ABSTRACTS

R. A. REINERS, Editor. ABSTRACTORS: J. G. Endres, J. Iavicoli, K. Kitsuta, F. A. Kummerow, C. C. Litchfield, Gladys Macy, Louise R. Morrow, E. G. Perkins, and T. H. Smouse

• Fats and Oils

Gas chromatography of the glyceride constituents of olive oil and Greek cottonseed oil. E. Synodinois, G. A. Kotakis, and E. Kokkoti-Kotakis (State Chem. Lab., Athens, Greece). *Rev. Franc. Corps Gras* 10(5,) 285–293 (1963). Contrary to reports pure olive oil does not contain detectible quantities of either lauric or myristic acid. Sizable quantities of these acids have been detected in industrial olive oil and it is suggested that their presence is a result of degradation of the oil by oxidation. The adulteration of olive oil with cottonseed oil can be detected; the lower limit being about 10% cottonseed oil. Formulas are presented to assist in the determination of the degree of adulteration. The adulteration of olive oil with olive cake oil cannot be determined with this method.

Problem of rancidity in edible fats and fatty foods. Part II. Oil and fats. Mangla Prasad. *J. Proc. Oil Technologists' Assoc. India, Kanpur.* 17, 77–102 (1962). The minor constituents that have been found in fats and oils are discussed. Fourteen components are listed. Each of the components is described from the standpoint of their occurrence, nature, and practical significance. Minor constituents of sesame and mustard seed oil are also discussed as are natural antioxidants. 324 references

New technology of separating fatty acid mixtures in aqueous dispersions by means of centrifuges. Ya. List (Research Inst. of the Fat Industry, Usti nad Labem, Ch. S.S.R.). *Maslob.-Zhir. Prom.* 29(1), 19–23 (1963). Of the well known processes for separating fatty acid mixtures in industry, only the Emersol process has attained recognition. However, the installation of this system is associated with large capital expenditures and with the use of large volumes of organic solvents. In the present report the separation of fatty acid mixtures dispersed in water by means of circulating centrifuges is considered. This separation depends on the melting points of the fatty acids, and was carried out in three steps: (1) centrifugation of the emulsion at 20–30C, (2) the stearine suspension resulting from the first step is separated at 38–47C, and (3) from the crude olein obtained in the first step, olein with a maximum congeal point of 6C is separated. A diagram illustrating these separations is provided. This method is more economical than those depending on selective extraction with methanol, propane, and furfural. Twelve patent references are cited.

Purification of barometric waters. P. L. Shkurenko, V. I. Babaev, and R. M. Granovskaya (Shebekino Combine of Synthetic Fatty Acids and Fatty Alcohols). *Maslob.-Zhir. Prom.* 29(1), 34–35 (1963). The distillation of the synthetic fatty acids obtained from paraffin is carried out in vacuo. Together with the gases, the fatty acids are partially carried off and condense and collect in the barometric water. The present study is an investigation under laboratory conditions of a method for purifying barometric water. According to this method, the barometric waters, containing fatty acids and calcium soaps, are treated with milk of lime and blown through with carbon dioxide. Thus, the organic acids are neutralized and converted to the calcium soaps and the milk of lime is converted to calcium carbonate, which precipitates and adsorbs the calcium soaps. Such a purification lowers the quantity of organic acids in barometric water by a factor of 5–7.

Experimental application of the hydrocyclone to the purification of sunflower miscella. V. A. Maslikov and V. A. Lebedev (Krasnodar Inst. of the Food Industry) and N. S. Arutyunyan and D. F. Agaryshev. *Maslob.-Zhir. Prom.* 29(1), 27–30 (1963). In the freeing of miscella from mechanical impurities by the hydrocyclone, the chief difficulty is that such a suspension consists of polydispersed particles which require 15–17 hrs. for their deposition by gravity alone. In plants where various filters ar used, the employment of hydracyclones with a diameter of 100 mm. makes possible the acceleration of the time interval between purifications by 80%.

Triterpenoic acids of sulfur olive oil and virgin olive oil. E. Vioque and M. P. Maza (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites (Seville, Spain)* 14, 9–11 (1963). The extraction, chromatographic purification, and identification of two triterpenoic acids from sulfur olive oil are described. One acid was identified as oleanic acid. The other acid (I) had physical properties similar to crategolic acid which occurs in *Cragaegus oxycantha L.* and the maslinic acid found in defatted olive press cake. (I) was found in the oil extracted from olives during various stages of growth.

Oil loss during refining and bleaching sesame seed oil. R. de Castro (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites (Seville, Spain)* 14, 1–8 (1963). Forty-one samples of sesame oil were cup refined using AOCS method Ca-9c-52. Refining losses were found to follow the relationship: % loss = 1.8 (%FFA) + 1.4. Certain bleaching earths were found to increase rather than decrease oil color. This color increase was attributed to the conversion of sesamoline to sesamol by acid activated earths.

Anomalous behavior of 'deep green' olive oils under U.V. spectrophotometric analysis. B. Giancaspro and I. Florio (Prov. Chem. Lab., Benevento, Italy). *Riv. Ital. Sostanze Grasse* 40, 121–9 (1963). Spectrophotometric analysis of the 'deep green' variety of olive oil indicates several points of difference from the yellow-colored oils. In particular, the value of $R = K_{232}/K_{270}$ is usually lower than 9.0, the typical minimum value for yellow-colored virgin olive oils, and the value of $\Delta K = K_{268} - \frac{1}{2} (K_{262} + K_{274})$ is never higher than 0.01. It is suggested that the latter characteristics may be used for ascertaining the purity of virgin olive oils.

Quantitative separation of solid fatty acids from mixtures with liquid fatty acids by means of solvents. I. G. B. Martinenghi (Res. Inst. for Fats and Oils, Milan). *Olearia* 17, 47–51 (1963). Attempts at quantitative separation of solid fatty acids from mixtures with liquid acids (notably oleic) for analytical purposes, have been only partly successful. Results with symmetrical dichloroethane and acetonitrile as solvents have often been comparable to those obtained by the Twitchell Method, using lead salts.

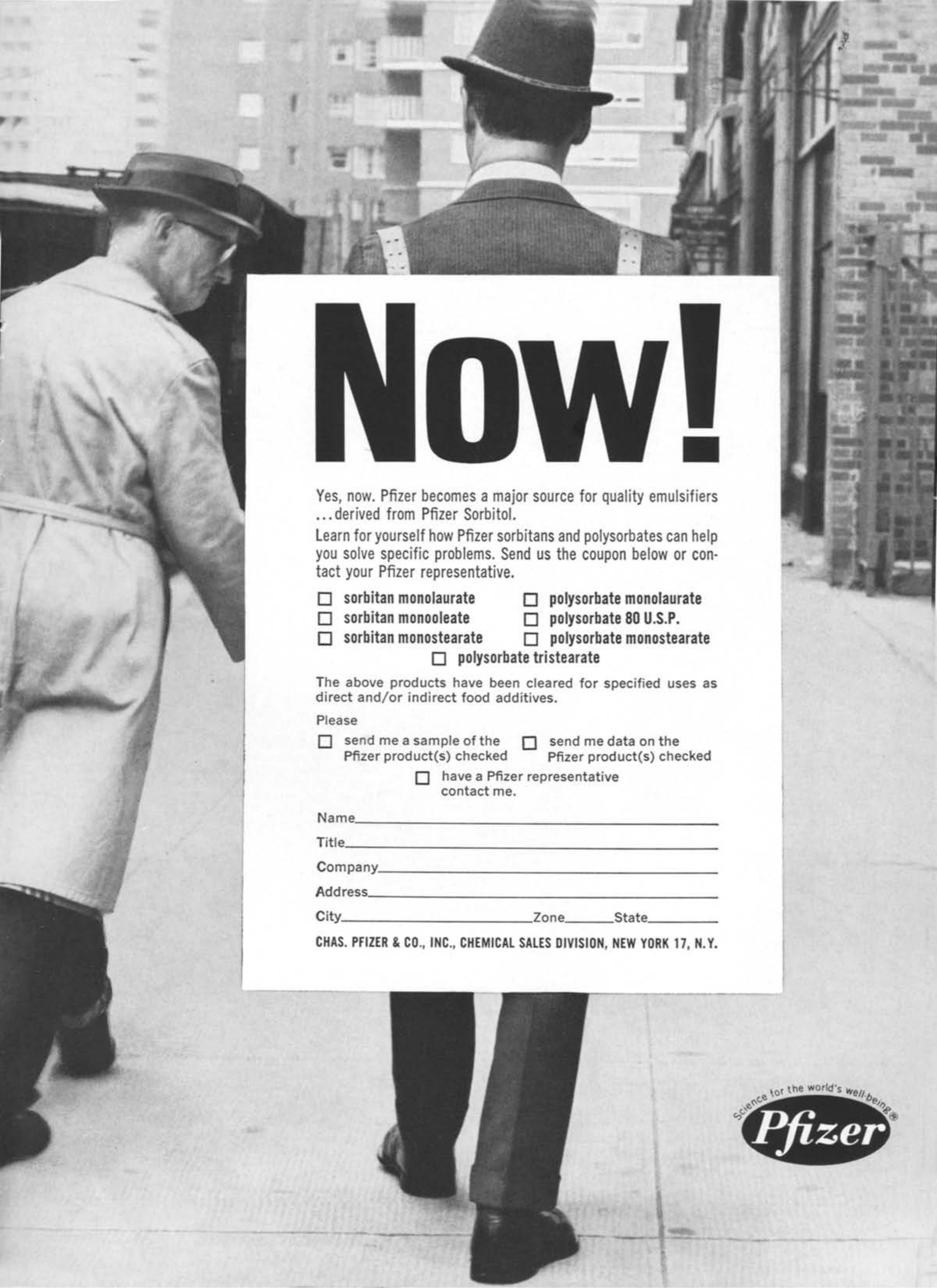
The determination of color in fats and oils. G. Bigoni (Gaslini Co., Genoa). *Riv. Ital. Sostanze Grasse* 40, 116–20 (1963). A modification of the trichromatic technique for measuring oil colors is proposed, which includes a transmittance measurement at 660 mμ which can be used to characterize the green color of some varieties of olive oil. Experimental results from which the method is derived are given, together with the proposed equations for calculating the trichromatic coordinates.

The fatty substances in coffee. C. Calzolari and E. Cerma (Univ. of Trieste). *Riv. Ital. Sostanze Grasse* 40, 176–80 (1963). The fatty substances extractable from crude coffee beans (of which they constitute 10–12%) have been examined by gas chromatography, bidimensional paper chromatography and standard chemical methods. The major fatty acids of coffee oil are oleic, linoleic and palmitic, while linolenic is found only in traces.

Detection of fatty acids by paper chromatography. Z. Kwapniewski and J. Sliviok (Katowice, Poland). *Riv. Ital. Sostanze Grasse* 40, 181–2 (1963). Pyrogallol red, cresol red and cresolphthalein dyes have been shown to be effective revealing agents in paper chromatography of fatty acids.

Characteristics of a rotating unit for preparative gas chromatography. M. Taramasso (S.N.A.M. Laboratories, S. Donato Milanese). *Riv. Ital. Sostanze Grasse* 40, 6–10 (1963). The operation of a rotating, completely automated unit designed to separate 1–10 Kgs/day of sample for preparative purposes is described. As an example, 500 cc/hr. of a mixture of *n*-heptane and toluene can be separated with a purity of 99.9% for both components. The author presents a formula relating the maximum allowable hourly load with the degree of purity desired.

Temperature programmed gas chromatography of butter and volatile fats. M. Morgantini (Univ. of Florence). *Riv. Ital. Sostanze Grasse* 40, 49–54 (1963). Temperature programmed gas chromatography allows the more volatile esters of butter fatty acids to be clearly separated. Optimum separation is obtained by programming the operating temperature between 110 and 205C at a constant rate of 3–5C/min. Repeated chromatograms indicate the excellent reproducibility of results obtained by this method.



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Use of infrared spectroscopy for determination of ethylenic bonds in the *trans* form in fatty materials. M. Naudet. *Bull. Soc. Chim. Fr.* **1962**, 664–666. The infrared absorption spectra of unsaturated fatty acids and their esters are discussed with particular reference to determination of *trans* bonds. Isolated *trans* bonds absorb specifically at 10·33 μ; a *cis-trans* conjugated system has a doublet at 10·16 μ and 10·54 μ; a *trans-trans* conjugated system absorbs at 10·11 μ and a conjugated triene system absorbs at 10·05 μ if one of the bonds is *cis* and at 10·00 μ if all are *trans.* The practical and theoretical difficulties in determining the *trans* double bonds in a sample by means of these absorption peaks are discussed. Sealed cells of $\ngtr$ 1 mm. thickness have to be used. (Rev. Current Lit. Paint Allied Ind.)

Inhibition mechanism in oxidation. J. R. Shelton. *Off. Dig.* **34**, No. 449, 590–602 (1962). Retarded oxidation in the presence of inhibitors is compared with uninhibited autoxidation. Classifications of inhibitors based on differences in the mechanism by which they appear to function are briefly described, including: peroxide decomposers; metal deactivators; light absorbers; inhibitor regenerators; and chain stoppers. Some recent studies relating to the mechanism of chain-stopping action in oxidation are reviewed. The kinetic deuterium isotope effect observed in oxidation with amine and phenolic inhibitors, in which the active hydrogen is replaced by deuterium, supports the hydrogen-donation mechanism rather than reversible complex formation as the rate-determining reaction. (Rev. Current Lit. Paint Allied Ind.)

Tall oil. W. Asche. *Farbe u. Lack* **68**(7), 448–55; (8), 518–25 (1962). The production and fractionation of tall oil and the composition of the fatty acids and rosin components are reviewed. (Rev. Current Lit. Paint Allied Ind.)

Epoxidised soyabean oil as plasticiser for polyvinyl chloride. D. Kalińska. *Polimery* **7**, No. 7-8, 245–8 (1962). This oil is a non-toxic secondary plasticiser with a stabilising action. The physical and chemical properties of the plasticiser and properties of the plasticised polyvinyl chloride are described. Results of an investigation into the stability of blends, the influence of processing temperature on the properties of products and the effects of incorporating primary plasticisers on the softening temperature of polyvinyl chloride are given. Examples of uses are included. (Rev. Current Lit. Paint Allied Ind.)

Effect of some factors on the composition of products of oil alcoholysis. G. L. Yukhnovshiĭ and V. M. Volosyuk. *Lakokras. Mat.* **4**, 16–20 (1962). The most favorable conditions for the production of monoglyceride were investigated by controlling the ratio of glycerin and oil, the temperature and the degree of alcoholysis. (Rev. Current Lit. Paint Allied Ind.)

Spectrophotometric determination of acyl ester groups in lipids. O. Ren-Konen. *Biochem. et Biophys. Acta* **54**, 361–2 (1961). The procedure of Snyder and Stephens was applied to acyl ester determinations in several highly purified glycerides and phosphatides. The colour yields obtained per micro-equivalent of ester were found to be independent of the lipid type assayed. (Rev. Current Lit. Paint Allied Ind.)

Estimation of the iodine value of edible and industrial oils by radio-iodine. M. F. Abdel-Wahab and S. A. El-Kinawi. *Z. Anal. Chem.* **186**, 364–8 (1962). The method depends upon a paper chromatography separation, followed by iodination directly on the paper with ^{131}I. Results are compared on 22 fats and oils (I.V. 7 to 155) with the standard Hübl method. (Rev. Current Lit. Paint Allied Ind.)

Liquid/liquid chromatography of ricinoleic and dihydroxystearic acids in the presence of saturated and unsaturated normal monocarboxylic acids. D. Chobanov, A. Popov and I. Mitsev. *Compt. Rend. Acad. Bulg. Sci.* **14**(5), 463–6 (1961) (in English). A method is developed for the quantitative determination, with the aid of partition chromatography, of ricinoleic and dihydroxystearic acids in mixtures of saturated and unsaturated normal monocarboxylic acids. Silica gel is used as carrier. Best results are obtained with the solvent system methanol (30 ml.), *n*-hexane (150 ml.) and acetone (15 ml.). Ricinoleic acid passes before the saturated and unsaturated acids, whilst dihydroxystearic acid passes after. The interval between the zones depends on the amount of acetone used. The accuracy is ± 2%. (Rev. Current Lit. Paint Allied Ind.)

Recent progress in gas chromatography and applications to the analysis of fatty materials. A. Liberti. *Boll. Lab. Chim. Prov.* **12**, No. 4, 411–21 (1961). The use of hydrogen-flame and argon detectors and capillary columns in the analysis of fatty acids, the identification of *cis* and *trans* isomers of oleic and palmitoleic acids and the estimation of fatty esters are discussed. (Rev. Current Lit. Paint Allied Ind.)

Quick method for determining oil content of sunflower seeds. M. Lazarov and E. Atanasova. *Compt. Rend. Acad. Bulg. Sci.* **14**(4), 401–4 (1961). A quick hydrometric method was developed for the determination of sunflower seed oil for selection purposes. The method allows serial analyses and is more convenient than other methods. The determination takes 6–8 min., whereas Soxhlet extraction takes 12 hrs. A 10 g. mean sample, cleaned from empty seeds and taken from each flower head, is covered with 70 ml. of *o*-dichlorobenzene and ground. The mixture is filtered and the filtrate quantitatively transferred to a 100 ml. measuring cylinder. The S.G. is determined, without shaking the solution, at a standard temperature of 20C. Precise temperature control and determination of S.G. are most important for obtaining accurate results.

Chemistry of fats and oils. C. Y. Hopkins and M. J. Chisholm. *Review of the National Research Council, Canada* No. 6816, 102–3 (1962). Examination of the glyceride oils of certain seeds has yielded interesting results. A new geometric isomer of α-elaeostearic acid was found to be the major acid in the oil of *Catalpa ovata,* family Bignoniaceae. It was isolated and characterised. Other species of this family were studied and showed unusual diversity in fatty acid compositions. A new and convenient source of punicic acid was discovered in the oil of *Momordica balsamina,* family Cucurbitaceae. *M. charantia* had the ordinary α-elaeostearic acid, while other members of this family which were examined had no conjugated fatty acid. α-Elaeostearic acid was shown to occur in Valerianaceae and in certain species of Rosaceae not previously studied. The usefulness of nuclear magnetic resonance spectra of fatty compounds was investigated further, particularly with respect to branched chain acids, hydroxy acids and mono- and di-glycerides. (Rev. Current Lit. Paint Allied Ind.)

Induction period. I. *Tech. Notes* 45, 1 p. (British Oil and Cake Mills). From measuring the induction period at 100C. of a number of samples of linseed and soya bean oils, the following general conclusions have been reached. (1) The removal of phosphatides and associated impurities by water-washing or alkali-refining leads to a considerable reduction in the induction period. A roughly linear relationship holds between the P content of the oil and the length of the induction period. (2) Fully refined linseed and soya bean oils have induction periods of the same order. The complete removal of tocopherol, which is not achieved by ordinary refining, reduces the period to about 45 mins. (3) Comparatively small additions of the ordinary drier metals (Pb, Mn or Co) have the effect of reducing the induction period to zero. (Rev. Current Lit. Paint Allied Ind.)

Differentiating the acid value into a hydrolytic and oxidation acid values with the view to characterizing more fully the rancidity of food fats. S. Ivanov. *Compt. Rend. Acad. Bulg. Sci.* (in German) **14**(7), 683–6 (1961). (Rev. Current Lit. Paint Allied Ind.)

Yield and refining of tall oil. S. Kahila. *Suomen Kem.* **1962**, A35, 73–81. The production of tall oil in Finland during 1955–1960 is reviewed from economic and technical aspects. Changes in tall oil yield on storage of pine trunks in water or on land are discussed. Experiments aimed at the synthesis of technical-grade chemicals such as azelaic and pelargonic acids and stearyl alcohol from tall oil fatty acids, by oxidation with ozone or by hydration, are described. (Rev. Current Lit. Paint Allied Ind.)

Refining of vegetable oil. Z. G. Akopyan U.S.S.R. 148,870. An improved method of refining vegetable oils is claimed which enables the process to be mechanised and accelerated and leads to reduced loss of oil. The oil is refined by centrifuging with cooling of the oil in an intermediate cooler, after which the final refining is effected in continuous separators. In carrying out the process, the vegetable oil, at a temperature of 40–80C, is pumped into a centrifuge from which the coarse impurities are continuously removed. The oil is then passed through an intermediate cooler in which it is cooled to 20–40C, after which the oil is passed through self-discharging separators in which colloidal impurities are removed. (Rev. Current Lit. Paint Allied Ind.)

PROCESS FOR BLEACHING REFINED COTTONSEED OIL. W. A. Pons, Jr., J. C. Kuck, and V. L. Frampton (Secretary of Agriculture, U.S.A.). *U.S. 3,087,946.* A process is described for treating refined cottonseed oil to bleach it and to remove entirely the response to Halphen test. A mixture containing sulfurous acid saturated activated alumina and refined cottonseed oil in the proportion of from 1 to 6 parts, by weight, of the alumina/100 parts of oil is heated at a temperature of at least 225C for from 30 to 60 minutes. The resulting bleached oil is then separated from the alumina.

PROCESS FOR PRODUCING AERATED SHORTENING. J. J. Kearns, Jr. (Lever Brothers Co.). *U. S. 3,095,305.* A stream of chilled aerated liquid fat is placed under high pressure to partially crystallize the fat. The pressure is suddenly released and the fat is subjected to a second partial crystallization with agitation at approximately atmospheric pressure. The aerated shortening contains from 15 to 32% of an aerated gas.

INTERESTERIFICATION PROCESS. R. W. Giddings and A. C. Davies (Lever Bros. Co.). *U. S. 3,095,431.* A process for the continuous liquid-phase interesterification of glycerides consisting of esters of glycerol in which at least 2 of the hydroxyl groups of the glycerol are esterified comprises (1) continuously feeding the glyceride together with a polyhydric alcohol, an interesterification catalyst and an inert gas, in the absence of free oxygen, into and through a reaction zone maintained at a temperature of 200–275C; (2) passing the products issuing from the zone immediately into and through a cooling zone maintained at a temperature below 100C; and (3) collecting the products at a temperature not substantially above 100C. The products have a free fatty acid content of not more than about 0.28% based on the weight of the products.

SHORTENING AND AGENT THEREFOR. R. R. Allen, R. J. Bell, and R. B. Donohue, Jr. *U. S. 3,097,098.* An edible shortening agent when combined with an edible shortening base forms a shortening. The shortening agent comprises a reaction product resulting from an ester interchange reaction of glycerides of an edible fat, propylene glycol and glycerine.

INTERESTERIFICATION OF FAT AND OIL. Nippon Oils and Fat Co.. *Jap.* 16,968/62. The method comprises subjecting the fat or oil to interesterification conditions in an inert atmosphere in the presence of granular alkali metal hydroxide catalyst supported on a catalyst carrier, the catalyst being obtained by mixing the alkali metal hydroxide solution with the carrier and drying the mixture in an inert gas. (Rev. Current Lit. Paint Allied Ind.)

SWEETENER FOR DRY CLEANERS' SOLVENTS. R. G. Riede (Johns-Manville Corp.). *U.S. 3,099,626.* In a process for dry cleaning soiled garments in which an organic solvent medium is employed to remove soil, the method of sweetening the fatty acid soil contaminated solvent medium consists of controlling and stabilizing the fatty acid content of the solvent medium by preferentially adsorbing fatty acid from the medium with particulate hydrated calcium silicate.

PROCESS OF IMPROVING THE WEAR PROPERTIES OF A MINERAL AND FATTY OIL LUBRICANT MIXTURE BY RADIATION. H. A. Ambrose and C. E. Trautman (Gulf Research and Development Co.). *U.S. 3,100,185.* A process for improving the wear characteristics of a lubricating composition which consists of a mixture of 50–90% by volume of a mineral oil and 10–50% of a fatty oil having an iodine value below 100 comprises subjecting the mixture to ionizing radiation for a time sufficient for the mixture to absorb at least 24 megareps of radiation.

METHOD OF STABILIZING CRYSTALLINE COMPOUNDS AGAINST OXIDATION. P. C. de Wilde and M. P. Rappoldt (North American Philips Co. Inc.). *U.S. 3,100,783.* A method of stabilizing crystalline compounds have carbon-carbon conjugated double bonds (vitamins A, D_2, D_3, provitamins D_2, D_3, esters of such vitamins and provitamins, tachysterol-2 and tachysterol-3) comprises the steps of applying to the surface of crystals of the compounds a solution of at least one solid antioxidant, in an amount sufficient only to coat the surface of the crystals, and then drying the crystals.

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New Books . . . .

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ticularly pertinent. As is perhaps fitting, the review is oriented toward description of the available equipment rather than toward applications, although one feels that much more needs to be written on this subject. The use of alpha particle excitation of X-rays appears to have considerable potential and it is surprising that more has not been done along this line. R. E. Richards discusses Nuclear Magnetic Resonance (pp. 101–188) in an excellent article which takes the form of a descriptive treatment of the various effects that can be observed. The author achieves his aim of presenting a "balanced account of uses and potentialities to problems in chemistry and chemical physics." This section is recommended as an introduction to the theoretical treatment of NMR spectra.

The review of Infrared Spectra of Crystals by W. Vedder and D. F. Hornig (pp. 189–262) is limited to a discussion of the spectral effects related to the intramolecular forces in crystals which are useful in elucidating the nature of the crystalline state. In this respect it is good, but falls somewhat short of filling the needs of the applied spectroscopist. A most interesting discussion of the Refraction of Gasses in the Infrared is given by J. H. Jaffe (pp. 263–292). It is pointed out that refractive dispersion curve and absorption curve in the infrared are merely different aspects of the same phenomena and that theoretically, one can calculate one from the other. This discussion is particularly important to the practicing spectroscopist because of the recent introduction of the ATR (Attenuated Total Reflectance) technique and the relation of the ATR spectrum to the absorption spectrum of a material.

Biological applications are discussed in two articles, The Ultraviolet Absorption Spectra of Proteins and Related Compounds, by G. H. Beaven (pp. 331–428), and Infrared Spectra of Micro-organisms by K. P. Norris (pp. 293–330). In both of these reviews, one gets the impression that much has been done with very litte. The situation with micro-organisms looks more promising in that spectra of micro-organism fractions appear to be useful in classification and in studies of life processes. The final review is, Some Recent Developments in the Theory of Molecular Energy Levels, by H. C. Longuet-Higgins (pp. 429–472). This is a mathematical treatment.

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Gas Chromatography, by Howard Purnell (John Wiley & Sons, 441 pp., 1962, $12.00), is ordered into three main sections, The Physico-Chemical Background of Gas Chromatography, Chromatographic Theory, and Gas Chromatographic Practice. The physical background section develops the mathematics of solution, adsorption, partition, vaporization of liquids, gaseous diffusion and gas flow. The chromatographic theory section proceeds from the first section to develop the theoretical plate concept, rate theories, and the thermodynamics of gas chromatography. Section three describes equipment design and utilization with examples of analyses.

It is a valuable addition to the literature concerned with this analytical tool. By developing a description of the technique from the applicable physical background, this book provides a consolidated basis for understanding the reasons for a choice of instrument conditions to perform specific analyses. The author diverges from the usual procedure of introducing gas chromatography in terms of the instrumentation and the analyses which have been performed. Instead, a basis for evaluation of instrument performance in terms of separation quality and detection sensitivity is presented before the description of application.

This book is recommended to the investigator who uses gas chromatography as an analytical tool and whose background excluded the mathematics to develop for himself the use of chromatographic theory. It is also recommended to the investigator who uses chromatographic theory for its own sake or for a basis of analytical method development. For this investigator, the book would serve as a consolidated reference. The logical development of this book is well executed and is reminiscent of a well-written, descriptive mathematics text.

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Wood Chemistry. Proceedings of the Wood Chemistry Symposium held in Montreal, Canada, August 9–11, 1961. (Butterworth Inc., 254 pp., 1962, $9.00). This book contains the text of papers presented at a symposium sponsored by the Applied Chemistry Section, Pulp, Paper and Board Division of the International Union of Pure and Applied Chemistry. The fifteen papers have appeared previously in Pure and Applied Chemistry, Vol. 5, Nos. 1 and 2.

For the specialist in wood chemistry this book serves as a reference volume of convenient size and as a review of the more recent work by some of the leaders in this field. For the non-specialist there is enough background and explanation presented in the introduction of most of the chapters to make them easily understood. The book is not indexed, nor does it include any discussion.

The subject matter is confined almost exclusively to lignin, cellulose, and hemicellulose with no coverage of bark, or the extractives or lipid components of the tree. There are discussions of the structure and biogenesis of both lignin and carbohydrates. The work on lignin is an interesting example of how the structural features of a natural polymer have been largely learned by studying a polymerization *in vitro* and comparing the properties of the synthetic intermediates and the natural material. Anyone working with carbohydrates will find something of interest in the discussions on methods of isolating and purifying hemicellulose and on the applications of infrared and X-ray techniques to structure determinations. Other topics include chemical grafting on cellulose, pulping and bleaching mechanisms, the physical chemistry of lignin, and viscoelastic behavior of cellulose.

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Chromatographic Analysis, Discussions of the Faraday Society, No. 7, 1949 (Butterworths, London, pp. 336, 1963 ($12.00). This "Discussion of the Faraday Society," which was published in 1949, has long been out of print. Many requests and inquiries were received by the Faraday Society concerning the publication so that it has now been reprinted and published. Many of the papers have become classics in the field.

The first five papers in the first section (Physico-chemical Principles and Their Utilization) as well as the next twelve are followed by general discussions. The two subsections (Inorganic and Organic and Biochemical) of the second section (Applications) are also followed by general discussions. In all there are 42 papers in the publication.

Those papers in the first section are of general interest, involving as they do questions of theory. Among the papers in the second section on applications many of the papers are primarily of historical interest although, for the novice in the field of chromatography, these papers will give many helpful hints.

This volume is recommended as a good reference text for the serious student of chromatography be he novice or veteran.

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Optics of Flames, Including Methods for the Study of Refractive Index Fields in Combustion and Aerodynamics, by F. J. Weinberg (Butterworth & Co., Washing-

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• Fatty Acid Derivatives

STEARYL MONOGLYCERIDYL CITRATE. EXTENDS BAKING TOLERANCES. J. J. Geminder (Chas. Pfizer and Co., Inc., New York, N. Y.). *The Bakers Digest* 2, 60 (April, 1963). Stearyl monoglyceridyl citrate shows surfactant activity and emulsion stabilization. It enhances emulsion stability when incorporated into shortenings containing food-grade emulsifiers. High-performance liquid shortenings can be prepared using stearyl monoglyceridyl citrate with 2.0–4.0 per cent glyceryl lactopalmitate, stearyl–2–lactylic acid or mono-diglyceride mixtures. These combinations result in improved over- and undermix and baking temperature tolerances.

ADDUCT OF AN ANHYDRIDE OF AN AROMATIC POLYBASIC ACID AND A FATTY ACID ESTER. J. Z. Matt (Reichold Chemicals, Inc.). *U.S. 3,098,051.* The described product is the adduct of an anhydride group of an anhydride of an aromatic polybasic acid which has at least 3 carboxylic acid groups with a hydroxyl group of a fatty acid ester containing at least 2 alcoholic OH groups including at least 1 in the fatty acid chain. The adduct contains at least 1 COOH group deriving from the anhydride group and an ester linkage at the hydroxyl group of the fatty acid chain, the ester linkage also deriving from the anhydride group.

WHIPPING AND POWDERED SHORTENING COMPOSITIONS. P. P. Noznick and C. W. Tatter (Beatrice Foods Co.). *U.S. 3,098,748.* A whipping composition in the form of a water soluble dry powder contains 40–60% edible fat, 0–10% mono- and diglycerides, 0.5–15% of a whipping agent selected from the group consisting of glycerol lacto monopalmitate, and glycerol lacto oleate, 5–35% sweetener, and 1–15% protein, all amounts being by weight of the finished powder.

LUBRICANTS PREPARED FROM ISO-OLEIC ACID. A. J. Morway (Esso Research and Engineering Co.). *U.S. 3,098,822.* A lubricant contains a major amount of lubricating oil and from 2 to 50 wt. % of a soap-salt thickener consisting of alkaline earth metal salts of C_2 to C_4 fatty acid and elaidic acid in a molar ratio of about 5 to 20 molar proportions of the salts of the short chain fatty acid per molar proportion of the alkaline earth metal salt of elaidic acid. In *U.S. 3,098,823,* LUBRICANTS CONTAINING THICKENERS PREPARED FROM TALL OIL, the thickener consists of the alkaline earth metal salt of about 5 to 60 molar proportions of C_2 to C_4 fatty acid per one molar proportion of alkaline earth metal soap of tall oil.

INSTANT COFFEE AND TEA. O. N Breivik and W. R. Johnston (Standard Brands, Inc.). *U.S. 3,100,151.* An instant beverage preparation contains a small but effective amount of monoglyceride of a higher fatty acid to reduce foaming when the preparation is dissolved in water.

GREASE COMPOSITION. R. A. Swenson and S. J. Zajac (Standard Oil Co.). *U.S. 3,100,193.* A lime soap lubricant grease composition comprises a mineral oil lubricant base, 1–20% by weight of a calcium soap of a long chain fatty acid, 1–10% of a calcium soap of a short chain fatty acid, and a small amount, effective to inhibit age hardening, of a member selected from the group consisting of an acetoxy substituted long chain fatty acid, having from 10 to 30 carbon atoms in the fatty acid chain in free acid form, and triglycerides, methyl and ethyl esters of such acetoxy substituted long chain fatty acids.

METHOD OF PRODUCING POLYMERS OF LINOLENIC ACID. C. G. Goebel (Emory Industries, Inc.). *U.S. 3,100,784.* A process for polymerizing fatty acid mixtures containing at least 25% linolenic acid comprises first subjecting the mixture to a thermal polymerization treatment at temperatures of from 260–340C at steam pressures above 40 p.s.i. until substantial polymerization is obtained, and then subjecting the intermediate reaction product so produced to a catalytic polymarization treatment conducted in the continuing presence of water and a crystalline clay mineral at temperatures of 180–200C for at least ½ hour.

• Biology and Nutrition

THE UPTAKE FROM THE BLOOD OF TRIGLYCERIDE FATTY ACIDS OF CHYLOMICRA AND LOW-DENSITY LIPOPROTEINS BY THE MAMMARY GLAND OF THE GOAT. D. S. Robinson, J. M. Barry, W. Bartley and J. L. Linzell (Oxford). *Biochem. J.* **87**,

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ton, D. C., 1963, pp. 251 + x, $10.95). This monogram is an attempt to cover rather exhaustively the usefulness of a wide variety of individual optical methods, their theory, their modification for, and their applications to, combustion research. The text may be considered to consist of two parts, The first three chapters comprise part one:

Chapter 1, containing the minimum necessary optics background, and entitled "Elements of Optics," is a rather unorthodox review in which "Nothing that is not required and used subsequently is included." The chapter consists of a mixture of rather elementary review with development of unusual extrapolations designed around the future requirements of the monogram. In any flame, changes in temperature, in composition, and in pressure accompanying expansion of the gas, give rise to variations in the refractive index. The optical properties of flames and of methods that exploit them all depend ultimately, on changes in refractive index that occur in gases during combustion.

Chapter 2, "Refractive Indices of Gases," is a summary of the dependence of gaseous refractive indices on these variables and of their relative importance in combustion.

"Flame Processes and Their Optical Properties" are reviewed in Chapter 3 to provide the necessary combustion background. Flames of premixed reactants, where a homogeneous mixture sustains the process in a given initial state of composition, temperature and pressure, are discussed both as steady-state flame propagation and nonsteady states. This is followed by a discussion of flame in reactants initially separate, so-called diffusion flames.

The second part of the monogram consists of Chapters 4, 5, 6, and 8, which deal with the general theory, optical techniques and applications to combustion of the individual methods. Under these three general headings "Schlieren Methods" are discussed in Chapter 4, "The Shadow Method" in Chapter 5, and "Deflection Mapping" in Chapter 6. Chapter 7 is an interesting very short interlude, entitled "Distortion of Flame Luminosity," describing the optical "illusions" induced by refractive index fields of the flames when they are observed by their own light. The last chapter, Chapter 8, returns to a consideration of individual methods, with a detailed discussion of "Interferometry," interferometers, interpretation of interferograms, and a comparison of these methods with ray deflection techniques.

A short appendix contains some thirty general references on high speed photography and short-duration light sources and lists 199 specific references cited in the text. A subject index is also included.

The fatty-acid chemist who is interested in the investigation of combustion effects by means of optical methods will find this monogram of considerable value. Most of the material collected here is available only in original publications widely scattered through journals on optics, combustion, physical chemistry, photography, etc. Much of the work is described as original, based on a course of postgraduate lectures given by the author at the Imperial College of Science and Technology in London.

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Design of Equilibrium Stage Processes, by Buford D. Smith (McGraw-Hill Book Co., Inc., 1963, 647 pp. $17.50). This book is of usual appearance and size. The table of contents indicates it covers such subjects as distribution coefficients, design variables, flash separations, binary distillation, ternary extraction diagrams, multicomponent separations, and tray hydraulics and efficiencies. It describes how equilibrium stage processing has to do with liquid-liquid extraction, distillation, and gas absorption and stripping. It indicates that the designer of these kinds of units must be concerned with three major factors. First, he must be concerned with physical chemistry of the materials involved so that the compositions of the various gas and liquid phases can be evaluated at equilibrium conditions. Secondly, there must be a method available to calculate the number of theoretical plates or equilibrium stages required to give a stated separation of the components. In addition, there must be a way of arriving at some value of plate or stage efficiency so that a plant unit can be compared to a theoretical equilibrium unit.

The first two chapters deal with equilibrium relationships. The mathematics and theory of these relationships are covered. References and evaluation of some of the available data, methods, and correlations are discussed. Both ideal and non-ideal systems are covered.

The numerous variables which a design engineer will encounter in a practical industrial plant are described and illustrated. These are related to computer techniques or terminology which have been applied in recent years.

The author gives many methods which have been proposed or used to determine the number of theoretical plates or equilibrium stages required. Some of these are graphical. Some are so called "short cut" methods where estimates may be obtained when complete data are not available. Others are of a theoretical nature and, with the use of computers, will give rigorous results. The author compares the usefulness and adequacy of many of these.

William L. Bolles and James R. Fair, Monsanto Chemical Co., have each contributed a chapter on tray hydraulics, the former on bubble-cap trays and the latter on perforated trays. Tray hydraulics are involved in plate efficiencies, and the final chapter of the book covers this aspect.

This book can be of value to the practicing engineer as well as to a student as a text or reference work. It is a review-type book with much of the material having been covered in earlier texts or journals. A chemical engineer would already be familiar with a considerable portion of the book such as the McCabe-Thiele or Ponchon Method for binary mixtures. However, for a non-chemical engineer, it might be worthwhile. One valuable feature is that many of the various methods are compared. Another is that many references are included so that original articles may be consulted.

From a utility point of view, it would have been desirable to use chapter sub-headings as the page headings. For example, there are six chapters with identical titles covering over 200 pages. The user is interested in finding information on the sub-headings.

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Progress in Polarography, Volume I. Edited by Petr Zuman, with collaboration of I. M. Kolthoff. (Interscience Publishers, 1962; 355 pp., $12.00). When American polarographers see the name Kolthoff on a new book about polarography, they expect an authoritative and reliable work. To see also the names of Delahay, von Stackelberg, Wawzonek, and Vlcek, to mention just a few others, is to hope for something of a scientific feast. The reader of this book will not be disappointed, and the mention of a few authors above should in no way detract from the excellent contributions of the others. Altogether this collection includes articles by twenty expert workers in polarography, among them nine members of the two institutes in Prague that have so skillfully carried on the work of Heyrovsky. The two volumes of this set are dedicated to Professor Heyrovsky on the occasion of his seventieth birthday.

The book is in no sense an elementary text, but rather a series of articles emphasizing advances of the last ten

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23P–24P (1963). Arteriovenous measurements across the mammary glands of lactating goats were made to discover which plasma lipid fractions provided the fatty acids of milk triglycerides. From the results the authors concluded that most of the fatty acids of the milk which come from the blood lipids are derived from the triglycerides of the chylomicra and $d < 1.019$ low-density lipoproteins.

A COMPARATIVE STUDY OF THE EFFECTS OF BILE ACIDS AND CHOLESTEROL ON CHOLESTEROL METABOLISM IN THE MOUSE, RAT, HAMSTER AND GUINEA PIG. W. T. Beher, G. D. Baker and D. G. Penney (Edsel B. Ford Inst. for Med. Res., Henry Ford Hosp., Detroit, Mich.). *J. Nutr.* 79, 523–530 (1963). Cholesterol concentrations in serum, liver and carcass, as well as acetate-1-C^{14} incorporation rates, were investigated in a comparative study on mice, rats, hamsters and guinea pigs, using a single standard basal diet supplemented in various ways with cholesterol and bile acids. When diets were supplemented with cholesterol, guinea pigs and hamsters accumulated large quantities of this sterol, whereas mice and rats were more refractory. In all species, cholesterol-containing diets inhibited incorporation of acetate-1-C^{14} into liver. None of the cholesterol or bile acid supplements had significant effects on carcass cholesterol concentrations in any of the species. Acetate-1-C^{14} incorporation into carcass remained unaffected in rat, mouse and hamster, but was inhibited in the guinea pig. Those bile acids that are present in the bile of a given species inhibited incorporation of acetate-1-C^{14} into liver cholesterol. Other bile acids had varying effects on cholesterol concentrations and synthesis rates. Hyodeoxycholic acid limited the accumulation of liver and blood cholesterol of animals fed atherogenic diets.

THE EFFECT OF DOSE LEVEL OF ESSENTIAL FATTY ACIDS UPON FATTY ACID COMPOSITION OF THE RAT LIVER. H. Mohrhauer and R. T. Holman (Univ. of Minnesota, The Hormel Inst., Austin, Minn.). *J. Lipid Res.* 4, 151–159 (1963). Dietary linoleate, fed in excess of 1% of calories, maintained good growth and cured fat deficiency. Increasing amounts of dietary linoleate were stored in the liver lipids and converted into fatty acids of the linoleate family—20:4 and 22:4. The concentration of 20:3 was decreased. Dietary arachidonate cured fat deficiency three times more effectively than linoleate. Increasing amounts of dietary arachidonate were stored in liver lipids and converted to $22:5\omega6$. The level of 20:3 was lowered three times more effectively than when linoleate was fed. No fatty acids of the linolenate family were synthesized from linoleate or arachidonate. Dietary linolenate did not support weight gain as efficiently as did linoleate or arachidonate. Fat-deficiency symptoms could not be cured completely. Increasing amounts of dietary linolenate increased the levels of fatty acids of the linolenate family; linolenic acid was stored, and 20:5, $22:5\omega3$, and 22:6 were synthesized from linolenate. The level of 20:3 was lowered in the same fashion as when linoleate or arachidonate was fed. The level of 20:4 was decreased with increasing amounts of dietary linolenate.

ISOLATION AND LIPID ANALYSIS OF LIPID GRANULES FROM EHRLICH ASCITES TUMOR CELLS. J. A. DiPaolo, A. Heining and C. Carruthers (Roswell Park Memorial Inst., New York State Dept. of Health, Buffalo). *Proc. Soc. Exp. Biol. Med.* 113, 68–70 (1963). The lipid composition of lipoid granules of Ehrlich ascites tumor cells was analyzed using silicic acid column and gas-liquid chromatography. Triglycerides formed the largest single pool. Oleic and linoleic acids formed the largest pools in the steroid ester fraction whereas palmitic, stearic, oleic and linoleic acids predominated in the triglyceride fraction.

RATE OF METABOLISM OF 9,10-DIMETHYL-1,2-BENZANTHRACENE IN NEWBORN AND ADULT MICE. I. I. Domsky, W. Lijinsky, K. Spencer and P. Shubik (Div. of Oncology, Chicago Medical School). *Proc. Soc. Exp. Biol. Med.* 113, 110–112 (1963). Determination of the proportion of free 9-10-dimethyl-1,2-benzanthracene remaining in newborn and in adult mice following intraperitoneal injection, revealed that this compound disappeared more quickly from the adult than from the newborn animals. This supports the view that the greater susceptibility of the newborn to tumor induction by this carcinogen is due to greater persistence of the compound in the newborn than in the adult.

TURNOVER OF PALMITATE C-14 IN DIABETICS AND NORMALS. C. R. Ford, R. Stevens, R. E. Bolinger and J. H. Morris (Dept. of Med., Univ. of Kansas Medical Center, Kansas City, Kansas). *Proc. Soc. Exp. Biol. Med.* 113, 177–179 (1963). Turnover rate of free fatty acids was studied during rest and exercise in 8 normals and 28 diabetics using carboxyl labeled palmitate C-14. Conditions during exercise do not satisfy the criteria for steady state dynamics. During rest the turnover rate of free fatty acids does not differ in normals and diabetics. At both higher and lower levels of blood glucose the turnover rate is increased.

FATTY ACID ETHYL ESTER FORMATION DURING ETHANOL METABOLISM IN VIVO. D. W. S. Goodman and D. Deykin (Section on Metabolism, National Heart Inst., Bethesda, Md.). *Proc. Soc. Exp. Biol. Med.* 113, 65–67 (1963). Long-chain fatty acid ethyl esters containing labeled ethanol have been tentatively identified in total body lipid extracts of rats given C^{14}-ethanol intravenously. Identification has included the isolation of a peak of radioactive material with the expected mobility on silicic acid column chromatography, the loss of most of its lipid-soluble radioactivity after hydrolysis, and demonstration of appropriate volatility of the radioactive material on gas-liquid chromatography. About 40% of the total lipid radioactivity was contained in this fraction.

LIPID COMPOSITION AND METABOLISM OF TRICHOMONAS FOETUS. S. Halevy (Laboratory of Nutr., Dept. of Biochem., Hebrew Univ. Hadassah Medical School, Jerusalem, Israel). *Proc. Soc. Exp. Biol. Med.* 113, 47–48 (1963). Lipid content and metabolism of 2 strains of *Trichomonas foetus* were examined. The parasites contained cholesterol-like material in amounts of about one hundred-fold as much as glycerol and about half that of phospholipids. No synthesis of the sterol was detected.

CONJUGATION OF C^{14}-DIETHYLSTILBESTROL BY CHICKEN LIVER IN VITRO. M. L. Hopwood, H. Karg and F. X. Gassner (Endocrine Section, Colorado State Univ., Fort Collins). *Proc. Soc. Exp. Biol. Med.* 113, 233–238 (1963). Chicken liver was incubated with C^{14}-labeled diethylstilbestrol (C^{14}-DES). Without incubation 94.6% of the radioactivity was extracted with ethanol while after incubation only 82.6% was removed from the tissue. Partition of the radioactivity between water and ether at pH 7 gave 7% of the counts in water from unincubated tissue and 75% of the counts in water after incubation. Hydrolysis of the aqueous portion with β-glucuronidase and paper chromatography established that the material was conjugated DES. Assay of the extracts for uterotropic activity using immature mice indicated that the conjugate was but 8% as potent as the free compound although incubation caused a 50% loss of estrogenic potency.

LIPOPROTEIN LIPASE ACTIVITY IN THE DOG PANCREAS AND PANCREATIC JUICE. J. I. Kessler, M. Finkel, D. A. Dreiling and H. D. Janowitz (Div. of Gastroenterology and Nutrition Lab, Dept. of Med. and Pancreatic Res. Lab, Dept. of Surgery, Mount Sinai Hosp., New York City). *Proc. Soc. Exp. Biol. Med.* 113, 127–132 (1963). Lipoprotein lipase (LPL) activity was demonstrated in canine pancreatic juice and pancreas. The LPL activity of the pancreatic juice was augmented by stimulation with secretion and pancreozymin, the known hormonal stimulants of exocrine secretion of the pancreas. An inhibitor(s) of the pancreatic LPL activity was suggested by dilution studies in pancreatic juice and in the pancreas. The possible relationship of the pancreatic LPL activity and its inhibitor(s) to the lipemia accompanying acute pancreatitis is discussed.

THE BIOLOGICAL ACTIVITY OF DI-α-TOCOPHERONE. D. J. Lee, H. H. Draper, J. G. Bergan and A. S. Csallany (Div. of Animal Nutrition, Univ. of Illinois, Urbana). *Proc. Soc. Exp. Biol. Med.* 113, 242–245 (1963). Di-α-tocopherone, a recently characterized metabolite of α-tocopherol isolated from animal tissue, was tested for biological activity with respect to resorption-gestation in vitamin E-deficient rats, nutritional muscular dystrophy in rabbits and hereditary muscular dystrophy in mice. The results indicate that this metabolite has less than 5% of the vitamin E activity of α-tocopherol and that it possesses no therapeutic value in treatment of the congenital myopathy. Its probable role in metabolism is that of a terminal oxidation product rather than an active form of vitamin E.

PHOSPHATIDES AND CHOLESTEROL IN THE RAT BODY: EFFECTS OF GROWTH, DIET AND AGE. T. F. Zucker and L. M. Zucker (Lab. of Comparative Pathology, Stow, Mass.). *J. Nutr.* **80**, 20–24 (1963). Data are presented on the content of phosphatides, free and total cholesterol, and neutral fat in 152 male rats from birth to 3 years of age. The ratio of phosphatides to total cholesterol remained remarkably constant at near 4 (mol ratio of 2) for the first year of life with a variety of diets. Two- and three-year-old rats showed a highly significant decrease in this ratio, corresponding to an increase in total cholesterol of about 10%, with no change in phosphatides. The percentage of free cholesterol decreased steadily throughout life from 90 to 72, diet and senescence having no effect thereon. The pattern of accretion of neutral fat with stock diet was in many respects very different from the common pattern observed for both phosphatides and cholesterol. The substitution of more concentrated, refined or purified diets of varying fat content (2% to approximately 40%) for the crude stock diet led to no change in phosphatides or cholesterol. These same rats showed large increases in neutral fat.

FAT ACCRETION AND GROWTH IN THE RAT. T. F. Zucker and L. M. Zucker (Lab of Comparative Pathology, Stow, Mass.). *J. Nutr.* **80**, 6–19 (1963). The normal course of fat accretion in male rats from birth to 3 years is described. The relative amount of fat and relative size of fat pads increased steadily throughout life (except for a brief cessation in fat accretion at weaning), in a manner closely related to body weight and independent of age. Several new rat strains with extremes of growth or fat accretion, fed the same diet, were used to define and illustrate courses of fat accretion: very large and very small non-obese strains and a hereditarily obese rat. Rats of different known strains fed a variety of more refined diets show a course of fat growth different from that obtained with stock diets. Several types of obesity are discussed: insulin obesity, nutritional obesity, and hereditary obesity. Hereditary size and growth of the rat were readily (in a few generations) altered up or down, by constantly using the largest or the smallest 25% of the population for breeders. It is probable that the large increase in size of some laboratory rats over the past 40 years has been accomplished not only by improvement in stock diets and colony conditions, but also by selection for increased hereditary size.

CHARACTERIZATION OF LIPIDS FROM CANINE ADRENAL GLANDS. T. L. Chang and C. C. Sweeley (Dept. of Biochem. and Nutr., Grad. School of Public Health, Univ. of Pittsburgh, Penn.). *Biochemistry* 2, 592–604 (1963). Neutral lipids, which represented approximately 90% of total adrenal lipids, were isolated by silicic acid chromatography. Methyl esters obtained from cholesterol esters and triglycerides by methanolysis were determined by gas-liquid chromatography. The cholesterol esters were mainly unsaturated, containing high proportions of 8,11,14-eicosatrienoic acid, arachidonic acid, and adrenic acid (7,10,13,16-docosatetraenoic acid) in addition to oleic acid, which was the major component. Over 90% of the cholesterol in canine adrenal gland existed in the esterified form. Adrenal phosphatides were partially purified by silicic acid chromatography. The methyl esters liberated from individual phosphatides by mild alkaline hydrolysis were studied by gas-liquid chromatography. Arachidonic and adrenic acids were distributed in all of the fractions, with relatively higher concentrations in phosphatidylethanolamine. Phosphatidylethanolamine and phosphatidylcholine showed a marked specificity for stearic and palmitic acids, respectively. Lysophosphatidylcholine was surprisingly rich in unsaturated fatty acids.

SEPARATION OF OXIDATIVE FROM PHOSPHORYLATIVE ACTIVITY BY PROTEOLYSIS OF GLYCERALDEHYDE-3-PHOSPHATE DEHYDROGENASE. I. Krimsky and E. Racker (Dept. of Biochem., The Public Health Research Inst. of The City of New York). *Biochemistry* 2, 512–518 (1963). Controlled digestion of glyceraldehyde-3-phosphate dehydrogenase with chymotrypsin resulted in marked changes in molecular size and enzymic properties of the protein. After digestion, the enzyme no longer catalyzed the over-all reaction of oxidative phosphorylation of glyceraldehyde-3-phosphate but retained the ability to oxidize glyceraldehyde in the absence of phosphate at an undiminished or even accelerated rate. Glyceraldehyde-3-phosphate was oxidized, in the presence of monothioglycerol as acyl acceptor, at a somewhat slower rate, whereas with arsenate as acceptor over 95% of the activity was lost after digestion. With enzyme acting stoichiometrically as acyl acceptor, the rate of oxidation of glyceraldehyde-3-phosphate by digested enzyme was unimpaired or accelerated. Threose-2,4-diphosphate, a potent in-

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years in theoretical and applied polarography. Volume II which follows, is more fully directed to applications than is Volume I. Each of the articles is written by an expert on the subject. Despite the multiple authorship, editing of the book has produced a smoothly flowing exposition without sharp breaks in style from chapter to chapter. Where the literary ability of the author is unusually high, as in the masterly chapter on Concentration Polarization and the Study of Electrode Reaction Kinetics, by J. E. B. Randles, or the delightful Recent Advances in Inorganic Polarography, by G. F. Reynolds, editing has not suppressed good writing.

A fine review, Polarographic Literature, by Marie Heyrovská, begins the book. The second chapter, on the diffusion current equation, by Jaroslav Koutecky and Mark von Stackelberg, is a thorough and scholarly theoretical treatment; it is one of two chapters in German. Chapter 3 is The Instantaneous Currents (i-t Curves) on Single Drops, by Jaroslav Kuta and Ivan Smoler. This article effectively discusses single-drop phenomena with respect to both theory and manifestations on typical i-t curves. Paul Delahay has contributed Chapter 4, Double-Layer Structure and Polarographic Theory, in his usual lucid manner. Adsorption in Polarography, by Charles N. Reilley and Werner Stumm, will be of particular interest to many readers of this journal, since it deals largely with the effects of surface-active agents in polarography.

Chapter 6, by Randles, has been mentioned. Chapter 7 is General Theoretical Treatment of the Polarographic Kinetic Currents, by Rudolf Brdicka, Vladimír Hanus, and Jaroslav Koutecky. The general concept of mass transfer in electrode processes is here carefully worked into quantitative descriptions of polarographic currents in certain particular cases. In this chapter the reader becomes deeply immersed in mathematics. Taitiro Fujinaga, in Chapter 8, Constant-Current Polarography and Chronopotentiometry at the Dropping Mercury Electrode, gives the view of one of the orginators of this interesting and sometimes controversial technique. Chapter 9, The Electroreduction of Anions, by Alexander N. Frumkin and Nina Nikolaeva-Fedorovich, represents some of the postwar work done in the U.S.S.R. Here, as in other chapters, the authors enter into the spirit of the collection by pointing out how fruitful have been many of the fields first plowed by Professor Heyrovsky.

Chapter 10, by Reynolds, as noted above, touches many of the more exciting areas of inorganic polarography in a readable descriptive style. It is followed by Mechanism of the Electrode Processes and Structure of Inorganic Complexes, by Antonin A. Vlcek. Both the progress and the continuing difficulties in deducing structures from polarographic behavior are brought out here. Chapter 12 is Polarography of Complex Compounds, by Jirí Koryta; this article treats the determination of stability constants and the kinetics of total electrode processes. Chapter 13, Trends in Organic Polarography, by Petr Zuman and Stanley Wawzonek, is a short, lively review of recent topics. Petr Zuman gives a further discussion of organic groups, this time more structurally oriented, in Current Trends in the Study of the Influence of Structure on the Polarographic Behavior of Organic Substances. The book ends with the second German chapter, on polarography in non-aqueous solutions, by Kurt Schwabe. Some mixed systems of very low water content are shown to behave surprisingly like aqueous solutions.

References are appended to each chapter. I found a few typographical slips, but nothing distressing. One kind of lapse I noticed twice: trade-marked names were used generically with no identification as trade marks. The publisher's editorial staff should see to such matters. The book has the convenient size of, for example, Inorganic Syntheses – slightly larger than 6 x 9 in. An attractive green and white jacket covers a pleasing hard cover of subdued green. Graphs and reproductions of polarograms are sharp and clear. Typography and makeup are excellent.

For a textbook or reference source on polarography one of the standard works would be preferred. For English-speaking chemists these include the books by Meites, by Milner, or by Kolthoff and Lingane. For those already knowledgeable in polarography who wish to have at hand a reasonably up-to-date collection describing most of the important active areas, *Progress in Polarography* is heartily recommended. Issuance of such collections at intervals of ten years or so would be an admirable service to chemists.

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PROGRESS IN POLAROGRAPHY, VOL. II. Edited by Petr Zuman in collaboration with I. M. Kolthoff. (John Wiley and Sons, Inc., Interscience Div., 440 Park Avenue South, New York 16, N. Y. 1962, 450 pages, $15.) This book is the second of two volumes and contains a collection of twenty-three papers, each of which constitutes a chapter in the book. The papers were written by specialists in the field of polarography and electrochemistry in celebration of Nobel Laureate Professor Heyvrosky's seventieth birthday.

The fifteen chapters of the first volume had discussed the advances in the theory of polarography. The chapters in the second volume are primarily descriptive in nature and present the development in the methodology and practices of polarography, in particular, the advances during the past ten years. There is very little consistency in the level or specificity of the material, however, because of the number of contributors and topics. Several of the chapters are too brief and consequently present no more than just a cursory summary of the topic discussed.

The important factors to consider in the collection and measurement of polarographic parameters such as half-wave potentials, wave heights, degree of "reversibility," and capillary constants are treated by Zuman in Chapter 29. The different operational techniques used in measurement of these parameters in classical polarography are also compared and discussed in this chapter.

A brief coverage of theory followed by a discussion of the practical aspects associated with the application of square wave and pulse, single sweep, oxcillographic, and alternating current polarography is found in chapters 19, 20, 21, and 22 respectively. These chapters should serve as an excellent review for those who are unacquainted with these methodologies.

A good survey on the uses, limitations, and properties of other mercury type electrodes, besides the dropping mercury electrode, such as the rotating mercury drop, the streaming mercury, the mercury pool, and the hanging mercury drop electrodes are found in Chapters 16 and 17. A chapter (23) on solid electrodes has also been included.

Polarographic instrumentation is presented in Chapters 24 (United States), 25 (Japan), and 26 (Europe). Chapter 27 has an excellent summary of cell designs and configurations. Since polarographic instrumentation is quite similar irrespective of geographic locations, some of the material presented in chapters 24–27 is redundant in content and scope.

Chapters 18, 28 and 30 through 38 review the application of polarography to the analysis of compounds or elements found in particular fields (medicine, biochemistry, metallurgy, geology, pharmaceuticals, chemical industry), specialties (chromatopolarography), or chemical systems (pesticides, organic reagents, etc.). The long bibliographies

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hibitor of glyceraldehyde or glyceraldehyde-3-phosphate oxidation by native enzyme, had little or no effect on digested enzyme. Acylation of digested enzyme by oxidation of aldehyde not only was more rapid but was more extensive as compared with native enzyme. This phenomenon was shown to be due to a pronounced inhibition of aldehyde oxidation by reduced diphosphopyridine nucleotide in the case of native enzyme. These findings are discussed in reference to the mode of action of glyceraldehyde-3-phosphate dehydrogenase and to problems of oxidative phosphorylation linked to electron transport.

THE IN VITRO CATABOLISM OF CHOLESTEROL: FORMATION OF $3\alpha,7\alpha,12\alpha$-TRIHYDROXYCOPROSTANE FROM CHOLESTEROL IN RAT LIVER. D. Mendelsohn and E. Staple (Dept. of Biochem., School of Med., Univ. of Pennsylvania, Philadelphia 4). *Biochemistry* 2, 577–579 (1963). An enzyme system has been found in rat liver which is capable of converting cholesterol to $3\alpha,7\alpha,12\alpha$-trihydroxycoprostane. This indicates that this compound is one of the intermediates directly on the pathway of catabolism of cholesterol to bile acids. The same enzyme system was also able to degrade cholesterol into a number of products apparently different from $3\alpha,7\alpha,12\alpha$-trihydroxycoprostane. It is tentatively suggested that one of these compounds is 7α-hydroxycholesterol, which can be formed enzymatically from cholesterol in rat liver.

STUDIES ON THE METABOLISM OF ADIPOSE TISSUE. XIII. THE EFFECT OF ANAEROBIC CONDITIONS AND DIETARY REGIME ON THE RESPONSE TO INSULIN AND EPINEPHRINE. E. G. Ball and R. L. Jungas (Dept. of Biological Chem., Harvard Medical School, Boston, Mass.). *Biochemistry* 2, 586–592 (1963). Studies have been made of the effects of epinephrine on the free fatty acid (FFA), glycerol, and lactate production of rat epididymal adipose tissue incubated in a Krebs-Ringer phosphate medium containing no glucose or albumin. Tissue from normally fed, fasted, and fasted-refed animals was employed under both aerobic and anaerobic conditions. Under aerobic conditions tissue from fasted-refed rats produced glycerol at a rate ten times greater than tissue from normally fed animals but had a lower tissue FFA level. Oxygen consumption of this tissue was four times that of normally fed rats. When insulin, 1000 μunits per ml, was also present these effects of epinephrine were sharply reduced. Anaerobic incubation reduced the formation of FFA and glycerol but increased lactate production in both types of tissue.

INFLUENCE OF HORMONES ON FOOD INTAKE AND LIPID DEPOSITION IN CASTRATED PHEASANTS. C. L. Nagra, R. P. Breitenbach and R. K. Meyer (Dept. of Zoology, Univ. of Wisconsin, Madison). *Poultry Sci.* 42, 770–775 (1963). Castrated adult pheasants were administered weekly injections of 35 mg. of testosterone cyclopentylpropionate (235 mg. total dose) for 6.8 weeks or daily injections of either 25 units of prolactin (350 units total dose) or 5 mg. of corticosterone (70 mg, total dose) for two weeks. Depo-testosterone, prolactin, or corticosterone increased food intake at least 38 percent. Corticosterone also reduced adrenal weight 21 percent and increased hepatic weight 100 percent and lipid content of the liver 168 percent. Depo-testosterone caused an 86 percent hypertrophy of the adrenal and elevated the weight of the heart 41 percent. It also increased body weight 20 percent. The heart of pheasants undergoes a seasonal weight cycle, and castration reduces its weight. Among intact males this organ is heaviest during April.

FATTY-ACID COMPOSITION OF PLASMA, AORTA AND LIVER LIPIDS IN COCKERELS WITH STILBESTROL- OR CHOLESTEROL-INDUCED HYPERLIPAEMIA. R. Blomstrand and S. Christensen (Dept. of Clinical Chemistry, Karolinska Institutet, Serafimerlasarettet, Stockholm, Sweden; Dept. of Physiology, Univ. of Aarhus, Denmark). *J. Atheroscler. Res.* 3, 142–152 (1963). The lipids from plasma, aortic intima-media and liver of control cockerels and of birds made hyperlipaemic either by the addition of 1% of cholesterol plus 3% of peanut oil to the diet, or by subcutaneous implantation of stilbestrol tablets have been studied. Lipids were fractionated into cholesterol esters, triglycerides and phospholipids. The fatty-acid composition of these fractions was determined by gas-liquid chromatography. When the concentration of any lipid fraction was considerably above the control value the amount of oleic acid as percentage of the fatty acids of that fraction was increased; often the percentage was more than doubled relative to control values.

HYPERLIPEMIA ACCOMPANIED BY A LIPOPROTEIN OF HIGH ELECTROPHORETIC MOBILITY IN ROOKS. I. Lélek, B. L. Tóth, J. Nicsovics and A. Pálfy (State Sanatorium, Sopron; Veterinary Univ. of Budapest; Municipal Hospital, Sopron, Hungary). *J. Atheroscler. Res.* 3, 137–141 (1963). In rooks high serum lipid values were found, as well as macroscopically visible lipemia without, by morphological examinations, any symptoms of atherosclerosis. The hyperlipemia was accompanied by lipoproteins of high electrophoretic mobility. Reasons for not finding atherosclerosis in rooks despite high plasma lipid levels are discussed.

THE RELATIONSHIP OF EDEMATOUS REACTION IN ARTERIES TO ATHEROSCLEROSIS AND THROMBOSIS. T. Shimamoto (Inst. for Cardiovascular Diseases, Med. School, Tokyo Medical and Dental Univ., Tokyo, Japan). *J. Atheroscler. Res.* 3, 87–102 (1963). A microstructural characteristic of the larger arteries is the unusually well-developed extracellular space seen in the muscular and subendothelial layers showing a clear cut contrast with arterioles and veins. This extracellular space is considered to be an intercellular irrigating system which connects with the vasa vasorum and irrigates the arterial wall. The administration of substances capable of inducing an atheromatous change experimentally, such as cholesterol or a physiologically significant dose of adrenalin, was found to induce an edematous reaction and striking enlargement of the extracellular space accompanied by fractionation of elastic fibres and of collagen fibrils. At the same time, tissue thromboplastin and a platelet-attracting substance were presumed to be released into the vessel lumen. Recovery from stagnation of edematous fluid is delayed in the innermost muscular and sub-endothelial layers. These edematous changes in the large artery are considered to be an important mechanism in atherogenesis and thrombogenesis. Substances capable of preventing the edematous reaction were also found to prevent experimentally-induced thrombosis and atheroma.

MORPHOLOGICAL CHANGES IN HYPERCHOLESTEROLEMIC RABBITS FED SATURATED FAT WITHOUT SUPPLEMENTARY CHOLESTEROL. N. G. Stormby and G. Wigand (Dept. of Pathology and Dept. of Medicine, Univ. of Lund, Sweden). *J. Atheroscler. Res.* 3, 103–120 (1963). Hypercholesterolemia was induced in 7-month-old rabbits by a semisynthetic diet with no cholesterol added containing either hydrogenated coconut oil or glyceryl trilaurate. The aorta and coronary arteries showed atheromatous changes resembling the picture described in rabbits fed cholesterol. In the heart, the vessels of the papillary muscles were involved first and most severely. In the liver, kidneys, spleen, and adrenals abundant fat was often seen, particularly in the reticulo-endothelial cells. The microscopic picture of these organs had the character of "cholesterol storage disease." Rabbits which had been fed hydrogenated coconut oil for one year, showed severe liver hemosiderosis. The morphological changes and their relation to human atherosclerosis are discussed.

HYPERCHOLESTEROLEMIA IN SUCKLING RATS. A. Bizzi, E. Veneroni and S. Garattini (Dept. of Pharmacology, Medical School, Milan, Italy). *J. Atheroscler. Res.* 3, 121–128 (1963). Suckling rats show a level of serum cholesterol about twice as high as the level present in adult rats. No changes were observed in liver cholesterol. Phospholipids but not triglycerides are also higher in serum of sucklings that in serum of adult rats. This hypercholesterolemia is sensitive to thyroxine and its congeners, benzmalacene, and difenesenic acid but not to biphenyl α-butyric acid, nicotinic acid, triparanol, heparinoid, hexestrol and ethionine. The suckling rats are more sensitive to the effect of thyroxine than adult rats. The administration of propylthiouracil to lactating rats results in a large increase of serum cholesterol in suckling rats.

AORTIC ATHEROSCLEROSIS IN WHITE CARNEAU PIGEONS: THE EFFECT OF HYPERCHOLESTEROLEMIA AND CERTAIN HYPOCHOLESTEROLEMIC AGENTS. B. A. Kottke, J. L. Juergens and J. L. Bollman (Sec. of Med., Mayo Clinic and Mayo Foundation, Rochester, Minn.). *J. Atheroscler. Res.* 3, 129–136 (1963). The effects of hypercholesterolemia secondary to induced hypothyroidism and of hypercholesterolemia produced by cholesterol feeding on spontaneous atherosclerosis of the White Carneau pigeon was investigated. The degree of atherosclerosis in a group of hypothyroid hypercholesterolemic birds was similar to that in euthyroid normocholesterolemic controls. Feeding dietary cholesterol to normal adult pigeons of this species did not aggravate the degree of atherosclerosis unless plasma cholesterol levels greater than 1500 mg/100 ml were produced. Triparanol produced some lowering of plasma cholesterol levels in normal pigeons but had no effect on the cholesterol levels of the hypothyroid birds. Nicotinic acid and cholestyramine had no effect on the plasma cholesterol levels

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Bond Award to Rouser—Nicolaides and Wheeler Honored

The celebrated Bond Award Gold Medal was awarded at the Minneapolis Fall Meeting to George Rouser, City of Hope Medical Center, for excellence of content and delivery of a technical paper presented at the AOCS 54th Annual Meeting in Atlanta.

Dr. Rouser's paper, "Lipid Composition of Beef Brain, Beef Liver, and the Sea Anemone: Two Approaches to Quantitative Fractionation of Complex Lipid Mixtures," was co-authored by Gene Kritchevsky, Dorothy Heller, and Ellen Lieber, who were also honored.

Honorable Mention Awards were presented to Nicholas Nicolaides and D. H. Wheeler.

The Rouser and Nicolaides papers were published in the Symposium on Special Methods in Lipid Chemistry of the September, 1963 issue of *JAOCS*. The third is in press.

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Thomas, Krishnamurthy and McCarthy Capture MacGee Awards

Three graduate students, doing work in the field of fats and oils, were recognized at the Minneapolis Meeting during the Banquet, Tuesday evening, Oct. 1, 1963, under the new MacGee Award System. A total of five students have received the award this year.

H. V. Thomas, School of Public Health, U.C.L.A.; R. G. Krishnamurthy, Dept. of Food Science, Rutgers University; and M. J. McCarthy, Dept. of Biochemistry, Queen's University, Can., were the recipients of an expense-paid trip to Minneapolis. The award included round trip fare, registration and activities fees, hotel room, and meal expense.

Designed to stimulate interest in the field at the graduate level of study, this award affords outstanding students the opportunity of hearing an AOCS Technical Program. The MacGee Award is under the sponsorship of the AOCS Education Committee, N. H. Kuhrt, Chairman, and is administered by the MacGee Award Sub-Committee, S. S. Chang, Chairman. Two previous awards were made at the Atlanta Spring Meeting to R. D. Wood and L. D. Williams.

The AOCS Governing Board has granted $1,000 per year for the MacGee Awards.

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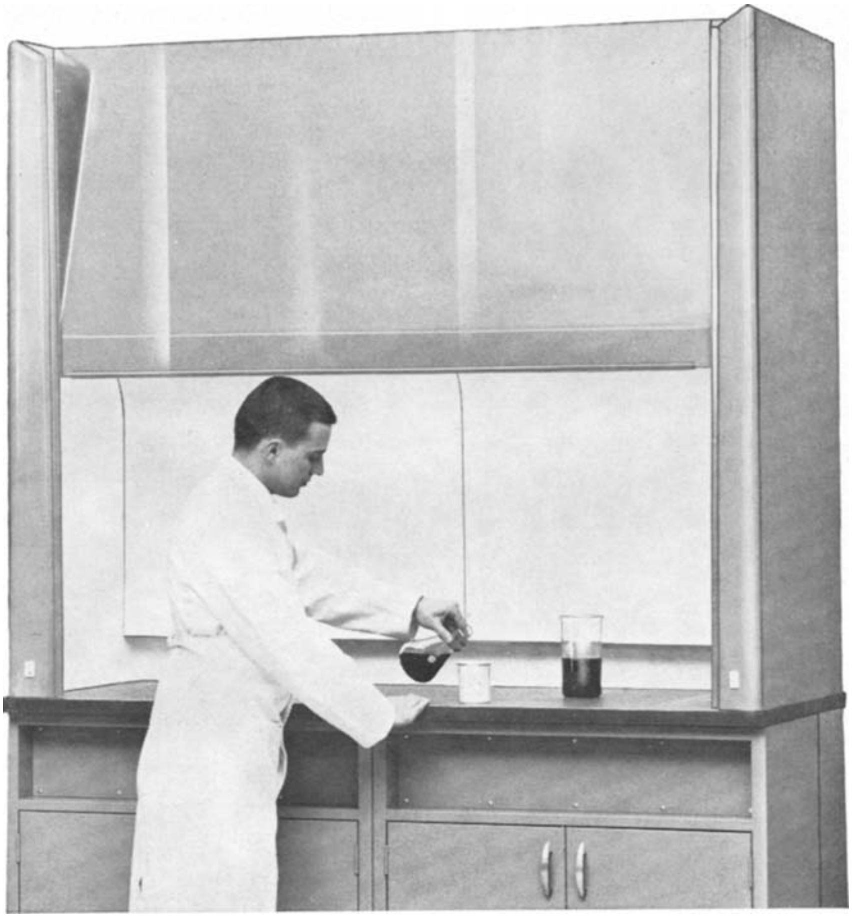

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of either normal or hypothyroid hypercholesterolemic pigeons. None of the three drugs studied had any effect on atherosclerosis in either normal or hypothyroid hypercholesterolemic groups of pigeons. Triparanol was found to be toxic to this species.

Serum cholesterol in a military population. R. A. Fischer (Fort Sam Houston). *J. Am. Dietet. Assoc.* **42**, 511–517 (1963). A study of total serum cholesterol and its relation to certain factors, particularly age, weight, and somatotype, was conducted on 476 healthy men between the ages of 17 and 44 years. There appeared to be a direct relationship between serum cholesterol and obesity, in terms of weight in excess of the predicted standard body weight. Mean serum cholesterol was 200.2 mg./100 ml., ranging from 182.5 for those below age 20 to 238.1 for the 30–34 age group. There appears to be a general increase in cholesterol level with aging from the 2nd to the 6th decade. The over-all incidence of hypercholesteremia (250 mg./100 ml. and greater) was 9.8%. Of the three somatotypes, the endomorphic group had the highest mean serum cholesterol, 241.1 mg./100 ml; the incidence of hypercholesteremia in this group was 43% higher than in the total population.

Use of oils obtained by the esterification of distilled fatty acids for the enrichment of chicken rations. A. Dangouman and H. Debruyne (Municipal Inst. of Res. on Human and Animal Nutr., Bordeaux, Fr.). *Rev. Franc. Corps Gras* **10** (5), 259–271 (1963). It has been shown that fatty acid esters can be added to chicken diets satisfactorily.

Studies on the nutritive value of raw and blended passion fruit seed oil. J. S. Pruthi (Centr. Feed Tech. Res. Inst., Mysore, India). *Indian Oilseeds J.* **7** (1), 60–65 (1963). Results of studies on the nutritive value of raw passion fruit (*Passiflora edulis Sims.*) seed oil and its blend with peanut oil (50/50) have been presented and discussed. Feeding the raw oil or the blended oil (50/50) at the 10% level in a 15% casein diet resulted in a better retention of calcium and phosphorus than in the fat free diet. However, no appreciable difference was noticed in nitrogen assimilation, blood analysis, liver weights, or histology, moisture content and liver lipids, bone formation, ash content, etc.

Effect of dietary and injected fat on the fatty acid composition of bovine depot fat and milk fat. S. B. Tove, and R. D. Mochrie (Nutrition and Animal and Dairy Husbandy Sec., Dept., of Animal Science, N. Carolina State College, Raleigh). *J. Dairy Sci.* **46**, 686–689 (1963). The ingestion of soybean oil by cows resulted in a distinct increase in stearic acid of both milk fat and adipose tissue, but oleic acid increased only in the milk fat. Linoleic acid increased only slightly when soybeans were fed, whereas intravenous infusion of a cottonseed oil emulsion produced a dramatic increase in the linoleate content of milk fat. These findings support the view that dietary unsaturated fatty acids are hydrogenated by the rumen microflora, then deposited by the animal. If the rumen is bypassed, unsaturated fatty acids are deposited without hydrogenation.

Effects of acid mucopolysaccharides on growth rates and constituent lipids of tissue cultures. L. M. Morrison, O. A. Schjeide, J. J. Quilligan, Jr., L. Freeman and R. Holeman (Loma Linda Univ. School of Med., Lab of Nuclear Med. and Radiation Biology, Univ. of Calif., Los Angeles). *Proc. Soc. Exp. Biol. Med.* **113**, 362–366 (1963). Lipid analysis of chick aorta intima and HeLa cell tissue cultures confirms histological studies indicating that total lipids and cholesterol are significantly reduced per unit volume of cells when very small amounts of calf aorta extracts or the mucopolysaccharide, chondroitin sulfate A, are added to the cultures. The lipid clearing effect noted in cells is often associated with stimulation of cellular growth and with a process of lipid dilution by cellular multiplication. However, in the case of one aortic extract, lipid clearing took place without significant stimulation of cellular growth. The latter suggests a specific cellular clearing effect as distinguished from lipid dilution by cell division and growth.

Interlipid relationships in clinical atherosclerosis. F. J. Moore, J. Marmorston and O. T. Kuzma (Dept. of Public Health and Med., Univ. of Southern Calif. School of Med., Los Angeles County Hosp. and Cedars of Lebanon Hosp., Los Angeles). *Proc. Soc. Exp. Biol. Med.* **113**, 350–356 (1963). Serum cholesterol and phospholipid determinations were made in 4 groups of subjects: 79 normal men without evident disease (''well controls,'' WC), 80 men suffering from a variety of chronic disorders but without evidence of coronary artery or cerebrovascular disease (''sick controls,'' SC), 223 men who had recovered from a frank myocardial infarction (MI), and 150 men who had recovered from a frank cerebral thrombosis (CT). In each group the cholesterol-phospholipid relationship appeared linear on a log-log scale and linear log-log regressions were calculated for each of the 4 groups. In the 2 control groups, WC and SC, showing no evidence of coronary or cerebral atherosclerosis, the quantitative relationship between cholesterol and phospholipids was the same, confirming reports of other workers. Also, age did not affect this relationship. In the 2 atherosclerosis groups, a substantial and highly significant abnormality in the quantitative relationship between cholesterol and phospholipids was observed (both groups showing the same abnormality). There is, therefore, a disturbance in the normal balance between these 2 kinds of serum lipid in men with atherosclerosis. This imbalance was present over the entire range of observed cholesterol levels and is thought to represent some important and consistent lipid abnormality characteristic of atherosclerosis.

A 1 carbon degradation of the long chain fatty acids of brain sphingolipids. J. F. Mead and G. M. Levis (Lab of Nuclear Med. and Radiation Biology, Dept. of Biophysics and Nuclear Med., Univ. of Calif., Los Angeles 24). *J. Biol. Chem.* **238**, 1634–1636 (1963). After intraperitoneal injection of carboxyl-labeled acetate, rats were kept for 5 months and the cerebroside fatty acids of their brains were isolated. The 23 and 24 carbon normal and hydroxy acids were isolated and degraded stepwise. In confirmation of earlier results, cerebronic (α-hydroxytetracosanoic) acid contained almost all of its activity in about equal distribution among the odd carbons. The 23 carbon acids, however, had radioactivity predominantly in the even carbons. This finding lends support to a proposed 1 carbon or α-oxidation degradation system for the long chain saturated fatty acids of the brain.

Cholesterol esterification by adrenal homogenates. C. Longcope and R. H. Williams (Dept. of Med., Univ. of Washington School of Medicine, Seattle). *Proc. Soc. Exp. Biol. Med.* **113**, 754–756 (1963). Cholesterol-esterifying was demonstrated in homogenates of rat, rabbit and guina pig adrenals. Cholesterol-esterifying activity was found to be deficient in homogenates of bovine adrenal tissue. This suggests that the amount of cholesterol esters in the adrenal gland is dependent on the level of cholesterol-esterifying activity in the gland, rather than on blood levels of cholesterol, free or esterified.

Ketonic intermediates in the demethylation of lanosterol. M. Lindberg, F. Gautschi, and K. Bloch (J. B. Conant Lab, Harvard Univ., Cambridge 38, Mass.). *J. Biol. Chem.* **238**, 1661–1664 (1963). The transformation of $\Delta^{8,24}$-lanostadien-3-one, of 4,4-dimethyl-Δ^{8}-cholesterol, and of 4,4-dimethyl-Δ^{8}-cholesten-3-one to cholesterol in liver homogenates is demonstrated. Several doubly labeled sterols containing H^3 in the 3α-position and C^{14} introduced by biosynthesis have been prepared. On conversion to cholesterol, 3α-H^3-lanosterol loses 100%, 3α-H^3-4,4-dimethyl-Δ_8-cholesterol 90%, and 3α-H^3-zymosterol 20 to 40% of the tritium label. 2-H^3-4α-methyl-Δ^{8}-cholestenol is efficiently converted to cholesterol; the corresponding 3α-H^3-stenol yields only insignificant amounts of labeled cholesterol. The results demonstrate that the formation of 3-ketones is a significant and possibly obligatory reaction in the transformation of lanosterol to cholesterol.

Influence of alpha-ketoacids on the respiration of brain in vitro. R. K. Howell and M. Lee (Dept. of Preventive Med., Univ. of Calif. School of Med., San Francisco). *Proc. Soc. Exp. Biol. Med.* **113**, 660–663 (1963). The effects of L-leucine, L-valine, L-phenylalanine, *alpha*-ketoisocaproic acid, *alpha*-ketoisovaleric acid, phenylpyruvic acid, and phenylacetic acid on oxygen consumption by slices or homogenates of rat brain were measured. None of these substrates significantly inhibited oxygen uptake by rat brain homogenates. L-leucine, L-valine, and L-phenylalanine were also found not to significantly depress oxygen uptake by brain slices. On the other hand, *alpha*-ketoisocaproic acid, *alpha*-ketoisovaleric acid, phenylpyruvic acid, and phenylacetic acid (at concentrations of 0.01 *M*) did depress oxygen utilization by brain slices to the extent of 10–27% of control values. It is suggested that the central nervous system dysfunction observed in patients with certain hereditary diseases characterized by defects in amino acid metabolism may be related to the accumulation of *alpha*-ketoacids which occurs in these diseases.

Effect of dietary fat and minerals on the incidence of diarrhea and rate of passage of diets in the digestive tract of dairy calves. L. J. Bush, J. D. Schuh, N. B. Tennille, and G. R. Waller (Dept. of Dairy, Oklahoma Agr. Expt. Sta., Stillwater). *J. Dairy Sci.* **46**, 703–709 (1963). Effects of adding animal tallow, minerals simulating whey ash, or both to a basal nonfat milk solids diet for calves were determined. Highly significant differences ($P < 0.01$) in the over-all incidence of diarrhea were observed among groups of calves fed the different diets in one trial extending for 21 days, but not in another trial of shorter duration. The added minerals increased the over-all incidence of diarrhea in the calves, whereas the animal tallow decreased its incidence in comparison to diets without added fat. The rather severe, apparently noninfectious, diarrhea subsided after several days, even though the same amount of the respective diets was fed each day throughout the experiment, indicating a marked adaptation of the calves to diarrheic diets. Addition of minerals to the diet appeared to accelerate, whereas added fat tended to delay, the rate of abomasal evacuation, as determined by radiography of 16 calves at four and 11 days of age. There was little evidence that the rate of abomasal evacuation was definitely related to the severity of diarrhea on the days the radiographs were made. The average weight, pH, and chemical composition of digestive tract contents in calves at 17 days of age were not related to fecal consistency at the time of slaughter.

Separation of some alkaloids, steroids, and synthetic compounds by thin-layer chromatography. B. P. Korzun, L. Dorfman, and S. M. Brody (Res. Dept., CIBA Pharmaceutical Co., Div. of CIBA Corp., Summit, N.J.). *Anal. Chem.* **35**, 950–952 (1963). The unique advantages of thin-layer chromatography has led to the development of a preparative method. Preparative thin-layer chromatography has proved effective for separation of alkaloids, steroids, and synthetic compounds in amounts of 100 to 500 mg. Large glass plates, 10 by 15 inches, are coated with a layer of absorbent 1 mm. thick and activated by heating. The sample mixture is applied as a streak across the bottom of the plate and developed with a solvent. After development, the bands are located by ultraviolet light or chemical reagent and scraped from the plate and each band eluted. A detailed account of the procedure, equipment, and examples of application is presented.

Beta-carotene production. R. C. Fulde (Swift & Co.). *U.S. 3,095,357.* A culture of carotenoid-producing microorganisms of the family *Choanephoraceae* is dispersed on particulate surface bearing material. The material contains nutrients assimilable by the micro-organisms and is characterized by greater than 4% of fatty material selected from the group consisting of animal fats, vegetable oils, and fatty acids of vegetable oils. The inoculated material is incubated under surface aerobic conditions conducive to active propagation of the micro-organisms.

Production of vitamin A aldehyde. H. C. Klein and D. R. Grasetti (Nopco Chemical Co.). *U.S. 3,097,244.* The described process comprises heating with iodine in the presence of an inert solvent a quaternary salt of an amine compound which has (1) vitamin A activity; (2) an absorption maximum in the ultra-violet region of the spectrum at 325 mμ and an extinction coefficient of about 1000; (3) an infra-red pattern having the characteristic amine band; (4) when treated with HBr gives a product having an absorption maximum in the u.v. region at 330 mμ; (5) when treated with phosphoric acid gives a product having an absorption maximum at 328–330 mμ; (6) contains the vitamin A chromophoric system; (7) contains a hexamethylene tetramine fragment; (8) has a Kjeldahl nitrogen content of about 9.6%; (9) when treated with acetic anhydride gives a product which shows an amide band when subjected to infra-red analysis; (10) when treated with iodine is converted to vitamin A aldehyde; and (11) when treated with aluminum isopropoxide is converted to vitamin A amine.

Component glycerides of an Indian fresh-water fish fat. S. P. Pathak and B. R. Reddy (Banaras Hindu University). *J. Sci. Food Agr.* **14**, 395–398 (1963). The glyceride structure of *Mystus seenghala* visceral fat has been investigated by fractional crystallization of the neutral fat from acetone, light petroleum and ethyl ether. The composition of the fractions was examined by the lithium salt-acetone and lead salt-alcohol methods and by methyl ester distillation. The component glycerides are (1) 27.5% disaturated monounsaturated, (2) 61.8% monosaturated diunsaturated, and (3) 10.7% triunsaturated. According to the authors, the glyceride composition of this fat does not conform with any of the glyceride theories.

Effects of palmitic, oleic, and linoleic acids on hepatic and vascular lipid deposits. R. J. Morin, Y. Shimma, S. Bernick, and R. B. Alfin-Slater (Division of Nutritional Science, School of Public Health, Univ. California, L. A.). *J. Lipid Res.* **4**, 351–361 (1963). Hepatic and vascular lipid deposits were produced in rats by a diet containing hydrogenated coconut oil plus cholesterol. The effects of different amounts of palmitic, oleic, and linoleic acids on these deposits were determined by histological examination and chemical analysis using silicic acid and gas-liquid chromatography. Marked regression of hepatic sterol esters and triglycerides was noted in the animals fed 5% or more of linoleate, but no effect on coronary lipid deposits was observed. When compared to a fat-free diet, oleate seemed to have no effect, whereas palmitate prevented the regression of hepatic sterol esters. The alterations in the fatty acid pattern of all the hepatic lipid fractions produced in animals by the cholesterol and coconut oil diet were reversed by 5% or more of dietary linoleate. There is suggestive evidence that linoleate induces increased synthesis of arachidonate. The latter fatty acid may then be incorporated into the structure of some phospholipids, which probably have a vital function in the transport of cholesterol and glycerides.

• Drying Oils and Paints

Properties of paints as affected by ultraviolet radiation in a vacuum. II. D. E. Field, J. E. Cowling and F. M. Noonan. *U.S. Naval Res. Lab., Washington, Interim Rept. No.* 5737, 1962, 28 pp. (1962); AD–273–716. Organic coatings are being studied as one possible means of achieving temperature control within space vehicles. Their usefulness in the space environment is limited by their physical and chemical stability in space. It is shown that the optical properties of most organic coatings are changed on exposure to intense U.V. radiation in high vacuum. Of the reflective pigments studied, those containing ZnS and leafing Al are shown to be most stable in this radiation. (Rev. Current Lit. Paint Allied Ind.)

Catalysts of film formation and degradation. R. R. Myers. *Off. Dig.* **34**, No. 449, 575–589 (1962). The drying and ageing of films by chemical means are discussed, with the objective of elucidating the role of metallic catalysts in both stages of the history of a film. Experimental work is cited which reveals that the electronic structure of the metal ion influences both the rate and, to a lesser extent, the course of a reaction. Alterations in the electronic structure by complex formation are considered. Film degradation is a more difficult process to study than is film formation, because the changes in mechanical properties are slower and more subtle in the case of degradation. The influence of driers on ageing is not necessarily deleterious and actually may have beneficial side effects. (Rev. Current Lit. Paint Allied Ind.)

Oil varnishes from methylolated rosin. *Annual Report* **1960–61**, 17 (Hyderabad Reg. Res. Lab.). Methylolated rosin was prepared by reacting rosin with formaldehyde with and without oxalic acid catalysts. The product was reacted with either drying oils or their fatty acids and the final acidity reduced by reaction with glycerin. The varnishes thus prepared were not found superior to the conventional ester gum varnishes. (Rev. Current Lit. Paint Allied Ind.)

Paints from self-spray containers. H. Kossmann. *Ind.-Lack.-Betrieb* **30** (1), 8–12 (1962). The principles of selection of the actuating gas and of formulation of the lacquer for aerosol paint packs are discussed. The gas is commonly a mixture of a fluorinated hydrocarbon and a hydrocarbon (3:1). Low-pressure (3 atm.) and high-pressure (> 10 atm.) systems may be employed. Tables are given of solubility parameters for gas solvents and of the b.p. of a number of

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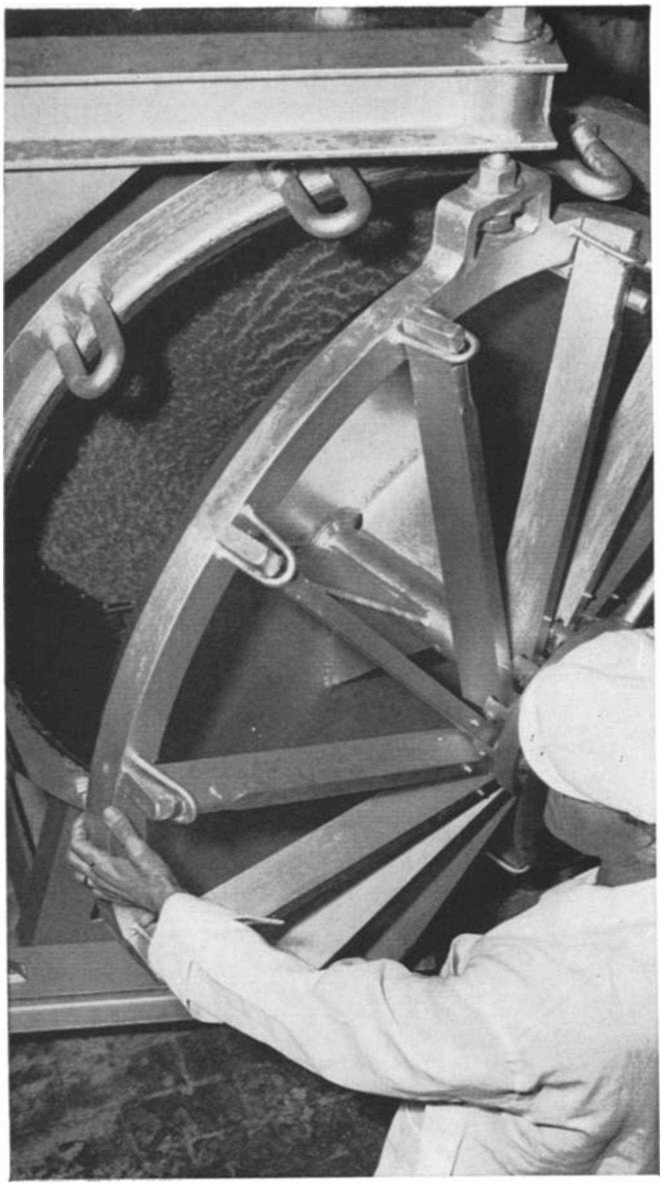

New Books . . . .

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associated with some of these chapters will be of interest to the analytical polarographer. The reviews in these latter chapters were not meant to be comprehensive, and with this limitation in mind, the summary or tabulation of compounds analyzable by polarography should be worthwhile additions to the analyst's file.

The book appears to be devoid of any major error. It should serve as a reference book for those who wish to review the many practical aspects in the more recent developments of polarography.

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Advances in Enzymology, Vol. 24, edited by F. F. Nord (John Wiley & Sons, Inc., N. Y., 572 pp., 1962, $16.00). The dark recesses of the mechanisms of enzyme action are slowly becoming illuminated. The approaches to this glimmer of understanding have necessarily been varied, as exemplified by the nine articles in this volume.

In accord with, and building upon, the simplicity of the Watson & Crick genetic code model, there appears to be a regular distribution, or periodicity, of certain amino acids throughout the length of a protein chain, as pointed out by Professor Sorm in his article on Identical and Analogous Peptide Structures in Proteins. This periodicity carries over of course to the active site of an enzyme and aids in explaining the organic mechanism by which enzymes function. Chapters on Chemical Modifications of Proteins, Effect of Ionizing Radiation on Enzymes, Molecular Properties of Glycogen Phosphorylose, and The Metabolism of Spermatozoa all emphasize the molecular concept (i.e., the chemical mechanisms) of modern biochemistry. All of these plus some high powered physical chemistry are beautifully coalesced by Professors Scheraga and Rupley in their article on the Structure and Function of Ribonuclease. For those who wish to know how an enzyme is isolated, characterized, modified, and then has its structure correlated with its function, I particularly commend this article.

Professor Westheimer then presents a thoroughly stimulating article on Mechanisms Related to Enzyme Catalysis in which he poses several rather difficult thermodynamic questions. For example, the magnitude of the catalysis by ribonuclease of the hydrolysis of ribonucleic acid is estimated to be of the order of 10^9 or 10^{10}. This enormous rate factor by which the enzyme speeds up the reaction requires an explanation, yet satisfactory answers are not as yet available. Professor Westheimer further states that, "one of the functions of an enzyme is to serve as an entropy trap; that is, an enzyme can overcome the unfavorable entropy of activation usually inherent in a chemical reaction." This of course begs the question—how, chemically, is this accomplished? Theories are offered but they are like viewing that famous painting, "White Cow in a Snowstorm."

Finally, a useful chapter entitled Distribution of Enzymes Between Subcellular Fractions in Animal Tissue is presented which should prove to be of value as a reference tool.

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Standard Methods of Chemical Analysis, Vol. II A and II B, Industrial and Natural Products and Noninstrumental Methods, edited by F. J. Welcher, (D. Van Nostrand, xi + 2609 pages, 1963, $50). This book is the second in a series of three volumes on practical methods of chemical analysis. Volume I covers the elements, Volume II (under review) deals with the analysis of various materials, largely by noninstrumental methods, and Volume III (to be published) will handle instrumental methods.

Volume II consists of two parts. The first part (530 pages) contains 21 chapters on apparatus, operations, and reagents. Topics are laboratory apparatus, sampling, detection (qualitative), mechanical separation, separation by precipitation, separation by electrolysis, solvent extraction, separation by distillation and evaporation, chromatography, ion exchange, gravimetric precipitates, titrations, nonaqueous titrations, colorimetric and electrometric determination of pH, statistics, the microscope, quantitative microchemistry, quantitative organic analysis, solubility measurement, and water determination. With a few exceptions, the chapters in this section seem to be of a general or survey nature, being valuable for introduction to the topics dealt with.

The second part (24 chapters, 2007 pages) gives practical techniques for the analysis of various materials, including commercial acids and bases, air pollutants, iron and steel, ferrous and non-ferrous alloys, protein hydrolyzates (for amino acids), bituminous substances, coal and coke, cement, clinical samples, explosives and propellants, fats, fertilizers, fuel and other gases, paints, paper (including wood and pulp), pesticides, petroleum and its products, plastics, poisons, rubber and its products, silicates (rocks, glass, and slag), soaps and detergents, soils, vitamins, and water. The most commonly used methods are described in sufficient detail to permit their performance without recourse to other works. Many of the methods are those recommended by ASTM, AOAC, TAPPI, and the American Oil Chemists' Society.

The index (70 pages) is thorough. The technical quality of the whole work is good. The writing style and the printing are also of high quality, and typographical errors are few. (However, the meaning of "hydraulic calcium silicates" still escapes this reviewer.) Because the text was contributed by 67 authors, it suffers some defects. The bibliographies for the chapters are not uniform. Although they are generally good and modern, the references in some chapters are inadequate or are not tied into the text. There is also some repetition: the Karl Fischer titration is described at least five times, each time at about the same level, and directions for the calcium oxalate precipitation are given in ten different places.

The wisdom of intentionally deemphasizing instrumental methods may be questioned. However, since this deemphasis presumably will be remedied in Volume III, no judgment can be rendered at this time. Overall, however, the preceding shortcomings are trivial in a work of this size. The editor is to be congratulated on the performance of what must have been an arduous and time-consuming task. There is no other single, recent work in the English language that fulfills the same needs of the analyst as this volume does, and it should be made accessible to all practising analysts.

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• *Referee Application*

First Notice. M. M. Phillippe, Shuey & Co., P. O. Box 663, Savannah, Ga., has applied for a Referee Certificate on oil cake and meal. The Chairman of the Examination Board should be contacted by interested parties wishing to comment on this certification. Please write to N. W. Ziels, Chairman of the Examination Board, Lever Bros. Co., 1200 Calumet Ave., Hammond, Ind.

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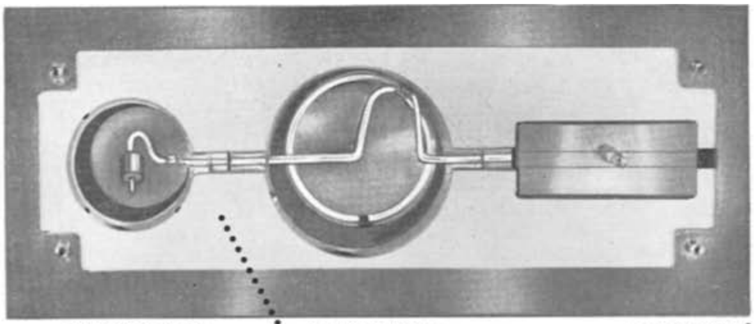

(Continued from page 39)

actuating gases, to help in the selection of suitable materials. (Rev. Current Lit. Paint Allied Ind.)

Interfacial electrochemical phenomena of pigment/vehicle systems. I. Y. Oyabu, H. Kawai and Y. Nakanisi. *J. Jap. Soc. Col. Mat.*, **35**, No. 3, 98–104 (1962). The interfacial electrokinetics phenomena of rutile TiO_2 pigments in paint vehicle solutions, which are composed of alkyd resins, melamine resins and xylene, have been investigated by means of electrophoresis. Based on the Helmholtz's hypothesis of interfacial electrical double layer, ζ-potentials have been computed. The ζ-potential of TiO_2 was positive in sign in alkyd resin/xylene systems and negative in melamine resin/xylene systems. Plotting logarithms of both potentials and resin concentrations, it is observed that the points lie very nearly on a straight line. However, for resin solutions whose concentrations are lower than 3% for alkyd and 10% for melamine, the above mentioned linear relations do not hold. In pigment, alkyd resin, melamine resin and xylene systems, the sequence in which the resin solutions are brought into contact with the pigment affects the ζ-potential and viscosity of the system, *i.e.*, when pigment and melamine resin solution are mixed previously, the viscosity is higher than when mixed otherwise. As the concentration of alkyd resin increases, the ζ-potential of the system approaches the value of that of alkyd resin/xylene/pigment systems. (Rev. Current Lit. Paint Allied Ind.)

New push for polyesters. Anon. *Chem. Week* **90** (2), 41 (1962). Tetrahydrophthalic anhydride is combined with fumaric acid, diethylene glycol and styrene to produce new high-quality polyester coating systems suitable for furniture, automobile and appliance finishing and possibly for paper-coating, can coating and machinery finishing. The new coatings are characterised by deep gloss without buffing, flexibility in coating thickness in single-spray application, excellent adhesion to steel and other metals, good light stability and quick cure. (Rev. Current Lit. Paint Allied Ind.)

Surfactant-modified calcined clays in alkyd flat paints. H. B. Naylor. *Off Dig.* **34**, No. 444, 51–58 (1962). Since the first introduction of calcined clays there has been an increasing awareness of their shortcomings. Particularly, excessive quantities of these products in a given formulation tend to impair the properties of enamel hold-out, sheen uniformity, stain removal, *etc.* In this paper a surfactant-coated product is discussed which improves these properties and permits the use of increased amounts of calcined clays. Although only solvent systems are discussed, this work points the way towards development of products suitable for water paints. (Rev. Current Lit. Paint Allied Ind.)

Critical pigment volume concentration and the theory of volumetric relations. A. Flamm. *Peint. Pig. Vernis* **38** (6), 320–335 (1962). European as well as American work is surveyed. (Rev. Current Lit. Paint Allied Ind.)

Common market problems for the European paint industry. C. Hill-Madsen. *Paint J.* **14**, No. 110, 475–477 (1962). The likely effect on Scandinavian industry and the role of the European Committee of Paint and Printing Ink Manufacturers are discussed. (Rev. Current Lit. Paint Allied Ind.)

Development of heat-resistant paints for metals. E. Mileski and A. E. Raeber. *Southern Research Inst., Birmingham, Ala., Rept.* No. 6151-1264-IV, 13 pp., (1961); *Final Rept.* 38 pp. (1962). Progress is reported on the preparation and evaluation of air-drying heat-resistant coatings for metal surfaces. The coatings are made by reacting P compounds with metal oxides or ceramic frits. Coatings based on ZnO, dimethyl hydrogen phosphite and ethyl acid phosphate with small amounts of colloidal silica had higher gloss and were harder than the same coatings without the silica. These coatings also had excellent heat resistance. Wetting agents in metal oxide/organo-P coatings cause the coatings to blister when subjected to high temperatures. In the system ZnO/dimethyl hydrogen phosphite/ethyl acid phosphate, the ratio of the solid to the liquid components was a major factor in determining the physical properties of the coating. Coatings made from mixtures high in ZnO and low in the liquid P compounds were brittle. Coatings made from mixtures low in ZnO and high in P compounds were soft but had high gloss. Formulations and coating procedures were developed that could produce coatings on metal substrates with any of the several properties that were desired, but it was not yet possible to obtain all of these properties simultaneously and reproducibly. The most promising coatings contain acid phosphates. The ceramic frits, some metal zirconates and bis(2-ethylhexyl) phosphite merit further study. Reaction mechanism studies indicate that dimethyl hydrogen phosphite hydrolyses and reacts with ZnO to form an amorphous polymeric product that is insoluble in organic solvents. (Rev. Current Lit. Paint Allied Ind.)

Recent developments in organic coatings. D. H. Grover. *Applied Plastics* **5**, 25 (6 pp.) (1962). It is pointed out that only since the advent of completely synthetic raw materials have substantial advances in extending the range of finishes available been made. The major classes of metal finishing materials are reviewed. (Rev. Current Lit. Paint Allied Ind.)

Paint for repelling animals. T. Yonesawa. *Jap.* 4611/62. Paint for repelling animals is made by mixing a naphthalene derivative which contains a hydroxyl or methyl radical with a solution or emulsion vehicle. *E.g.*, 10 g. of linseed oil, 10 g. of terpene resin and 30 g. of creosote are mixed. Separately 5 g. of β-naphthol and 10 g. of methylnaphthalene are dissolved in 35 g. of methanol. Then both solutions are mixed. (Rev. Current Lit. Paint Allied Ind.)

Paint additives—their chemistry and application. W. J. Stewart. *Double Liaison* **88**, 77 (11 pp.) (1962). The additives considered are driers, antiskinning agents, bodying agents and fungicides. The specific performance of each additive is shown. Co and Mn are classified as active catalysts for air drying and Co, Mn, V, Fe, Ce and the rare earths for stoving, the other metals being auxiliary matalysts. Antiskinning products are mainly phenols and oximes; the former are chiefly used in dip coating. Bodying agents have three principal actions and the author describes the relationship between these actions in various kinds of paint. It follows that it is impossible to choose a single product for all paint systems. This study ends by the examination of fungicides. Hg salts are toxic; Cu 8-quinolinolate is non-toxic but imparts a greenish yellow colour to the film; thiophthalimides are very effective and have the advantage of imparting little or no colour to the paint. (Rev. Current Lit. Paint Allied Ind.)

Recent advances in thixotropic paints. J. R. Berry. *Paint Manuf.*, **32**, No. 12, 431 (7 pp.) (1962). Incorporation of thioxtropic alkyds in paints leads to improved application properties, including a satisfactory combination of sag resistance and flow out. The instrumental methods employed in formulating such coatings are discussed, together with the results obtained with one particular thixotropic alkyd developed for use in undercoats. (Rev. Current Lit. Paint Allied Ind.)

Solventless varnish. Meidensha Electric Mfg. Co. *Jap.* 2976/62. To prepare a solventless varnish of the epoxy-modified unsaturated alkyd resin type, an excess of a trihydric alcohol is added to a mixture of one or more saturated or unsaturated dibasic acids and hydroxy acids. The condensate so obtained is condensed with maleic anhydride in an amount more than equivalent to the remaining hydroxy radicals. The unsaturated alkyd resin obtained by reaction of the alkyd resin and the glycidyl ether is dissolved in a monomer containing vinyl and/or allyl compound. *E.g.*, 92 g. of glycerol, 100 g. of ricinoleic acid and 100 g. of terephthalic acid are mixed and CO_2 gas is introduced until the whole is clear. Then 198 g. of ricinoleic acid and 147 g. of maleic anhydride are added. A reddish-brown viscous resin is obtained. To 100 g. of the resin 26 g. of Epikote 828 are added and 65 g. of styrene is dissolved in the mixture, which is filtered, 2% of di-tert.-butyl peroxide being added to the filtrate. (Rev. Current Lit. Paint Allied Ind.)

Fire- and chemical-resistant paint. Chugoku Paint Co. *Jap.* 2975/62. Fire- and chemical-resistant paint is prepared by mixing epoxy resin varnish with silicone resin varnish and heat-resistant pigment. *E.g.*, 10% of silicone resin varnish, 70% of epoxy resin varnish, 7% of urea resin varnish and 13% of TiO_2 are mixed together. (Rev. Current Lit. Paint Allied Ind.)

PESTICIDAL PAINT. T. Yamamoto. *Jap.* 10,350/62. The composition consists of active principle, sublimation agent and drying oil. As the active principle, γ-hexachlorocyclohexane (BHC), hexachloroepoxyoctahydroendoendodimethanonaphthalene and naphthalene may be used, the last compound also serving as the sublimation agent. Drying oils such as linseed oil, tung oil, *etc.*, and soyabean oil, cotton seed oil, sesame oil, groundnut oil, turpentine, copal, gum arabic, synthetic resins and so on, are used as the constituents to make a suitable form of preparation. Since the preparation becomes finely porous by the effect of subliming naphthalene as it hardens, the application to the bark of trees does not interfere with the function of the bark. *E.g.*, 0·1% BHC, 0·1% Endrin, 10% crystalline naphthalene, 2·0% turpentine and 60·0% tung oil are mixed with vehicle such as talcum powder or kaolin. The preparation applied near the holes of longhorn beetles in a tree killed all the beetles within a few minutes. When the preparation was applied to the bark of the tree in a horizontally parallel-striped pattern of 30 cm. intervals, only the beetles in the areas where the preparation was applied were effectively prevented from swarming and egg-laying. This effect persisted over one month without noxious effects upon the tree. (Rev. Current Lit. Paint Allied Ind.)

HEAT-RESISTANT COATING. C. Oda. *Brit.* 889,866. Coatings resistant to temperatures up to 2000C comprise exfoliated vermiculite, colloidal silica, ZrO_2, TiO_2, white cement, active carbon and a polyester resin. (Rev. Current Lit. Paint Allied Ind.)

• Detergents

DETERMINATION OF ETHANOL. I. G. Agranovich (Shebekino Combine of Synthetic Fatty Acids and Fatty Alcohols). *Maslob.-Zhir. Prom.* 29(1), 36 (1963). In the oxidation of paraffin hydrocarbons boiling in the 275–320C range, a complex mixture of organic compounds is formed. This mixture includes monatomic alcohols, ketones, glycols, keto alcohols, and hydrocarbons. After sulfating to obtain wetting agents, and because sulfating does not exceed 60%, the mixture contains a great number of non-sulfated compounds as fatty alcohols, olefins, ketones, keto alcohols, etc. In the process of purifying the sulfated product, a control method for determining ethanol in this mixture was needed. For this, a method from the literature was used, and the results compared with those of distillation. The method used involved oxidation of the alcohol with potassium bichromate and titrating the excess bichromate with Mohr's salt. Direct distillation did not give accurate results. Results of the investigation showed that the bichromate method could be used for determining the alcohol content in the sulfated product before and after evaporation, in benzine solution, and in solutions with a high alcohol content. It is necessary to dilute the solutions to be analyzed so that the alcohol content does not exceed 10%.

MONOGLYCERIDES AND THEIR DERIVATIVES. I. SOME PROPERTIES OF POLYOXYETHYLENE MONOGLYCERIDES. Shoji Miyagawa, Tatsuo Kitagawa, and Hiroshi Sone (Riken Vitamin Oil Co., Ltd., Tokyo). *Yukagaku* 12, 295–9 (1963). Polyoxyethylene derivatives of monoglyceride were prepared by addition polymerization of about 5 and 20 moles of ethylene oxide to monoglycerides synthesized from hydrogenated coconut oil, partly hydrogenated beef tallow, fully hydrogenated beef tallow or cotton seed stearins. The surface activity of these products was studied and compared with that of commercial polyoxyethylene sorbitan fatty acid monoesters (Tween). The results indicated that all of these derivatives were as good as Tween in surface activity. The 20 moles addition products were superior to Tween in interfacial tension, emulsifying power and permeability.

DYNAMIC SYSTEMS ARE USED TO PROBE BIODEGRADATION. Anon. *Chem. & Eng. News* 41 (25), 50 (1963). The ability of bacteria to degrade various sulfonated surfactants was studied using a continuous, three-stage process designed to simulate commercial waste disposal plants. Surfactant biodegradability in this dynamic system roughly paralleled the results of static tests previously reported. Mechanism studies showed that initial microbial attack on alkylbenzene sulfonates occurred at the methyl group most distant from the aromatic ring. Subsequent oxidation formed a terminal carboxyl group, and the side chain was then degraded by conventional β-oxidation.

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