

# ABSTRACTS

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

## • Fats and Oils

RICE BRAN MILLING. D. Ramachar, R. K. Viswarradham and S. D. Thirrimala Rao (Oil Tech. Res. Inst., Anantapur, India). *Oils Oilseeds J. (Bombay)* 21, No. 10, 13-14 (1969). The technical feasibility of milling rice bran in an expeller has been studied. Mixing rice bran (18% oil) with equal quantities of first-pressed peanut cake (15% oil content) and crushing the mixture in a Rosedown Max oil expeller using a 0.5 hour cook, yielded about 6% oil based upon the weight of the rice bran crushed.

THE SYNTHESIS OF PROSTAGLANDIN E<sub>1</sub> AND RELATED SUBSTANCES. W. P. Schneider, U. Axen, F. H. Lincoln, J. E. Pike and J. L. Thompson (Experimental Chem. Unit, Upjohn Co., Kalamazoo 49001). *J. Am. Chem. Soc.* 91, 5372-5378 (1969). The total synthesis of crystalline *dl*-prostaglandin E<sub>1</sub> and its methyl ester via bicyclo(3.1.0)hexanone intermediates is described. The same reaction sequence also produces *dl*-8-isoprostaglandin E<sub>1</sub>, the 15-epimers of these prostaglandins, and also *dl*-PGA<sub>1</sub>, and *dl*-PGB<sub>1</sub> methyl esters.

DETERMINATION OF THE NATURE OF MEAT FROM THE FAT COMPONENT AND SUBSTANCES ACCOMPANYING FATS. J. Wurziger and G. Hensel (Chem. and Nutrition Res. Lab. of the Hygiene Inst., Free and Hansestadt, Hamburg, W. Ger.). *Fette Seifen Anstrichmittel* 71, 144-151 (1969). It is possible to distinguish between beef, pork, horse, kangaroo, rabbit, tiger and elephant meat in food products. Distinction is made on the basis of the polyunsaturated fatty acids and the cholesterol of the meat fats.

APPLICATION OF UV SPECTROPHOTOMETRY IN THE INVESTIGATION OF OXIDATION AND POLYMERIZATION OF FATS. B. A. J. Sedlacek (Inst. for Nutrition Res., Prague, Czechoslovakia). *Fette Seifen Anstrichmittel* 71, 133-138 (1969). Sunflower oil was heated in air, an air steam, and in a nitrogen stream. Using the direct UV method the first maximum of extinction at 243 m $\mu$  of heated sunflower oil is related to viscosity, refractive index and specific weight, but is not related to peroxide value and aldehyde content.

VISCOSITIES AND VISCOSITY-TEMPERATURE RELATIONSHIPS OF ALKYL CYCLOALKANES, ALKYL BENZENES, ALKANES AND SOME ETHYLENE GLYCOL ETHERS COMPARED TO N-ALKANES. R. Riem-schneider and G.-A. Hoger (Inst. for Biochem., Free Univ., Berlin, 1 Berlin 19, Volivarallee 8, Berlin, Ger.). *Fette Seifen Anstrichmittel* 71, 128-132 (1969). Kinematic viscosities of several alkyl cycloalkanes at different temperatures were determined. The viscosities at 20C and the viscosity-temperature relationship of alkyl cycloalkanes were compared to those of alkyl benzenes, alkenes, alkanes and some ethylene glycol ethers.

STRUCTURE DETERMINATION OF METHYL ESTERS OF CYCLIC FATTY ACIDS. I. COMPOSITION OF MIXTURES CONTAINING METHYL ESTERS OF AROMATIC FATTY ACIDS OBTAINED FROM PRODUCTS OF CYCLISATION AND AROMATISATION OF LINOLEIC ACID, METHYL LINOLEATE AND THE METHYL ESTERS OF LINSEED AND TUNG OIL FATTY ACIDS. H. Scharmann, W. R. Eckert and A. Zeman (Lever Res. Lab., Hamburg, W. Ger.). *Fette Seifen Anstrichmittel* 71, 118-121 (1969). The composition of methyl ester mixtures of aromatic fatty acids obtained by alkaline cyclisation and catalytic aromatisation of linolenic acid and methyl linoleate was determined. All the isomeric o-alkyl substituted methyl esters of aromatic fatty acids (n = 0 to 11) could be identified by IR, UV, mass spectrometry, gas chromatography and by comparison with synthetic substances. The distribution of isomers in mixtures obtained by various procedures was determined by gas chromatography. O-Dodecylphenol was found to be a by-product in the catalytic aromatisation of free linoleic acid.

AUTOXIDATION OF SATURATED FATTY ACIDS V: THE ACTION OF OXYGEN AND THE FORMATION OF PEROXIDES DURING THE OXIDATION OF LAURIC AND STEARIC ACIDS AND THEIR METHYL ESTERS. H. Thaler and H.-J. Kleinau (Inst. for Food Chemistry, Tech. Univ. Braunschweig, W. Ger.). *Fette Seifen Anstrichmittel* 71, 92-98 (1969). No unsaturated substances were found in the products of oxidation. Alkan-2-ones and alkanals containing one carbon atom less than the fatty chain were identified as the primary products of the degradation of the acids and esters. From the composition and periodic occurrence of the products of degradation, it was concluded that preferentially a beta oxidation occurred. The formation of alkanals having chain lengths shorter by one carbon atom than the starting materials indicates alpha oxidation as well, but at a rate much slower than beta oxidation.

REACTIONS OF METHYL RICINOLEATE AND METHYL ACETYL-RICINOLEATE WITH MERCURIC ACETATE IN HOT ACETIC ACID. Y. Toyama and K. Takaoka (Dept. Applied Chem., Faculty of Engineering, Toyo Univ., Kawagoe-shi, Saitama-ken, Japan). *Fette Seifen Anstrichmittel* 71, 88-92 (1969). In the reaction of methyl ricinoleate and mercuric acetate in glacial acetic acid at 115C, an acetoxy-acetoxymercuric complex is formed which decomposes as the reaction proceeds and completely disappears to give non-mercurial products. The latter contain 9-acetoxy-12-hydroxy-10-, 10-acetoxy-12-hydroxy-8- and 12-hydroxy-9-octadecenoates together with small amounts of 10,12-octadecadienoate. The hydroxy group is partially acetylated, while the ethylenic bond is partially *trans*-isomerized. Methyl ricinoleate and methyl acetylricinoleate are less readily acetoxyated than oleate and linoleate. This indicates a steric hindrance exerted by the hydroxyl and acetoxy groups to the reaction of mercuric acetate and the ethylenic bond located near these groups.

THE OCCURRENCE OF PHENOLIC SUBSTANCES IN NATURAL FATTY RAW MATERIALS AND THEIR REMOVAL. K. Thewalt, A. Pastura and G. Renckhoff (Dynamit Nobel Res. Lab., Witten, W. Ger.). *Fette Seifen Anstrichmittel* 71, 85-88 (1969). Using paper and gas chromatography, various phenolic compounds such as phenol and cresol were found in coconut oil and in products derived from coconut oil. The amounts of these phenolic materials in coconut oil ranged from 10<sup>-2</sup> to 10<sup>-5</sup> weight percent. The origin of these substances is discussed. A process employing formaldehyde for the removal of phenols is discussed.

DIRECT DETERMINATION OF TRACE METALS IN FATS AND OILS BY ATOMIC ABSORPTION SPECTROSCOPY. R. Guillaumin (Labs. de l'Inst. des Corps Gras, Paris). *Rev. Franc. Corps Gras* 16, 497-500 (1969). The method described is based on the direct use of solutions of lipids in organic solvents. It permits simple and rapid preparation and analysis. The minimum quantities of metals detectable by this procedure are: Fe, 0.1 ppm; Cu, 0.05 ppm; Ni, 0.5 ppm; Na, 0.1 ppm; K, 0.05 ppm; Ca, 0.4 ppm; and Mg, 0.005 ppm.

EFFECT OF THE COMPOSITION OF THE FATTY PHASE ON THE CONSISTENCY OF MARGARINES. E. Sambuc, M. Naudet and G. Raymond (Lab. Nat. des Matieres Grasses, ITERG, Faculte des Sciences, Marseilles). *Rev. Franc. Corps Gras* 16, 489-496 (1969). The margarine oil used in these experiments was composed of liquid oil (peanut oil), hard fat with a narrow melting range (coconut oil) and hard fat with a wider melting range (a mixture of four parts by weight of whale oil hydrogenated to a 44C melting point and five parts of palm oil). Consistency was measured as a resistance to extrusion in a special test and penetration of a sharply-pointed cone. A series of curves at different temperatures show the effects of varying proportions of these components.

MARGARINE PACKAGING: MATERIALS AND MACHINES. J. Auvinet (Soc. d'Emballages Plastiques, Neuilly-sur-Seine). *Rev. Franc. Corps Gras* 16, 473-480 (1969). Methods of packaging margarine for shipment from factories to store storage areas are discussed, taking account of transit between them and storage at different points along the way. The properties of various materials of different suitability for margarine packaging are tabulated.

MODERN TECHNIQUES FOR PROCESSING MARGARINE. I. Blanc. *Rev. Franc. Corps Gras* 16, 457-471 (1969). Modern process-

(Continued on page 16A)

## HAHN LABORATORIES

Consulting and Analytical  
Chemists

1111 Flora St. P.O. Box 1177 Columbia, S.C. 29202

## • Industry Items

L. F. Christianson, Chairman of the board and President of ELECTRONIC ASSOCIATES, INC., and E. L. Ginzton, Chairman of the board and Chief Executive Officer of VARIAN ASSOCIATES, today jointly announced that their companies have reached a preliminary agreement for the acquisition of the assets and business of Electronic Associates, Inc., for stock of Varian Associates. One full share of Varian Associates common stock will be issued for each 1.6 shares of Electronic Associates, Inc., common stock. Varian Associates, with headquarters in Palo Alto, California, is a manufacturer of microwave and power tubes, scientific analytical instruments and other electronic products. Electronic Associates, Inc., is a manufacturer of general purpose, electronic analog, analog/hybrid, digital computing and electronic systems and precision electronic plotting equipment. The heads of the two companies noted that the terms of the acquisition are in the preliminary stage and that the proposal is subject to the completion of a definite agreement, as well as necessary approval of the Directors and Stockholders.

A new company, LOVIBOND OF AMERICA INC., Albertson, L.I., N.Y., has been formed to handle U.S. sales of the range of products made by the Tintometer Ltd., of Salisbury, England. The range includes colorimeters and comparators for chemical analysis. Up to now sales in America have been handled by Hayes G. Schimp Inc. of 870 Willis Avenue, Albertson, Long Island. The new company will have the same address and Mrs. Betty Czernba, daughter of the Schimp company's founder, will be its president.

Establishment of an Akron, Ohio, sales office for the Catalysts Division of Chemetron Corporation is announced by J. W. Benedict, division vice president. The office, located at 60 Seiberling Street, will be headed by Richard W. Voight Jr., sales engineer. Chemetron produces industrial and medical gases and related products, chemicals, metal products and process equipment.

UNIVERSAL INDUSTRIES CORPORATION, Santa Fe Springs, Calif., announces formation of the Unimetries Universal Corporation, a subsidiary manufacturing a new and unique patented line of micro syringes and other scientific laboratory equipment. Key applications for the new syringes include injecting samples into gas chromatographs, one of the most widely used and sensitive instruments for analytical chemistry techniques.

Complete product specifications information will be available in November. The new division is located at 11791 East Slauson Avenue, Santa Fe Springs, California 90670.

Witeco Chemical Corporation announced that the SOCIETÀ ITALIANA DELLA UNION CHIMIQUE BELGE S.p.A. (S.I.U.C.B.) of Italy will build a new plant and offices in San Martino-Rho, province of Milan, Italy. The announcement was made by Witeco Chemical. The Argus Chemical Corporation, a subsidiary of Witeco Chemical, jointly owns the Italian company with The UCB Group of Brussels, Belgium. Construction of the new plant and offices will begin this fall on a ten acre site purchased earlier this year by the Italian company in San Martino-Rho. Present facilities of S.I.U.C.B. are located in the suburbs of Milan. Completion of construction is scheduled by the end of 1970. The expansion program is due to increased demand for the products of the Italian company in recent years.

SCIENTIFIC MANUFACTURING INDUSTRIES, Emeryville, Ca., announces the acquisition of the American Optical Company's thin layer, paper and column chromatography lines, including the A. O. fraction collector, TLC adsorbents and plate spreaders, aerosol reagent sprays, and developing jars. SMI will market these chromatography tools through local laboratory supply distributors and will temporarily continue to take orders using A.O. catalogue numbers.

An ion exchange process for recovery of chromates from solution was introduced by NALCO CHEMICAL Co., Chicago, Ill., at the recent Water Pollution Control Federation exhibit in Dallas. The system is effective on many cooling tower blowdown streams and can be adapted to other chromate applications. Chromate formulations have received wide acceptance as cooling system corrosion inhibitors, but can be potential stream pollutants. Discharge rates are regulated by law in most states. Because of their efficiency, many plants will welcome the opportunity to continue using chromate inhibitors without creating pollution problems. An important feature of Nalco's recovery system is the value of the chromate-rich solution produced on regeneration of the ion exchange resin. The solution is stored and recycled to the cooling system. With blowdown streams of 100 gpm or more, savings in inhibitor costs pay for the recovery plant. It is often practical to combine blowdown streams from several different cooling systems for processing in the recovery plant. A bulletin on the ion exchange system and its application to cooling tower waste streams is available.

The ARKANSAS GRAIN CORP., Stuttgart, Ark., started operations in their new hydrogenation plant in the beginning of October. The plant is designed to harden 12 cars per day of soybean oil from the plant's refinery in Stuttgart. The facility also includes a tank farm for various hardened oils, a winterizing plant and a packaging and shipping plant. ENGINEERING MANAGEMENT, INC., Des Plaines, Ill., furnished the hydrogenation equipment and Arkansas Grain Corporation used its own personnel to erect all of the buildings, equipment, piping and all related equipment.

## Northeast Section Plans 1970 Symposium

The Northeast Section of the American Oil Chemists' Society has selected Manny Eijadi as Chairman of the Ninth Annual Symposium to be held at the Military Park Hotel, Newark, New Jersey, on April 14, 1970. Mr. Eijadi has chosen a working committee consisting of George Raupp, Dan Meshnick, Robert Casparian, Art Wrigley, Don Fritz, August Rossetto, Frank Naughton, Henry Salomon and Stanley Dominik.



Manuche Eijadi

The Symposium will feature the Processing and Utilization of Synthetic Fatty Acids for the Fats and Oil Industry. Four papers are proposed for the morning session to review the application, synthesis, hydrogenation and economics of synthetic fatty acids. For the afternoon session, it is proposed that John Monick of Colgate Palmolive Company speak on a spectrum of fatty alcohols, followed by a talk on hydrogenation of fatty acids, alcohols, nitriles and amines.

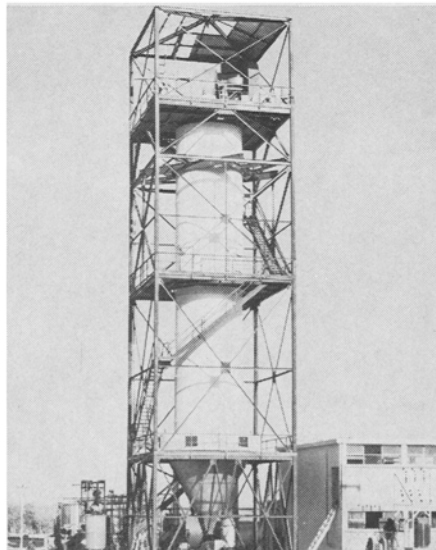
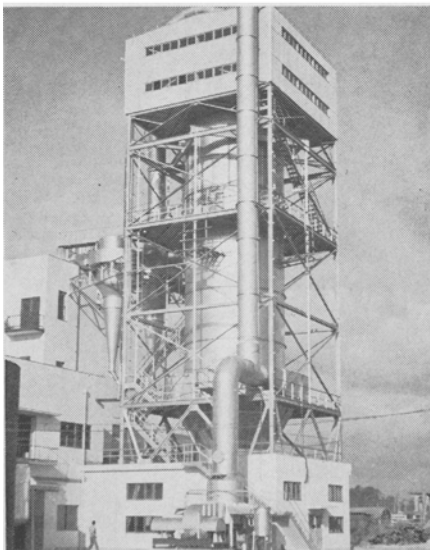
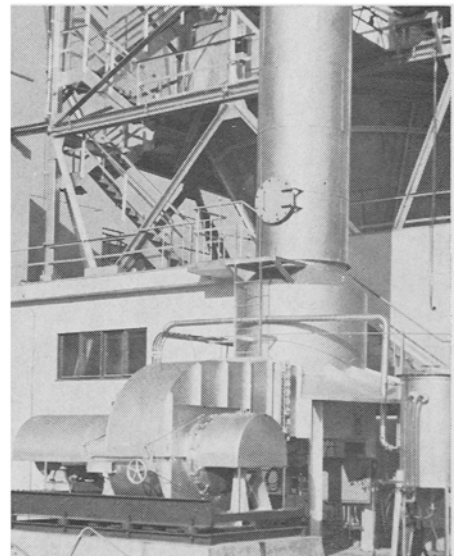
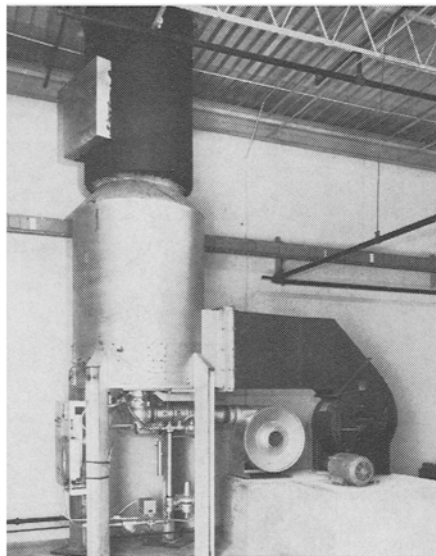
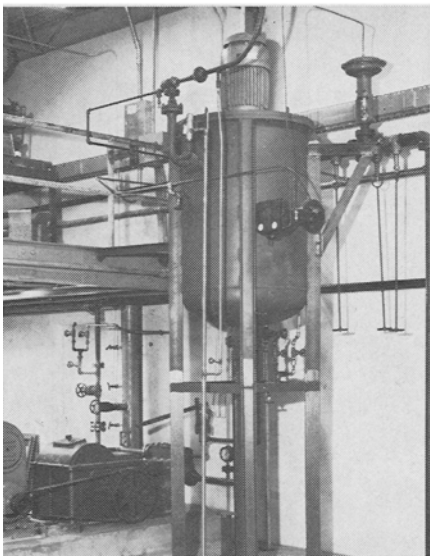
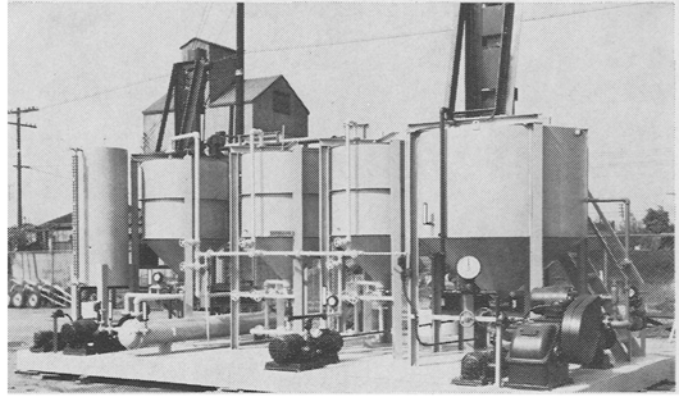
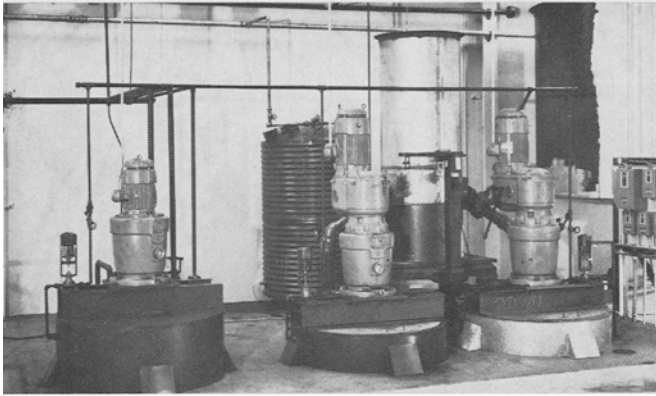
The luncheon speaker will be Juan Lefevich, News Director of the Interamerican Broadcasting Network. Mr. Lefevich will speak on the growth of the fats and oil industry in Latin America and its effect on the American markets. The talk promises to be one of the highlights of the meeting.

Further information on the Symposium may be obtained from Manny Eijadi, Drew Chemical Corporation, 416 Division St., Boonton, New Jersey. Additional data will also be forthcoming in the next issue of JAOCS.

# W & S SYNTHETIC DETERG

## DESIGNED FOR FLEXIBLE & EFFICIE

SOME INSTALLATIONS PRODUCING SYNTHETIC DETERGENTS



# ENT PLANTS NT OPERATIONS

## SULFONATION SYSTEM —

The system for sulfonation is arranged for continuous operation using oleum and a material such as alkane, glyceride oils, fatty acids, tall oil, etc. With slight changes the system may be operated batchwise. Major features of the system are based on the use of a unique dual mixer for reagents wherein exceptionally high shear rates are developed and accurate control of phase conditions is maintained in the sulfonic acid separating step. Close temperature control preserves reactant color throughout the operation.

## SLURRY PREPARATION —

This operation is one of preparing a mixture of the active synthetic and builders, brighteners, soil suspending agents and other ingredients to produce a pumpable mass free of lumps and of uniform solids and air content. For maximum operating economy in drying, the moisture content of the slurry is maintained as low as practical. The crutcher operates batchwise and may be charged with either the sulfonic acid or its sodium salt depending upon its characteristics. The Booster smooths out batch variations and operates continuously as does the balance of the plant. Deaeration, as indicated, is optional depending upon density requirements. In most cases, it may be eliminated. The critical step of grinding centrifugally assures elimination of particles which might block nozzles and valves in the high pressure system operating at 250-5000 psig, usually about 1000 psig.

## SPRAY DRYING —

Drying of the sprayed slurry is accomplished by counter-current flow of air in the drying tower. Slurry is sprayed down from the top of the tower. Product characteristics are readily varied by adjusting the elevation of the nozzles in the tower. Depending on the nature of the product, inlet air temperature may vary from 500° F to 900° F and exhaust air at about 200° F to 220° F. Exhaust air is cleaned by cyclone dust separators which perform efficiently. Where maximum precaution is essential, wet scrubbing may follow the cyclone separators. Product from the tower is preferably moved on an oscillating conveyor to air lift for recovery in a cyclone separator to be screened, perfumed and packaged or stored.

WURSTER & SANGER  
DO BRASIL  
Caixa Postal 7707  
Sao Paulo, Brasil



LICENSEE:  
Stork Smulders N.V.  
P.O. Box 108  
Amstelveen, Holland

Rep: The E. J. Nell Company  
P.O. Box 612, Manila, Philippines

Rep: Arturo Samudio & Cia. Ltda.  
Calle 37 No. 44-40 Barranquilla, Colombia

**WURSTER & SANGER, INC., Dept. B, 164 W. 144th Street,  
Chicago (Riverdale), Ill. 60627, CABLE: WURSANCHEM**

*A Division of Jacobs Engineering Co., Pasadena, Calif. — Oak Brook, Ill. — Linden, N.J.*

## • Local Section News

### Northeast Section

The December meeting of the Northeast Section took place in the Military Park Hotel in Newark, New Jersey. The chairman of the meeting, Robert Casparian, introduced the speaker, W. R. Bradley, who lectured on water and air pollution problems of edible fat plants. Mr. Bradley covered many facets of the field including the points of view of industry as well as of State law enforcing agencies. Following are the photographs taken at the meeting:



Left to right: W. R. Bradley of W. R. Bradley Associates, A. N. Wrigley of USDA, Philadelphia, Pa., Robert Casparian of Carver Greenfield, and D. J. Meshnick of Drew Chemical Corp.



Left to right: H. G. Salomon of L. A. Salomon & Bros., Inc., Manuchehr Eijadi of Drew Chemical Corp. and B. Kipperman of Norda Chemical.



Left to right: H. C. Yeamakis, Best Foods Div., CPC Int'l. Inc.; Isaiah Robinson, Technical Oil Products Inc.; C. W. Nagengast, Best Foods Div., CPC Int'l Inc.; and A. C. Geisler, Technical Oil Products Inc.

(Continued from page 12A)

ing of margarine is discussed. Chill rolls and Votators are described at length. The different ways of arranging the A and B units as well as ways of feeding the two phases and recycling part of the charge are shown with the aid of diagrams and step-by-step descriptions of the processes. These different arrangements should permit processing most of the oil blends and margarine formulations likely to be encountered. Finally, some advantages and disadvantages of the newer equipment are discussed.

THE STATE OF MARGARINE LEGISLATION IN FRANCE. PROSPECTIVES IN THE E.E.C. AND UNDER THE CODEX ALIMENTARIUS. R. Souverain. *Rev. Franc. Corps Gras* 16, 481-488 (1969). Regulations concerning margarine vary considerably from one country to another. In an attempt to harmonize the regulations, the Codex Alimentarius Commission (FAO/WHO) and the EEC have each prepared drafts. The 1969 temporary Codex standard specifies composition, cleanliness, appearance and control criteria. They have been carefully formulated and may be used in many different parts of the world. The standard is submitted to the different governments for approval. The proposed 1969 regulations of the EEC covering the same areas are more closely defined and exacting. However, in spite of the satisfactory consumer protection afforded by these two sets of regulations, those in France are more rigorous and restrictive. It is expected that the margarine regulations imposed in the countries of the Common Market will be decided toward the end of 1969.

IDENTIFICATION OF CERAMIDE PHOSPHORYLETHANOLAMINE AND CERAMIDE PHOSPHORYLGLYCEROL IN THE LIPIDS OF AN ANAEROBIC BACTERIUM. J. P. LaBach and D. C. White (Dept. of Biochem., Univ. of Kentucky, Med. Center, Lexington, Ky. 40506). *J. Lipid Res.* 10, 528-34 (1969). Nearly half the phospholipids isolated from the anaerobic bacterium *Bacteroides melaninogenicus* are phosphosphingolipids. The two major phosphosphingolipids have been characterized as ceramide phosphorylethanolamine and ceramide phosphorylglycerol. The long-chain bases of these phosphosphingolipids appear to have branched and normal saturated carbon chains of 17, 18 and 19 atoms; the phosphate is at the 1-position of the long-chain base. The composition of the amide-linked fatty acids of the phosphosphingolipids differs from that of the ester-linked fatty acids of the diacylphosphoglycerides in having a higher percentage of 14:0, 17:0 and 18:0 acids as well as containing nearly all the monoenoic fatty acids found in the bacterial lipids. The finding of phosphosphingolipids in bacteria is exceedingly rare and to our knowledge ceramide phosphorylglycerol has not been previously found in nature.

REACTIVITY OF PLASMALOGENS: KINETICS OF ACID-CATALYZED HYDROLYSIS. M. F. Frosolono and M. M. Rapport (Dept. of Biochem., Albert Einstein College of Med., Yeshiva Univ., Bronx, N.Y. 10461). *J. Lipid Res.* 10, 504-6 (1969). The acid-catalyzed hydrolysis of the  $\alpha,\beta$ -unsaturated ether group of two plasmalogens, lysophosphatidyl choline and lysophosphatidyl ethanolamine, and several model compounds (isobutyl vinyl ether, 1-butenyl ethyl ether, and dihydropyran) was studied by determining the true second-order rate constants. The results indicate that the chemical reactivity of the substituted vinyl ether group in plasmalogens is not appreciably affected by the presence of a bulky substituent on the  $\beta$ -carbon. Activation energies, enthalpies, and entropies were determined from measurements of the rate constants at different temperatures.

FAT DESTABILIZATION IN FROZEN DESSERTS CONTAINING LOW DEXTROSE EQUIVALENT CORN SWEETENERS. S. R. Mahdi and R. L. Bradley, Jr. (Dept. of Food Science, Univ. of Wis., Madison, Wis. 53706). *J. Dairy Sci.* 52, 1738-1741 (1969). Data collected with the aid of hanging drop slides and polyacrylamide gel electrophoresis indicated that  $\alpha_s$  and  $\beta$ -casein complexed with low dextrose equivalent corn sweeteners and fluidity starch in frozen dessert mixes during pasteurization.

Subsequent manufacture into frozen desserts caused a stripping of the complex from the surface of the fat globules which permitted aggregation. Frozen desserts containing 10-dextrose equivalent corn sweetener made from milo did not show this defect. This suggested that the amylose fraction of corn sweeteners is involved in the complex with  $\alpha_s$  and  $\beta$ -casein.

STRUCTURE OF PLASMA SPHINGADIENINE. O. Renkonen and E. L. Hirvisalo (Dept. of Biochem., Univ. of Helsinki, Helsinki, Finland). *J. Lipid Res.* 10, 687-93 (1969). The dienic long-chain base (sphingadienine) of human plasma sphingomyelins has been identified as D-erythro-1,3-dihydroxy-2-amino-4-trans-14-cis-octadecadiene. A similar sphingosine was also detected in plasma sphingomyelins of rat, rabbit and cat. The key reaction in the structural studies was partial reduction of sphingadienine with hydrazine to *cis*-14-sphingene and 4-sphingene.

MASS SPECTROMETRIC ANALYSIS OF LONG-CHAIN ESTERS OF DIOLS. W. J. Bauman, J. Seufert, H. W. Hayes and R. T. Holman (Univ. of Minn., Hormel Inst., Austin, Minn. 55912). *J. Lipid Res.* 10, 703-9 (1969). Homologous series of synthetic long-chain monoesters and diesters of 1,2-ethanediol were analyzed by mass spectrometry, and the patterns of fragmentation were studied. Under electron impact, saturated ethanediol monoesters yielded prominent ions characteristic of the short-chain diol, such as the rearranged ion formed by 2,3-cleavage ( $m/e$  104) and the ion caused by 3,4-cleavage ( $m/e$  117). Fragments characteristic of the constituent long-chain moieties were the acylium ions  $[RCO]^+$ ,  $[RCO-1]^+$ , and the ions  $[RC(OH)_2]^+$ . The mass spectra of ethanediol diesters exhibited very intense peaks due to the ions formed by loss of the acyloxy group,  $[M-RCOO]^+$ , or one carboxylic acid,  $[M-RCOOH]^+$ . These ions are distinctive for diol diesters. Precise mass measurements by high resolution mass spectrometry verified the composition of the ion fragments. Spectral studies of some monoesters and diesters of 1,3-propanediol, 1,4-butanediol, 2,3-butanediol, and also some monounsaturated homologues, demonstrated that mass spectrometry is very suitable for the identification, distinction and analysis of diol lipids.

BINDING OF PHOSPHATIDYLCHOLINE-<sup>14</sup>C TO GLASS. F. A. Green (Dept. of Med., State Univ. of New York at Buffalo, Buffalo, N.Y. 14215). *J. Lipid Res.* 10, 710-11 (1969). Lecithin-<sup>14</sup>C was found to bind to Pyrex glass. The percentage bound varied with different organic solvents, being greatest in dioxane solution. Thorough treatment of the glass with dimethyldichlorosilane prevents the binding, which suggests that charge-charge interactions are involved.

QUANTITATIVE DETERMINATION OF PHOSPHORUS IN SOYBEAN LIPIDS. A. V. Zhukov and A. G. Vereshchagin (Lipid Biochem. Res. Unit, Inst. of Plant Physiol., Acad. of Sciences, Moscow, USSR). *J. Lipid Res.* 10, 711-13 (1969). Black and Hammond's method for determining lipid phosphorus has been modified for use with oils containing small amounts of phosphorus. The minimum amount of P that can be determined is 3 nmoles.

EFFECT OF BLEACHING OF SOYBEAN OIL ON ITS OXIDATIVE STABILITY AND ON ALTERATIONS OF THE TOCOPHEROLS. R. H. Hafzov *et al.* (Inst. Pedagog. d'Etat de Khabarovsk). *Pisc. Tehnol.* 4, 51-56 (1969). Soybean oil was bleached with Czechoslovakian earth and with certain adsorbents from the Far East. The crude oil had the following characteristics: acid value, 0.18; P.V., 0.038% iodine; color, 43 mg of iodine; unsaponifiables, 0.64% and tocopherol content, 130 mg %. The degree of bleaching, oxidative stability of the oil, and alterations of the tocopherols depend on the nature of the treatment, the method of activation, and the quantity of the adsorbent used. As a result of the treatments, the P.V. was increased by 0.012-0.167% iodine and the tocopherols decreased by 3.9-29.3%. Loss of tocopherols is due to their adsorption on the earth and to oxidation to tocopherylquinones. The best results were obtained with Czechoslovakian earth and with an adsorbent bed of Pionersk activated with 20% sulfuric acid and substituted with Al ions. (*Rev. Franc. Corps Gras*)

LIPID FRACTIONS IN YEASTS AND BACTERIA. U. Bracco and H. R. Muller (Res. Labs. of Nestlé Products, Vevey). *Rev. Franc. Corps Gras* 16, 573-580 (1969). The lipid fractions of the following microorganisms, grown on synthetic media were studied: *S. cerevisiae*, *Candida krusei*, *C. pelliculosa*,

(Continued on page 18A)

**THE POPE TESTING LABORATORIES**  
Analytical Chemists

2618½ Main P.O. Box 903 Dallas, Tex.



## • *New Products*

A new solenoid pilot valve, allowing high-pressure actuation, for use in conjunction with electrical logic circuits in chemical processing equipment is announced by Fluid Power Division, WESTINGHOUSE AIR BRAKE COMPANY. The direct solenoid-operated, 3-way, normally closed, balanced valve operates with an electrical signal. It energizes the solenoid to pull in the armature and depress the hollow valve stem closing the exhaust port. As the valve stem continues downward it allows air to flow through the output port. When the electric signal is removed the solenoid is de-energized, the supply valve seated, and the exhaust valve is opened by spring action. The valve operates at a supply pressure of 0-150 psi at -20 F to 160 F; has a flow capacity equal to .093 in. diameter exhaust orifice and .062 in. diameter supply orifice, a cyclic response of 15 cps with equal on-off time; and a life expectancy of 3 million operations.

A new laboratory stirrer and power drive system, incorporating the latest advances in solid state circuitry for controlling and maintaining a desired speed setting, has been developed and is now being marketed by the MANOSTAT CORPORATION, New York. Designed both for delicate, small low rpm operation requiring high torque, and for high speed stirring, the unit, known as the Manodyne, has motor and controller matched to give extreme speed stability (from no load to full load), and excellent reproducibility. The system offers such advanced features as an enclosed dual shaft permanent magnet motor, forward and reversing by a switch, and solid state stepless regulation, with no warm up required, to control the motor at any pre-selected speed setting in either forward or reverse rotation.

TECHNE INC., Princeton, New Jersey, has recently introduced their redesigned and improved Gelation Timer for use in laboratories and in quality control. Prior to the advent of this instrument, the determination of the gelling time of the liquid was found only by a tedious test which relied on subjective judgment. With such tests it is impossible to obtain consistent results. The Tecam Gelation Timer measures in minutes the time which elapses before the liquid under test has gelled sufficiently to support a known weight on a known area. Gelation time cannot properly be measured with a viscometer. The onset of gelation means that the material has acquired a measurable elastic modulus. This gel time can be measured in many adhesives, silicate solutions, drying oils and plastics.

TRACOR, INC., Austin, Texas, announces that the flame photometric system devised by Brody and Chaney at Melpar, Inc., for specific detection of sulfur and phosphorus is now operable at temperatures up to 250 C. High temperature operation has been made possible by changes in the burner assembly and associated seals. A conversion kit for the previous low temperature unit is available. The new model may also be backfitted at any time with a second photometric channel to give simultaneous triple response to sulfur, phosphorus, plus FID from the single flame. Vital new information can be obtained from pesticides, flavors, phospholipids, and many other organophosphorus or organo-sulfur compounds.

A convenient bench-model ultrasonic cleaner operating on an efficient 40 kc electrical system now is available from NATIONAL-STANDARD COMPANY'S Auto Are Division. Designated Multisonic Model 66, the cleaner has a 1/2 gal capacity to accommodate a wide range of types and sizes of objects. It gives clinical cleanliness to laboratory glassware, wire-drawing dies, printed circuits and small mechanical and electrical assemblies. Other applications include degassing liquid, brightening metal, deburring small metal parts, etching and speeding chemical reactions.

KONTES GLASS COMPANY, Vineland, N.J., has announced the availability of a multi-purpose, new design flask. The design combines a conventional round bottom with a modified Kjeldahl shape to provide easy recovery of col-

**OFFICIAL STAINLESS STEEL**

# **ZONE OIL SAMPLER**

**A.O.C.S. APPROVED**

**FOR USE IN  
REFINED, EDIBLE OILS & FATS  
LIQUID CHEMICALS ETC.**

**FOR**

**REDUCED PRICE INFORMATION**

**CONTACT**

**CURTIS & TOMPKINS, LTD.**

**Analytical Chemists  
Bulk Oil Surveyors**

**236 FRONT STREET  
SAN FRANCISCO, CALIF. 94111**

lected solids and liquids. With "shoulder" removed, easy insertion of spatulas, brushes, etc., is possible. Solids pour out easily. The lower portion, with round bottom style, fits standard heating mantles for distillation and reflux applications.

WATERS ASSOCIATES, INC., Framingham, Mass., has announced three new chromatographic column packings utilizing a concept of permanent, chemically-bonded liquid coatings on a solid substrate. The new packing materials, tradenamed Durapak, are made by a proprietary Waters bonding process based on research by István Halász. With liquid coatings permanently bonded to the solid support, the familiar problem of column bleeding and baseline drift in both gas and liquid chromatography is virtually eliminated. Even with temperature programming, there is no need for compensating dual columns and dual detectors. Peaks are symmetrical for polar as well as nonpolar compounds. The three new coating/substrate combinations are as follows: Oxypropionitrile (OPN) permanently bonded to Porasil Type C porous silica beads (for use at temperatures up to 135 C); Carbowax 400 on Porasil C (to 200 C); and *n*-octane on Porasil C (to 175 C).

A low cost mass spectrometer fast enough to be coupled to a gas chromatograph for continuous analysis of eluted fractions has been developed by EDWARDS HIGH VACUUM INTERNATIONAL, LTD., Sussex, England. The unit also can be adapted to a nude source instrument for 'in system' analysis. The Edwards 60° mass spectrometer has scanning speeds down to 0.1 sec per mass range, permitting spectra to be obtained of the separate fractions which emerge from the chromatograph column. The instrument will cover a mass range up to 350, with complete mass separation to mass 200. Gas chromatogram and mass spectrum can be recorded simultaneously to improve the depth examination of any selected point on the chromatogram scan, and hours of recording time can be saved by the ability to monitor the complete spectrum of each fraction on the oscilloscope.

(Continued from page 16A)

*C. rugosa*, *Hansenula anomala*, *H. Schneggi*, *Pichia membranaefaciens* and *Micrococcus cerificans*. Their total fatty acid content and for some, the composition of the phospholipid and sterol fractions, are given. The fatty acid composition of synthetically-grown microorganisms is similar to that found in naturally-grown ones. A sterol derived from ergosterol has been separated and identified as lumisterol. Two ubiquinones, Coenzyme Q<sub>6</sub> and Q<sub>7</sub>, have been isolated and their structures determined. These compounds have antioxidant and paravitaminic properties.

SANITATION AND BACTERIOLOGICAL CONTROL OF MARGARINES. L. Coignera-Devillers (Lab. Cobac, Paris). *Rev. Franc. Corps Gras* 16, 561-571 (1969). Margarine produced in modern factories under sanitary conditions has been responsible for very few cases of food poisoning. However, manufacturers must continually control all sources of contamination, air, water, insects, rodents and personnel. Even if the contaminant does not reach a toxic level, enzymatic deterioration of flavor may occur, to the general detriment of the product.

CLASSICAL METHODS OF MARGARINE CONTROL AND ANALYSIS OF SOME MARGARINE COMPONENTS. A. Prevot (Inst. des Corps Gras, Paris). *Rev. Franc. Corps Gras* 16, 551-559 (1969). The author reviews control procedures used on margarine oils, both crude and processed, on other raw materials (water, milk, lecithin, monoglycerides, starch, salt, sugar, packaging materials) and on the finished product (moisture, pH, chlorides, starch, occluded gas and fineness of the emulsion). Organoleptic and bacteriological controls are also of prime importance. Newer methods, such as GLC analysis of fatty acids, are displacing some of the classical ones.

## • Fatty Acid Derivatives

TRITIUMBORATION AND SYNTHESIS OF TRITIUM-LABELED POLYUNSATURATED FATTY ACIDS. D. S. Sgoutas, H. Sanders and E. M. Yang (Burnsides Res. Lab., Univ. of Illinois, Urbana, Ill. 61801). *J. Lipid Res.* 10, 642-5 (1969). Methyl esters of polyunsaturated fatty acids labeled with tritium were prepared by partial stereoselective reduction of the corresponding acetylenic esters with tritiated disiamylborane, followed by protonolysis with tritiated acetic acid. The labeling was strictly specific, and the tritium atoms were located only at the carbon atoms forming the unsaturated bond(s). Synthesis of some tritiated fatty acid methyl esters with methylene-interrupted *trans-cis* double bonds is also reported.

AHMAD-STRONG SYNTHESIS OF 8-, 9-, AND 10-PENTADECYNOIC ACIDS. D. R. Howton and R. A. Stein (Laboratory of Nuclear Med. and Radiation Biol., Univ. of Cal., Los Angeles, Cal. 90024). *J. Lipid Res.* 10, 631-35 (1969). Three pentadecynoic acids, with the triple bond in the 8-, 9- and 10-positions, have been synthesized on a gram scale in over-all yield of 65% by refinements of the five-step Ahman-Strong method; isolation of intermediates was shown to be unnecessary prior to purification of acetylenic nitriles by column chromatography on silicic acid. The melting points of the pentadecynoic acids alternate regularly and widely with position of unsaturation.

SYNTHESIS OF DL-ALEPRYLIC ACID. A. Tanaka (Dept. of Radiochem., Nat. Inst. of Hygienic Sciences, Tokyo, Japan). *J. Lipid Res.* 10, 681-2 (1969). dl-Aleprylic acid [7-(cyclopent-2'-en-1'-yl)-heptanoic acid], a natural constituent of chaulmoogra oil with reputed antileprosy properties, has been synthesized. Electrolysis of a mixture of (cyclopent-2'-en-1'-yl)-acetic acid and methyl monoester of heptanedioic acid in methanol yielded, after saponification of the reaction products, the racemic mixture.

## • Biochemistry and Nutrition

THE PERFORMANCE OF ADULT FEMALE JAPANESE QUAIL ON LINOLEIC ACID DEFICIENT DIETS. C. C. Calvert (U.S. Dept. Agr., Beltsville, Md.). *Poultry Sci.* 48, 975-78 (1969). To determine if Japanese quail can substitute for the chicken in the study of linoleic acid metabolism, 8-week old Japanese quail were placed on linoleic acid deficient diets for 12 weeks and egg production, egg weight, fertility, hatchability and the levels of fatty acids in plasma and eggs were determined. Both egg production and egg weights were significantly reduced by feeding a linoleic acid deficient diet to quail. The responses were similar to those obtained with the laying chicken hen, but the length of time required to produce these effects were reduced. Fertility appeared to be lower in eggs from quail hens receiving linoleic acid deficient diets but the small number of eggs used and the methods used in obtaining fertile eggs cast some doubt on the validity of these results. Zero hatch of fertile eggs was obtained. This was the same result that has been the primary characteristic of a linoleic acid deficiency in laying chicken hen. The fatty acid levels of both plasma and eggs reflected the typical effect of a linoleic acid deficiency. A reduction in both linoleic and arachidonic acids and an elevation in oleic and eicosatrienoic fatty acids were observed. The fact that both linoleic and arachidonic acids were reduced to trace or undetectable quantities attested to the severity of the linoleic acid deficiency in these birds. The conclusion is that the Japanese quail are a suitable substitute for the laying chicken hen in the study of linoleic acid metabolism.

INACTIVATION OF RIBONUCLEASE AND OTHER ENZYMES BY PEROXIDIZING LIPIDS AND BY MALONALDEHYDE. K. S. Chio and A. L. Tappel (Dept. Food Sci. and Tech., Univ. Cal., Davis, Cal.). *Biochemistry* 8, 2827-2832 (1969). Quantitative enzyme inactivation by lipid peroxidation has been studied. Sulfhydryl enzymes are most susceptible to inactivation by lipid peroxidation intermediates. Oxidation products of polyunsaturated lipids also inactivate nonsulfhydryl enzymes, for example, ribonuclease A. Concomitant with the loss of ribonuclease A activity is the appearance of fluorescence in the enzyme-lipid reaction mixture. The inactivated RNase A shows fluorescent monomer, dimer and higher molecular weight species in the Sephadex G-100 fractionation pattern. The fluorescence maximum is at 470 m $\mu$ ; and the excitation maximum is at 395 m $\mu$ . Ribonuclease A, inactivated by malonaldehyde, has fluorescence and a gel filtration pattern similar to that of the enzyme inactivated by peroxidizing polyunsaturated lipids. Malonaldehyde is probably the agent responsible for the intra- and intermolecular cross-linking of ribonuclease A. The fluorescence produced from the cross-linking is attributed to the conjugated imine structure formed in protein between two  $\epsilon$ -amino groups and malonaldehyde. There are marked similarities between the ribonuclease A-polyunsaturated lipid product and age pigment; cardiac age pigment is a protein-lipid complex and both have similar fluorescence characteristics.

THE REVERSIBILITY OF THE  $\Delta^8$ -CHOLESTENOL  $\rightarrow$   $\Delta^7$ -CHOLESTENOL ISOMERASE REACTION IN CHOLESTEROL BIOSYNTHESIS. D. C. Wilton, A. D. Rahimtula and M. Akhtar (Dept. of Physiol. and Biochem., Univ. of Southampton, SO9 5NH). *Biochem. J.* 114, 71-3 (1969). The incubation of  $\Delta^7$ -cholestenol with a 10,000g supernatant or 105,000g microsomes in the presence of tritiated water is studied. The reisolated  $\Delta^7$ -cholesterol contained up to 0.67 g. atom of tritium/mole. This result can best be explained by assuming the reversibility of the reaction  $\Delta^8$ -cholestenol  $\rightarrow$   $\Delta^7$ -cholestenol.

LIPID ACCRETION IN THE PERFUSED RABBIT AORTA. A. Vost (McGill Univ. Med. Clin., Montreal). *J. Atheroscler. Res.* 9, 221-38 (1969). A technique of *in situ* perfusion of rabbit abdominal aorta permitted measurement of rates of aortic lipid synthesis in conditions approaching the physiological. Aortic synthesis of fatty acids proceeded by both chain elongation and *de novo* pathways. Fatty acids synthesized in aorta from glucose were a quantitatively unimportant source of aortic lipid whereas perfusate free fatty acids were rapidly incorporated into aortic lipid. Aortic lipid glycerol was synthesized from labeled glucose and more than 96% of the label in aortic lipid was in non-fatty acid moieties. While tri- and diglycerides were synthesized in aorta from perfusate glucose and free fatty acids, aortic phospholipids

(Continued on page 20A)

**Ozone Research & Equipment Corp.**

*Ozone Testing, Research, Consultation*

**3840 N. 40th Ave., Phoenix, Arizona 85019**

## • *New Literature*

FISHER SCIENTIFIC Co., Pittsburgh, Pa., now offers 22 high-purity grades of silica gels in a comprehensive range of particle sizes and porosities, in quantities designed for laboratory use, from 1 to 150 lb. The high porosity, and consequent large specific surface area, which gives the gel its extreme adsorbing capacity, also make it an efficient catalyst carrier. Gels listed in the catalog are of interest to biological, hydrocarbon, pharmaceutical, and foodstuff studies, among others, and are ideal for steroid chromatography.

A new, eight page booklet on general laboratory centrifuge, has just been issued by IVAN SORVALL, INC. of Norwalk, Conn. The new brochure gives details and illustrations of the basic instrument, and also of the HL-4 horizontal rotor that accepts carriers and inserts for up to 160 tubes. Trunnion rings accommodate 50 ml buckets and 100 ml buckets. Speeds of up to 2,600 rpm and relative centrifugal forces to  $1,240 \times g$  can be achieved with the HL-4. The GLC-1 centrifuge has applications in a variety of different-size laboratories, and disciplines.

The latest edition of BASF's "Special List of Organic Intermediates" is now available from BASF CORPORATION, Paramus, N.J., the U.S. subsidiary of the multinational BASF Group. The new brochure tabulates the various organic intermediates under nine different functional classifications. For each class and product, information is included showing the chemical name of the compound, description of its contents, boiling point, melting point, form at room temperature, aqueous solution, molecular weight and structural formula.

A new four page product data bulletin on ethylene dichloride, a chlorine compound also known as Dutch oil, has been issued by UNION CARBIDE CORPORATION. It lists its physical properties, specifications, applications, shipping data and precautionary labeling. Being almost completely insoluble in water, ethylene dichloride is an excellent solvent and extractant for many organic materials. It is widely used in industry as a solvent for fats, oil, waxes, natural gums and resins, to dissolve polyvinyl acetate, vinyl chloride-acetate copolymers and several types of rubbers. It is used in oil extraction, the production of Vitamins A and D from cod and shark liver oil; in metal degreasing; in the formulation of textile scouring agents, as a scavenger in making tetraethyl lead for gasoline, and in many other ways. For a copy of the bulletin, write to Union Carbide Corporation, 30-20 Thomson Avenue, Long Island City, N.Y. 11101, and ask for F-42131.

A new nine page booklet of technical information on acetic acid and acetic anhydride, two organic chemicals with a wide variety of uses in diverse industries, has been issued by UNION CARBIDE CORP. Acetic acid is used by the textile, rubber and leather industries, makers of photographic film, and by candy makers to glaze candy. Diluted with water it is an effective preservative for food products. Acetic anhydride and its derivatives are used to produce aspirin and sulfa drugs, acetate fibers, plastics, coatings and films. Acetic anhydride can be used in the manufacture of plasticizers, as an intermediate for perfume chemicals, in the processing of soybean oil, among other things. The physical and toxicological properties, specifications, shipping and storage data of acetic anhydride and acetic acid, as well as graphs of the various properties of acetic acid-water solutions, are to be found in the booklet.

Now available from PHARMACIA FINE CHEMICALS is Technical Data Sheet No. 15 announcing the availability of the most complete line of laboratory columns and accessories specially designed and developed for use in gel filtration and ion exchange chromatography. This data sheet describes and illustrates in detail each of the available laboratory columns including a chart listing the bed volume of each column and the amount of Sephadex gel required to fill it. Pharmacia Fine Chemicals, Inc., 800 Centennial Ave., Piscataway, N.J. 08854.

# McKEE

## PROCESS PLANTS

### PRELIMINARY PLANNING SERVICES

- Feasibility Studies
- Process & System Analysis
- Site Location Evaluation
- Architectural Design & Planning
- Material Handling & Distribution Studies
- Utility Analysis

### PROJECT MANAGEMENT SERVICES

- Definitive Design
- Complete Engineering
- Procurement & Expediting
- Construction
- Plant Startup

### ARTHUR G. McKEE & COMPANY

FOOD & PHARMACEUTICAL DIVISION  
10 S. Riverside Plaza Chicago, Ill. 60606  
Telephone: 312/236-8191

A new 10 page catalog from FISHER SCIENTIFIC Co., Pittsburgh, Pa., entitled "Fisher Solvents for Instrumental Analysis," describes 45 improved solvents specially purified to expedite spectrophotometry and gas chromatography. There are now 26 Fisher "Spectranalyzed" solvents for ultraviolet and infrared spectrophotometry, and 19 solvents, the Fisher "99+ Mol %" line, for gas chromatography. The solvents contain higher purity specifications than ever before, to keep abreast of present analytical instrumentation, whose sensitivity and stability make it possible for today's chemists and technologists to determine far lower concentrations with far higher precision.

A new booklet on Water Pollution Control has been published by SHIRLEY MACHINE COMPANY, a division of TASA Corporation, Pittsburgh, Pa. Case histories of successful application of Mixmeter systems in treatment of waste water volumes to 2 million gal/day are cited and illustrated. Mixmeter continuously electronic-controlled portable, semipermanent and permanent installations are reported to have wide application in mills, mines, water and sewage works as well as in the chemical, food and paper processing industries. The booklet may be obtained without charge by writing to Shirley Machine Company, 725 Liberty Avenue, Pittsburgh, Pa. 15222.

FISHER SCIENTIFIC Co., Pittsburgh, Pa., has just issued a new 14 page catalog entitled, "Don't Waste Those Corners." The catalog, in photographs, schematics, and text, gives specifications for four Fisher-designed units that permit laboratories to use previously wasted corners. Units include the unique Revolve-Drawer module for small appliances, a corner sink assembly that serves workbenches on both sides, a corner cupboard whose dual Lazy Susan design makes its entire interior accessible for storage and a new ultra-thin corner "apron" that fits into areas too small to take normal-sized modules. Also described are specially designed corner shelves and worktops.



(Continued from page 18A)

were the major ester-product (>56%) of these substrates. Phosphatidylethanolamine was the major phospholipid synthesized and was formed by *de novo* synthesis although data were also compatible with the presence of a lysophosphatide pathway in intima. Phosphatidylinositol was rapidly synthesized and glucose carbon entered glycerol but not inositol of this lipid. The possibility of contamination of aortic lipid with radioactive lipid from periaortic adipose tissue was emphasized by the demonstration that rates of lipid synthesis from various substrates were 30-400 times greater in periaortic adipose tissue than in aorta.

**VITAMIN A IN DEVELOPMENT OF THE EMBRYO.** J. N. Thompson (Dept. of Poultry Science, Cornell Univ.). *Am. J. Clin. Nutr.* 22, 1063-1069 (1969). Investigations with eggs from hens fed retinoic acid in place of the true vitamin A have revealed a role of vitamin A in embryonic development and hitherto unsuspected relationships between chemical structure and biological activity. The vitamin A-deficiency syndrome in the chick embryo is suggested as a promising area for future histological and biochemical investigations concerning the mode of action of vitamin A.

**DISSOCIATION AND RECONSTITUTION OF THE STABLE MULTIENZYME COMPLEX FATTY SYNTHETASE FROM YEAST.** M. Sumper, C. Riepertinger and F. Lynen (Max Planck Inst. für Zellchemie, München). *FEBS Letters* 5, 45-49 (1969). Freezing in salt solutions has been shown to cause dissociation or denaturation of a number of enzymes. Although the nature of this process is not clearly understood, a concentration effect is assumed. The liquid regions of the frozen system contain a high concentration of salt which changes such physical parameters as ionic strength, pH and water structure and leads to denaturation or dissociation. The spontaneous recombination of subunits to form simple enzymes has been reported many times. Examples of enzymes composed of identical and nonidentical subunits are known. Thiollase, for example, is built from four identical subunits; aldolase from 2 $\alpha$  and 2 $\beta$  subunits. The aggregation of three different subunits to form pyruvate dehydrogenase represents an example of the spontaneous recombination at a much higher organizational level. The construction of fatty acid synthetase moreover requires the proper orientation of six different enzymes and acyl carrier protein. Apparently again in this case spontaneous aggregation occurs. An estimation of the molecular weight of the protein(s) in the most prominent of the electrophoresis bands according to the method of Martin and Ames leads to values between 200,000 and 250,000. It is therefore questionable whether the described dissociation results in single enzyme components. After dissociation of the complex it was surprising to find that  $\beta$ -ketoacid reductase activity had sunk to zero. Two explanations are conceivable.

Either the native structure of the partial enzyme was altered by freezing and must first reactivate itself before association with neighbour enzymes is possible, or possibly the partial activity itself depends on protein-protein interactions with several neighbouring enzymes which become physically separated during dissociation.

**ENERGY FLUX AND MEMBRANE SYNTHESIS IN PHOTOSYNTHETIC BACTERIA.** G. A. Sojka, Assunta Baccarini and H. Gest (Dept. of Microbiol., Indiana Univ., Bloomington 47401). *Science* 166, 113-115 (1969). Synthesis of the energy-converting membrane complex of the photosynthetic purple bacterium, *Rhodospseudomonas capsulata*, during growth under different conditions of energy flux was studied by examining the disorganizing effects of polymyxin B, with or without lysozyme, on integrity of the cell envelope. Cells growing with a limited supply of energy show an elevated bacteriochlorophyll content and increased resistance to breakdown of the "permeability barrier" by these agents. It seems that purple bacteria respond to energy restriction by preferentially synthesizing excess bacteriochlorophyll-membrane which, in effect, toughens the cell integument.

**AORTIC ATHEROSCLEROSIS OF TURKEYS INDUCED BY FEEDING OF CHOLESTEROL.** C. F. Simpson, and R. H. Harms (Dept. of Vet. Sci., Univ. of Fla., Gainesville, Fla.). *J. Atheroscler. Res.* 10, 63-75 (1969). Aortic atherosclerosis was induced by feeding turkeys 2% cholesterol from 6-14, 24, 30 and 32 weeks of age. Simple, intermediate and advanced stages of aortic atherosclerosis, resulting from feeding cholesterol for the 4 different time intervals, were studied by histologic and electron microscopic techniques. The simplest lesion was characterized by lipid vacuoles in the aortic endothelium, non-membrane bound lipid between cells in the plaque, widening of the extracellular spaces, and fraying of basement membranes of modified smooth muscle cells. An intermediate lesion contained foam cells and necrotic modified smooth muscle cells widely separated by fibrillar material and pools of lipid which appeared to be in the process of crystallization. The advanced atherosclerotic lesions contained foam cells. Many of these cells were necrotic, and some were binucleated. Cholesterol and mineral were present in foam cells as well as in the extracellular spaces. Fibrillar-flocculent material was also present in these spaces. The origin of foam cells and fibrillar-flocculent material in the advanced atheroma is also discussed.

**FACTORS AFFECTING BODY DENSITY AND THICKNESS OF SUBCUTANEOUS FAT.** R. J. Shephard, G. Jones, K. Ishii, M. Kaneko and A. J. Olbrecht (Dept. of Physiol. Hygiene and Epidemiology, Univ. of Toronto, Toronto, Canada). *Am. J. Clin. Nutr.* 22, 1175-89 (1969). Factors affecting body density and skin-fold measurements are analyzed in a population of 518 Canadian city dwellers. The distribution of skin-fold measurements shows significant skewing and kurtosis in children and young adults but not in older members of the population; presumably, at this stage all have some obesity. In adult subjects, neither theoretical nor experimental justification was seen for logarithmic transformation of the data. The first component of a principal component analysis accounts for 59-74% of the variance of data at different ages. Six skin folds (subscapular, chest, waist, abdomen, triceps, and suprailiac) are uniformly represented in this component, which seems a general expression of subcutaneous fat. Two other folds (chin and knee) behave atypically. In children, the best prediction of body density is obtained from the sum of the three folds recommended for the IBP (triceps, subscapular, and suprailiac); however, caution should be exercised in endorsing the triceps measurement since this fails to increase with age, and the reported results vary widely between different laboratories. Some 72% of the variance in skin-fold measurements can be described by a multiple regression based on weight, height and height. Other factors having a significant influence on skin-fold thickness include age, alcohol consumption, attitude toward sports, and sleeping habits.

**THE DEPRESSANT EFFECT OF FATTY ACIDS ON THE ISOLATED RABBIT HEART.** L. Severeid, W. E. Connor and J. P. Long (Dept. of Internal Med., College of Med., Univ. of Iowa, Iowa City, Iowa 52240). *Proc. Soc. Exp. Biol. Med.* 131, 1239-43 (1969). The toxic effects of stearic and oleic acids on the rabbit myocardium were investigated in a plasma-free system using a modified Langendorf isolated heart preparation. A 0.1% stearic acid or 0.1% oleic acid solution was added to the solution which perfused the coronary vessels. The coronary flow, and the rate and amplitude of contractions progressively

# Shelton Towers

HOTEL

exciting East Side Hotel  
Midway between United  
Nations & Rockefeller  
Center. 1200 fine  
air-conditioned rooms  
with TV. Superb food.  
Swimming Pool, Solarium.

Singles from \$ 12  
Doubles from \$ 16

Lexington Ave., 48-49th Sts.  
New York City 10017  
TEL: (212) Plaza 5-4000  
— or your travel agent —

FREE SWIMMING in

# N.Y.C.

deteriorated until there was death of the heart. Equimolar albumin incubated with the fatty acid solutions prevented this toxic effect. The time of incubation was important to the blocking of toxicity for stearic acid but not for oleic acid. No incubation period was required to prevent the toxicity of the oleic acid when combined with albumin. This suggested a difference in the rate of albumin-fatty acid binding for different fatty acids. Unbound fatty acids, saturated or unsaturated, were extremely toxic to the heart.

**PHOSPHOLIPID CHANGES IN THE EYE AND AORTA OF CHOLESTEROL-FED RABBITS.** H. G. Roscoe and B. A. Riccardi (Dept. of Metabolic Chemistry, American Cyanamid Co., Pearl River, N.Y. 10965). *J. Atheroscler. Res.* 10, 123-130 (1969). The phospholipid changes which occur in the diseased cornea, iris and atherosclerotic intima from rabbits fed 1% cholesterol for 2 or 3 months, were studied. A significant correlation between total cholesterol and total phospholipid was found in each of the three tissues at both time intervals studied. The composition of the tissue phospholipid, which accumulated as a result of cholesterol feeding, was compared to that of the plasma in animals fed 1% cholesterol for 3 months. The distribution of phospholipid in the diseased cornea was essentially the same as that found in the plasma, both being characterized by a high percentage of lecithin (77.5 and 67.4%, respectively). On the other hand, the phospholipids obtained from the diseased iris and atherosclerotic intima contained a high percentage of sphingomyelin (35.0 and 37.7%, respectively) and lower percentage of lecithin (34.0 and 40.1%, respectively) than did the plasma (sphingomyelin = 15.8% and lecithin = 67.4%). The decrease in percent of tissue lecithin was not a result of increase in sphingomyelin since the concentration of the two phospholipids increased in both tissues. These data suggest that the mechanism of lipid accumulation in the atherosclerotic intima and the diseased iris may be similar and may not be the result of simple lipid infiltration from the plasma.

**METABOLISM OF SULFATED MUCOPOLYSACCHARIDES IN VITAMIN A DEFICIENCY.** C. A. Pasternak and D. B. Thomas (Dept. of Biochem., Univ. of Oxford, Oxford, England). *Am. J. Clin. Nutr.* 22, 986-990 (1969). Experiments with rats and with neoplastic mast cells show that vitamin A is not required for the synthesis of sulfated mucopolysaccharides, but that deficiency may lead to conditions which favor the breakdown and increased turnover of certain cell constituents.

**THE INFLUENCE OF MYRISTIC ACID ON DIETARY FATS ON SERUM CHOLESTEROL.** S. Mukherjee, R. Dutta and C. Bandyopadhyay (Lab. of Lipid Res., Dept. of Applied Chem., Univ. of Calcutta, Calcutta, India). *J. Atheroscler. Res.* 10, 51-4 (1969). The effect of dietary myristic acid on serum cholesterol of rats was studied using mixtures of trimyristin and groundnut oil. Incorporation of trimyristin in the oil resulted in marked rise in serum cholesterol of rats over the control group fed groundnut oil. A direct relationship between serum cholesterol and the myristic acid content of dietary fat was not apparent. Thus the cholesterol response to a diet containing an interesterified fat, prepared from a mixture of trimyristin and groundnut oil, was lower than that obtained by administering the same fat mixture without treatment.

**INSULIN-RECEPTOR INTERACTION IN ISOLATED FAT CELLS. I. THE INSULIN-LIKE PROPERTIES OF P-CHLOROMERCURIBENZENE SULFONIC ACID.** T. Minemura and O. B. Crofford (Dept. of Med. and Physiol., Vanderbilt Univ., Nashville, Tenn. 37203). *J. Biol. Chem.* 244, 5181-5188 (1969). Suspensions of fat cells were prepared from rat epididymal adipose tissue by digestion of the tissue with crude bacterial collagenase. One portion of each suspension was exposed to p-chloromercuribenzenesulfonic acid (CMS), washed, and then incubated in Krebs-Ringer-bicarbonate buffer. A second portion, the control, was not exposed to CMS, but it was otherwise treated identically. Acceleration of glucose transport was estimated from the rate of conversion of glucose-<sup>14</sup>C to <sup>14</sup>CO<sub>2</sub> and <sup>14</sup>C-labeled lipids. Inhibition of the lipolytic action of adrenocorticotrophic hormone (ACTH) was evaluated by measuring (a) the cyclic 3',5'-AMP concentration of the cell suspensions and (b) the rate of release of glycerol into the incubation medium.

**THE STIMULATION OF INTESTINAL CHOLESTEROGENESIS IN THE RAT BY PHENOBARBITAL.** W. R. J. Middleton and K. J. Isselbacher (Dept. of Med., Harvard Med. School, Boston, Mass. 02114). *Proc. Soc. Exp. Biol. Med.* 131, 1435-37 (1969). The administration of phenobarbital to rats (80 mg/kg/day for 5

(Continued on page 22A)

## AOCS HONORED STUDENT PROGRAM CALL FOR NOMINATIONS

R. T. Holman, Chairman of the AOCS Honored Student Award Program, has issued a call for nomination of outstanding graduate students in the field of Fats, Oils and Lipids.

The Honored Student Program was established in 1963 under the direction of the AOCS Education Committee. The Program awards to selected students an all-expense paid trip to attend AOCS National Meetings.

Several awards will be conferred in 1970 and all will be made for attendance at the ISF-AOCS World Congress which will be held in Chicago, September 27-October 1, 1970. Foreign students will be nominated by their respective national organizations and need not apply directly.

Professors are urged to nominate the most promising students. Nominations are to be submitted before March 1, 1970. Forms are available upon request from R. T. Holman, The Hormel Institute, 801 16th Ave. N.E., Austin, Minnesota 55912.

## Glandless Cottonseed Flour Developed

A light-colored glandless cottonseed flour, with many potential food applications, was produced on October 27-28 at the Producers Cooperative Oil Mill in Oklahoma City, Oklahoma.

The test was conducted under the supervision of the National Cottonseed Products Association and engineers of the Crown Iron Works Company in collaboration with personnel of the Southern Utilization Research and Development Division of the USDA in New Orleans and the Oilseed Products Research Center at Texas A&M University. A number of interested observers were present, including cotton breeders and producers, oil mill operators, equipment manufacturers, and representatives of the food industry, as well as a representative from the Research Institute of Cotton in Paris, France.

The study was conducted at the Oklahoma City Mill, among other reasons, because of its capability for desolventization without the addition of steam which denatures the protein and limits food end use flexibility. The glandless cottonseed extracted was certified planting seed of the 'Watson GL 16' variety which was purchased from Rogers Delinted Cottonseed Company, Waco, Texas.

The results of the test showed that a light-colored, non-heat denatured cottonseed protein suitable for use by the food industry as a low-cost, high-quality protein source for human foods, could be produced in a commercial oil mill as it had already been produced on a laboratory and pilot plant scale by the USDA and Texas A&M University. From preliminary laboratory analyses, the flour produced would appear to meet the food industry's stringent requirements for functionality. Those associated with the study report that all preliminary results indicate that it is commercially feasible to produce, in such a commercial oil mill, a cottonseed protein product which has special value to the food industry.

### OLD JAOCS

Have you finished reading the January and March 1968 issues of JAOCS and have no more need for them? AOCS will buy these issues from you at \$1.50 each. Send copies to American Oil Chemists' Society, 35 East Wacker Drive, Chicago, Ill. 60601.

(Continued from page 21A)

days) was associated with an increased incorporation of acetate into cholesterol by liver and small intestine *in vitro*. The stimulating effect of phenobarbital on intestinal cholesterologenesis has not previously been reported. Its overall effect on systemic cholesterol metabolism remains to be determined.

CHEMICAL CHARACTERIZATION OF ENDOTOXIC LIPOPOLYSACCHARIDE FROM THREE STRAINS OF PSEUDOMONAS AERUGINOSA. G. B. Michaels and R. G. Eagon (Dept. of Microbiology, Univ. of Georgia, Athens 30601). *Proc. Soc. Exp. Biol. Med.* 131, 1346-1349 (1969). A chemical characterization of the endotoxin from three strains of *Pseudomonas aeruginosa* was undertaken to determine the relationships of the endotoxin of this microorganism to endotoxins from other species of gram-negative bacteria. Hydrolysis of the polysaccharide fraction of the endotoxin of *P. aeruginosa* yielded glucose, glucosamine, galactosamine, rhamnose, heptose and ketodeoxyoctonate. Fatty acids identified as methyl esters in the lipid fraction were lauric, palmitic, stearic, oleic, linoleic; caprylic and capric acids also appeared to be present. Two additional minor fatty acid components which could not be positively identified could have been either fatty acids of 14 and 15 carbon chain lengths or hydroxylated fatty acids.  $\beta$ -Hydroxymyristic acid could not be detected. The endotoxin of *P. aeruginosa* appeared to have a backbone core polysaccharide similar to the *Salmonella-Escherichia* group of gram-negative bacteria. The polysaccharide comprising the core side chains of the endotoxin of *P. aeruginosa* was less complex with respect to the variety of carbohydrates than that of the enteric bacteria but similar to that of *Neisseria* or *Xanthomonas*. The lipid fraction of the endotoxin of *P. aeruginosa* is further distinguished by the absence of  $\beta$ -hydroxymyristic acid which is a component of the lipid fraction of the endotoxin of other gram-negative bacteria studied to date.

THE CATABOLISM OF CHOLESTEROL IN VITRO. FORMATION OF 3 $\alpha$ ,7 $\alpha$ ,12 $\alpha$ -TRIHYDROXY-5 $\beta$ -CHOLESTANOIC ACID FROM CHOLESTEROL BY RAT LIVER. D. Mendelsohn and L. Mendelsohn (Dept. of Chem. Path., Witwatersrand Univ. Med. School, Johannesburg, S. Africa). *Biochem. J.* 114, 1-3 (1969). Both 25-D- and 25-L-3 $\alpha$ ,7 $\alpha$ ,12 $\alpha$ -trihydroxy-5 $\beta$ -cholestanic acid were isolated from the gallbladder bile of *Crocodylus niloticus*. The catabolism of cholesterol to 25-D- and 25-L-3 $\alpha$ ,7 $\alpha$ ,12 $\alpha$ -trihydroxy-5 $\beta$ -cholestanic acid was studied by using a rat liver preparation *in vitro*. The results show that rat liver can metabolize cholesterol to both forms of 3 $\alpha$ ,7 $\alpha$ ,12 $\alpha$ -trihydroxy-5 $\beta$ -cholestanic acid. However, a preference was noted for the formation from cholesterol-4-<sup>14</sup>C of 3 $\alpha$ ,7 $\alpha$ ,12 $\alpha$ -trihydroxy-5 $\beta$ -cholestanic acid (25-D), which was isolated from the incubations with a specific radioactivity about four times that of 3 $\alpha$ ,7 $\alpha$ ,12 $\alpha$ -trihydroxy-5 $\beta$ -cholestanic acid (25-L). The results indicate that 3 $\alpha$ ,7 $\alpha$ ,12 $\alpha$ -trihydroxy-5 $\beta$ -cholestanic acid is a normal intermediate in the biosynthesis of bile acids from cholesterol in the rat.

STUDIES ON A LIPOPOLYSACCHARIDE FROM ESCHERICHIA COLI. HETEROGENEITY AND MECHANISM OF REVERSIBLE INACTIVATION BY SODIUM DEOXYCHOLATE. F. C. McIntire, G. H. Barlow, H. W. Sievert, R. A. Finley and A. L. Yoo (Molecular Biology Dept., Abbott Lab., North Chicago, Ill. 60064). *Biochemistry* 8, 4063-4067 (1969). A lipopolysaccharide from *Escherichia coli* K-235 contains free amino groups which can be converted into the 2,4-dinitrophenylamino groups without loss of pyrogenicity. This derivative permitted study of its reversible disaggregation and inactivation by sodium deoxycholate at low concentrations of both solutes; 99% inactivation of pyrogenicity required at least 1 mg of sodium deoxycholate/ml and was accompanied by 100% disaggregation of 2,4-dinitrophenylaminolipopolysaccharide to a subunit of 118,000 daltons. The same degree of disaggregation to the same size of subunit was also obtained without any decrease in pyrogenicity in solutions of 0.02 and 0.03 mg of sodium deoxycholate per ml. Regardless of the sodium deoxycholate concentration, 100% disaggregation required a sodium deoxycholate:2,4-dinitrophenylaminolipopolysaccharide ratio of only 4:6, but 0.03 mg of sodium deoxycholate/ml failed to depress pyrogenicity even though the sodium deoxycholate:2,4-dinitrophenylaminolipopolysaccharide ratio was 3000. Inactivation of 2,4-dinitrophenylaminolipopolysaccharide therefore probably depends upon an interaction with sodium deoxycholate beyond that which is required for disaggregation. Gel permeation chromatography in sodium deoxycholate solution indicated that lipopolysaccharide is a heterogeneous population of closely related molecules which are all highly pyrogenic.

DIETARY RESPONSE OF TWO GENETICALLY DIFFERENT LINES OF INBRED RATS: LIPIDS IN SERUM AND LIVER. M. W. Marshall, B. P. Smith and R. P. Lehman (Human Nutr. Res. Div. and Biometrical Services, Agr. Res. Service, USDA, Beltsville, Md. 20705). *Proc. Soc. Exp. Biol. Med.* 131, 1271-6 (1969). Responses of two inbred lines of rats to a stock diet or to diets (all low-fat, low-cholesterol) containing one of two levels of defatted egg or of lactalbumin as the source of protein differed depending upon the genetic characteristics of the rats. One line with serum cholesterol levels in the range usually considered normal for the parent (BHE) changes in levels with diet. The other line, with abnormally high levels, had levels above "normal" regardless of diet; yet an additional rise was seen in these rats when the protein was increased from 24% to 47%. The elevated serum cholesterol of this "high" line was accompanied by approximately the same amount of cholesterol in the livers and a smaller concentration of lipid than in the "normal" line. The "high" line was particularly susceptible to nephrosis and/or abnormal lipid metabolism. Although the defective control mechanism is not yet identified, it clearly is related to the partition of cholesterol between serum and liver and the error is heritable.

THE EFFECT OF PHYSICAL EXERCISE ON CHOLESTEROL DEGRADATION IN MAN. M. R. Malinow and A. Perley (Oregon Res. Primate Res. Center, Beaverton). *J. Atherosclerosis Res.* 10, 107-111 (1969). Cholesterol-26-<sup>14</sup>C was injected intravenously into 4 healthy male subjects. Muscular exercise greatly increased the respiratory excretion of <sup>14</sup>CO<sub>2</sub>.

ISOMERS OF GLUCOSAMINYLPHOSPHATIDYLGLYCEROL IN BACILLUS MEGATERIUM. J. C. MacDougall and P. J. R. Phizackerley (Nuffield Dept. of Clin. Biochem., U. of Oxford, Radcliffe Infirmary, Oxford). *Biochem. J.* 114, 361-367 (1969). The lipids of *Bacillus megaterium* were extracted and three lipids containing glucosamine were identified. One of these is not a phospholipid, but the other two, which differ in their chromatographic behaviour, contain phosphorus, glycerol, fatty acid and D-glucosamine in the molar proportions 1:2:2:1. In both phosphoglycerolipids, the fatty acids are bound in ester linkage, and both yield 2,5-anhydromannose and 3-*sn*-phosphatidyl-1'-*sn*-glycerol on treatment with sodium nitrite. Both phosphoglycerolipids were N-acetylated and, after removal of fatty acids by mild alkaline hydrolysis, in both cases N-acetylglucosamine was quantitatively released by  $\beta$ -N-acetylhexosaminidase. The glucosaminylglycerols derived from the two phosphoglycerolipids by partial acid hydrolysis differ in their behaviour towards periodate. In one case 1 mole of periodate is rapidly consumed/mole of glucosaminylglycerol, but in the other case under identical conditions the consumption of periodate is negligible. The phosphoglycerolipids were identified as 1'(1,2-diacyl-*sn*-glycero-3-phosphoryl)-3'-O- $\beta$ -(2-amino-2-deoxy-D-glucopyranosyl)-*sn*-glycerol and as 1'(1,2-diacyl-*sn*-glycero-3-phosphoryl)-2'-O- $\beta$ -(2-amino-2-deoxy-D-glucopyranosyl)-*sn*-glycerol. Both phosphoglycerolipids are good substrates for phospholipase A: neither is a substrate for phospholipase C from *Clostridium perfringens*, and only 3'-glucosaminide is a substrate for phospholipase D.

EXCRETION OF BILE ACIDS BY COCKERELS FED DIFFERENT LIPIDS. O. B. Lindsay, J. Beily and B. E. March (Dept. of Poultry Sci., Univ. of British Columbia, Vancouver 8, B.S., Canada). *Poultry Sci.* 48, 1216-22 (1969). Bile acid excretion in chickens was measured in response to feeding different lipids. Adult cockerels fed 15% of coconut oil excreted lesser amounts of bile acids than did cockerels fed 15% of either corn oil or herring oil. The differences in bile acid excretion were evident both in the percentages of bile acids in the excreta and in the daily excretion per kg. of body weight. Both 0.5% of  $\beta$ -sitosterol and 2.5% of crude soybean lecithin increased bile acid excretion in growing cockerels. The increase in excretion of bile acids induced by the sitosterol was 20 to 30% depending upon the basis for calculation, and the increase resulting from feeding lecithin was 80 to 100%. The feeding of lecithin resulted in appreciable alteration of the proportions of different bile acids excreted.

METABOLIC HAZARDS OF FASTING. T. Lawlor and D. G. Wells (Botleys Park Hosp., Chertsey, Surrey). *Am. J. Clin. Nutr.* 22, 1142-1149 (1969). Metabolic changes that occur in fasting patients were studied with special reference to those metabolic disturbances that might adversely affect the health of the patient. Fasting is an effective method of treating obesity, and no serious metabolic disturbances were encountered when the fast lasted less than 40 days. However,

(Continued on page 24A)

(Continued from page 22A)

in prolonged fasting (i.e., periods greater than 40 days) electrolyte disorders, protein deficiency, normochromic anemia and malabsorption of vitamin B<sub>12</sub> were encountered. The significance of these observations is discussed.

CONCENTRATION OF TESTOSTERONE AND DIHYDROTESTOSTERONE IN SUBCELLULAR FRACTIONS OF LIVER, KIDNEY, PROSTATE AND MUSCLE IN THE MALE DOG. A. Kowarski, J. Shalf and C. J. Migeon (Harriet Lane Home, Johns Hopkins Univ. Sch. of Med., Baltimore, Md. 21205). *J. Biol. Chem.* 244, 5269-72 (1969). Testosterone-1,2-<sup>3</sup>H was infused intravenously at a constant rate to four adult male dogs over a period of 120 min, at which time the plasma concentration of testosterone-<sup>3</sup>H reached a plateau indicating a state of equilibrium in all body compartments. The specific activity of plasma testosterone at the end of the constant infusion was determined. Parts of the liver, kidney, striated muscle and the prostate were removed, homogenized and fractionated by ultracentrifugation. The concentration (per 100 mg of protein) of testosterone and dihydrotestosterone in each fraction was then calculated from the concentration of testosterone-<sup>3</sup>H and dihydrotestosterone-<sup>3</sup>H divided by the specific activity of the plasma testosterone-<sup>3</sup>H. Of all the organs, the prostate had the highest concentration of testosterone and dihydrotestosterone, and the subcellular fraction with the highest concentration of testosterone and dihydrotestosterone was the microsomal fraction of the prostate. Furthermore, the concentration of dihydrotestosterone exceeded the concentration of testosterone only in that fraction. The concentration of dihydrotestosterone in plasma was below the sensitivity of the method employed. The data are interpreted to indicate the presence of a material with a high affinity for testosterone and dihydrotestosterone in the cells of the prostate, most markedly at the microsomal fraction. The higher concentration of dihydrotestosterone in this fraction may be interpreted as suggesting that this is the site of conversion of testosterone to dihydrotestosterone.

INFLUENCE OF SUCROSE ON RUMEN FERMENTATION PATTERN AND MILK FAT CONTENT OF COWS FED A HIGH-GRAIN RATION. D. W. Kellogg (Dairy Dept., New Mexico State Univ., Las Cruces 88001). *J. Dairy Sci.* 52, 1601-1604 (1969). Milk fat content was not increased by replacing milo with sucrose at levels representing 5, 10 and 15% of the dry matter in rations containing 10% alfalfa hay and fed in excess of National Research Council requirements. The experiment involving 16 cows was conducted in randomized block design. It consisted of a standardization period of two weeks, a transition period of four weeks, and a comparison period of sixteen weeks. During the standardization period the cows received *ad libitum* a ration comprised of 40% alfalfa hay (estimated net energy basis) and 60% ground milo plus minerals. There were no significant differences among the covariant-adjusted treatment means for milk and solids-corrected milk production, milk fat, and solids-not-fat content or production efficiency. In the rumen contents pH was lower ( $P < 0.05$ ) and lactate concentration was higher ( $P < 0.10$ ) with sucrose in the ration. The mean proportions of rumen volatile fatty acids were not significantly different among treatments.

VITAMIN A AND NUCLEAR RNA SYNTHESIS. B. C. Johnson, Michelle Kennedy and Naoki Chiba (Dept. of Biochem., Univ. of Oklahoma, School of Med., and Biochem. Section, Oklahoma Med. Res. Found., Oklahoma City, Okla.). *Am. J. Clin. Nutr.* 22, 1048-1058 (1969). It appears that vitamin A administration to vitamin A-deficient rats very rapidly increases uridine incorporation into intestinal mucosal RNA and into liver nuclear RNA.

ALPHA-TOCOPHEROL CONTENT OF CEREAL GRAINS AND PROCESSED CEREALS. D. C. Herting and E. E. Drury (Biochem. Res. Lab., Distill. Prods. Ind., Rochester, N.Y. 14603). *J. Agr. Food Chem.* 17, 785-790 (1969). Although natural grains often contain appreciable quantities of vitamin E ( $\alpha$ -tocopherol), little information is available concerning the content in cereals as consumed in the human diet. The  $\alpha$ -tocopherol content of cereal grains and cereals derived therefrom was determined by using thin-layer chromatography on alumina. Average contents in whole corn, wheat, oats and rice were 1.53, 0.87, 1.54, and 0.35 mg. per 100 grams, respectively. Up to threefold variation among samples of the same natural grain was undoubtedly influenced by where the plant was grown, the time of harvest and the stability after harvest. The processing of grain by flaking, shredding, puffing

and other procedures to produce cereals usually resulted in extensive loss of vitamin E, sometimes as much as 90%. Analyses of samples of the same type of cereal from different processors showed up to fivefold variation, which reflects not only the variation in the original grain but probably also differences in processing technique. The lipid content of the grain was usually reduced by processing, but the distribution of fatty acids was essentially unchanged. The extensive loss of vitamin E during processing of grains to cereals suggests the advisability of restoring nutritive value by fortification of the finished cereal.

LIPID METABOLISM IN NORMAL AND RACHITIC RAT EPIPHYSEAL CARTILAGE. E. Havivi and D. S. Bernstein (Dept. Nutr., Harvard Med. School, Boston, Mass. 02115). *Proc. Soc. Exp. Biol. Med.* 131, 1300-1304 (1969). Lipid synthesis in rat epiphyseal cartilage has been studied in relation to normal growth and the production of rickets. Cartilage was incubated *in vitro* in modified Krebs-Ringer bicarbonate buffer with added 1-<sup>14</sup>C palmitic acid. In normal 28-day-old male weanling rats, the total uptake of 1-<sup>14</sup>C palmitic acid from the media showed a gradual increase with time. Fractionation of the lipids showed 64.6% of the label in free fatty acids; 19.2% in triglycerides; 12.8% in phospholipids; and 6.2% in cholesterol and cholesterol esters. In rachitic rats of comparable age, the total uptake of 1-<sup>14</sup>C palmitic acid was increased significantly, indicating an increased rate of lipid synthesis.

PIG ATHEROSCLEROSIS. EFFECT OF THE ANTIHISTAMINE, CHLORPHENIRAMINE, ON ATHEROGENESIS AND SERUM LIPIDS. D. Harman (Dept. of Biochem., Univ. of Nebraska College of Med., Omaha). *J. Atheroscler. Res.* 10, 77-84 (1969). The antihistamine, chlorpheniramine, has been shown previously to inhibit cholesterol-induced rabbit atherosclerosis. The effect of chlorpheniramine has now been evaluated on the spontaneous atherosclerosis of uncastrated male minipigs. Three groups of pigs of 10 each were started at age 3 months on a nutritionally adequate diet containing 30% by weight of lard to which was added either 0, 0.5 or 1.0 mg of chlorpheniramine/kg body weight. The animals were killed and autopsied at age 24 months. The aortas were stained with Sudan IV and graded on a basis of 0-4+ in the arch and abdominal areas. Atherosclerosis involvement was small in all groups; there were no significant differences although the 1.0-mg chlorpheniramine group had the least atherosclerosis. Chlorpheniramine appeared to increase the serum cholesterol levels while analysis of the fatty acid composition of the total serum lipids showed an increase in the percentage of 18:2 and decreases in 16:0 and 18:1.

BLOOD SERUM LIPOPROTEINS: A REVIEW. L. C. Griel, Jr. and R. D. McCarthy (Depts. of Veterinary Sci. and Dairy Sci., Penn. State Univ., University Park, Pa. 16802). *J. Dairy Sci.* 52, 1233-1243 (1969). There is an increased amount of evidence that ruminant metabolism is primarily lipid-oriented. Therefore, serum lipoproteins must play a major physiological role in balanced metabolism. An understanding of the various factors affecting lipoprotein metabolism is lacking and should be the object of additional research. Fortunately, a base of information and techniques are available from work with other animal species.

THE REACTION OF GLUTARALDEHYDE WITH TISSUE LIPIDS. R. Gigg and S. Payne (National Inst. for Medical Res., Mill Hill, London N.W. 7). *Chem. Phys. Lipids* 3, 292-295 (1969). Portions of mouse brain, kidney and liver were fixed with glutaraldehyde and the lipids were then extracted with chloroform-methanol. Comparison of the extracted lipids with those from similar portions of the same unfixed tissues by thin-layer chromatography showed the absence of phosphatidyl ethanolamine in the extract from the fixed tissues. Acid hydrolysis of the fixed, extracted tissue liberated free fatty acids suggesting that the phosphatidyl ethanolamine had been fixed to the tissue proteins.

THE CHOLESTEROL-LOWERING EFFECT OF DEXTRAN-40. J. Ditzel and J. Dyerberg (Dept. of Internal Med., Aalborg Mun. Hosp., Aalborg, Denmark). *J. Atheroscler. Res.* 10, 5-10 (1969). During a double-blind investigation of the haemorrhological effects of low molecular weight dextran (mol. wt. 40,000) in 33 patients with acute myocardial infarction, a significant cholesterol-lowering effect of Dextran-40 was demonstrated. The average serum cholesterol level decreased from 264 mg/100 ml to 166 mg/100 ml on the 7th day in the group of patients receiving a daily infusion of 500 ml of Dextran-40 for 5 days, whereas the serum cholesterol level only decreased from 289 mg/100 ml to 240 mg/100 ml in

the placebo group. The possible mechanism of the hypolipidemic effect of dextran and other osmotic active compounds is discussed.

**METABOLISM OF VITAMINS D AND A.** H. F. DeLuca (Biochem. Dept., Univ. of Wisconsin, Madison 53706). *J. Agr. Food Chem.* 17, 778-784 (1969). Recent advances in the elucidation of the metabolism of vitamins A and D have been reviewed. Retinol and retinoic acid are metabolized to CO<sub>2</sub> and other excretion products by three pathways. Both *in vivo* and *in vitro* evidence has been obtained for all three. One pathway, traced to the microsomal fraction, involves oxidative decarboxylation of the terminal carbon to CO<sub>2</sub> with TPNH and O<sub>2</sub> as requirements. Vitamin D is metabolized to 11 metabolites, which are readily separated on silicic acid columns. An ester of vitamin D with long chain fatty acids represents one metabolite fraction. Quantitatively most important is another metabolite which has been isolated and identified as 25-hydroxycholecalciferol. It probably represents the metabolically active form of vitamin D. Other metabolites are as yet unidentified.

**N-ACYLPHOSPHATIDYLETHANOLAMINE, A PHOSPHOLIPID THAT IS RAPIDLY METABOLIZED DURING THE EARLY GERMINATION OF PEA SEEDS.** R. M. C. Dawson, N. Clarke and R. H. Quarles (Dept. of Biochem., Agr. Res. Council Inst. of Animal Physiol., Babraham, Cambridge). *Biochem. J.* 114, 265-270 (1969). A phospholipid that rapidly disappears from pea seeds during the early stages of germination has been isolated and shown to be N-acylphosphatidylethanolamine. Chromatographic evidence for the presence of the same phospholipid in oats, soya beans and spring (tick) beans has been obtained, and its loss during early germination measured. A scheme for the step-wise degradation of the phospholipid with alkali and acid is presented.

**METABOLIZABLE ENERGY AND PROTEIN AND FAT DIGESTIBILITY EVALUATIONS OF FISH SOLUBLES IN DIETS OF YOUNG TURKEYS.** A. B. Chu and L. M. Potter (Dept. of Poultry Sci., Virginia Polytech. Inst., Blacksburg, Va. 24061). *Poultry Sci.* 48, 1169-74 (1969). Two experiments were conducted to determine the digestibility of the protein and fat, and the me-

tabolizable energy value of fish solubles. Lyophilized fish solubles was added to a basal ration at 0, 5, 10, 15 and 20 percent on a dry matter basis. From the two experiments, the determined coefficients of digestibility of the protein were 65.9 and 68.4 percent, and of the fat were 96.5 and 98.9 percent, and the determined metabolizable energy values were  $3.967 \pm .711$  and  $4.351 \pm 0.348$  kilocalories per gram of dry matter.

**PHENOLSULFOTRANSFERASE IN THE DEVELOPING RAT.** J. Carroll (Biochem., Trinity College, Dublin 2, Ireland). *Am. J. Clin. Nutr.* 22, 978-985 (1969). From this study emerges some indication of the multiplicity of variables that must be defined before kinetic studies on phenolsulfotransferase, reported by various laboratories, can be compared. The age of the tissue preparation, together with its concentration, influences the activity of the natural inhibitor. In addition, dilution of the enzyme favors its disaggregation, which may in turn influence its reactivity. The low concentration of phenolsulfotransferase in embryonic rat liver probably accounts for its apparently small particle size on gel filtration. The results of this study do not support the view that vitamin A has a direct coenzymic role in the phenolsulfotransferase reaction. The decreased enzymic activity associated with vitamin A deficiency is more likely to be the result of impaired cellular activity caused by the malnutrition.

**STUDY OF THE LOW-FAT MILK PHENOMENON IN COWS GRAZING PEARL MILLET PASTURES.** H. F. Bucholtz, C. L. Davis, D. L. Palmquist and K. A. Kendall (Dept. of Dairy Sci., U. of Illinois, Urbana 61801). *J. Dairy Sci.* 52, 1388-1394 (1969). Two trials were conducted in an effort to elucidate the factor(s) responsible for the depression in fat test when cows are allowed to graze pearl millet pasture. Comparisons between Sudan grass and pearl millet with respect to chemical composition of the plant materials as well as animal performance were made. The results revealed no significant difference in the cell-wall constituents and lipid composition of the two plant materials; however, the oxalic acid content of the pearl millet plant material was significantly higher

(Continued on page 26A)

## Call for Nominations for Seventh AOCS \$2,500 Award in Lipid Chemistry

### Sponsored by Applied Science Laboratories

In April 1964 the Governing Board of the American Oil Chemists' Society established an Award in Lipid Chemistry under the sponsorship of the Applied Science Laboratories Inc., State College, Pennsylvania. Previous awards were presented as follows: Erich Baer, August 1964; Ernest Klenk, October 1965; H. E. Carter, October 1966; Sune Bergstrom, October 1967; Daniel Swern, October 1968 and H. J. Dutton, October 1969.

The award consists of \$2,500 accompanied by an appropriate certificate. It is now planned that the seventh award will be presented at the AOCS Fall Meeting in Chicago, Illinois, Sept. 27-Oct. 1, 1970.

### Canvassing Committee Appointees

Policies and procedures governing the selection of award winners have been set forth by the AOCS Governing Board. An Award Nomination Canvassing Committee has been appointed. Its membership is L. N. Norcia, Chairman; J. G. Coniglio, Morris Kates, J. C. Hamilton and F. T. Lindgren. The function of this committee is to solicit nominations for the seventh award. Selection of the award winner will be made by the Award Committee whose membership will remain anonymous.

### Rules

The rules prescribe that nominees shall have been responsible for the accomplishment of original re-

search in lipid chemistry and must have presented the results thereof through publication of technical papers of high quality. Preference will be given to individuals who are actively associated with research in lipid chemistry and who have made fundamental discoveries that affect a large segment of the lipid field. For award purposes, the term "lipid chemistry" is considered to embrace all aspects of the chemistry and biochemistry of fatty acids, of naturally occurring and synthetic compounds and derivatives of fatty acids, and of compounds that are related to fatty acids metabolically, or occur naturally in close association with fatty acids or derivatives thereof. The award will be made without regard for national origin, race, color, creed or sex.

Letters of nomination together with supporting documents must be submitted in octuplicate to L. N. Norcia, Temple University, Health Science Center, School of Medicine, Philadelphia, Pennsylvania 19140, before the deadline date of April 15, 1970. The supporting documents shall consist of professional biographical data, including a summary of the nominee's research accomplishments, a list of his publications, the degrees he holds, together with the names of the granting institutions, and the positions held during his professional career. There is no requirement that either the nominator or the nominee be a member of the American Oil Chemists' Society.

Remember the DEADLINE, April 15, 1970



(Continued from page 25A)

than that of Sudan grass. Cows grazing the pearl millet pasture produced milk significantly lower in fat content, and the fat contained a higher degree of unsaturation than when the cows grazed Sudan grass. The molar percentage of rumen butyrate was significantly decreased when the cows grazed pearl millet. No significant change occurred in the molar proportions of rumen acetate and propionate as a result of grazing pearl millet pasturage.

STUDIES ON THE COMPOSITION OF ADIPOSE TISSUE FROM THE GENETICALLY OBESE RATS. G. A. Bray (New Eng. Med. Center Hosp. and the Dept. of Med., Tufts Univ. School of Med., Boston, Mass. 02111). *Proc. Soc. Exp. Biol. Med.* 131, 1111-14 (1969). The size of fat cells and the composition of adipose tissue has been measured in normal and genetically obese (fatty) rats and in thin rats made fat with hypothalamic lesions. The fat cells of the obese rats were 50% larger in diameter than fat cells from normal rats. Subcutaneous fat cells in the obese rats were significantly smaller than the corresponding parametrial or epidymal fat cells. DNA content was higher in pieces of fat than in fat cells, and the content of DNA in cells from obese animals was higher than in the cells of normal animals. The fatty acid composition of the subcutaneous fat in the two types of obese rats was identical.

PHYTOL DERIVED C<sub>19</sub> DI- AND TRIOLEFINIC HYDROCARBONS IN MARINE ZOOPLANKTON AND FISHES. M. Blumer, J. C. Robertson, J. E. Gordon and J. Sass (Woods Hole Oceanographic Inst., Woods Hole, Mass. 02543). *Biochemistry* 8, 4067-4074 (1969). Three phytol-derived olefinic hydrocarbons have been isolated from marine zooplankton and fishes. Their structures have been determined by ultraviolet, infrared, nuclear magnetic resonance, mass spectrometry and by combined gas chromatography and mass spectrometry of their ozonolysis products. They are the 2,10- and 5,10-diene and the 2,6,10-triene analogs of pristane (2,6,10,14-tetramethylpentadecane). The presumed mode of formation of these and related olefins and their fate in the marine food chain and in marine sediments is discussed. Because of their relative stability, these and related hydrocarbons provide tracers for the study of dynamic processes in the marine food chain. These olefins are not present in ancient sediments and in petroleum; therefore, they are valuable markers for the distinction between marine hydrocarbons derived from organisms and from oil pollution.

STUDIES ON THE ORIGIN OF MILK FAT. A FURTHER STUDY OF BOVINE SERUM LIPOPROTEINS AND AN ESTIMATION OF THEIR CONTRIBUTION TO MILK FAT. C. Bishop, T. Davies, R. F. Glascock and V. A. Welch (National Inst. of Res. in Dairying, Univ. of Reading, Shinfield, Reading). *Biochem. J.* 113, 629-633 (1969). Tritium-labelled palmitic acid combined in olive oil triglycerides was introduced into the rumen of a lactating cow and the specific radioactivity of the lipids of milk and of the lipoproteins of both jugular and mammary venous serum was measured. As previously found in a similar experiment with stearic acid-<sup>3</sup>H, the specific radioactivity of the triglyceride fraction of the dextran sulphate-precipitable lipoproteins reached a maximum earlier and greater than that of the milk fat. This fraction was the only lipid separated that had a significant arteriovenous difference in concentration, and is therefore identified as the main circulating lipid precursor of milk fat. By comparison of the mean specific radioactivities of milk fat and of this precursor, its contribution is calculated as 36%. This value is discussed with reference to the concentration of C<sub>16</sub> and C<sub>18</sub> fatty acids in milk fat and it is concluded that substantial amounts of these acids must have been derived from a source other than preformed circulating lipids.

THE DISTRIBUTION OF LIPID IN COLONIC MUCOSA. H. J. Binder and S. VanNoorden (Dept. of Med., Univ. of Chicago, Chicago, Ill. 60637). *Proc. Soc. Exp. Biol. Med.* 131, 1110-23 (1969). A description of the distribution of stainable lipid in the colonic mucosa of man is presented. In normal individuals and patients without steatorrhea, stainable lipid is observed in the lamina propria and the subnuclear portion of the surface epithelium. Only in patients with steatorrhea is lipid found in supranuclear portion of the surface epithelium. This observation and an identical distribution of lipid (i.e., supranuclear part of the surface cell) in segments of colon perfused with fat in both man and dog suggests that the lipid observed in the supranuclear area may originate from colonic luminal lipid.

GAS-LIQUID CHROMATOGRAPHY OF FATTY ACIDS AND TRIGLYCERIDES FROM RAT ADIPOSE TISSUE. J. Bezdard and M. Bugaut (Laboratoire de Physiologie Animale et de la Nutr., Faculté des Sciences, 21-Dijon, France). *J. Chromatog. Sci.* 7, 639-644 (1969). Gas-liquid chromatography was used for quantitative analysis of the fatty acids and triglycerides of coconut oil and of adipose tissue from rats receiving a normal diet and rats receiving a diet containing coconut oil for six weeks. The results show that fatty acids and triglycerides can be analyzed quantitatively by this technique. When samples contain short-chain fatty acids, analyses are made as the butyl esters. Accurate calibration is essential in the analysis of triglycerides because of the variations in quantitative response with molecular weight of the triglycerides. Application of the analysis to adipose tissue indicated there was significant incorporation of fatty acids of medium chain length (12:0 and 14:0) but none of short-chain fatty acids (8:0 and 10:0) in adipose tissue of rats receiving a coconut oil diet. Because of the incorporation of fatty acids of medium chain length the triglyceride composition of adipose tissue was considerably modified, becoming intermediate between the triglyceride composition of coconut oil and that of adipose tissue of rats on a normal diet.

PRELIMINARY EVALUATION OF THE HYPOLIPIDEMIC EFFECTS IN MAN OF A NEW PHENOLIC ETHER. M. M. Best and C. H. Duncan (Dept. of Medicine, Univ. of Louisville School of Medicine, Louisville 40202). *J. Atherosclerosis Res.* 10, 103-106 (1969). A new phenolic ether which has been reported to be hypolipidemic in the rat has been given to 8 volunteer subjects for an 8-week period. A reduction in serum triglyceride and to a lesser extent cholesterol and phospholipid occurred in 7 of the 8 subjects.

THE TIMING OF PHOSPHOLIPID SYNTHESIS IN NEOPLASTIC MAST CELLS. J. J. M. Bergeron, A. M. H. Warmesley and C. A. Pasternak (Dept. of Biochem., Univ. of Oxford, UK). *FEBS Letters* 4, 161-3 (1969). It is known that DNA synthesis occurs at a discrete time (the S phase) during the life cycle of eukaryotic cells whereas RNA and protein are synthesized throughout the intermitotic period, the rate of synthesis increasing during S. The timing of phospholipid synthesis is of interest insofar as the event is a prerequisite for the construction of new membranes. Using choline as a specific precursor, we have now investigated phospholipid synthesis in neoplastic mast cells.

INCREASED HOST RESISTANCE TO INFECTION ELICITED BY LIPOPOLYSACCHARIDES FROM BRUCELLA ABORTUS. F. M. Berger, G. M. Gukiu, B. J. Ludwig and J. P. Rosset (Wallace Labs., Cranbury, N.J. 08512). *Proc. Soc. Exp. Biol. Med.* 131, 1376-81 (1969). Lipopolysaccharides isolated from cell walls of *Brucella abortus* 19-9R increase resistance in mice to infections with *Salmonella typhimurium*, *Salmonella typhosa*, *Diplococcus pneumoniae* or *Streptococcus mastitidis*. In this respect, the action of *Brucella* LPS is similar to that of lipopolysaccharides obtained from other gram-negative bacteria. However, considerably larger amounts of *Brucella* LPS are required to produce protection than is the case with lipopolysaccharides. *Brucella* LPS also differs from other lipopolysaccharides in not eliciting the Shwartzman reaction or epinephrine-induced dermal necrosis and in having a low pyrogenicity.

HYPCHOLESTEREMIC EFFECT OF GLUTAMIC ACID IN THE MONGOLIAN GERBIL. G. Bazzano (Dept. of Biochem. St. Louis Univ. School of Med., St. Louis, Mo. 63104). *Proc. Soc. Exp. Biol. Med.* 131, 1463-5 (1969). Several animals have been tested in search of a model to study the mechanism of the hypocholesteremic effect of glutamic acid formula diets, previously demonstrated in human beings. Upon feeding the glutamate formula diet to the Mongolian gerbil, the characteristic decline in serum cholesterol has been demonstrated. These data support the view that the Mongolian gerbil is an excellent animal model for the study of the mechanism by which dietary glutamic acid, under our experimental conditions, lowers serum cholesterol in human beings.

BLOOD KETO ACIDS IN MALNUTRITION. G. A. O. Alleyne and G. H. Scullard (Med. Res. Council, Tropical Metabolism Res. Unit, Univ. of the West Indies, Mona, Kingston 7, Jamaica, West Indies). *Am. J. Clin. Nutr.* 22, 1139-1141 (1969). Blood pyruvate and  $\alpha$ -ketoglutarate were measured in seven children while they were suffering from protein-calorie malnutrition and again after complete recovery. There was no change in pyruvate or  $\alpha$ -ketoglutarate with clinical recovery.

(Continued on page 28A)

# A Guide to Authors of Manuscripts for Lipids and for the Journal of the American Oil Chemists' Society

It is recognized that no rigid formula for preparation of manuscripts can be satisfactory for all experimental designs, procedures, results and conclusions. Although much of what follows may appear arbitrary, this document is a *guide* to authors. Except where explicitly indicated otherwise, the contents of the Guide should be regarded as suggestions to be followed to the extent possible and feasible, for the benefit of authors, editors, and especially readers.

No papers should be submitted whose principal contents have been published, or are being considered for publication by another journal. When accepted for publication, manuscripts become the property of The American Oil Chemists' Society, and may not be reproduced in part, or in whole, without written permission from the Director of Publications.

The content of a manuscript usually determines whether it should be submitted to *Lipids* or to *The Journal*. The format is the same for both publications, and both publish regular papers, short communications and letters to the editor. Short communications report significant but more limited observations than regular papers and, because of their brevity, usually can be published quickly. Letters to the editor provide new interpretations of published data or new features of equipment, instrumentation or techniques.

*Lipids* contains significant original findings of physical, chemical, biochemical, pharmacological and physiological characteristics of lipids, lipoproteins and other lipid complexes. It includes methods for identification, qualitative and quantitative analysis, and other forms of characterization of these substances. Reviews on timely topics will be published occasionally. Manuscripts are addressed to The Editor, *Lipids*, The Hormel Institute, 801 16th Avenue N.E., Austin, Minnesota 55912.

The *Journal* contains original papers and timely reviews of physical, chemical and processing data and methods for fats, waxes and related products such as fatty acids. It includes information on fat derivatives, detergents, paints, proteins and oilseed products. Symposia on any of these subjects may be published as a unit if a deadline for receipt of all papers is met. Manuscripts are addressed to The Editor, *Journal of the American Oil Chemists' Society*, Cargill, Inc., Cargill Building, Minneapolis, Minnesota 55402.

Submit three complete copies of the regular manuscript, short communication or letter to the editor, typed double-spaced. Consult a recent issue for acceptable arrangements of main headings, subheadings, literature references, footnotes and other elements of general form. More specific details of form are outlined below.

## Preparation of Manuscript

### For Regular Papers

**Title Page.** (Page 1 of your manuscript.)

**Title:** brief, and containing important words for indexing.

**Authors:** names and initials (without titles), laboratory name and address with zip code.

**Cover Title** (60 letters & spaces long) and **Running Head** (35 letters & spaces long): A condensation of the title of the paper will appear on the cover of the issue containing it. A similar (but shorter) condensation will appear at the top of each right hand page on which the paper is printed. In order to insure that these condensations best represent the work, the author should prepare them.

**Page Proof** Recipient's name and address.

**Abstract.** (Page 2 of your manuscript.) Maximum length

to be 5% of paper or 250 words for long papers; no literature references.

**Key Words and Key Phrases.** (Page 3 of your manuscript.) Suitable for use in indexing.

**Text.** (Page 4 and subsequent pages of your manuscript.) Introduction: brief and informative with a few key references to orient readers.

**Procedures:** sufficient detail to permit other scientists to repeat or extend the experiments.

**Results:** organized to supplement, but not repeat, data in Tables and Figures and to present in narrative form equations, formulas and data for which Tables are unnecessary.

**Discussion:** to relate results to published studies and to present pertinent conclusions; may be combined with the Results section.

**Acknowledgments.** As a group, in simplest form, e.g., "Supported in part by research grants from \_\_\_\_\_ and \_\_\_\_\_; chromatographic analysis by John Doe; technical assistance by Jane Smith; advice from J. J. Jackson."

**References.** Listed by number in the order cited. Limit "in press" references to papers accepted for publication and cite the journal in which publication is scheduled. Mention unpublished work in text only, with "(unpublished)" after the author's name.

### For Short Communications

Pages 1, 2 and 3, same as for regular papers. Page 4, Text, including Tables or Figures and references not to exceed two printed pages (about four pages of typed manuscript).

### For Letters to the Editor

Usual letter style (see recent issues); maximum of four typed pages including data and literature references in text of letter.

### For All Types of Manuscripts, Where Applicable

**Tables.** Each on a separate sheet, numbered (Roman) and titled, first word of column heads capitalized, units of expression under heads, superscripts a, b, c for footnotes.

**Figures.** Artwork must be of good quality.

Size: 8½ × 11 in. or less.

Paper: line drawings on white with black ink or glossy photographs, no black grids.

Letter Height: at least 4 mm or 2% of Figure width for single printed column or 1% for double column.

Lettering: with commercial lettering guide (typed or hand lettering not acceptable); minimal lettering on Figures.

Identity: Figure number and author(s) in soft pencil on back of Figure.

Figure Title Page: separate typed sheet for Figure numbers (Arabic), titles, key to lettering and explanatory details if necessary.

**Formulas and Equations.** Inked drawings for any which cannot be readily set in type.

Costs of Redrawing: at author's expense if Figures must be redrawn.

Equations: as  $A = B/(C-D)$ , not  $A = \frac{B}{(C-D)}$ , usually in text rather than as separate illustrations.

## • Guide to Author . . .

**Abbreviations.** Without period or degree sign, e.g., ml, g, sec, 100 C or 373 K (for others see Style Manual for Biological Journals, 2nd Edition, Am. Institute of Biological Sciences, Washington, D.C., 1964).

**Other Items of Form.** Metric systems wherever feasible; decimals in preference to fractions; per cent symbol (%) only after numbers; characters subject to misinterpretation, e.g., Greek letters, spelled in margin; formal name and E. C. number for enzymes at first mention—trivial name subsequently, if more convenient; commercial products expressed by common name or scientific name (if one exists) followed by trade names in parentheses only if essential; promotional statements concerning commercial products are not accepted.

### Procedure for Accepted Papers

#### Galley Proofs

Two copies and reprint order form are sent to author

to be returned promptly. Authors may be charged for changes other than correction of printing errors.

#### Charge to Authors

Page charge (\$35 per printed page for Lipids, \$40 for Journal), on assumption of payment from author's supporting funds, accompanies galley proof. Payment provides reprints at lower price but is not mandatory for publication if funds are not available.

### For the Author's Thought

The experienced reader appreciates the additional effort an author puts forth to present his work concisely and clearly because it permits the reader to gain the greatest return for the time he invests in reading. The author's success in this effort is a primary determinant of the time interval in which editors and reviewers complete their tasks, the alacrity with which acceptable manuscripts are published and the effectiveness of the service provided for progress in lipid science.

## ABSTRACTS: BIOCHEMISTRY AND NUTRITION

(Continued from page 26A)

The data are interpreted to mean that there is no metabolic block in the oxidation of pyruvate via the Krebs cycle. Also, normal levels of  $\alpha$ -ketoglutarate might indicate that there was no severe derangement of hepatic excretory function in the children studied.

**GLUCOSE AND GALACTOSE TRANSPORT ACROSS A WATER-BUTANOL-PHOSPHOLIPID INTERFACE.** T. J. Moore and B. Schlowsky (Dept. of Pediatrics, St. Luke's Medical Center, New York 10025). *Chem. Phys. Lipids* 3, 273-279 (1969). A physicochemical model membrane with characteristics that mimic glucose and galactose transport in the intact erythrocyte has been reported previously. The model required erythrocyte lipid for this behavior. Introduction of pure cholesterol instead of erythrocyte lipid into the model results in virtually identical transport rates for D-glucose and D-galactose. Both the "nonacidic" and "acidic" chromatographic fractions of erythrocyte phospholipid, accelerate the transport of D-galactose relative to D-glucose at 1.3 M concentration. Each commercial phospholipid tested, (lecithin, phosphatidyl ethanolamine, sphingomyelin, phosphatidyl serine and phosphatidyl inositol), has the same effect. The reason for this action of the phospholipids is at present unknown.

**THE CHEMICAL COMPOSITION OF THE LIPOPOLYSACCHARIDE OF PSEUDOMONAS AERUGINOSA.** A. H. Fensom and G. W. Gray (Dept. of Chem., Univ. of Hull). *Biochem. J.* 114, 185-196 (1969). Lipopolysaccharide was isolated from both cell walls and acetone-dried whole cells of *Pseudomonas aeruginosa*. Closely similar products are obtained, although that from whole cells cannot be completely freed from small amounts (2-7%) of residual nucleic acids. The lipid moiety (23-33%) has a similar amino sugar backbone to that of lipids of enterobacterial lipopolysaccharides, but contains different hydroxy acids (2- and 3-hydroxydodecanoic acid and 3-hydroxydecanoic acid). 3-Hydroxytetradecanoic acid is absent, and 3-hydroxydodecanoic acid is the main N-acylating acid. No clear evidence permitting a distinction between the possibilities that phosphodiester or glycosidic linkages exist between the glucosamine residues was obtained. Identifiable sugars (glucose, rhamnose, 3-deoxy-2-octulonic acid and heptose) account for less than 20% of the lipopolysaccharide, and alanine, galactosamine and fucosamine are apparently components of the polysaccharide moiety. The polysaccharide moiety is unusual in that it is not readily obtained from the lipopolysaccharide by treatment with dilute acetic acid, which does, however, solubilize much of the phosphorus of the lipopolysaccharide. The "polysaccharide" fraction (approx. 21%) obtained by treatment with dilute acetic acid contains only a small proportion of the total polysaccharide components, and in one case only 45% of the fraction was accountable for in terms of identifiable components. Evidence suggests that unidentified nitrogenous components are concentrated in the residual material after removal of both the lipid and the "polysaccharide" fraction from the lipopolysaccharide.

**DETERMINATION OF ALDOSTERONE AND TETRAHYDROALDOSTERONE IN BLOOD BY ELECTRON CAPTURE GAS CHROMATOGRAPHY.** L. F.

Fabre, Jr., D. C. Fenimore, R. W. Farmer, H. W. Davis and G. Farrell (Dept. of Neuroendocrinol., Texas Res. Inst. of Mental Sciences, Houston, Tex.). *J. Chromatog. Sci.* 7, 632-638 (1969). Physiologic and pathologic studies of aldosterone metabolism are facilitated by reliable ultramicro analytical methods for plasma aldosterone. This paper describes the use of gas chromatography with electron capture detection in the analysis of aldosterone and tetrahydroaldosterone from blood. Calculated recoveries of steroids added to blood are in the range 100%  $\pm$  6%. For adrenal venous blood, aldosterone is analyzed by formation of the gamma lactone prior to GLC. For peripheral blood from human subjects or laboratory animals, it is convenient to measure tetrahydroaldosterone (THA). THA is quantitated by GLC with EC by formation of the monochlorodifluoroacetate of the THA gamma lactone. Although blood THA levels represent a balance between the adrenal secretory rate of aldosterone, ring A reduction by the liver and subsequent clearance by the kidney, the interpretation of such levels appears to present no more difficulty than is the case with plasma free aldosterone (in which the level is a function of the same three variables). The sensitivity of the electron capture detector for the THA derivative makes its measurement the method of choice in humans; 10 ml samples of venous blood are adequate.

**EFFECT OF CARBON MONOXIDE AND PHENOBARBITAL ON HYDROXYLATION OF BILE ACIDS BY RAT LIVER MICROSOMES.** K. Einarsson and G. Johansson (Dept. of Chem., Karolinska Inst., Stockholm, Sweden). *FEBS Letters* 4, 177-180 (1969). The hydroxylation of taurodeoxycholic acid, taurochenodeoxycholic acid and lithocholic acid, catalyzed by the microsomal fraction of liver homogenate fortified with an NADPH-generating system, was studied in control rats and phenobarbital-treated rats. On average, the 7 $\alpha$ -hydroxylation of taurodeoxycholic acid was 2.7 times more efficient in phenobarbital-treated rats than in control rats. The 6 $\alpha$ -hydroxylation of taurochenodeoxycholic acid was 2.8 times and the 6 $\alpha$ -hydroxylation of lithocholic acid 3.8 times more efficient in phenobarbital-treated rats. The increase in oxidative demethylation of aminopyrine and in hydroxylation of androst-4-ene-3,17-dione was 3.2 and 5.7 times, respectively.

**THE REACTION OF MITOCHONDRIAL L-3-GLYCEROPHOSPHATE DEHYDROGENASE WITH VARIOUS ELECTRON ACCEPTORS.** A. P. Dawson and C. J. R. Thorne (Dept. of Biochem., Univ. of Cambridge). *Biochem. J.* 114, 35-40 (1969). The kinetics of the reaction of glycerophosphate dehydrogenase with a variety of electron acceptors have been investigated. In all cases the reaction mechanism appears to involve a free modified-enzyme intermediate. With some electron acceptors, the maximum velocity of the reaction and the  $K_m$  for glycerophosphate are independent of the nature of the electron acceptor, whereas in other cases this is not so. The reaction mechanism of the enzyme extracted with phospholipase A instead of with Triton X-100 is of a similar type.

**VITAMIN A IN LIQUID FEED SUPPLEMENTS.** D. B. Parrish and Dalia Aguilar (Dept. of Biochem., Kansas State Univ., Manhattan, Kan. 66502). *J. Assoc. Offic. Anal. Chem.* 52(3), 451-55 (1969). Maleic values were determined on vitamin A extracts from liquid feeds so that estimates could be made

of biopotency of the vitamin A; the AOAC method is not suitable for this assay. Biopotencies were 57-81% of total vitamin A found. For comparison, maleic values were determined on Vitamin A Reference Solution and on chicken, quail and rat livers. Most vitamin A in those sources appeared to be the all-trans form. Results of bioassays of vitamin A in liquid feeds indicate that further work is required before the assays are suitable for comparative purposes with results of biopotency estimates using maleic values.

INTRACELLULAR MECHANISMS FOR THE DECOMPOSITION OF A LIPID PEROXIDE. I. DECOMPOSITION OF A LIPID PEROXIDE BY METAL IONS, HEME COMPOUNDS AND NUCLEOPHILES. P. J. O'Brien (Dept. Med. Biochem. and Pharm., Birmingham Univ., U.K.). *Can. J. Biochem.* 47, 485-492 (1969). Linoleic acid hydroperoxide was prepared. Two types of mechanisms for its decomposition were found. The hydroperoxide was rapidly decomposed by certain transition metal ions, heme and hemoprotein to a complex range of products, the decomposition being accompanied by changes in ultraviolet absorption spectra. The production of radical oxidizing species may account for these products. It was also found that the hydroperoxide could be decomposed by nucleophiles presumably in a nonradical reaction to a hydroxy acid without any change in ultraviolet spectra. The kinetics, the pH dependence, and the effects of metal-complexing agents, inhibitors, and hydrogen donors on the catalytic activity of the metal ions and heme compounds were also investigated.

II. DECOMPOSITION OF A LIPID PEROXIDE BY SUBCELLULAR FRACTIONS. P. J. O'Brien and C. Little. *Ibid.*, 493-499. The properties of subcellular fractions of rat liver in catalyzing the decomposition of linoleic acid hydroperoxide have been compared with those of transition salts, heme compounds and nucleophiles. It was concluded that the decomposition of the hydroperoxide in the liver cell was due principally to reaction with the intracellular nucleophile glutathione by a mechanism catalyzed by the enzyme glutathione peroxidase. In the absence of glutathione, however, both the mitochondrial and microsomal fractions decomposed the hydroperoxide presumably by a radical mechanism probably involving the cytochromes.

CHOLESTEROL METABOLISM AND VITAMIN B<sub>6</sub>. I. HEPATIC CHOLESTEROGENESIS AND PYRIDOXINE DEFICIENCY. P. J. Lupien, C. M. Hinse and M. Avery (Dept. Biochem., Fac. Medicine, Laval Univ., Quebec, Canada). *Can. J. Biochem.* 47, 631-635 (1969). Hepatic cholesterogenesis was studied in pair-fed and pyridoxine-deficient rats as well as in rat liver homogenate systems. Crossover of various subcellular components from pair-fed homogenates into pyridoxine-deficient homogenate systems and vice versa was also done. During 8 weeks of pyridoxine deficiency, acetate-<sup>14</sup>C incorporation rates into liver cholesterol increased by a factor of approximately 10. The same phenomenon was observed with the total liver homogenate systems. Pyridoxine deficiency does not appear to affect HMG-CoA reductase activity of pyridoxine-deficient liver microsomes sufficiently to explain the rapid acetate-<sup>14</sup>C incorporation rates in this same tissue. The activating system(s) responsible for the 10-fold increase in acetate-<sup>14</sup>C incorporation rates into pyridoxine-deficient rat liver cholesterol appears to be located in the high-speed supernatant fraction. Other subcellular components such as lysosomes and mitochondria are probably implicated to some extent in this phenomenon. The results indicate that vitamin B<sub>6</sub> is necessary for normal hepatic cholesterogenesis in the rat. The significance of these findings and the possible relationship between these factors are discussed.

METABOLISM OF FATTY ACIDS IN THE SOUTHERN ELEPHANT SEAL, *MIROUNGA LEONINA* (L.). M. M. Bryden and G. B. Stokes (Dept. Animal Husbandry, Univ. Sydney, New South Wales 2006, Australia). *Can. J. Biochem.* 47, 757-760 (1969). The composition of the blubber of the southern elephant seal, determined by gas-liquid chromatography, is similar to that of other marine mammals. In this regard, the present work disagrees with an earlier study made on an individual of this species. The marked disappearance of the long-chain polyunsaturated acids in both the nursing cow and fasting pup suggests catabolism of these acids during nonfeeding periods. Support is given for the contention that some fatty acids are transferred intact from the depot fat of the seal cow to her pup via the milk.

THE RELEASE OF LIPOPROTEINS BY RAT LIVER SLICES. A. I. Kook and D. Rubinstein (Dept. Biochem., McGill Univ., (Continued on page 32A)

• *Names in the News* . . .

W. H. TALLENT ('65) has been named chief of industrial crops research at the Department of Agriculture's Northern Utilization Research Laboratory, Peoria, Ill. He succeeds



W. H. Tallent

I. A. Wolff who became director of the Eastern Laboratory, Wyndmoor, Pa., in August. Both laboratories are divisions of USDA's Agricultural Research Service. Three other utilization research laboratories are located in New Orleans, Athens, Ga., and Albany, Calif. Dr. Tallent joined the Northern Laboratory in 1964 as head of an investigations group in industrial crops research. He had 11 years' experience in industry and with the U.S. Public Health Service.

Dr. Tallent is a member of the American Oil Chemists' Society; American Chemical Society; Phi Lambda Upsilon, honorary fraternity for chemists; Sigma Xi, honorary scientific fraternity, and Alpha Chi Sigma, professional fraternity. As president-elect of the Peoria section of ACS, he will become president in January.

E. G. LATONDRESS ('53), a native of Menasha, Wis., has been named operations manager of the Swift Edible Oil Company refinery at Bradley, Ill. Mr. Latondress joined Swift in 1966 as superintendent at Bradley.

D. W. CORRELL, who recently became associated with Capital City Products Co., Division of Stokely-Van Camp, Inc., will represent the Industrial Food Products Division in the Biscuit and Cracker, Confectionery, and Allied Industries. He will be located at Philadelphia, Pennsylvania. Mr. Correll previously held positions at Walter Baker Division of General Foods Corporation and Wilson-Martin Division of Wilson Pharmaceutical and Chemical Co.

After his recent illness, CHARLES DE BOINVILLE, chairman of the Unilever Animal Feeds Group in the United Kingdom, has decided on medical advice to retire from Unilever at the end of the year. Now aged 55, he has spent 33 years in the oil milling, seed crushing and animal feeds side of the Unilever business, joining as a management trainee in 1936. He became vice-chairman of the British Oil & Cake Mills Limited in 1959 and in 1963 was appointed chairman of that company and also of the U.K. Milling Group of Unilever, now known as U.K. Animal Feeds Group. He relinquished the chairmanship of BOCM Limited since June, 1968. A prominent personality in the world of agriculture, Mr. de Boinville has been president of the International Association of Seed Crushers since 1962. He intends, however, to continue in that post until his term of office expires in July, 1970. Until arrangements for a successor can be made, he will also continue as joint chairman of the National Joint Industrial Council for the Seed Crushing, Compound and Provender Manufacturing Industries, a post he has held since 1963.

**HAVE YOU MOVED?**

**BE SURE TO ADVISE AOCS HEAD-QUARTERS PROMPTLY OF CHANGE OF ADDRESS. WRITE: AMERICAN OIL CHEMISTS' SOCIETY, 35 E. WACKER DR., CHICAGO, ILL. 60601**

# • Solvent Extraction of Cottonseed . . .

(Continued from page 6A)

TABLE III  
Chemical Analyses of Meals

Run No.	Sample No.	Moisture %	Lipids %	Nitrogen %	Epsilon amino free lysine g/16 g N	Nitrogen solubility % (0.02N NaOH)	Free gossypol %	Total gossypol %	Crude fiber %	Ash %
1 & 2	80292	8.76	0.74	8.42	3.87/3.89	95.84	0.02	0.02	8.3	6.90
3 & 4	80293	8.50	0.80	8.46	3.85/3.79	93.74	0.01	0.02	7.4	6.63
5 & 6	80294	7.76	0.48	8.45	3.90/3.83	96.09	0.02	0.02	8.2	6.42
7 & 8	80295	6.56	0.54	8.62	3.86/3.91	97.45	0.02	0.02	8.0	7.17
9 & 10	80296	6.53	0.16	8.77	3.78/3.84	95.78	0.003	0.006	8.1	7.08
11 & 12	80297	11.08	0.62	8.27	3.85/3.80	94.20	0.02	0.02	7.1	6.86
13 & 14	80298	6.16	0.82	8.35	3.77/3.75	90.16	0.005	0.009	9.2	6.96

screen to remove lumps, then divided into two portions of 6.5 pounds each. Each portion in turn was steeped for 40 min in 10.5 lb. of warm hexane. The slurry was then poured over a fine screen in a 10½ in. diameter stainless steel Buchner type funnel and washed with 41½ lb. of additional warm hexane. 4 in. Hg vacuum was applied during filtration. The average rate of flow of filtrate was 1.15 gpm.

Two additional basket extraction runs were made. In run No. 15 standard commercial hexane was used; in run No. 16 the high *n*-hexane solvent was used. Four bench scale extraction runs, No. 17 through 20, were carried out on glanded cottonseed flakes, two with standard hexane and two with the high *n*-hexane content. These were similar to the basket extractions but were conducted in a 7½ in. diameter stainless steel Buchner type funnel. The meats were cooked in a bench scale steam jacketed cooker similar to that described in reference 7 and flaked immediately. Nine hundred and fifty grams of flakes were charged into the funnel and steeped for 10 min in warm solvent. Then the drain valve was partly opened and additional solvent admitted at the rate of 230 ml/min. The total solvent to flakes ratio was 8:1. The two final (basket extraction) runs, No. 21 and 22, using both kinds of hexane, were made on a quantity of old glanded seed that happened to be available. These last eight runs were made to evaluate the oil obtained from the two kinds of hexane.

## Oil

All miscellas were filtered to remove fines. Miscellas from basket extraction runs were first evaporated at atmospheric pressure to approximately 50% concentration. These concentrated miscellas and the raw miscellas from the filtration extraction runs were put through a Struthers-Wells rising film evaporator operating under 20" Hg vacuum, from which they were discharged at concentrations of 98% or more. Final desolventization was accomplished in a rotary evaporator in which the sample is contained in a tilted large round-bottom flask under vacuum, made to rotate in a hot water bath. The heat, the vacuum, and the extended surface produced by the rotation facilitate the evaporation of solvent. Vapors are drawn out into a condenser. A feed tube protruding into

TABLE IV  
Composition of Basal Diet

Ingredient	Per cent
Glucose, monohydrate	68.85
Casein	11.10
Ground cellulose	4.84
Corn oil	9.97
Mineral mixture <sup>a</sup>	4.23
Vitamin mixture <sup>b</sup>	1.00
Ethoxyquin	0.01

<sup>a</sup> Furnishes to the diet: CaHPO<sub>4</sub> · 2H<sub>2</sub>O, 3.00%; NaCl, 0.5%; KHCO<sub>3</sub>, 0.40%; MgSO<sub>4</sub>, 0.24%; Ferric citrate, 0.03%; MnCO<sub>3</sub>, 0.05%; ZnCO<sub>3</sub>, 0.008%; CuCO<sub>3</sub> · Cu(OH)<sub>2</sub>, .002%; NaIO<sub>3</sub>, 0.0001%; NaSeO<sub>3</sub>, 0.00001%.

<sup>b</sup> Add following quantities to each kg of diet: Vitamin A, 20,000 IU; Vitamin D<sub>3</sub>, 2,000 USP; Vitamin E, 100 IU; Menadione sodium bisulfite, 2 mg; Thiamine HCl, 10 mg; Riboflavin, 10 mg; Niacin, 50 mg; Pyridoxine HCl, 10 mg; d Ca Pantothenate, 20 mg; Vitamin B<sub>12</sub>, 10 µg; Folic acid, 2 mg; Biotin, 0.5 mg; Choline chloride, 1.5 g; BHT, 20 mg.

the flask permits the addition of sample while under operation. The feed tube was also used to introduce water vapor to sweep out the last traces of solvent. Miscellas from the four bench scale runs were all evaporated and desolventized as above.

The colors of the crude glandless oils were all read on a Photovolt Corp. Model 40IM spectrophotometer. The readings are approximately equivalent to Lovibond red numbers. Free fatty acid tests were made in accordance with AOCS Official Method Ca Sa-40. Refining loss tests were run in accordance with AOCS Official Method Ca Qa-52 except for oils from bench extractions in which insufficient sample was available. In these instances the method of P. A. Williams was used (8). Colors of the refined oils were read on the spectrophotometer. The oils were bleached using 4.6% official AOCS natural bleaching earth and again the colors were read. The data are shown in Table II.

## Meal

The mares from the first 10 runs and from runs No. 13 and 14 were dried in the steam jacketed kneader mixer at such a rate that a final temperature of 220 F was attained in about 60 min. The mares from run No. 11 and 12 were dried in air with no application of heat. The meals were passed through cracking rolls to reduce any lumps. Meals from pairs of runs which were processed similarly, i.e., Run 1 and 2, 3 and 4, etc., were blended together in the kneader mixer at room temperature. This resulted in seven lots of meals which were sampled and analyzed. The results are shown in Table III.

The protein quality of the cottonseed meals was evaluated in feeding tests with rats. The basal diet is shown in Table IV. The cottonseed meals were incorporated into the diets so as to furnish 10% protein. All diets were kept isocaloric by adjusting the level of corn oil and ground cellulose so that the total level of fat and crude fiber plus ash of each diet was similar. In addition to diets prepared with glandless cottonseed meals, three additional diets were prepared from casein (ANRC Casein, Sheffield Chemical Company, Union, N.J.), isolated soybean protein [RP-100 Assay Protein, Ralston Purina Company, St. Louis, Mo. (Supplemented with DL methionine)] and a 50% protein prepress solvent cottonseed meal. Each diet was fed to 12 weanling rats which were individually fed and housed in wire-bottomed cages for 28 days. Protein efficiency ratios (PER) were calculated from the data on weight gain and total consumption of protein (10).

## Results and Discussion

### Oil

The results indicate that it should be easier to produce a high quality oil from glandless seed than from glanded. Some savings in processing costs may be realized too, since refining losses are lower and in general a prime bleachable oil can be obtained without the need of bleaching. Glandless oil is less sensitive to damage from heat than is glanded oil. Glandless oil which had been severely heated during desolventization refined to colors below



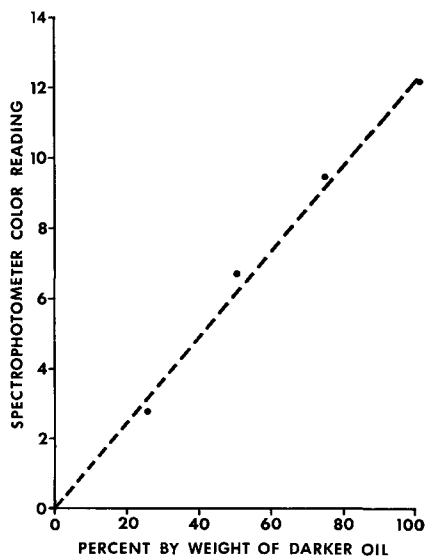


FIG. 2.

2.5 red. Carefully refined and bleached glandless oils gave a Lovibond reading of 7Y/0.7R or less.

Glandless oil with a reading of .015 on the spectrophotometer was mixed in various proportions with a glanded oil reading 12.235. The color readings of the mixtures are plotted against composition in Figure 2. The plot is virtually a straight line and indicates how the glanded oil could be upgraded colorwise by blending with glandless oil. It is important to note that red color readings alone may be misleading. A refined glandless oil with a strong yellow cast may give a lower color reading on the spectrophotometer than a well bleached glanded oil yet appear to the naked eye much more colored than the latter. On a Wesson type colorimeter, the red number for such a refined glandless sample will likewise be lower than for the bleached glanded sample but the yellow number will be higher. The yellow number may, therefore, become of greater importance in the evaluation of glandless oils. The color index method (9) or modification thereof may prove to be more reliable in classifying oils by color.

The temperature to which meats were heated in the preparation operations did not exert an appreciable effect on the quality of the oil.

*n*-Hexane seemed to be a slightly better solvent than standard hexane inasmuch as somewhat lower refining losses and lower bleached colors were realized with the former.

Mixed solvent (AHW) gave much slower percolation rates and yielded much darker crude oils having higher free fatty acid values and higher refining losses.

Extreme conditions of temperature and time during desolventization and in storage of seed or oil or both is detrimental to any vegetable oil. Since the glandless variety is not as sensitive to extremes as is the glanded, the processor should have more reliance on a favorable economic return in the case of the former.

#### Meal

The chemical analyses do not show any critical differences caused by the temperature to which the meats

TABLE V  
Results of Rat Feeding Study

Glandless cottonseed meals				28 Day gain, <sup>a</sup> g	PER <sup>a, b</sup>
Sample No.	Max. cooking temp., F	Solvent temp., F	Solvent		
80297	79	78	Std. hex.	87 ab	2.34 de
80292	81	120	Std. hex.	90 ab	2.37 cde
80295	148	120	Std. hex.	90 ab	2.35 cde
80294	170	120	Std. hex.	91 ab	2.35 cde
80293	200	120	Std. hex.	91 ab	2.35 cde
80298	228	120	Std. hex.	84 b	2.30 e
80296	120	105	AHW <sup>c</sup>	99 a	2.49 cd
Protein source					
ANRC casein				21 ab	2.50 c
Isolated soybean protein + 0.2% DL Methionine				112	2.85
Commercial prepress solvent cottonseed meal				51	1.49

<sup>a</sup> Means with the same letters are not significantly different ( $P \leq 0.05$ ) as computed by Duncan's multiple range tests (11).

<sup>b</sup> Protein efficiency ratio.

<sup>c</sup> 39% acetone, 60% hexane, 1% water (w/w).

were subjected prior to extraction. There is a slight loss of EAF lysine and nitrogen solubility in meal sample No. 80297 which was heated to 220 F before extraction. No appreciable difference is indicated by the type solvent, the temperature of the solvent, or the type of extraction (basket or filtration).

The rat feeding tests, the results of which are shown in Table V demonstrated that the protein quality of the glandless cottonseed meals was superior to that of the commercial prepress solvent glanded cottonseed meal. The mixed solvent extracted meal (sample 80296) appeared to have a protein quality somewhat superior to that of the hexane extracted cottonseed meals and approaching that of casein. This, together with the dark color of the crude oil (Table II, Run 9 and 10), suggests that the mixed solvent extracts additional constituents, at least some of which exert a negative effect on protein quality. In work with chicks, Johnston and Watts (12) hypothesized that a polar solvent such as acetone-hexane-water induces some sort of change in glandless meal making the protein more available. There seemed to be a small decrease in protein quality of the meal obtained from flakes preheated to 228 F. The diet made up of isolated soybean protein supplemented with methionine was quite superior to all the other diets tested.

#### REFERENCES

- Hyer, A. H., Cotton Gin & Oil Mill Press 67, 10 (1966).
- Harper, G. A., Oil Mill Gaz. 68, 25 (1963).
- Thaung, U. K., A. Gros, and R. O. Feuge, JAOCS 38, 220 (1961).
- Lawhon, J. T., and A. C. Wamble, Ibid. 43, 639 (1966).
- Graci, A. V., Jr., J. J. Spadaro, M. L. Paredes, E. L. D'Aquin, and H. L. E. Vix, Ibid. 32, 129 (1955).
- Gastrock, E. A., E. L. D'Aquin, E. J. Keating, V. Krishnamoorthi, and H. L. E. Vix, Cereal Sci. Today 10, 572 (1965).
- Eaves, P. H., L. J. Molaison, and J. J. Spadaro, I&EC 48, 45 (1956).
- Boatner, C. H., C. M. Hall, R. T. O'Connor, L. E. Castillon, and M. C. Curet, JAOCS 24, 276 (1947).
- Pons, W. A., Jr., J. C. Kuck, and V. L. Frampton, Ibid. 37, 671 (1960).
- Horwitz, W., Editor, "Official Methods of Analysis of the Association of Official Agricultural Chemists," 10th Edition, 1965, p. 786.
- Steel, R. G. D., and J. H. Torrie, "Principles and Procedures of Statistics," McGraw-Hill Book Company, Inc., New York, N.Y. 1960.
- Johnston, C., and A. B. Watts, Poultry Sci. 44, 652 (1965).

[Received August 11, 1969]

TO APPEAR IN THE FEBRUARY ISSUE

COMPLETE PROGRAM  
AOCS ANNUAL SPRING MEETING, JUNG HOTEL  
NEW ORLEANS, LA., APRIL 26-30, 1970

(Continued from page 29A)

Montreal, Quebec, Canada). *Can. J. Biochem.* 47, 65-69 (1969). The release of the lipid and protein moieties of lipoproteins by liver slices from rats charged *in vivo* with palmitate-9,10-<sup>3</sup>H and leucine-1-<sup>14</sup>C was followed. The replacement of Ringer solution as the incubation medium by serum resulted in an increase in the release of the labelled lipid moiety but had no effect on the radioactivity of the protein moiety. Analysis of the lipoproteins indicated that serum had no effect on the radioactivity of the neutral lipid in the lipoprotein of d <1.063 or beta-lipoproteins prepared by ultracentrifugation or heparin precipitation, respectively. However, the lipoprotein of d <1.063 released into serum contained considerable amounts of labelled phospholipids and fatty acids which were not present in the beta-lipoprotein precipitated by heparin or in the low density lipoproteins prepared by either procedure following incubation in Ringer solution. Following incubation of the slices in serum, but not in the Ringer solution, the lipoprotein having d <1.063 and the supernatant of the heparin precipitate contained considerable amounts of labelled phospholipid. It is concluded that serum may contain a lipoprotein capable of combining with liver phospholipids and that ultracentrifugation results in the separation of low density lipoproteins containing excess lipid.

CHANGE OF LIPID METABOLISM IN CARDIAC INFARCTION. V. Lahn, L. Volenikova, F. Musil and J. Suva (Div. for Clinical Biochem. of Univ. Clinic, Plzen, USSR). *Fette Seifen Anstrichmittel* 71, 212-215 (1969). The authors investigated the alterations of various lipid fractions at different stages of cardiac infarction of 111 patients. A statistically significant increase in the level of beta-lipoproteins, free fatty acids and saturated esters of cholesterol was observed at the beginning of the disease. A striking rise in triglyceride content occurred in the sixth week. The proportion of *alpha* lipoproteins and cholesteryl linoleate decreased during the entire period of ailment. The content of free fatty acids sank from the second collection (4th till 10th day) of blood onward.

FAT METABOLISM IN GAMMA IRRADIATED GROUNDNUT IN RELATION TO OTHER METABOLIC PRODUCTS. PART I. G. M. Patel, K. C. Patel and R. D. Patel (Dept. Chem., Sardar Patel Univ., Vallabh Vidyanagar, Gujarat State, India). *Fette Seifen Anstrichmittel* 71, 203-208 (1969). The fat metabolism of a special variety of groundnut, exposed to 10-200 kr dosage levels of gamma rays and germinated for 0, 1, 3, 6, 12 and 20 days in sterile media, has been reported. Irradiation of the seeds has little effect on their neutral oil content during the initial period of germination, during which the free fatty acids and carbohydrates supply the energy of respiration. Free fatty acids do not accumulate throughout germination. Irradiation affects the rate of utilization of neutral oil, whose active metabolism occurs after the sixth day in the control seeds exposed to 10-50 kr of gamma rays. Interconversion of fatty acids occurs right from the beginning of germination, whereby the amount of linoleic acid in groundnut increases during the early stage. The linoleic acid initiated the metabolism, indicating the preferential mode of fatty acid utilization.

LIPIDS OF CANCEROUS TISSUE. A HYPOTHESIS ON THE CAUSE OF CANCER GENERATION FROM THE VIEWPOINT OF FAT CHEMISTRY. K. Fukuzumi (Dept. Applied Chem., Faculty of Eng., Nagoya Univ., Nagoya, Japan). *Fette Seifen Anstrichmittel* 71, 104-108 (1969). A hypothesis is presented which states that cancer is generated by oxidized lipids accumulating in the living body. The hypothesis explains the inhibition of beta oxidation in cancerous tissues, the decrease of catalase activity and the generation of cancer by radiant rays and arsenic.

NUTRITIONAL VALUE OF INTERESTERIFIED FAT. B. Kadykov *et al.* (VNIIZ, Leningrad and IPT, Varsovie). *Tluszczę Jadalne* 13(1), 6-23 (1969). The present work is concerned with the effect of interesterification on the nutritive value of fats. A mixture of 65% liquid rapeseed oil and 35% hydrogenated beef tallow (I.V. 18) was chosen so that the softening point of the product would be close to that of margarine fat. Feeding studies were used to determine the caloric efficiency (kcal. consumed per g. weight gain) of this mixture before and after interesterification. A regular margarine fat containing 25% sunflower seed oil, 70% rapeseed oil hydrogenated to a softening point of 32C, and 5% whale oil hydrogenated to a softening point of 33C was also fed. The following results were recorded: mixture before

interesterification, 30.0 kcal./g.; mixture after, 30.2 kcal./g.; margarine fat, 28.6 kcal./g. When the dosage of B vitamins in the diet was cut by 75%, the following results were recorded: mixture before, 44.5 kcal./g.; mixture after, 32.8 kcal./g.; margarine fat, 36.1 kcal./g. These latter results show that the mixture before interesterification had the poorest caloric efficiency while the mixture after treatment had the best. (Rev. Franc. Corps Gras)

ASCORBIC ACID AND COPPER IN LINOLEATE OXIDATION. I. MEASUREMENT OF OXIDATION BY ULTRAVIOLET SPECTROPHOTOMETRY AND THE THIOBARBITURIC ACID TEST. F. Haase and W. L. Dunkley (Dept. of Food Sci. and Technol., Univ. of Cal., Davis, Cal. 95616). *J. Lipid Res.* 10, 555-60 (1969). The UV absorption method and the thiobarbituric acid (TBA) test for oxidation of an aqueous suspension of linoleate were compared. The absorption method depends on the formation of hydroperoxides having conjugated double bonds that absorb strongly at 233 m $\mu$ . The absorption at 233 m $\mu$  increased markedly during oxidation of linoleate catalyzed by either ascorbic acid or cupric ions. The concentration of ascorbic acid in the reaction mixture was also measured by UV absorption at 265 m $\mu$  and pH 7.0. Color development in the TBA test also increased markedly with the extent of oxidation of linoleate. When ascorbic acid was the catalyst, UV absorption detected early stages of oxidation with greater sensitivity than the TBA test. The reverse was true when Cu<sup>+</sup> was the catalyst. In general, the relation between the two procedures will depend on whether copper is present when the TBA test is made.

II. ASCORBIC ACID AND COPPER AS OXIDATION CATALYSTS. *Ibid.*, 561-67. Both ascorbic acid and copper were strong pro-oxidants in the oxidation of linoleate in a buffered (pH 7.0) aqueous dispersion at 37C. Minimum concentrations at which catalytic activity was detected were  $1.3 \times 10^{-7}$  M for copper and  $1.8 \times 10^{-6}$  M for ascorbic acid. For concentrations up to  $10^{-3}$  M, the increase in rate of oxidation with increase in concentration of catalyst was greater for ascorbic acid than for copper. Ascorbic acid had maximum catalytic activity at  $2.0 \times 10^{-3}$  M, but was still prooxidant at the highest concentration tested ( $5.0 \times 10^{-2}$  M). Dehydroascorbic acid was a weaker prooxidant than ascorbic acid. Further degradation products of ascorbic acid were not prooxidant. In early stages of the oxidation autocatalytic behavior was observed with copper, but not with ascorbic acid. Ascorbic acid functions as a true catalyst, i.e., it accelerated the reaction but it was not oxidized simultaneously with the linoleate. It is proposed that the dehydroascorbic acid radical initiates the linoleate oxidation reaction.

CORRELATION BETWEEN PERCENTAGE OF PALMITIC ACID IN ADIPOSE TISSUE AND SERUM CHOLESTEROL LEVEL IN PATIENTS WITH MULTIPLE SCLEROSIS. W. Insull, Jr., J. B. Houser and A. S. Littell (Depts. of Med., Preventive Med., and Biometry, Case Western Reserve Univ., Cleveland, Ohio 44106). *J. Lipid Res.* 10, 535-8 (1969). To investigate mechanisms controlling the concentration of serum cholesterol we studied its relationship to the proportions of fatty acids in the lipids of adipose tissue of patients with multiple sclerosis. In 26 men the serum cholesterol concentration had a significant multiple linear regression on the proportion of palmitic, palmitoleic and grouped longer-chain acids in adipose tissues. In 29 women the serum cholesterol had a significant regression on the proportion of palmitic acid and age. Whether these observations would hold for normal people must be determined in future studies.

ISOLATION AND IDENTIFICATION OF PHOSPHOLIPIDS OF BOVINE RHODOPSIN. R. G. Adams (Lab. of Phys. Biol., Nat. Inst. of Arthritis and Metabolic Diseases, Bethesda, Md. 20014). *J. Lipid Res.* 10, 473-78 (1969). Phospholipids present in digitonin solutions of bovine rhodopsin have been identified and assayed. Digitonin interferes with extraction of lipids by the usual methods; digitonin was therefore removed from the preparation as an ergosterol digitonide, soluble in absolute ethanol but precipitated in 80% ethanol. The supernatant 80% ethanol contained one portion of the phospholipid, mainly choline and ethanolamine phosphoglycerides with traces of serine phosphoglyceride and sphingomyelin. The rhodopsin residue (free from digitonin) was extracted with chloroform-methanol 2:1; this extract contained the rest of the phospholipid, which consisted only of choline and ethanolamine phosphoglycerides. Plasmalogens were not found, but could have decomposed during the procedures.

(Continued on page 35A)

(Continued from page 32A)

EFFECT OF GLUCOSE INGESTION ON THE METABOLISM OF FREE FATTY ACIDS IN HUMAN SUBJECTS. C. Waterhouse, N. Baker, and H. Rostami (Univ. of Rochester School of Med. and Dent., Rochester, N.Y. 14620). *J. Lipid Res.* 10, 487-94 (1969). The rate of appearance of  $^{14}\text{CO}_2$  in expired air after the injection of a single dose of  $\text{NaH}^{14}\text{CO}_3$  has been determined in normal individuals both in the fasted and fed states. These data were combined with previously obtained results on the rate of disappearance of injected palmitate- $^{14}\text{C}$  from the bloodstream, to give a multicompartamental analysis of free fatty acid oxidation and esterification. The results confirm that glucose feeding promptly inhibits the rate of free fatty acid oxidation to  $\text{CO}_2$ . The "irreversible disposal rate," or irreversible flux of free fatty acids from the plasma, was also consistently reduced by glucose feeding. The diminution in irreversible disposal, not accounted for entirely by reduction of direct oxidation, must indicate suppression of other disposal mechanisms, including net esterification of free fatty acids. An average drop of 49% in "net esterification" when glucose was given may be compared with the 65% inhibition of rapid free fatty acid oxidation.

## • Drying Oils and Paints

ROLE OF SULPHURIC ACID IN THE DEHYDRATION OF CASTOR OIL. D. N. Bandopadhyaya. *Chem. Age India* 19, 116-7 (1968). The mechanism of dehydration of ricinoleic acid is discussed. The variation of viscosity of dehydrated castor oil due to polymerisation at 260C was studied. (World Surface Coat. Abs. No. 327)

INFRARED SPECTROSCOPIC DETERMINATION OF ALKYD RESIN COMPONENTS. M. Nagakura, Y. Ogawa and K. Yoshitomi. *J. Jap. Soc. Col. Mat.* 41, 542-53 (1968) (in Japanese). The I.R. spectroscopic method was applied to determine alkyd resin compositions with special emphasis on the identification of polyols and cyclic monobasic carboxylic acids. The presence of polyols such as propylene glycol (PG), glycerol (G), trimethylolethane (TME), trimethylolpropane (TMP) and pentaerythritol (PE) was detectable from the characteristic absorption band in the 1500-1360, 1350-1040 and 1000-900  $\text{cm}^{-1}$  regions. Whether an alkyd resin was composed of polyols containing either primary OH or secondary OH was determined from the absorption bands of primary and secondary OH groups. The former had absorptions at 1490, 1450, 1100, 990 and 970  $\text{cm}^{-1}$ , and also at 1470  $\text{cm}^{-1}$  as the shoulder of the 1450  $\text{cm}^{-1}$  band, and the latter at 1470 and 970  $\text{cm}^{-1}$ , and at 1450 and 1490  $\text{cm}^{-1}$  as the shoulders of 1470  $\text{cm}^{-1}$  band. No absorption at 990  $\text{cm}^{-1}$  was observed with the latter. TMP and TME alkyds had stronger absorption at 1380  $\text{cm}^{-1}$  than at 1470  $\text{cm}^{-1}$ ; with PE alkyds the situation was reversed. The PE/G weight ratio of the alkyds which were prepared from mixtures of these polyols keeping the oil length constant was proportional to the absorbance ratio  $D_{1380}/D_{1090}$ . The terminal OH groups had no effects on the 1100 and 1040  $\text{cm}^{-1}$  bands while this was not the case with castor oil modified alkyd resins. Aromatic monobasic carboxylic acids such as benzoic acid and *p*-tert-butylbenzoic acid were detected from the absorptions of benzene ring substituents. The benzoic acid content was determined from  $D_{710}/D_{748}$ . In the case of a soyabean oil fatty acid modified alkyd resin of 40% oil length, the benzoic acid content was obtained from the equation

$$x\% = (1/0.0458) \times \sqrt{(D_{710} - 0.513 D_{748})}$$

Since the extent of double bond isomerisation of unsaturated fatty acid during the synthesis of alkyd resin was negligible, the geometric isomers of double bonds in unsaturated fatty acid modified alkyd resins had no effects on the 990 (*trans/trans* conjugated) and 968  $\text{cm}^{-1}$  (isolated *trans*) bands, except for dehydrated castor oil modified alkyd resin. (World Surface Coat. Abs. No. 327)

**SOUTHWESTERN**

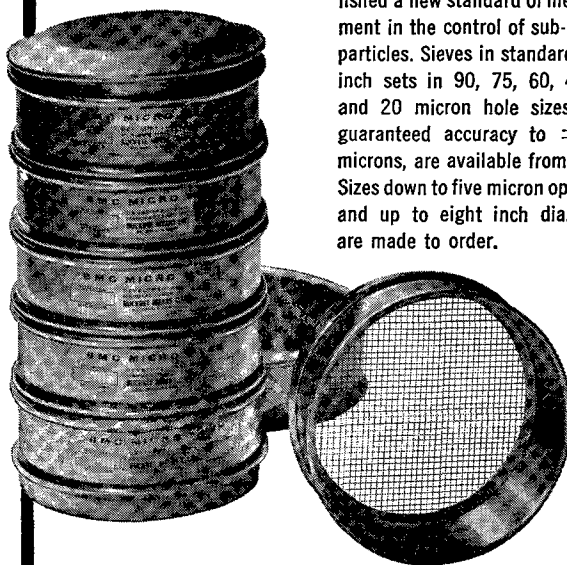
**LABORATORIES**

Inspection and Testing  
Engineers

DALLAS  
TEXARKANA  
FORT WORTH  
MIDLAND  
HOUSTON  
BEAUMONT  
817-332-5181

## Micro-mesh sieve sets 90 to 20 microns, measure particle size

Buckbee Mears sieves, made by an entirely new process, have established a new standard of measurement in the control of sub-micron particles. Sieves in standard three inch sets in 90, 75, 60, 45, 30 and 20 micron hole sizes, with guaranteed accuracy to  $\pm$  two microns, are available from stock. Sizes down to five micron openings and up to eight inch diameters are made to order.



bmc

**BUCKBEE - MEARS  
COMPANY**

245 E. 6th St., St. Paul, Minn. 55101 / (612) 227-6371

## • Detergents

ISOTROPIC GEL PHASES IN SURFACTANT-OIL-WATER SYSTEMS. H. N. Hoffmann and E. F. Paulus (Hoechst AG, Frankfurt/M.-Hoechst, W. Ger.). *Fette Seifen Anstrichmittel* 71, 399-403 (1969). As a model for similar systems at present being used in cosmetics, the phases formed by the system oleyl alcohol decaglycol ether/paraffin oil/water were examined. The individual phases are distinguished from one another by means of polarized light and by their greatly different rheological behavior. The results of X-ray diffraction pictures are given and discussed. The conditions for the occurrence of a transparent, isotropic gel phase (called G-phase) were examined.

COMPARATIVE BIODEGRADATION OF DETERGENTS I: COMPARATIVE BACTERIAL BIODEGRADATION OF LAURYL SULPHATE AND TRIDECYL BENZENESULPHONATES. E. J. Nymis, M. Lambert and A. L. Wiaux (Lab of Enzymology, Fac. of Sci., Univ. of Louvain, Heverlee, Belgium). *Fette Seifen Anstrichmittel* 71, 232-236 (1969). Twenty strains of bacteria isolated in a medium with lauryl sulphate as carbon source and twenty strains isolated with tridecyl benzenesulphonates were compared, with respect to growth and ability to degrade detergents in submerged cultures containing one of these surfactants as the major source of carbon. No strain was ideally suited for detergent biodegradation. Most bacteria isolated on lauryl sulphate rapidly degraded lauryl sulphate completely whereas they degraded tridecyl benzenesulphonates to a lesser extent than bacteria isolated on tridecyl benzenesulphonates. The latter strains, in turn, degraded lauryl sulphate at a lower rate and incompletely.

TECHNIQUE AND APPLICATION OF GAS CHROMATOGRAPHY IN THE FIELD OF FATS FOR THE SOAP INDUSTRY. G. Weis (Mannheim, W. Ger.). *Fette Seifen Anstrichmittel* 71, 226-231 (1969). A short introductory review on the development of gas chromatography is followed by an explanation of the principles involved in the construction of a gas chromatograph with

(Continued on page 36A)

(Continued from page 35A)

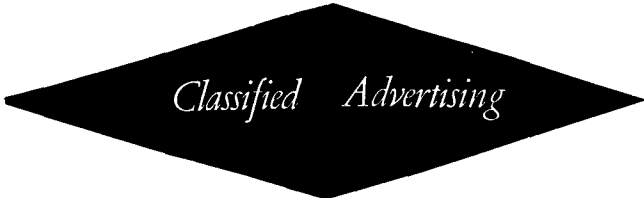
reference to the various detectors. The procedures for the esterification of fatty acids and interesterification of fats for gas chromatographic analysis are examined. The adjustment of a gas chromatograph as well as the evaluation of chromatograms are subsequently discussed. Finally, the possibilities for the use of gas chromatography in the investigation of fats for the soap industry are shown.

ANALYSIS OF ANTIMICROBIAL ACTIVE ADDITIVES FOR WASHING AGENTS. G. Schwarz (Anal. Lab., Henkel and Cie., Dusseldorf, W. Ger.). *Fette Seifen Anstrichmittel* 71, 223-226 (1969). With the help of ion exchangers, a rapid and reliable separation of antimicrobial additives from a large excess of surfactants can be accomplished. The active components can thus be easily identified and quantitatively determined. A further tool for the detection of the above additives is thin-layer chromatography.

CONSTITUTION AND PROPERTIES OF SURFACTANTS. E. Gotte (Dev. Lab., Henkel and Cie., Dusseldorf, W. Ger.). *Fette Seifen Anstrichmittel* 71, 219-223 (1969). From the information available in the literature and author's own investiga-

tions, general rules regarding the optimum structure of anionic and non-ionic surfactants are derived. Especially, linear, branched and cyclic hydrocarbon moieties with hydrophilic groups in various positions are considered. Furthermore, the change in properties of surfactants by the introduction of etheric oxygen in the alkyl part is demonstrated.

ANALYSIS OF NONIONIC SURFACE AGENTS. III. INFRARED SPECTRA OF EMULSIFIERS BASED ON PARTIAL GLYCERIDES. A. Seher (Federal Inst. for Fat Res., Munster/Westf., W. Ger.). *Fette Seifen Anstrichmittel* 71, 138-144 (1969). The efficacy of emulsifiers based on partial glycerides can be considerably improved by reacting them with edible acids. Such modified products are complicated mixtures whose analysis poses problems. A comparison of the IR-spectra of different emulsifiers has shown that the characteristic parts of the molecule can be clearly recognized. The spectra of similarly built products resemble each other to such a great extent that the type of product can be readily recognized from its spectrum. Products such as 1-monostearin, 1,3-dipalmitin, technical monoglycerides from palmitic acid, stearic acid, and lard, monoglyceride citrate, glyceryl lacto stearate, diglycerides and polyglycerols were studied using IR spectrophotometry.



### PLANT MANAGER

Established Venezuelan vegetable oil products manufacturer is seeking an experienced plant manager to manage a large modern vegetable oil refinery.

Ideally, the man selected should have a degree in Chemical Engineering and a strong background in edible oil processing, especially hydrogenization.

Salary commensurate with experience and ability(\*) This position offers excellent future opportunities.

**Box 11-A, American Oil Chemists' Society, 35 East Wacker Drive, Chicago, Illinois 60601**

### TECHNICAL DIRECTOR

Established Midwest food oil products manufacturer is seeking an experienced chemist or chemical engineer to head its quality control, process and product development department.

Ideally, the man selected will have a strong background in edible oil processing, product development and quality control. The position requires an aggressive man seeking a challenging job and a substantial growth opportunity.

Salary commensurate with experience and ability. An equal opportunity employer.

**BOX 9-D**

**AMERICAN OIL CHEMISTS' SOCIETY**

35 East Wacker Drive  
Chicago, Illinois 60601

### CHEMIST

Experienced chemist wanted for Official Laboratory Analyses of soybean meal and related grain products.

Must be qualified to maintain A.O.C.S. Certification. Excellent opportunity for young man to get started with new commercial laboratory located in the Southern Gulf Area of the United States.

All inquiries strictly confidential. Please send resume to:

**Box 12-S  
American Oil Chemists' Society  
35 E. Wacker Drive  
Chicago, Illinois 60601**

**FOR SALE: AOCS Official Methods, like new, revisions thru 1969. \$50.00 or best offer. J. P. Hewlett, P. O. Box 25861, Oklahoma City, Oklahoma.**

### OLD JAOCs

Have you finished reading the January and March 1968 issues of JAOCs and have no more need for them? AOCS will buy these issues from you at \$1.50 each. Send copies to American Oil Chemists' Society, 35 East Wacker Drive, Chicago, Ill. 60601.