDS. W. Fuchs and H. Moritz (Inst. for Chemical Technology, Technischen Hochschule, Aachen). *Fette Seifen Anstrichmittel* 61, 1124-26 (1959). A new method makes it possible to synthesize the diesters of higher dicarboxylic acids from the monoesters of lower dicarboxylic acids. The electrochemical synthesis of diethyl sebacate from monomethyl adipate is carried out by using platinum electrodes and an electrolyte solution which consists of equal parts of water and the sodium salt of monomethyl adipate. A description of the apparatus is given and the yields of dimethyl sebacate, which is dependent upon current density, are given graphically.

PREPARATION OF OLEIC, LINOLEIC, AND LINOLENIC ACIDS WITH THE HELP OF ADSORPTION CHROMATOGRAPHY. Cl. Franzke (Inst. of Food Chem. and Tech. Humboldt Univ., Berlin). *Fette Seifen Anstrichmittel* 61, 905-08 (1959). The author describes an adsorption chromatographic method for the preparation of native oleic, linoleic and linolenic acids in the form of their methyl esters. Hyflo Supercel columns are used with petroleum ether as the eluting solvent. The method gives satisfactory yields of methyl oleate and linoleates, and a poor yield of methyl linolenate. The examination of the infrared spectra of the isolated acids shows that the all-*cis* form of the native acids is not affected during the isolation process.

PAPER CHROMATOGRAPHIC INVESTIGATIONS ON THE COMPOSITIONS OF DIFFERENT SEED OILS FOUND TO BE SUITABLE FOR CULTIVATION IN POLAND. H. Grynberg, A. Rutkowski, and H. Szczepanska (Inst. for Fat Industry, Warsaw, Poland). *Fette Seifen Anstrichmittel* 61, 908-10 (1959). The authors have examined cramb oil, perilla oil, German sesame oil, safflower oil, and purging oil. Characteristics of the seed oils are given. The oil constants were determined by the DGF standard methods of analysis. The fatty acid compositions which constitute the most important factor for determination of the quality of oils were determined paper chromatographically.

COLOR IMPROVEMENT OF COTTONSEED OIL. F. A. Norris (Swift & Co.). *U. S. 2,915,538*. To crude cottonseed oil is added at least 0.05% by weight of hydrogen peroxide. The oil is heated

under vacuum to reduce the moisture content to less than 0.35% and then refined in the usual manner.

PROCESS FOR MAKING CORN CHIPS. B. H. Kuncze, J. T. Long, Jr., and G. G. Olson (Fiesta Foods Corp.). *U. S. 2,916,378*. Corn chips of lower fat content and superior flavor and texture are produced by dehydrating the chips from 50% moisture to 15% moisture in an oven at 675 to 725°F. for a period of 30 seconds. The dehydrated chips are then fried in shortening corn oil or other vegetable oil for a period of 25 to 40 seconds at 370°F.

COLORING COMPOSITION AND METHOD OF PRODUCING THE SAME. J. C. Bauernfeind and R. H. Bunnell (Hoffmann-LaRoche Inc.). *U. S. 2,916,385*. A stable carotene composition especially adapted for the coloring of butter consists of 1 to 30% by weight of β -carotene suspended in an edible vegetable oil (preferably corn or peanut) containing a small amount of an edible fatty acid having 16 to 22 carbon atoms. Stearic or palmitic are preferred.

ASPIRIN-MODIFIED COCONUT OIL LIQUID SUSPENSIONS. F. H. Buckwalter (Bristol Labs. Inc.). *U. S. 2,916,416*. A highly palatable, stable liquid suspension for oral therapeutic use consists of aspirin in coconut oil whose settling point has been reduced below 60°F. by interesterification, ester interchange, and/or acidolysis.

METHODS FOR ENRICHMENT OF ALKOXYGLYCEROLESTERS FROM LIPID MIXTURES. J. K. O. H. Holmberg and Clara A. G. Sellman (A/B Kabi, Stockholm). *U. S. 2,916,419*. Alkoxyglycerolesters are isolated from natural source lipid-containing starter materials and from triglycerides by subjecting the starting material to the hydrolytic triglyceride-splitting action of a lipolytic enzyme inert to alkoxyglycerolesters (*Ricinus lipase*) for a sufficient time to hydrolyze the glycerides to the corresponding fatty acids and glycerol. The fatty acids and glycerol can then be removed from the ester.

SEPARATION OF MONOCARBOXYLIC AND DICARBOXYLIC ACIDS. R. R. Allen and A. A. Kiess (Armour & Co.). *U. S. 2,916,502*. A mixture containing a monocarboxylic acid having greater than four carbon atoms and a dicarboxylic acid having 4 to 22 carbon atoms is introduced into an aqueous aliphatic polyalcohol or monoalkyl ether (glycerol, ethylene glycol, glycol monomethyl ether) and is extracted with a petroleum hydrocarbon solvent having a boiling point in the range of 30 to 100°. The monocarboxylic acids are found in the hydrocarbon phase, and the dicarboxylic acids in substantially pure form are found in the aqueous phase.

WAX TREATMENT OF COFFEE BEANS. M. Specht and Verena C. Specht (Transoceanic). *U. S. 2,917,387*. In the treatment of green coffee beans preparatory to roasting them, it is recommended that the beans be coated with a solution of coffee bean wax so that the wax penetrates the beans and inhibits perspiration of the beans during roasting. The wax is prepared by extracting caffeine, wax, and oil from the beans and then separating the wax from the oil and caffeine.

PROCESS FOR REFINING GLYCERIDE OILS. B. H. Thurman (Refining Unincorporated). *U. S. 2,917,525*. The glyceride oil is mixed with soda ash under conditions which produce an oil-soapstock mixture containing carbon dioxide and water. The mixture is held under vacuum and the carbon dioxide is removed without substantially dehydrating the mixture. The soapstock is then separated from the oil. The detailed process with diagrams of the equipment is given.

PROTEIN FOOD PRODUCTS AND THEIR PREPARATION. A. Hirsch, B. M. Gibbs, and B. D. Hemmings (Lever Bros. Co.). *U. S. 2,919,192*. A cheese-like product is prepared by incorporating vegetable fat with an aqueous suspension of oil-free peanut extract containing sucrose. The resulting suspension is homogenized at 75 to 100°, cooled to a temperature not above 35°, inoculated with a sucrose-fermenting strain of *lactic streptococci*, and batched until a curd has formed and the pH has fallen to within the range 5.8 to 6.3. The curd is cut while the pH remains in this range, and the resulting product is drained, pressed, and ripened.

PROCESS FOR THE CONVERSION OF NORMALLY WATER-INSOLUBLE ORGANIC SUBSTANCES INTO WATER-SOLUBLE FORM AND SUBSTANCES PRODUCED BY SAID PROCESS. E. Schauenstein (Nitritfabrik Aktiengesellschaft). *U. S. 2,919,287*. Water-insoluble organic compounds having at least two double bonds in their molecules (higher fatty acids, their esters, aldehydes, and ketones of ethereal oils) are agitated in their liquid state with an excess of water nearly free of free oxygen in the absence of catalysts, until part of the organic compound is dissolved

in the water. The undissolved compound is then separated from the aqueous solution.

SYNTHETIC FATTY ACIDS BY PARAFFIN OXIDATION. P. Zschimmer. *Ger. 1,002,749*. Air is blown through paraffins at 65–120° in the presence of metal carbonyls to give fatty acids. The carbonyls of iron, manganese, cobalt, nickel, chromium, molybdenum, and tungsten are soluble in paraffin (slack wax), and the carbonyls of platinum, silver, osmium, iridium, and ruthenium are soluble in fatty acids; both groups can be used. Air (15–20 cu. m./hour) is blown at 65–115° through a mixture of 100 kg. crude paraffin (slack wax), 200–300 g. cobalt carbonyl (or 5 kg. platinum carbonyl), and 100–500 g. triethanolamine. The temperature should not exceed 120°. After 6–8 hours the oxidation is stopped. Light-colored products are obtained which contain approximately 50% nonsaponifiable matter. The nonoxidized paraffin is used for the next oxidation. (*C. A. 53*, 21668)

• Fatty Acid Derivatives

CONFIGURATION AND PROPERTIES ON UNSATURATED ACIDS AND THEIR DERIVATIVES. X. THIOCYANATION OF OLEIC AND ELAIDIC ACIDS AND THEIR ESTERS. A. K. Plisov and L. A. Zhila (Inst. Food and Refrigeration Ind., Odessa). *Zhur. Obshchei Khim* 29, 323–8 (1959). Oleic acid and its esters were thiocyanated more rapidly than the corresponding elaidic acid or its esters. (*C. A. 53*, 21633)

RELATIONSHIPS OF RATE PROCESS PARAMETERS FOR DIELECTRIC ABSORPTION IN CRYSTALLINE LONG-CHAIN COMPOUNDS. R. J. Meakins (Div. of Electrotechnology, C.S.I.R.O., Sydney, Australia). *Trans. Faraday Soc.* 55, 1694–1700 (1959). Measurements of the dielectric absorption due to molecular rotation in β - and α -phase long chain esters and ethers are described (e.g. *n*-decyl laurate, ethyl stearate, ethyl behenate). The energy barriers ΔE , frequency factors *A*, entropies of activation ΔS , and free energies of activation ΔF at 20° are tabulated. Similar measurements with dilute solid solutions of ketones and ethers in hydrocarbons are also described. The dependence of the rate process parameters on molecular chain length are discussed.

THE MAGNITUDE OF THE DIELECTRIC ABSORPTION IN SOLID ALIPHATIC LONG-CHAIN COMPOUNDS. *Ibid.*, 1701–1704. The magnitude of the dielectric absorption is investigated for a number of dilute solutions of long-chain ketones and ethers in hydrocarbons (di-*n*-decyl ketone, di-*n*-dodecyl ether, etc.). In each case the dielectric absorption increases with decreasing temperature, and the results indicate that the equilibrium positions of the molecules in the crystal lattice are nearly equal in energy. The results, considered in relation to structure, suggest that the energy differences are related chiefly to the end-to-end interaction between molecules in adjacent layers.

POLYVINYL CHLORIDE PLASTICIZED WITH ADDUCTS OF LONG CHAIN OLEFINIC ACID AMIDES AND FUMARIC ACID ESTERS. J. Dazzi (Monsanto Chemical Co.). *U. S. 2,913,431*. Amides formed by the condensation of tall oil or tallow fatty acids with dimethylamine are reacted with *n*-butyl fumarate in the presence of di-*tert*-butylcatechol. The adducts are stable, high-boiling materials suitable for use as plasticizers for polyvinyl chloride, moisture-proofing agents, and lubricant adjuvants. The amides may be prepared from any nonconjugated, nonhydroxylated olefinic acid having 10 to 24 carbon atoms.

REDUCTION OF FATTY ACID ESTERS TO PRODUCE ALCOHOLS. V. L. Hansley and S. Schott (National Distillers & Chemical Corp.). *U. S. 2,915,564*. Fatty alcohols having 12 to 22 carbon atoms are produced by treating the corresponding fatty acid esters of a reducing alcohol having at least 4 carbon atoms (e.g. methyl isobutyl carbinol ester of tallow fatty acids) with an alkali metal and a reducing alcohol in stoichiometric amounts (4 moles alkali metal and 2 moles reducing alcohol per mole of ester) at a temperature of at least 130°. The resulting mixture is hydrolyzed and the fatty alcohols are isolated.

PROCESS OF EPOXIDATION. F. P. Greenspan and R. J. Gall (Food Machinery & Chemical Corp.). *U. S. 2,919,283*. An ester of an unsaturated higher fatty acid is mixed with acetic acid, aqueous hydrogen peroxide, and a sulfonic acid cation exchange resin. The mixture is heated to the range of 50 to 100° and maintained at this temperature during the epoxidation. Acetic acid is present in amounts of 0.25 mol. to 1.0 mol. per mol. of unsaturation to be reacted; hydrogen peroxide, 1 mol. per mol.

of unsaturation; and cation exchange resin, 5 to 25% by weight of the hydrogen peroxide and acetic acid.

• Biology and Nutrition

SERUM CHOLESTEROL LEVELS OF NORTH AMERICAN WOMEN LIVING IN GUATEMALA CITY. J. Méndez, N. S. Scrimshaw, and Marina Flores (Inst. Nutrition Central America and Panama, Guatemala City, Guatemala). *Am. J. Clin. Nutrition* 7, 590–4 (1959). Serum cholesterol levels of 42 nonpregnant North American women who had lived in Guatemala City at least 2 years were slightly lower than the United States standards for women under 40 years of age, and were similar to those of older groups. (*C. A. 53*, 22323)

ORIGIN OF FATTY ACIDS IN REGENERATING RAT LIVER. C. Janion and A. Szenberg (Polska Akad. Nauk, Warsaw). *Bull. acad. polon. sci., Sér. sci., biol.* 6, 63 (1958). Erucic acid was found by paper chromatography in the fatty acid fraction isolated according to Masoro, *et al.*, (*C. A. 44*, 10833*h*) from fat depot and regenerating rat liver. Erucic acid was not observed in the liver before regeneration. (*C. A. 53*, 22332)

SERUM CHOLESTEROL IN A POPULATION SAMPLE OF MALES AGED 65–85 YEARS. R. M. Acheson, W. F. Hemmens, and W. J. E. Jessop (Trinity Coll., Dublin, Ire.). *Gerontologia* 2(6), 357–71 (1958). Blood serum cholesterol determinations were carried out on samples from 217 randomly selected male pensioners of a brewery. Alcohol consumption, diet, body fat, and height and weight were also studied in these men. Satisfactory blood serum cholesterol determinations were obtained on 209 samples and of these, 5 blood serum cholesterol values were over 300 mg. %. These data were subjected to statistical treatment and omission of the 5 high values gave the following blood serum cholesterol values in mg. % at the stated ages: 65, 216; 70, 200; 80, 192; 85, 185. This drop in blood serum cholesterol level with increasing age was the most significant correlation found. (*C. A. 53*, 22334)

THE FATTY-ACID PATTERNS OF PLASMA LIPIDES DURING ALIMENTARY LIPEMIA. V. P. Dole, A. T. James, J. Webb, M. A. Rizak, and M. F. Sturman (Rockefeller Inst., New York, N. Y.). *J. Clin. Invest.* 38, 1544–54 (1959). Plasma lipides were fractionated into chylomicra, nonesterified fatty acids, triglycerides + cholesterol esters, and phospholipides. The fatty acid composition of these fractions was determined by analysis with gas-liquid chromatography. The data showed a fairly consistent pattern for each fraction in a group of normal fasting subjects. A few analyses of animal plasma yielded essentially the same patterns. Plasmas taken during alimentary lipemia were analyzed similarly. Neither the chylomicra, nor any other fraction, acquired the pattern of dietary fat during the period of lipemia. This suggests that the fatty acid pattern of chylomicra in plasma is stabilized by equilibration with a larger pool of tissue lipides. (*C. A. 53*, 22368)

THE DEGRADATION OF LABELED β -CAROTENE. F. J. Lotspeich, R. F. Krause, V. G. Lilly, and H. L. Barnett (Dept. of Biochem., West Virginia Univ. Med. Center and the Dept. of Plant Pathology, West Virginia Univ., Morgantown, W. Va.). *J. Biol. Chem.* 234, 3109–10 (1959). The β -carotene produced by *Phycomyces blakesleeanus* grown on a medium containing labeled acetate has been partially degraded. Carbon 5, 5', 9, 9', 13 and 13' are labeled when $\text{C}^{14}\text{H}_3\text{CO}_2\text{H}$ is used, whereas these carbons and the attached methyl groups are labeled when $\text{C}^{14}\text{H}_5\text{CO}_2\text{H}$ is used in the medium. The activity of the ring carbons has been determined indirectly and appears to be greater than the activity of the carbons of the side chain.

MILK, CHOLESTEROL, AND ARTERIOSCLEROSIS. W. Halden (Univ. Graz, Austria). *Intern. Dairy Congr., Proc. 15th Congr., London* 1, 27–33 (1959). Cholesterol is essential for all the tissues of the human and animal body. The average concentration of cholesterol in the blood varies from 120 mg. % in infants to 240 mg. % for older people. Milk contains only 12 mg. % of cholesterol, the lowest value of all foodstuffs of animal origin. The quantity of cholesterol synthesized within the organism is 10–20 times higher than the normal intake of cholesterol from a mixed diet. Lecithin and vitamin A inhibit, to some extent, the deposition of cholesterol in arterial walls. The lecithin content of milk is about 20 times higher than its cholesterol concentration. Moreover, the essential amino acids and some vitamins of milk contribute to the resistance of the arterial wall against degenerative diseases. New experiments with a biologically well-balanced diet, containing about 50 g. milk fat

led to significant decreases of cholesterol in the blood of human volunteers. The metabolism of cholesterol is stabilized by equilibria of saturated and certain unsaturated fatty acids, in the presence of sufficient amounts of lecithin. (*C. A.* 53, 22311)

THE EFFECTS OF DIFFERENT VARIETIES OF RAPESEED OIL ON WEIGHT GAIN, AND OF GOLDEN RAPESEED OIL ON REPRODUCTION OF THE RAT. Joyce L. Beare, E. R. W. Gregory, and J. A. Campbell (Food and Drug Labs., Ottawa). *Can. J. Biochem. and Physiol.* 37, 1191-5 (1959). Rapeseed oil of the Polish, Golden, or Swedish variety, corn oil, or mixtures of corn oil, and ethyl erucate were fed to weaning rats of the Wistar strain for 9 weeks. Weight gains were inversely related to the content of erucic acid in the diet, confirming previous indications that the growth-retarding effect of rapeseed oil is due to its erucic acid. In general, the differences in weight gains could be explained by the effect of rapeseed oil on food consumption. Golden rapeseed oil and corn oil were compared in a reproduction study involving three litters of one generation. Although the young rats fed rapeseed oil were of lesser weaning weight, there was no difference in the number of animals successfully weaned. (*C. A.* 53, 22320)

SOME TRANSITORY CHANGES IN CHOLESTEROL METABOLISM INDUCED BY DIETARY CHOLESTEROL. P. D. Klein and Rita A. Martin (Div. of Biol. and Med. Research, Argonne Natl. Lab., Lemont, Ill.). *J. Biol. Chem.* 234, 3129-32 (1959). Tritiated cholesterol was fed at hourly intervals to rats for periods of 0.5, 1.0, 3.0, or 7.0 days. Analysis of the content and specific activities of free and ester cholesterol in the liver revealed the presence of several unsuspected processes in cholesterol metabolism. At the end of the first 12 hours, the specific activity of liver free cholesterol is higher than that of the esters. At subsequent time periods, its activity appears to fluctuate above and below that of the esters. The increase in liver ester cholesterol at early time periods is composed to a large extent of endogenously synthesized cholesterol. The endogenous contribution to this increase reaches its maximum by the third day and thereafter declines. The individual ester pools display differing abilities to expand in response to the influx of cholesterol. The rate of incorporation of dietary cholesterol into these esters are heterogenous, although in a different fashion from those of endogenously synthesized cholesterol.

LIPIDE FACTORS IN THE PRODUCTION OF ENCEPHALOMALACIA IN THE CHICK. B. Century, M. K. Horwitt, and P. Bailey (Elgin State Hosp., Elgin, Ill.). *A.M.A. Arch. Gen. Psychiat.* 1, 420-4 (1959). Encephalomalacia was induced in tocopherol-deficient chicks on diets containing safflower, corn, soybean, and cottonseed oil or lard. The effects appeared to be related to amounts of linoleic acid in the fat used. Coconut oil and butter, which are low in linoleic acid, did not produce similar symptoms. Corn oil (4%) induced an incidence of encephalomalacia of over 80%, and the tocopherol intake needed to reduce or prevent the effect was decreased with correspondingly lower percentages of corn oil in the diets. Addition of coconut oil to diets containing minimum amounts of safflower or corn oil increased the incidence of encephalomalacia. (*C. A.* 53, 22318)

COMPARISON OF THE PROPERTIES OF TISSUE LIPOLYTIC ENZYMES AND THE CLEARING FACTOR BY INCUBATION WITH LIPEMIC SERUM. D. Grafnetter, and T. Zemplenyi (Inst. for Circulation Research, Prague). *Zeit. Physiol. Chem.* 316, 218-23 (1959). The lipolytic action of different rat tissues and of post heparin clearing factor on incubation with lipemic human serum or artificially prepared emulsions was investigated. Comparison of pH dependency, substrate specificity, and the action of various inhibitors give the same properties for both the lipolytic system of myocardium and clearing factor, whereas the enzymes of livers are different. Tween 60 was successful as a substrate for the investigation of post heparin clearing factor.

HIGH FAT DIET AND DEVELOPMENT OF OBESITY IN ALBINO RATS. J. Masek and P. Fabry (Inst. of Human Nutrition, Prague) *Experientia* 15, 444-5 (1959). Animals fed high fat or high carbohydrate diets did not differ significantly in weight or amount of body fat. A high ratio of dietary fat in the diet *per se* did not lead to obesity in young adult rats. This is in contradiction to the work of others who report that rats fed this type of diet for a prolonged time become obese.

THE SPECIFIC GRAVITY OF THE LIVER AND ITS RELATION TO FAT CONTENT FOLLOWING HIGH FAT DIETS AND CCl_4 POISONING. D. G. Harvey (Royal Vet. Coll., Camden Town, London). *Experientia* 15, 445-46 (1959). The author showed that a relationship exists between the above factors, which can be demonstrated when certain techniques are applied.

BIOLOGICAL ESTIMATION AND DETERMINATION OF THE CONJUGATED FATTY ACIDS IN SWEDISH CRISP BREAD. W. Halden, L. Prokop, E. Schauenstein, and H. Buchta (Vienna). *Fette Seifen Anstrichmittel* 61, 1065-68 (1959). It was found that the serum cholesterol value of persons fed lecithin enriched Swedish crisp bread shows downward trend, which was said to be due to the presence of several synergetic lipid factors. The explanation of the authors should be of interest to investigators in the field of arteriosclerosis.

INVESTIGATIONS ON THE FEEDING OF CALVES WITH BEEF TALLOW. M. Witt and F. W. Huth (Max Plank Inst. for Animal Nutrition, Trenthorst). *Fette Seifen Anstrichmittel* 61, 1087-94 (1959). The author has found that the use of beef tallow for supplementing a combined full milk and skimmed milk food or the replacement of full milk by beef tallow in the feeding of calves does not lead to satisfactory results. Homogenized tallow, various tallow emulsions, and coconut oil-tallow emulsions are not assimilated by calves sufficiently.

PROPERTIES OF BETAINE ESTERS OF SOME STEROLS AND PENTACYCLIC TRITERPENES. C. H. Brieskorn and H. Herrig (Pharmaceutical Chemistry Inst., Univ. Tübingen). *Fette Seifen Anstrichmittel* 61, 1077-79 (1959). The authors describe syntheses of betaine ester chlorides of cholesterol, β -sitosterol, ursolic acid, oleanolic acid, α -amyirin, and betulin.

THE BIOLOGICAL SIGNIFICANCE OF POLYUNSATURATED FATTY ACIDS AND THEIR ESTERS IN WATER. E. Schauenstein and G. Schatz (Inst. Physical Chem., Univ. Graz). *Fette Seifen Anstrichmittel* 61, 1068-76 (1959). Investigations show that the higher fatty acids and their esters as well as vitamins A and D give rise to the formation of water soluble products on being dispersed in water. This is attributed partially to the formation of hydroxy compounds and partly due to the isomerism of the original products. The biological effect of the described water reaction of higher unsaturated fatty acids has been investigated in the present study. In order to identify the reactive components of the water soluble reaction products, the authors have studied the action of various fractions on the same biological system and that of the same fraction on different biological systems.

DEGREE OF OBESITY AND SERUM CHOLESTEROL LEVEL. Caroline B. Thomas and S. M. Garn (Department of Medicine, Johns Hopkins University School of Medicine, Baltimore, Maryland). *Science* 131, 42 (1960). No significant correlation was found between the serum cholesterol level and weight, weight corrected for frame size, or thickness of the fat shadow in medical students (mean age, 22 years).

EFFECT OF DIETARY FATS AND CARBOHYDRATES ON DIGESTIBILITY OF NITROGEN AND ENERGY SUPPLY, AND ON GROWTH, BODY COMPOSITION AND SERUM CHOLESTEROL OF RATS. Mary Marshall, Hazel Hildebrand, Jacqueline DuPont and Madelyn Womack (Human Nutrition Research Div., U. S. Dept. of Agriculture, Washington, D. C.). *J. Nutrition* 69, 371-382 (1959). Groups of male and female rats were fed stock or purified low-fat diets and similar diets with corn oil, hydrogenated vegetable oil, or lard added. Records of weight gains and food intakes were kept until the animals were killed when either 200 or 400 days old. The addition of any of the fats improved digestibility of the energy supply of the stock diet but had no consistent effect on the purified diets. Of the male animals 400 days old, those which received 15% corn oil and sucrose had the highest body fat, and had the highest level of serum cholesterol, but there was no correlation ($r = -0.27$) between per cent body fat and serum cholesterol for animals of this group.

EFFECTS OF ESSENTIAL FATTY ACIDS, INOSITOL, VITAMIN B_{12} AND HYDROLYZED GLUCOSE-CYCLOACETATE ON BLOOD COAGULATION FACTORS IN RABBITS EXHIBITING HYPERLIPEMIA INDUCED BY FEEDING SATURATED FAT. M. C. Nath and A. Saikia (Univ. Dept. of Biochemistry, Nagpur 1, India). *J. Nutrition* 69, 403-411 (1959). Prolonged feeding of a diet containing 20% of highly saturated fat to rabbits and which leads to experimental atherosclerosis has been found to shorten the coagulation factors (bleeding time, coagulation time and prothrombin time), as well as to increase the liver fat and number of blood platelets, and to increase ester cholesterol in blood and liver and heart tissues.

ESTROGENIC ACTIVITY IN MILK OF COWS AND THE BILE OF CALVES FED LOW LEVELS OF DIETHYLSTILBESTROL. E. H. Herrick, C. Paulson, R. Baron, and C. B. Browning. (Department of Zoology and Department of Dairy Husbandry, Kansas State University, Manhattan). *J. Dairy Sci.*, 42, 1966-9 (1959). Milk from cows fed diethylstilbestrol (DES), and bile from calves

fed this substance, were extracted and tested in castrate mice, using uterine weight as the criterion for measuring estrogenic activity. Extracts of milk from untreated cows, in different phases of sexual cycles, gave no estrogenic response. Extracts of milk from cows fed 10 mg. diethylstilbestrol (DES) per 1,000 lb. body weight per day caused no measurable estrogenic response. Test mice consistently responded to known amounts of 0.048 mg. DES each. Known amounts of DES were placed in milk, then extracted. These extracts caused consistent responses for estrogenic substance in test mice.

MODIFICATIONS OF DIETS RESPONSIBLE FOR INDUCTION OF CORONARY THROMBOSES AND MYOCARDIAL INFARCTS IN RATS. W. A. Thomas, W. S. Hartroft, and R. M. O'Neal (Dept. of Pathology, Washington Univ. School of Medicine, St. Louis, Mo.). *J. Nutrition* 69, 325-337 (1959). The dietary production of experimental arterial thrombosis, with resultant myocardial and renal infarction, has been accomplished in 6 separate experiments. Of the many dietary constituents omitted, none was found to be absolutely essential to the development of infarcts, but omission of any of the important ingredients (propylthiouracil, sodium cholate, cholesterol and fat) lowered the incidence of infarcts. The areas of infarction in these rats are grossly visible, well circumscribed, almost always single, and often associated with thrombi in the supplying artery. These infarcts are to be distinguished from "metabolic" areas of necrosis or "infarctoid" lesions obtained in other experimental models of myocardial disease.

RELATION OF DIETARY FAT AND SUPPLEMENTARY RIBOFLAVIN TO TISSUE LEVELS OF CHOLESTEROL, RIBOFLAVIN AND TOTAL LIPIDS IN THE RAT. Inez Harrill, Anne Kylene, Adelia Weis and Elizabeth Dyar (Home Economics Section, Agricultural Experiment Station, Colorado State Univ., Fort Collins). *J. Nutrition* 69, 356-364 (1959). Rats fed a ration containing 20% of fat and varying levels of riboflavin had a higher concentration of cholesterol in liver than did corresponding animals fed a ration containing 5% of fat. An increase of supplementary riboflavin from 10 to 30 μ g. or 30 to 100 μ g. per day decreased the deposition of cholesterol in liver for rats on 20% of fat. The level of dietary fat had no effect on serum cholesterol which increased with increased riboflavin intake at both fat levels.

STUDIES ON THE RELATIONSHIPS BETWEEN RUMEN ACIDS AND FAT METABOLISM OF RUMINANTS FED ON RESTRICTED ROUGHAGE DIETS. P. J. Van Soest and N. N. Allen (Dept. of Dairy Husbandry, Univ. of Wisconsin, Madison). *J. Dairy Sci.* 42, 1977-85 (1959). The feeding of restricted roughage with high levels of concentrates produced significant declines in milk fat in lactating cows and goats. Associated with the decline in milk fat were a significant increase in the concentration of rumen propionic acid and a decrease in blood ketone bodies. There was a decrease in arterial-blood acetic acid and in the arterial-mammary differences under conditions of ground and restricted-roughage feeding. The feeding of sodium acetate tended to increase low milk fat, and the feeding of sodium propionate tended to lower it further.

THE ABSORBABILITY OF STEARIC ACID WHEN FED AS A SIMPLE OR MIXED TRIGLYCERIDE. F. H. Mattson (The Procter & Gamble Co., Miami Valley Lab., Cincinnati, Ohio). *J. Nutrition* 69, 338-342 (1959). Rats were fed a series of fats in which the level of stearic acid and the distribution of the stearic acid among simple and mixed triglycerides were varied. The coefficients of absorbability of these fats were determined. From the results obtained it is shown that the stearic acid of tristearin is not absorbed. On the other hand, the stearic acid of distearin-monounsaturated or monostearin-diunsaturated triglycerides is almost completely absorbed. It is concluded that the coefficient of absorbability of a fat is inversely proportional to its content of simple triglycerides made up of saturated fatty acids having a chain length of 18 carbon atoms or greater and is influenced by the level of such saturated fatty acids only insofar as they are present as saturated triglycerides.

TOTAL MONOGLYCERIDE CONTENT OF SOME DAIRY PRODUCTS. R. G. Jensen, G. W. Gander, and A. H. Duthie (Department of Animal Industries, Storrs Agricultural Experiment Station, Storrs, Connecticut). *J. Dairy Sci.* 42, 1913-16 (1959). The average total monoglyceride contents of several dairy products reported as mM/100 g. of fat were: fresh, raw milk, 0.077; pasteurized whole milk, 0.145; homogenized milk, 0.206; 40% cream, 0.119; butter, 0.189; and Blue cheese, 0.354. Some of the implications of the monoglyceride content of dairy products are discussed.

INFLUENCE OF NICOTINIC ACID ON HEPATIC CHOLESTEROL SYNTHESIS IN RABBITS. H. Schade and P. Saltman (Dept. of Biochem. and Nutrition, School of Medicine, Univ. of S. California, Los Angeles). *Proc. Soc. Exptl. Biol. Med.* 102, 265-267 (1959). The rate of cholesterol synthesis in rabbit liver slices from animals on control or cholesterol supplemented diets, with or without nicotinic acid, has been determined by measurement of total liver cholesterol as well as rate of incorporation of acetate-1-C¹⁴ into the cholesterol. There is a marked inhibition of the rate of cholesterol synthesis by animals fed nicotinic acid on both control and supplemented diets. Since the principal detoxication product of large doses of nicotinic acid is nicotinuric acid, the authors suggest that this inhibition of cholesterol synthesis occurs as a direct result of competition of lipid synthesizing and detoxication systems for a limited amount of Coenzyme A in the liver cell.

INFLUENCE OF VITAMIN A ON CHOLESTEROL BLOOD LEVELS. Lois J. Kinley and R. F. Krause (Dept. of Biochem., West Virginia Univ. Med. Center, Morgantown). *Proc. Soc. Exptl. Biol. Med.* 102, 353-355 (1959). Dairy oral administration of 100,000 I.U. of vitamin A acetate for 4 to 6 months significantly reduced the elevated serum cholesterol levels in atherosclerotic patients but had no effect on individuals with normal cholesterol levels.

EFFECT OF VITAMIN E DEFICIENCY ON PROTEIN COMPOSITION OF GUINEA PIG SKELETAL MUSCLE. A. D. Bender, D. D. Schottelius, and B. A. Schottelius (Dept. of Physiology, Col. of Medicine, State Univ. of Iowa, Iowa City). *Proc. Soc. Exptl. Biol. Med.*, 102, 362-364 (1959). The gastrocnemius muscles of guinea pigs subjected to a vitamin E deficient diet for 21 or 30 days underwent a statistically significant increase in collagen nitrogen and decrease in contractile protein nitrogen. Masseter muscles were more resistant to the effects of vitamin E lack on the protein components. Sarcoplasmic nitrogen was not altered by 21- or 30-day dietary deficiency regimens.

SHORT-TERM STUDIES OF EFFECT OF HEPARIN UPON CHOLESTEROL EXCRETION IN MAN. II. Engelbert (Cedars of Lebanon Hospital, Los Angeles, Calif.). *Proc. Soc. Exptl. Biol. Med.* 102, 365-367 (1959). Serum triglycerides and cholesterol were decreased, and fecal bile acids and digitonin precipitable sterols were increased after injection of heparin into four human subjects. Evidence is discussed which indicates that this effect of heparin upon cholesterol metabolism is a secondary phenomenon resulting from maintained reduction of circulating triglycerides.

EFFECT OF FATTY ACIDS ON CHICK ENCEPHALOMALACIA. B. Century and M. K. Horwitt (Biochem. Res. Lab., Elgin State Hospital, Elgin, Ill., and Dept. of Biological Chem., Univ. of Illinois Col. of Medicine, Chicago). *Proc. Soc. Exptl. Biol. Med.* 102, 375-377 (1959). Corn, soybean, cottonseed, safflower oils, and lard from which tocopherol had been removed promoted chick encephalomalacia, whereas coconut oil, butter, linseed oil, and cod liver oil did not produce symptoms. Olive oil had a questionable effect. Dietary combinations of 2% tocopherol-free corn oil with either 8% coconut oil, lauric acid, myristic acid, or a mixture of saturated fatty acids like coconut oil significantly increased the incidence of encephalomalacia over the tocopherol-free corn oil alone, while 6% linseed oil, cod liver oil, or oleic acid inhibited the effect of 4% corn oil. Olive oil, butter, and fatty acids like palmitic and stearic had no net effects upon the incidence of encephalomalacia induced by tocopherol-free corn oil. The intake of linoleic acid appears to be a primary factor in the etiology of encephalomalacia, but some of the other fatty acids may secondarily increase or decrease this effect.

FORMATION OF MIXED CRYSTALS OF CHOLESTEROL AND SITOSTEROL IN VITRO AND IN RABBIT INTESTINE. J. L. Hudson, E. R. Diller, R. R. Pfeiffer, and W. W. Davis (Lilly Research Labs., Indianapolis, Ind.). *Proc. Soc. Exptl. Biol. Med.* 102, 461-463 (1959). The experiments demonstrated that in a model colloidal aqueous system and in intestines of rabbits, mixtures of sitosterol and cholesterol are converted to a 1:1 mixed crystal which exhibits reduced solubilization in aqueous sodium oleate or sodium desoxycholate systems. Sitosterol thus physically removes cholesterol from the dispersed state necessary for absorption. It is suggested that the formation of a mixed crystal may be a mode of action responsible for the hypocholesteremic effect in ingested plant sterols.

PLASMALOGEN IN THE DEVELOPING BRAIN. N. E. Erickson and W. E. M. Lands (Dept. of Biol. Chem., Univ. of Michigan, Ann Arbor). *Proc. Soc. Exptl. Biol. Med.* 102, 512-514 (1959). Plasmalogen content in brains of newborn rats is about 2

μ moles/g. of wet tissue and represents about 10% of total phospholipid. During growth, and after major increase in brain weight, phospholipid composition shifts to one containing about 20 to 25% plasmalogen (12 μ moles/g.). Maximal rate of accumulation of plasmalogen in brain occurs in 20- to 24-day-old rats. This shift in phospholipid composition does not occur in developing adipose tissue or liver.

VITAMIN A DEFICIENCY AND THE UBIQUINONE AND SUBSTANCE SC CONTENTS OF RAT LIVER: THE TIME FACTOR. R. A. Morton and W. E. J. Phillips (Biochem. Dept., The University of Liverpool). *Biochem. J.* **73**, 416-420 (1959). Weanling rats on a vitamin A deficient diet reached a weight plateau after variable periods of time (21 to 37 days). Food consumption began to fall from 14 to 4 days before growth ceased. Deprived animals were killed at intervals, and the liver unsaponifiables were analyzed chromatographically. Sterol content increased at or beyond the weight plateau; a rise in substance SC became marked when growth had slackened or ceased. The concentration of ubiquinone rose progressively as vitamin deficiency progressed, and the amount of a hydrocarbon fraction showing selective absorption at 260 μ also increased steadily with the rising ubiquinone concentration.

UNSAAPONIFIABLE CONSTITUENTS OF RAT TISSUES IN RELATION TO VITAMIN K STATUS. R. A. Morton and W. E. J. Phillips (Biochem. Dept., Univ. of Liverpool). *Biochem. J.* **73**, 421-427 (1959). Vitamin K status was found to have remarkably little effect on constituents of the unsaponifiable matter from rat tissues.

UNSAAPONIFIABLE CONSTITUENTS OF LIVER, KIDNEY AND HEART TISSUES FROM VITAMIN E DEFICIENT RATS COMPARED WITH α -TOCOPHEROL SUPPLEMENTED RATS. R. A. Morton and W. E. J. Phillips (Biochem. Dept., University of Liverpool). *Biochem. J.* **73**, 427-430 (1959). Two groups (male and female) of weanling rats were given a vitamin E free basal diet for 127 days with a tocopherol supplement. Two similar groups were given the unsupplemented diet and when killed were vitamin E deficient. The unsaponifiable fractions from liver, heart, and kidney were chromatographed on alumina. Ubiquinone contents of approximately 120, 110, 230, and 25 μ g./g. were found for liver, kidney, heart, and testes. The vitamin E status had no striking influence on the amounts of hydrocarbon, sterol, or ubiquinone obtained from the different tissues.

EFFECTS OF VITAMIN A DEFICIENCY AND ADRENALECTOMY ON UBIQUINONE AND SUBSTANCE SC IN RAT LIVER. W. E. J. Phillips and R. A. Morton (Biochem. Dept., Univ. of Liverpool). *Biochem. J.* **73**, 430-433 (1959). The increases in ubiquinone and substance SC concentration which occur in the livers of vitamin A deficient rats may be hastened if at an early age in the deficiency the rats are bilaterally adrenalectomized. If, however, the deficiency syndrome is already far advanced, adrenalectomy does not noticeably influence the concentrations of minor constituents of liver unsaponifiable matter. In rats on a stock diet, adrenalectomy brought about no striking changes in liver vitamin A, ubiquinone, or sterol content. Substance SC was not present in more than trace amounts.

THE BIOSYNTHESIS OF PHOSPHOLIPIDS BY HUMAN BLOOD CELLS. C. E. Rowe (National Institute for Medical Res., Mill Hill, London, N.W. 7). *Biochem. J.* **73**, 438-442 (1959). The simultaneous incorporation *in vitro* of P^{32} -orthophosphate and C^{14} -acetate into the phospholipids of human blood cells has been measured. The doubly labelled phospholipids obtained were fractionated by chromatography on silica gel into ethanolamine-containing cephalins, serine-containing cephalins, phosphatidylcholine, sphingomyelin, and other phospholipids. The fatty acids of the fractionated phosphatides were analyzed by vapor-phase chromatography and the distributions of fatty acids for each fraction were observed. An attempt was made to measure the metabolic activity of each class, both from the point of view of the fatty acid chains and the phosphate groups.

ROLE OF FATTY ACIDS IN THE GROWTH STIMULATION OF SARCIINA SPECIES BY VITAMIN-FREE CASEIN DIGESTS. A. L. Demain, D. Hendlin, and Jo Anne Newkirk (Merek Sharp & Dohme Res. Labs., Rahway, N. J.). *J. Bacteriol.* **78**, 839-843 (1959). The growth stimulation activity of a commercial vitamin-free casein hydrolyzate was found to be due to fatty acids, not peptides. This appears to be the first report of fatty acid stimulation in *sarcina*. The most potent compounds were long chain (C_{18} and C_{20}) unsaturated fatty acids. Of many saturated acids studied, only lactobacillic acid was active. Other inactive compounds related to lipids included Tweens 20 and 40, cholesterol, squalene, mevalonic acid, *o*-phosphorylethanolamine, and vita-

mins D_2 , D_3 , E, K, and K₁. The data indicate that the use of vitamin-free casein digests as sources of amino acids would be unwise in studying fatty acid requirements of microorganisms.

OBSERVATIONS ON THE EFFECT OF CHOLESTEROL AND FAT SUPPLEMENTATION ON THE COMPOSITION OF RABBIT LIVER AND PLASMA LIPIDES. J. D. Evans and Nadia Oleksyshyn (Temple Univ. School of Medicine, Philadelphia, Pa.) and F. E. Luddy, R. A. Barford, and R. W. Riemenschneider. *Arch. Biochem. Biophys.* **85**, 317-322 (1959). A study was made of liver and plasma lipides from rabbits fed commercial chow, chow supplemented with beef tallow and cholesterol, and chow plus corn oil and cholesterol. Animals fed the supplemented diets showed substantial increases in liver and plasma total lipides, particularly in cholesteryl esters; those receiving tallow and cholesterol showed the greatest increases. Monoenoic acid was the principal fatty acid of the liver and plasma cholesteryl esters. The fatty acid composition of the liver phospholipides was relatively uniform, whereas that of the plasma showed large increases in each fatty acid in the supplemented groups. The amounts of dienoic and tetraenoic acids were greatest in the plasma phospholipides of the tallow-cholesterol supplemented animals.

KINETICS OF THE DEPLETION OF LINOLEIC ACID IN MICE. S. B. Tove and F. H. Smith (Nutrition Section, Dept. of Animal Industry, North Carolina State Col., Raleigh). *Arch. Biochem. Biophys.* **85**, 352-365 (1959). Two rates of disappearance of linoleate from the depot fat were observed. The more rapid rate is observed only when the depot fat level of linoleate is more than 12%. First-order rate constants for the slower rate are higher for females and immature males than for mature males. This suggests that the sex hormones (possibly androgens) play a role in the control of linoleic acid metabolism.

COENZYME Q. IX. COENZYME Q_{10} AND Q_{15} CONTENT OF DIETARY COMPONENTS. A. C. Page, Jr., P. H. Gale, F. Koniuszy, and K. Folkers (Merek Sharp & Dohme Res. Labs., Rahway, N. J.). *Arch. Biochem. Biophys.* **85**, 474-477 (1959). The results of coenzyme Q analyses of some common dietary ingredients are reported. Corn oil and wheat germ oil contain considerable quantities of coenzyme Q_{10} . Smaller amounts of Q_{10} were found in butter, crude soybeans, soybean oil, and isolated soybean protein product. Other materials tested did not contain measurable amounts of coenzyme Q_{10} .

SUBSTRATE COMPETITION IN GLUCOSE AND PALMITATE OXIDATION IN THE INTACT RAT. Katherine F. Lewis, A. Allen, and Sidney Weinhouse (Dept. of Chem., Temple Univ., Philadelphia, Pa.). *Arch. Biochem. Biophys.* **85**, 499-511 (1959). Using C^{14} -labeling, the interdependence of glucose and fatty acid oxidation was studied in the normal, fasted rat. When fed separately, glucose and palmitate were oxidized at approximately equal rates. When fed together, glucose was oxidized preferentially, inhibiting palmitate oxidation. Glucose also inhibited the oxidation of endogenous palmitate, as determined by depression of $C^{14}O_2$ excretion when the labeled fatty acid was fed 24 or 48 hours previously. The suppression of fatty acid oxidation was only temporary, covering the period of maximum glucose absorption.

ROLE OF CHOLESTEROL IN HOUSE FLY REPRODUCTION. R. E. Monroe (Entomology Res. Div., Agricultural Res. Service, U.S.D.A., Insect Physiology Lab., Beltsville, Md.). *Nature* **184**, 1513 (1959). Adult house flies were fed on a synthetic diet consisting of vitamin-free casein, sucrose, sodium oleate, Wesson's salts, zinc chloride, nucleic acids, and a mixture of B vitamins. Cholesterol, when present, was added to the diet at 0.1%. The cholesterol-deficient diet not only prevented egg hatch but also inhibited larval development in a medium containing sterols. However, the lack of a dietary sterol had no effect on total egg production.

BIOLOGICAL ORIGIN AND CONFIGURATION OF 10-HYDROXY- Δ^2 -DECENOIC ACID. S. A. Barker, A. B. Foster, D. C. Lamb (Chem. Dept., The University, Edgbaston, Birmingham, 15) and L. M. Jackman. *Nature* **184**, 634 (1959). The finding of 10-hydroxy- Δ^2 -decenoic acid, which constitutes about 15% of royal jelly, in the mandibular glands of foraging bees is reported. Methods for identification by filter paper chromatography and paper ionophoresis are described. The application of nuclear magnetic resonance spectroscopy established the *trans* configuration of the acid.

PREPARATION OF VITAMIN A ACETATE. D. R. Grassetti and H. C. Klein (Nopco Chemical Co.). *U. S. 2,913,487*. A solution of vitamin A aldehyde in ether is added to a suspension of lithium

aluminum hydride and the mixture held at room temperature for 10 minutes and then cooled in an ice bath. Acetic anhydride is added to the aldehyde-hydride complex and refluxed for the 25 minutes and the vitamin A acetate is isolated.

• Paints and Drying Oils

PREPARATION OF ESTERS OF PENTAERYTHRITOL ARSENITE AND OF OTHER PENTAERYTHRITOL ESTERS. T. E. Stevens (Rohm & Haas Company, Redstone Arsenal Research Division, Huntsville, Ala.). *J. Organic Chem.* **24**, 1715-7 (1959). Several esters of pentaerythritol arsenite have been prepared. The arsenite ester portion of these compounds was found to be selectively hydrolyzed, acetylated, or nitrated to produce the corresponding pentaerythritol monoester, the pentaerythritol ester triacetate, or the ester of pentaerythritol trinitrate.

VOLUMETRIC DETERMINATION OF ISOPHTHALIC AND OTHER DICARBOXYLIC ACIDS IN MODIFIED ALKYD RESINS. G. G. Esposito and M. H. Swann (Aberdeen Proving Ground, Aberdeen, Md.). *Anal. Chem.* **32**, 49-50 (1960). Nonaqueous titration in ethylene glycol-ethyl alcohol medium affords a rapid method for determining dicarboxylic acids in modified alkyl resins. The volumetric procedure eliminates the need for drying, weighing, and cooling filtration crucibles, and compares favorably with the ultraviolet method.

U.S.D.A. OIL FILMS ADHERE TO METAL. *Soybean Dig.* **20**(2), 21 (1959). Fatty alcohols commercially prepared by sodium reduction of soybean and linseed oils are reacted with "welding grade" acetylene to produce vinyl ethers. Polymerization of these ethers yields film-forming materials which adhere especially well to metals such as black iron or aluminum. The films are flexible, withstand heat, and resist abrasion and the action of alkalis, acids, and organic solvents.

TREATMENT OF HYDROCARBON LIQUIDS. W. M. Chamot and J. M. Ferrara (National Aluminate Corp.). *U. S.* **2,914,417**. The addition of small amounts of a fatty acid salt of a polyamine to a paint or varnish formulation greatly reduces the discoloration of the hydrocarbon solution caused by the heavy metal soap driers. A typical solvent contains turpentine, 0.001% to 0.1% of a cobalt soap, and 2 to 500 p.p.m. of the oleic acid salt of tetraethylene pentamine.

PAINT COMPOSITIONS. E. F. Schumacher and J. N. Moses (Devoc & Reynolds Co.). *U. S.* **2,915,411**. Paint formulations especially effective for poor paint-holding woods consist of a pigment-to-vehicle ratio of 60/40. The pigment composition consists of 10 to 30% of titanium dioxide and from 5 to 15% on total pigment of water-ground mica. The binder should contain 20 to 55% substantially completely esterified pentaerythritol esters of vegetable oil acids, the oils having a linolenic acid content below 7%. The combination of the pentaerythritol esters and the water-ground mica is extremely effective in both undercoat and finish coats.

WATER-DISPERSIBLE POLYESTER AMINOPLAST CONDENSATION RESINS AND METHODS FOR PRODUCING THEM. J. P. Shelley (Rohm & Haas Co.). *U. S.* **2,915,487**. Methods are described for the preparation of an alkyd-aminoplast condensation product which has excellent curing properties, produces films of good cohesion, flexibility and toughness, and is self-dispersible in aqueous systems. The resin is produced by the coreaction of the following three components: (1) an alkyd or an oil-modified alkyd of molecular weight 2,000 to 10,000 containing available hydroxyl groups; (2) an aminoplast soluble in such organic solvents as butanol; (3) a polyester having an average molecular weight of 800 to 1500 and having OH groups available for condensation with the aminoplast and free carboxyl groups available for neutralization by means of ammonia, an amine, or a quaternary ammonium compound.

BENZOIC ACID-MODIFIED ALKYD RESINS AND THEIR PRODUCTION. W. M. Kraft and H. M. Metz (Heyden Newport Chemical Corp.). *U. S.* **2,915,488**. The replacement of a portion (20 to 80%) of the fatty acids in an oil-modified alkyd resin formulation with benzoic acid produces resins with improved alkali resistance. They body more rapidly to higher viscosities and dry more rapidly to give harder films. A typical resin is prepared by heating soybean oil fatty acids (0.82 mole) and benzoic acid (0.82 mole) at 260-270° for 3 hours. Pentaerythritol and phthalic anhydride are then added and the reaction completed.

AIR DRYING FILMS FROM UNSATURATED FATTY ACID METAL SALTS. E. C. Chapin and Mary E. Murphy (Monsanto Chemical Co.). *U. S.* **2,916,392**. Hard, solvent resistant surface coating resins capable of air drying and possessing excellent adhesive qualities are prepared by the reaction of a metal Lewis base (1.0 to 1.5 eq.) with a mixture of an unsaturated fatty acid of 10 to 18 carbon atoms (0.6 to 0.9 eq.) and a mono- or polybasic hydroxy acid containing 2 to 18 carbon atoms (0.4 to 0.1 eq.). For example, aluminum tri-isopropoxide is dissolved in xylene, and to this solution is added a mixture of soya fatty acids and ricinoleic acid. Resinification takes place at room temperature although elevated temperatures may be employed.

AMINOPLAST-MODIFIED ALKYD RESIN COATING COMPOSITION. B. L. Williams, Jr. and H. M. Culbertson (Monsanto Chemical Co.). *U. S.* **2,916,467**. The desired coating is an organic solvent solution (20 to 80% total solids) of a mixture of (1) 50 to 90% by weight of an oil-modified alkyd resin (coconut, castor, soybean, linseed, tung, etc.) and (2) 50 to 10% of an etherified cyclohexylmelamine-aldehyde resin.

SYNTHETIC DRYING OILS. A. M. Partansky (Dow Chemical Co.). *U. S.* **2,918,440**. An improved synthetic drying oil consists of a phenol-formaldehyde novolak resin which has been etherified with styrene oxide and finally esterified with drying oil or semi-drying oil fatty acids.

FAST-CURING LINOLEUM COMPOSITION. G. E. Graham (Armstrong Cork Co.). *U. S.* **2,918,441**. A linoleum composition consists of filler and a linoleum cement containing 65 to 85% by weight of an oxidized siccativ fat oil and 35 to 15% by weight rosin, and 1 to 15% (on weight of cement) of a metal salt of a monomeric aliphatic hydrocarbon-substituted polyalkylol phenol such as the calcium salt of the dimethylol derivative of *p*-propyl phenol. Esters of crude tall oil and pentaerythritol may be used as a total or partial replacement for the normally used drying oils such as linseed oil.

STYRENATED OIL-MODIFIED ALKYD RESINS MODIFIED WITH DIVINYLBENZENE AND THE PROCESS OF PREPARING THE SAME. W. F. Hart (American Cyanamid Co.). *U. S.* **2,919,253**. A glyceride oil-modified alkyd resin in an inert organic solvent is reacted at the reflux temperature with a mixture of styrene or ring-substituted alkyl styrenes and divinyl benzene in the presence of a catalyst such as a tertiary alkyl-substituted diperoxide. The styrene compound and the divinyl benzene are present in minor amounts as compared with the amount of oil-modified alkyd resin solids.

• Detergents

STUDIES ON MICELLAR GROWTH IN SURFACTANT SOLUTIONS, WITH AND WITHOUT ADDITIVES. A. K. Biswas and B. K. Mukherji (Univ. of Calcutta, Calcutta, India). *J. Phys. Chem.* **64**, 1-4 (1960). A study has been made of micellar formation in ionic surfactant solutions in the presence of NaCl and a nonionic surfactant. Experiments on sodium monolaurin sulfate (SMLS), preparation and properties of which have not been so far reported, reveal that the electrolyte reduces the critical micellar concentration of the surfactant solution. The dye-titration method gives a value of c.m.c. lower than that found by the conductance method; with increased electrolyte concentration, the difference in the two values gradually decreases to a small order. Conductance-concentration curves of ionic detergents with and without nonionic additive suggest that on addition of nonionic additive, mixed micelles are formed, in which hydrogen bonds are the main binding factors. While conductance of anionic detergent solution increases, that of a cationic detergent solution decreases on minute addition of nonionic detergent; in both cases, the characteristic bend in the conductance-concentration curve tends to disappear gradually, for which plausible explanations are offered.

THE EFFECT OF pH SOLUBILIZATION OF WEAK ACIDS AND BASES. D. L. Dyer (Dow Chem. Co., Midland, Mich.). *J. Colloid Sci.* **14**, 640-5 (1959). Recent studies of the nature of surface-active agents in solution indicate that micelles formed in such solutions behave somewhat as a separate phase. Solubility measurements were made on *o*-phenylphenol, pentachlorophenol, and *p*-dimethylaminoazobenzene in solutions with and without surfactant over a wider pH range. The ratio of solubility in a surfactant solution to solubility in a similar solution without surfactant is defined as relative solubilization. This varies with solution pH and solute pK, being at a maximum for nonionized

solute and at half-maximum when pH is equal to pK. The variation of relative solubilization with pH is that which is predicted from treatment of micelles as a separate phase.

CONNECTION BETWEEN THE STRUCTURE OF SURFACE-ACTIVE SUBSTANCES AND THEIR ADSORPTION PROPERTIES. S. M. Levi and O. K. Smirnov (Sci. Research Motion Picture & Photography Inst., Moscow). *Kolloid Zhur.* 21, 315-21 (1959). Critical velocity (c.v.) of adsorption of wetting agents was measured by the controlled speed acceleration of the wetted surface above the wetting liquid contact with the surface. At the c.v. the wetting breaks off. The wetting agent concentration was $10^{-4}M$ in a 2-3% gelatin solution in water. Depression of the surface tension of the solution was determined by the capillary method on the emulsion foam. Maximum emulsifying and foam-forming activity in gelatin solutions was exhibited by derivatives of alkenylsuccinic acids with alkenyl chains C_{12-16} , in the presence of ionogenic groups, and polyglycerides of alkyl phosphinic acids with polyglyceride chains longer than C_{20} . Within the homologous series, the c.v. increases with the molecular weight of the surface-active agent to a certain maximum greatest for polyglycerides. The surface tension depression of aqueous and gelatin solutions of the active substances increases with the length of the alkyl chain. 19 references. (*C. A.* 54, 41)

THE EFFECT OF SOAP SOLUTIONS OF THE SWELLING AND SOFTENING OF HAIR. K. Habicht (Palmolive-Binder and Ketels Co., Hamburg). *Fette Seifen Anstrichmittel* 61, 985-89 (1959). The swelling of human and horsehair in water and soap solutions has been investigated. Observations show that the soap solutions swell the hair more than water alone. The stage of maximum swelling, which is reached after 2 to 5 minutes, is dependent on soap anions. The degree of swelling caused by anion-active colloidal electrolytes lies between those of water and soap solutions.

SYNTHESIS AND SURFACE ACTIVE PROPERTIES OF BRANCHED CHAIN FATTY ACIDS— C_{10} — C_{20} IN THE SERIES $C_nH_{2n-1}COOH$. A. Petrow, G. I. Nikischin, I. N. Ogibin, F. W. Newolin, and T. G. Tipisowa (Inst. of Organic Chemistry of the Academy of Science, Moscow). *Fette Seifen Anstrichmittel* 61, 940-46 (1959). Branched chain fatty acids with from 8 to 15 carbons in the chain and with 2 to 3 branched chains have been synthesized through the malonic ester synthesis with the aid of magnesium organic compounds. The foam formation characteristics and resistance to foam are less marked in the case of branched chain acids as compared to *n*-acids. The solution of *n*-acid sodium salts show comparatively greater surface activity than that shown by the sodium salt solutions of the equimolecular branched chain acids.

A NEW METHOD FOR THE QUANTITATIVE ANALYSIS OF NONIONIC SURFACE ACTIVE AGENTS. W. Kimura and T. Harada (Dept. of Applied Chemistry, Nagoya University, Nagoya, Japan). *Fette Seifen Anstrichmittel* 61, 930-34 (1959). The barium phosphotungstic acid complex method has been used for the quantitative determination of the nonionic capillary active polyalkyl compounds. The method gives exact results, although in some cases empirical factors are used. The authors have studied the influence of various factors of the results of the analysis and have determined the composition of the polyalkyl adduct complex gravimetrically.

ALIPHATIC SURFACE-ACTIVE AGENTS: DEVELOPMENT AND RAW MATERIALS. H. Machemer. *Melliand Textilber.* 40, 56-65, 174-9 (1959). An extensive review of the whole field from its earliest beginnings is given. A summary is followed by discussion of surface-active agents based on oils and fats, alkylnaphthalene-sulfonic acids, sulfonated fatty acid amides and alkyl esters, alkyl sulfates, Igepols, and Ultravons. Agents on a fat free basis are then considered, with reference to the Fischer-Tropsch process, sulfochlorination, paraffin oxidation, nonionics, the Oxo process, Teepol, alkyl aryl sulfonates, and cation-active agents. Details of product composition of many syntheses are provided. Numerous tables and graphs illustrate viscosities, surface tension, and wetting and foaming power. Literature and patent references.

THE EFFECT OF SOIL ON THE PHOTOCHEMICAL DEGRADATION OF COTTON. Mary Ann Morris and Barbara Wilsey (Univ. of California, Berkeley, Calif.). *Textile Research J.* 29, 971-4 (1959). The effect of three soiling agents on the photochemical

degradation of cotton was studied. Cotton yarns were impregnated with an air-borne soil, a ground soil, and a lignin derivative of the ground soil. After exposure to a carbon-arc light source, degradation was measured by fluidity and breaking-strength determinations. Fluidity measurements indicated that the air-borne soil accelerated photochemical degradation of the cotton. There was no indication that the ground soil and lignin derivative had a photosensitizing action. No differences in breaking strength values were found.

INDUSTRIAL DETERGENTS. D. Price. *Soap Chem. Specialties* 35 (12), 55-8, 135-9 (1959). Modern industrial cleaners consist of mixtures of various chemical ingredients: alkaline cleaners; solvent cleaners; emulsion cleaners, including di-phase cleaners; acid cleaners (liquid and solid); and chlorinated hydrocarbons (for vapor degreasing). The active ingredient common to all cleaning compositions is a surface-active agent. The different industrial applications of these various types are reviewed.

SYNTHETIC DETERGENTS. G. Renard. *Parfums, cosmét., savons* 2, 357-65 (1959). A review of anionic and nonionic detergents. (*C. A.* 53, 23008)

PROTEIN BASED DETERGENTS. H. L. Sanders (Stepan Chem. Co., Chicago, Ill.) and M. Nassau (Maywood Chem. Works, Maywood, N. J.). *Soap Chemical Specialties* 36(1), 57-9, 122 (1960). The Maypons, fatty amides of complex polypeptides derived from proteins are classified as surface active agents. The most commonly used source of the protein is scrap leather and the fatty acids are usually coconut or oleic. These protein condensates are used in laundry detergents, shampoos, rug shampoos, dishwashing compounds, alkaline cleaners, and textile auxiliaries.

BUILDING LIQUID DETERGENTS. J. R. Van Wazer and R. L. Liss (Monsanto Chem. Co., St. Louis, Mo.). *Soap Chemical Specialties* 35(12), 59-61, 144 (1959). Phosphate builders are well accepted in the formulation of detergents due to the synergistic action between synthetic actives and the phosphates. For a homogeneous liquid detergent, potassium polyphosphates are the most suitable because they are highly soluble. Largest selling builder for household and industrial laundry detergents is sodium tripolyphosphate. While all of the polyphosphates, from pyrophosphates through the extremely long-chain phosphates are good builders, wash tests show the most effective builders to be among the shorter chain compounds.

SKIN FAT IN TEXTILES AND ITS REMOVAL. E. Walter. *Melliand Textilber.* 40, 646-51 (1959). Chromatograms of fresh and stale skin fat demonstrate decrease in unsaturated fatty acid content, increase of unsaponifiable matter and resinification on aging. Calcium soaps adsorb skin fat and interfere with adsorption of fluorescent brightening agents. Synthetic detergents containing polymeric phosphates overcome this, and to some extent, iron contamination, and appeared more efficient than soap in removing skin fat. Iron enhances resinification, and causes yellowing above a threshold of 30 mg. per kg. skin fat containing textile. Iron free controls were not yellowed after extensive light exposure, unlike fabrics containing 44 mg. per kg. Fe after only 12 hours.

POLYFUNCTIONAL SURFACE-ACTIVE AGENTS. Sinnova. *Brit. 816,888*. Treating degraded protein with a halogenated acid chloride and then condensing with an amine yields surface-active agents which have effective wetting and detergent properties in hard or soft water and under both acid and alkaline conditions.

DETERGENTS CONTAINING PERBORATES AND A COPPER SALT. Food Machinery & Chem. Corp. *Brit. 819,842*. Addition of a water-soluble copper salt to a mixture of an alkyl aryl sulfonate and a perborate yields a mixture which has good detergent and bleaching action even when kept for prolonged periods.

DETERGENT COMPOSITIONS FOR LAUNDERING FIBROUS MATERIALS OR TEXTILES. K. Dithmar (Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler). *Ger. 1,010,048*. It was found that addition of formamide to detergent compositions containing reactive O, e.g. those containing perborates, improves the laundering efficacy of these compositions by increasing the rate of release of O at temperatures below the b.p. of the baths. Thus, detergent compositions containing formamide can be used for laundering at 50-60°. Approximately 0.1-1 g. formamide is added per l. of laundering bath. (*C. A.* 54, 931)