

Miscella Refining¹

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Abstract

The miscella-refining process is most economically done at the crushing mills. Advantages over conventional refining are: production of lighter-colored oil, light enough so that some salad oil processors do not need to bleach the oil; lower operating costs, with smaller investments; also lower labor and power costs; greater yields of refined oil per ton of oilseed; more effective removal of free fatty acids, with resulting lower refining loss.

Introduction

THE ADVANTAGES OF miscella refining have been reported in several papers that have been presented to the American Oil Chemists' Society over the past 12 years. The theory had been proven on a laboratory scale well before this century; however the commercial application has only begun to gain impetus in the past 12 years with the development of specialized equipment and with the large-scale, solvent-extraction plants.

The acetone process, as developed by Vaccarino, is used in several plants in Europe; about 15 plants in the United States, Mexico, and Central America are using the hexane process as developed by Ranchers Cotton Oil Company and De Laval. This paper will elaborate on what has been done in the field of miscella refining and what can be done without any specific recommendation of a particular process or patented application.

Although miscella refining is most economically done when it is integrated with the oilseed crushing mill, feasible operation for oil purchased as crude oil and reconstituted with solvent can be a reality, particularly if the miscella refinery includes continuous solvent winterizing. A report of the advantages of miscella winterizing has also been published by JAOCS, and winterizing will be considered as a part of an integrated miscella-refining operation in this paper.

Quality Control of Plant Losses

In a conventional refinery the plant losses can be determined very simply by comparing the yield of finished oil with the weight of crude oil purchased. Where the miscella refinery is integrated with the solvent-extraction operation of the crushing mill, a weight of crude oil, or even a sample of crude oil for analysis, is not readily available. Cavanagh has reported the logic of the increased yield of refined oil products per ton of oilseed instead of the yield of finished oil from a given weight of crude oil. It must always be kept in mind that, in an integrated operation, not only the refining loss but the quality of the finished oil may be affected by processing conditions in the preparation of the oilseed and in the solvent-extraction operation.

Where the weight of oilseed crushed for a given period is available, the weight of finished oil products should be compared with source material on a pounds-per-ton basis as the primary criterion of plant-operating efficiency. Unfortunately the weight of bulk flow of oilseed from storage houses is also often not available, and daily weight of oilseed crushed is determined by applying an expected oil factor, based on prior years of operating and/or on laboratory analysis.

Refining losses are most often determined by the sodium balance method, where the laboratory analysis of the feed of miscella plus sodium hydroxide to the refining centrifuge is compared with the analysis of the soap phase from the centrifuge. From these figures the weight of soap per hour can be calculated. The plant loss is calculated as the weight of soap calculated per hour, corrected by subtracting weight of moisture and volatiles, dry NaOH, and acid treat as

determined by laboratory analysis of soap. The corrected soap weight is divided by weight of crude oil feed per hour. If the plant is equipped with reliable flowmeters that have been calibrated for accuracy, the plant loss can be determined by using a stopwatch and weighing the soap for a given period. The soap weight is corrected by subtracting analysis for moisture and volatile plus dry NaOH.

The flow of miscella should be converted to oil basis by checking the percentage of solvent and comparing the oil basis flow per hour with the corrected soap weight per hour. If the soap from miscella refining is returned to the oilseed meal, an estimate of refining loss can be determined by comparing fat analysis of the meal before and after adding the soap. The meal analysis could be compared to analysis of spent flakes if the soap is added in the meal desolventizer to recover the hexane in the soap, which averages 5 or 6%. In considering fat addition from soap loss, it should be kept in mind that only about two-thirds of the soap loss is extractable with petroleum ether when official AOCS methods are used.

It is difficult to obtain a sample of crude oil for analysis. When the hexane is evaporated from crude cottonseed oil miscella on a steam bath, the oil turns very black, and it is hard to strip off hexane from enough oil to run the cup loss. A more realistic plan is to evaporate hexane from crude miscella to run either the Wesson loss or the chromatographic loss; the chromatographic loss is considered as the lowest theoretical loss. Miscella refining should operate between 1.3 and 1.4 times theoretical loss on low-loss oils where the loss runs from 3 to 5%, with higher factors times theoretical for higher-loss oils. These loss figures would compare with 30 to 50% savings over cup loss for conventional refining as cup loss normally runs 1.5 to 1.8 times theoretical loss.

The plan to compare plant losses with theoretical instead of with savings over an arbitrary cup analysis is more practical since it points up the basic idea in an integrated plant of trying to recover, as finished oil, the largest possible percentage of the neutral oil purchased in the oilseed.

Plant Operation

Preparation for miscella refining should begin in the cooking stage of the oilseed meats prior to extraction. The temperature and moisture level reached can affect the oil color, FFA rise in crude oil, and the plant-refining loss. The meats should be cooked to a temperature and moisture level that will roll to a thin, crisp flake which will not disintegrate during direct solvent-extraction. Where screw presses are used ahead of solvent extraction, the temperature and moisture control would be planned for better operation. The Ranchers process recommends the addition of soda ash to the meats after cooking and ahead of screw-pressing.

The addition of soda ash would not be advantageous for direct solvent-extraction. It is possible to neutralize the free fatty acids partially and to combine some phosphatides with the protein for an oil that can be refined with lower losses and colors. Higher cooking temperatures can produce the same result in lower losses and colors for a direct solvent-extraction plant. However each plant should maintain a close check on yields of oil to be sure that neutral oil is not excessively bound with the protein, along with gossypol and phosphatides in the preparation steps. Where the plant is prepressing ahead of solvent extraction, the normal blend of prepress oil with the unevaporated full miscella (full miscella normally is 16-24%) will run between 40 and 45% oil.

The Ranchers process, with soda ash, is designed to operate at these levels of under 50% miscella, where the phosphatide level is low because of high temperature cook, action of soda ash, and the high-temperature shearing action of the screw-press. High phosphatide content oils, typical of direct solvent-extraction, will be easier to refine at higher

¹ Presented at the AOCS Short Course, "Processing Quality Control of Fats and Oils," East Lansing, Mich., Aug. 29-Sept. 1, 1966.

concentrations. Plains Cooperative has two miscella refineries operating with direct solvent-extraction and has observed both lower losses and better color-removal at the level of 60 to 65% oil and 40 to 35% hexane miscellas.

Regardless of the type of operation, the plant should be equipped to adjust concentrations to a desired level by evaporation or by addition of hexane or crude oil. An accurate flow-rate meter for the miscella and lye, together with automatic proportioning equipment for adding the lye, are desirable. The lye is normally 14 to 18 Baumé, or 9 to 13% sodium hydroxide, varying with miscella concentration and refining loss.

The DeLaval process recommends the addition of an acid pretreatment, such as glacial acetic, in the range of 400 to 1,000 ppm acid just ahead of the caustic addition, as an aid to color removal. The acid treat is more necessary on green, low FFA seed than on aged or high FFA seed operation. One patented process calls for adding a surface-active agent, such as Polyglycol, instead of acid. However where the soap wastes are being added to the meal, certain of the surface-active agents may not be allowed. The lye is mixed intimately with the oil-solvent in either an Oakes high shear mixer or a homogenizer. The mixture then passes through a heat exchanger and a series of slow-speed mixers to allow several minutes of reaction time with the lye, reaching the centrifuge at a temperature of 130 to 138F. After separation in the centrifuge the refined phase will be a light yellow neutral miscella, and the soapstock will be a heavy brown-black fluid, thick enough not to flow in a solid stream but not too heavy for good centrifugal separation.

The soapstock may either be added to the meal in the desolventizer or passed through a continuous evaporator to an acidulation process. The soap is normally 45 to 50% water and 5 to 6% hexane as it leaves the centrifuge, with 5 to 6% free sodium hydroxide. About 35% of the undried material can be recovered as distillable fatty acids in an acidulation process or, when added to the meal, aids in preventing dustiness of the solvent meal and also aids in pelleting the meal. Cottonseed meal with the added soapstock is a bright orange color and has a natural odor. It has excellent acceptance in the cattle-feeding industry.

The refined miscella may be filtered to remove traces of

soap and evaporated to be sold as refined oil. A water-wash centrifuge is normally not necessary as the soap content is normally under 50 ppm and can be lowered to under 10 ppm by filtration with a diatomaceous earth filter. The color of miscella refined oils will be much lower than conventional refined oils because the oils have not been subjected to a heat high enough to set colors until after the refining step. The low viscosity of the miscella allows a higher capacity through pumps and centrifuges with lower power costs. The bleached color of miscella-refined oils normally is lower than the AOCS bleach from cup test; there are savings of 30 to 50% over the AOCS cup loss.

If desired, the refined miscella may be either bleached or winterized in the miscella state. Several reports have been published concerning the advantages of miscella winterizing; the most successful continuous process for miscella winterizing is a miscella process. The oil is cooled to crystallization temperature in about three hours as compared with four days by the conventional winterizing method. Yields of winterized oil are much higher, normally about 90% of winterized oil by the miscella method; the other 10% is a hard stearine of about 70 IV. This stearine brings a premium price over conventional stearine of about 80 to 80 IV.

Miscella-refined oils, on winterization and subsequent deodorization, produce a salad oil that is lighter colored and more stable. It is normal to expect the color of salad oil from the deodorizer to be 2.0 to 2.5 red Lovibond color with no bleaching other than the heat bleach in the deodorizer. It is possible to produce an oil bleached to under 1.0 red Lovibond color by this method.

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"Discovery and Development" Theme of IFT Meeting

Over 4,000 food technologists will meet at the Philadelphia Civic Center, May 20-23 to attend the 28th annual meeting of the Institute of Food Technologists, and to discover and develop solutions to world-wide food problems.

Members of the IFT and other interested scientists from many areas of the world will exchange views on such important technical problems as the chemical and physical nature of food, nutrition and toxicology, food production and quality control, and the control of pollution—air and water—by process adaptation.

The theme of the IFT meeting is "Discovery and Development." One highlight of the meeting will be a symposium Monday morning, May 20, at the Civic Center on the subject, "Stimulating International Development." Featured speakers include C. W. Cook, Chairman and Chief Executive officer of General Foods Corporation; G. L. Mehren, Assistant Secretary of Agriculture, H. J. Rafson of Topco Associates, Inc., and G. F. Stewart, President of the Institute of Food Technologists.

Following the symposium will be a luncheon in the Bellevue-Stratford Hotel for invited members of the working press. Menu will consist entirely of convenience foods with emphasis on the instant and synthetic types, ranging from the new breakfast drinks, through meatless meats and "instant" dishes, to no-bake desserts.

In addition to the symposium, 191 symposia and technical papers will cover a variety of topics important to the world's food technologists.

International Society for Neurochemistry (ISN) Meets in Milan

The Second International Meeting of the International Society for Neurochemistry (ISN) will be held in Milan, Italy, from Sept. 1-5, 1969. This meeting, which will consist of specific symposia and general sessions, will deal with all aspects of neurochemistry. Communications on original work may be submitted to the Program Committee for presentation. Those related to the following topics will be especially welcome:

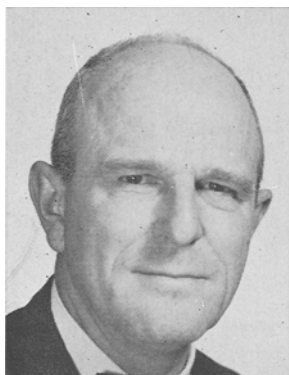
- 1) The biochemistry of peripheral nerve (including axoplasmic flow and transport).
- 2) The biochemistry of the nervous system during development and maturation.
- 3) The biochemical aspects of neural excitatory processes (ion pumps and membrane polarization; metabolism, physiological roles and pharmacology of biogenic amines, etc.).

Communications may be presented in English, French, German or Russian and an abstract of not more than 300 words should be submitted, preferably in English, before March 15, 1969. For further details and registration forms please contact one of the secretaries as follows:

Dr. J. Folch-Pi, Dept. of Neurochemistry, McLeans Hospital, Harvard Medical School, Belmont, Mass. 02178, USA	Dr. Rodolfo Paoletti, Institute of Pharmacology, University of Milan, Via Andrea del Sarto 21, 20129 Milan, Italy.
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The 1967 Short Course in Soaps and Detergents

THE AMERICAN OIL CHEMISTS' SOCIETY through its Short Courses acts as an agency for the dissemination of the latest information and techniques in various phases of fat and oil chemistry. Since cleaning agents, at least



J. F. Gerecht

historically, were derived from natural fats, they have always been considered to come within the purview of the Society, and Short Courses in Soaps and Detergents have been held previously in 1952, 1958 and 1963. The latest of these was held in 1967 at the Pocono Manor Inn. Like its predecessors it was held in an atmosphere of changing technology, but insofar as possible most of the major problems of the industry were considered.

Although detergents have been used since the early 1930's, they only became important commercially in the post World War II era. Two technological developments occurred which changed the washing habits of Mrs. Housewife. A process for producing an inexpensive yet adequate detergent raw material was developed. It was based largely on the polymerization of propylene, a technology acquired by the petroleum industry during the war years. Furthermore, during this period sodium tripolyphosphate also became a low-priced commercial item. Without these two almost simultaneous developments, it is doubtful that soap as a cleaning agent would have been so rapidly superseded by detergents.

Less than twenty years later the use of these two basic materials has been questioned, and one of them has already been replaced completely. The original alkylbenzene sulfonate caused trouble in sewage disposal plants and formed unsightly foams on surface waters. The elimination of these problems by the replacement of the original branched chain by a more biodegradable detergent raw material are summarized in a paper by T. Brenner in this Short Course.

As this rapidly changing detergent age continues, we now have phosphates in surface waters blamed for causing prolific algae growth resulting in undesirable changes in rivers and lakes. The origins of these phosphates are not at all clear at this time, and detergent builders are responsible for only part of the phosphate in surface waters. Human wastes and fertilizers leached from the land by natural drainage also must be considered as major sources of this contamination. These considerations stimulated the inclusion of a number of papers on builders in the 1967 Short Course. The use of phosphates, silicates and nitrilotriacetate in formulations was discussed. However, the replacement of phosphates in detergents, if at all possible, is a more formidable task than the replacement of alkylbenzene sulfonate because it is not certain that the only role of tripolyphosphate in the washing operation is to tie up naturally occurring hardness.

Detergency is not a well-understood process and the methods for evaluating it are highly empirical. Agreement as to the significance of the various tests employed is far from universal, and a vast amount of research is needed before an understanding of the process can be obtained. A discussion of the physical chemical properties of surfactant solutions and their effect on detergency was part of the program. In one of the papers it was reported that a small amount of clay was picked up and held tenaciously by cotton. Surprisingly it was not removed by water, anionic or cationic detergents, but by the nonionic type. Much more work of this fundamental nature is needed.

The increasing use of synthetic and so-called permanent press fabrics poses another problem for the detergent

industry. These new materials do not behave as plain cotton during washing and are affected not only by the detergent but also by the type of washing operation. We attempted to bring this complex, multi-industry problem into focus through a session on the washing of synthetic and treated fabrics. The stage was set by Drs. Tesoro and Grindstaff who discussed textile finishes and the removal of various types of soil from Dacron, nylon and cotton respectively. Methods for using radiotracers in washing studies were summarized by B. Gordon. The practical approach was elaborated by R. T. Hunter, and finally the role the appliance manufacturer plays in this complex picture was given by R. C. Davis. No pat solution to the problem was suggested, but a discussion from these various points of view should prove useful and stimulate further research.

Toilet bars are quite different from the rest of the detergent market. Here soap is king. Compared to almost complete replacement of soap by detergents in other areas such as shampoos, powdered and liquid detergents, the toilet bar market is still dominated by soap. However, detergents are slowly making inroads into soap's last domain and some of the reasons for this slow progress were discussed. The bar soap industry has not been static however, and the introduction of bacteriostats into soap has modified the demands of the consumer in this field. Furthermore, as evidence that toilet soaps are very much alive, equipment companies have developed machinery for the continuous processing of fats or fatty acids into the finished bar. Papers on the modern processing of soap and the various aspects of bacteriostats in soaps were presented by Dr. E. Jungermann and C. Kraus.

The average formulator of soap and detergent products knows little about the chemistry of the perfumes he uses in his products. They are customarily supplied by a separate section of the company or may even be recommended and supplied by another company. Motivation for the purchase of the product however, is often based as much on fragrance as on performance. The paper on detergent perfumery will not help the formulator to choose a more acceptable perfume, but it will enlighten him regarding the available perfumery materials. Coupling this with his own knowledge of the product, it might enable him to reject certain materials which may react with one or more of the ingredients.

Optical brighteners and bleaches are perhaps as responsible for the appearance of today's wash as are the detergents themselves. Technology in these fields is also changing rapidly, and discussions of the latest trends in optical brighteners and bleach chemistry were included in the program.

Finally, cationic agents are finding ever increasing uses in the detergent field, not as cleaning but as conditioning agents. As such they are used after shampooing or added to the rinse cycle of clothes washing. The myriad uses of these agents were discussed in a paper by R. Eagan.

Although no one can predict exactly what the future of the detergent industry will be, it is certain that change will continue. How will synthetic fatty acids effect the industry? Will olefin sulfonates ultimately displace the linear alkylbenzene sulfonate now used for liquid and powdered products. Will the newer synthetic alcohols and their derivatives become important detergent raw materials? Will an effective conditioning detergent combination be produced? These and many other questions offer technological challenges and opportunities to the detergent and chemical industries. As the answers to the problems develop, the American Oil Chemists' Society through both its National Meetings and Short Courses will continue to be a forum for discussion and dissemination of the latest information in this area.

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Fall Meeting Committee

New York, Oct. 20-23, 1968

International Symposia — New Topics, New Speakers



Committee Members Named for AOCS New York Meeting

THE AOCS-AACC WASHINGTON MEETING is a hard act to follow! With its double-sized program and attendance, it set records hard to match for the committee planning the New York Meeting. However, the individuals named here have already demonstrated that they intend to make this also a most distinguished meeting.

Pictured above, from left to right, are the committee members. General Chairman for the 42nd Annual Fall Meeting is F. B. White, Foster-Wheeler Corporation, Livingston, N. J.; Co-Chairman is E. A. Lawrence of Union Carbide Corporation, New York.

Technical Program Committee Chairman is S. S. Chang, Rutgers, The State University, New Brunswick, N. J.

The Finance Committee is chaired by J. F. Anodide, Lever Brothers Co., Edgewater, N. J., with Emil Horvath (not pictured), also of Lever Brothers, serving as Co-Chairman.

Hotel Committee Chairman is John Geminder, Chas. Pfizer & Co., Inc., New York; Co-Chairman, John McNaught, Lever Brothers Research, Edgewater, N. J.

Registration and Printing Committee, Frank Naughton, Baker Castor Oil Co., Bayonne, N. J.; Co-Chairman, August Rossetto, Jr., (not pictured) L. A. Salomon & Bro., Inc., Port Washington, N. Y.

Fund-Raising Committee Henry Salomon, L. A. Salomon & Bro., Inc., Port Washington, N. Y.; Co-Chairman, Les Hale (not pictured), Swift & Co., Chicago, Ill.

Plant Trip Committee, R. J. Houle, Lever Brothers Research, Edgewater, N. J.; Co-Chairman, Walter Koehler, also of Lever Brothers Research.

(Continued on page 295A)

Three Symposia on Lipid Biochemistry and Nutrition Organized by Hans Kaunitz

Hans Kaunitz of Columbia University has organized three outstanding symposia in the biochemistry and nutrition of lipids for the 1968 Fall Meeting of the American Oil Chemists' Society. The meeting will be held at the Statler Hilton Hotel, New York, Oct. 20-23, 1968.

The three symposia are:

Properties of Adipose Tissue. This will be a whole-day symposium, in an area of growing interest to lipid chemists. Among the participants are E. Aaes-Jorgensen of Denmark; Jeannine Raulin of France; and G. F. Cahill, Jr., Jules Hirsch, Jerome Knittle, David Kritchevsky, David Rittenberg, Daniel Rudman and Donald Therriault of the United States.

Lipids in Disease. Many diseases, including arteriosclerosis and the lipidoses, involve the characteristic disturbances of lipid metabolism. Some of these changes will be discussed by J. C. Blum and D. G. Derviehian of France; K. K. Carroll of Canada; and Roslyn Alfin-Slater, Hans Fisher, Helmut Mangold, John Senior and George Weber of the United States.

Organ Specific Triglycerides. Speakers in this symposium will include Jacqueline Clement and J. Flanzky of France; and Frederick Eirich, Robert Jensen, Hans Kaunitz, Donald Malins, Sister Paul Michael Slakey, and Robert VanderWal of the United States.

(Continued on page 295A)

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• *New Literature*

Bulletin C-14, just published by THE FOXBORO COMPANY, describes ERB Series electronic strip chart recorders.

The accurate, compact instruments can record up to 12 different variables in as many colors. Inputs may be from thermocouples, resistance bulbs, or any d-c voltage or current signal. (Foxboro, Mass. 02035.)

MELPAR, INC., Subsidiary of Westinghouse Air Brake Company, has a data sheet on the model S-201 shipping container which provides a thermally controlled environment for temperature-sensitive payloads such as pharmaceuticals, cultures, or sensitive electronic instruments, and other materials affected by temperature changes during shipment. This versatile shipper, once energized, will maintain its payload at a nearly constant temperature during shipment without external power. (7700 Arlington Boulevard, Falls Church, Va. 22046.)

THE SOYBEAN COUNCIL OF AMERICA, INC., in cooperation with the United States Department of Agriculture, has published a booklet entitled "The Role of Soybean Meal in the Development and Use of Modern Livestock and Poultry Feeds," written by R. S. Burnett, Technical Director, Soybean Council of America, Inc. (Available in English and Spanish, free, from Technical Department, Soybean Council of America, Inc., Nunuz de Balboa, 11, Madrid-1, Spain.)

WORTHINGTON BIOCHEMICAL CORPORATION has just published a 4-page bulletin describing its new reagent for the determination of serum creatine phosphokinase (CPK) in the clinical laboratory. Designated Determatube CPK, the new reagent makes possible the early, positive diagnosis of myocardial infarction and muscular disorders. (Freehold, N. J. 07728.)

Versene chelating agents, metal ion control products produced by THE DOW CHEMICAL COMPANY, are described in two new technical brochures recently issued by Dow. "Versene NTA" discusses Dow's NTA chelating agent. "Versene Chelating Agents" describes Dow's EDTA, DTPA, and HEDTA products. Both brochures discuss the chemistry of chelation, the physical and chemical properties of the various chelating agents, product forms available, safety, analytical procedures, and applications. (Designed Chemical Sales, 2020 Abbott Road Center, Midland, Mich. 48640.)

PRESTON TECHNICAL ABSTRACTS COMPANY gas chromatography abstracts are now available in a monthly bound volume. In the past, their Gas Chromatography Abstracting Service has been available *only* on 5" x 8" edge-notched cards. While many scientists prefer the abstracts in this form for literature searching purposes, other users have indicated that the cards are not entirely convenient for their purposes. In response to these comments,

we are now supplementing the abstract service in card form with the same abstracts printed in bound (book) form as well. While the cards are issued weekly, the bound form will be issued on a monthly basis. (909 Pitner Ave., Evanston, Ill. 60202.)

A rapid method to obtain chromatographic separation of nine carboxylic acids which are common intermediates of microbial metabolism is outlined in the first issue of *Current Chromatography*. This monthly newsletter, published by the Gelman Instrument Company, presents the latest developments in thin-layer chromatography. Special emphasis is placed on techniques utilizing Instant Thin Layer Chromatography (ITLC), the Gelman ready-to-use chromatographic medium.

BRINKMAN INSTRUMENTS, INC., has prepared a new brochure listing several interesting lines of analytical chemicals, including a variety of materials offered for the first time. 1) New deuterated solvents, organic and inorganic forms; 2) unique, disposable concentrated normal solutions; 3) ultra-pure reagents; 4) chromatography chemicals. In addition, a bulletin listing several new precoated plates and new multiplate development tanks is available as well as free samples of precoated TLC plates. (Cantiagne Road, Westbury, N. Y. 11590.)

RAI RESEARCH CORPORATION announces the successful completion of the development program aimed at the duplication of radiation grafted membranes by means of chemical grafting. The new process permits the preparation of specialty membranes exhibiting the same unique characteristics as their radiation grafted counterparts while significantly improving the quality and uniformity of the resulting product. The procedure is also adaptable to a continuous manufacturing technique resulting in greatly lowered cost. (RAI Research Corporation, 199 Sound Beach Ave., Old Greenwich, Conn. 06870.)

CHROMATRONIX, INC., has introduced a line of microbore liquid chromatography columns that make high-resolution separations quickly and with minimum labor. The chemically inert columns have bores of 1, 2 or 3 mm and operate at pressures up to 500 psi, high enough to drive samples rapidly through the fine packing materials that produce the sharpest separations. (2743 Eighth Street, Berkeley, Calif. 94710.)

NBS has developed a rapid procedure, employing viscometric techniques, for estimating the apparent molecular weights of vinyl acetate copolymers in latex paints. This inexpensive technique provides coatings laboratories with a means of relating the weights of these copolymers to the paint's properties and performance in actual use. (NBS Office of Technical Information and Publications, Room A 500/101, Washington, D.C. 20234.)

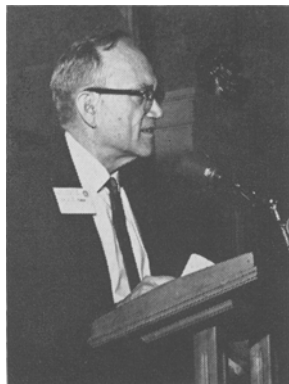
(Continued on page 300A)

Eighth Alton E. Bailey Award Honors Herbert Dutton of USDA

Cited for Work in Stability of Edible
Soybean Oils



R. J. Evans



J. C. Cowan



R. A. Reiners presents the Bailey Award Medal to H. J. Dutton.

The Medal commemorates Alton E. Bailey's outstanding contributions to the field of fats and oils as a researcher, as the author of several standard books in the field, and as a leader in the work of the Society.

Previous Medalists were: 1959, V. C. Mehlenbacher; 1960, R. H. Potts; 1961, J. C. Cowan; 1963, A. R. Baldwin; 1965, T. P. Hilditch; 1966, Daniel Swern; 1967, W. O. Lundberg.

Dr. Dutton Is Eighth Medalist

The 1968 Medalist is Herbert Dutton of the Northern Regional Research Development Laboratories in Peoria,

(Continued on page 281A)

MARCH 20TH WAS A GALA EVENING for the North Central Section of The American Oil Chemists' Society on the occasion of the annual Alton E. Bailey Award Dinner at the Swedish Club in Chicago. Over 100 members were on hand to celebrate the occasion.

The North Central Section established the award in 1959 to honor "Outstanding Research and/or Service in the Fields of Oils, Fats, Wax and Allied or Associated Products."



Among the many guests on hand to congratulate Dr. Dutton were (upper left, left to right) W. Cole, Toni Trinchese, E. F. Sipos; (center left) D. R. Erickson, E. Matern, H. C. Black, B. Greenwell; (lower left) F. A. Norris, E. W. Meyer, H. A. Luetig, E. F. Sipos, R. Slutkin, D. M. Fujii; (lower center) Bailey Award banquet; (top right) R. Wantz, D. Dunnigan, Hi Spannuth; (right center) D. H. Howland, E. Jensen, J. L. Schille, J. C. Pressick; (lower right) R. A. Reiners, H. J. Dutton and representatives of sponsoring companies.



ABSTRACTS

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

• Fats and Oils

METHOD OF RAPID LIPID EXTRACTION. K. Abel, H. S. de-Schmertzing and J. I. Peterson (Melpar, Inc.). *U.S. 3,365,277*. A method for the determination of the composition of bacterial lipids comprises the steps of suspending the bacteria in a lower aliphatic alcohol, transesterifying the lipid acids by heating the suspension in the presence of an alcoholysis catalyst such as boron trichloride until volatile esters of the lipid acids are formed, extracting the volatile esters with a solvent and analyzing this extract by gas chromatographic methods to determine the nature and amount of each lipid acid ester.

PROCESS FOR MAKING LOW FAT SPREAD. G. D. Voss and C. J. Rogers (Armour and Co.). *U.S. 3,366,492*. A process for preparing a food product comprises the steps of blending non-fat milk solids, gelling agent and water in a temperature range of 150-180F, cooling to 80F, and blending in a water-in-oil emulsion containing large fat globules of about 50-100 micron diameter and free-fat crystals at 80-90F, until a homogeneous blend is obtained. The final product contains 1-5% non-fat milk solids, 0.3-1% gelling agent and 24-60% fat.

DETERIORATION OF FRYING OILS IN CONTINUOUS WATER-SPRAYING AND HEATING SYSTEM. VIII. FRYING QUALITY OF KAPOK SEED OIL. Etsuji Yuki (Food Industrial Expl. Sta., Hiroshima Pref.). *Yukagaku 17, 19-22 (1968)*. The oil showed good stability against hydrolytic deterioration during frying with practically no increase of acid value. However it was very unstable against thermal oxidative deterioration as shown by a rapid increase in viscosity and foaming tendency. Covering the oil with a metal float was effective for prevention of thermal oxidative deterioration and retention of light color. Kapok seed oil had good stability against autoxidation at room temperature. Addition of refined kapok oil to soybean oil was effective in improving hydrolytic deterioration of soybean oil. This may be due to high content of cyclopropenoid fatty acid in kapok oil.

A METHOD OF ESTIMATION OF ACID DISTRIBUTION AND THE ORDERED DISTRIBUTION HYPOTHESIS IN NATURAL FAT TRIGLYCERIDES. Shigeru Tsuda (Ind. Research Inst., Osaka Pref.). *Yukagaku 17, 26-31 (1968)*. The possibility of the ordered distribution hypothesis proposed previously was discussed. Assuming the selectivities with variable degrees in the esterification of the 1 and 2 position, wide range of the acid distribution containing random distribution is obtained, 1,3-random 2-random and 1-random 2,3-random. The saturated acid distribution of many fats may fall in this range of ordered distribution. It is also shown that the presence of racemic glyceride cannot be a proof of equal distribution of acid in the 1 and 3 positions, because in a special case, unequal distribution leads a racemic glyceride.

LIPIDS OF THE SNAIL, *BATILLARIA MULTIFORMIS*, *LUNELLA CORONATA*, *TRITIA FESTIVUS*, *SEMISULCOPIRA LIBERTINA*, AND *MUD-SNAIL OILS*. Shigeru Hamada and Sei-ichi Ueno. *Yukagaku 17, 39-42 (1968)*. The fatty acids from these oils contained C₂ to C₂₂ saturated and unsaturated acids, some with 1, 2, 3 and 4 double bonds. These are the same kinds of fatty acids found in fish oil and shell-fish oil. The snail oil contained a sterol with m.p. 142-4C, that from roll-shells had m.p. 141-2C.

COMPONENTS OF FLAVORS IN EDIBLE OILS. Shizuyuki Ota (Ajinomoto Co., Kawasaki). *Yukagaku 17, 2-18 (1968)*. A review with 140 references.

FAT AND OIL INDUSTRIES IN JAPAN IN THE PAST 100 YEARS (1868-1968). Shizuyuki Ota. *Yukagaku 17, 43-6 (1968)*.

INVESTIGATIONS OF FAT ANTIOXIDATION. IV. THE PRESERVATION OF TALLOW TO BE USED AS A MILK REPLACER FOR CATTLE. M. Loury and C. Bloch (Lab. of Jean Rupert, Inst. of Fats and Oils, Paris, Fr.). *Rev. Franc. Corps Gras 14(11), 645-647 (1967)*. Tallows destined for milk replacers must be of high quality and perfectly preservable. While rancidity due to biochemical agents can be avoided, rancidity due to oxidation by atmospheric oxygen can only be retarded. Most antioxidants are derivatives of phenol. Little is known of the effect of these chemicals on the physiology of young animals. Synergistic mixtures based upon tocopherol and ascorbyl palmitate may be as efficient as synthetic antioxidants, and are known to be nontoxic.

THE PRODUCTS AVAILABLE IN THE EUROPEAN ECONOMIC COMMUNITY COUNTRIES FOR THE DENATURATION OF FATS FOR INDUSTRIAL USES. A REVIEW. A. Uzzan (Documentation Service, Inst. of Fats and Oils, Paris, Fr.). *Rev. Franc. Corps Gras 14(11), 659-661 (1967)*. Denatured fats are taxed at a lower rate. Use of denatured fats for industrial purposes offers an economic advantage. This report reviews the products available for denaturation purposes. An ideal denaturant is defined. None of the denaturants now legally accepted within the EEC meets the criteria of the ideal denaturant. It is suggested that new products in better accordance with the criteria should be proposed when building the Community regulations.

ON CALCULATIONS OF SPECIFIC VOLUMES FROM DILATOMETRIC MEASUREMENTS. E. Sambuc and M. Naudet (Nat. Lab. of Fats and Oils (ITERG), Fac. of Sci., Marseilles, Fr.). *Rev. Franc. Corps Gras 14(12), 725-729 (1967)*. With dilatometry it is possible to find the temperature dependence of the specific volume of a fat. The principle of a method for the precise determination of specific volume along with practical calculations for specific volume are presented.

EXAMINATION OF THE LIPID FRACTION OF VARIOUS VEGETABLES AND FRUITS. U. Bracco, J. J. Wuhrmann and R. H. Egli (Nestle Res. Lab., Vevey, Switzerland). *Rev. Franc. Corps Gras 14(12), 707-712 (1967)*. The lipid fraction of a variety of ordinary vegetables and mushrooms and a certain number of tropical fruits has been examined. The fatty acid composition and the content and the constituents of the unsaponifiable matter exhibit certain similarities, independent of the variety of the various types of vegetables examined. Due to its composition, the lipid fraction of the mushrooms is clearly distinguishable from that of the other types of vegetables. The common characteristic of vegetables and mushrooms is the high degree of unsaturation of the fatty substance which, although ponderably insignificant, is responsible for the instability of these products when they are dehydrated, especially in those cases where the heat treatment applied destroys the cell organization of the product. Certain tropical plants contain a high content of relatively stable fatty substances. Certain fruits may be used as sources of juice; the seeds constitute a by-product of manufacture.

LABORATORY BLEACHING TESTS WITH EDIBLE OILS AND FATS. F. D. Tollenaar, H. Hoekman and J. M. Valkenburg (Central Inst. of Nutr. and Foods, TNO a Zeist, Holland). *Rev. Franc. Corps Gras 14(12), 699-706 (1967)*. The method of carrying out bleaching experiments in the laboratory and the differences that may arise as compared to industrial bleaching are described. Changes in soap content due to bleaching were investigated. It appears that this change depends on the pressure during the process. A study was made of the formation of free fatty acids during the bleaching process. It was demonstrated that not only are fatty acids formed from soap, but also by hydrolysis of glycerides, especially if acid activated clays are used. Non-activated earths absorb fatty acids. The factors affecting glyceride hydrolysis by activated earths have been studied. Here again, the pressure used during the process is influential. With an industrial bleaching process, using a temperature of 90C and 2% earth, it may be expected that the increase in acid value due to glyceride hydrolysis will not exceed 0.04 milligrams KOH per gram. This corresponds with 0.02% free fatty acid. Type of oil has little effect.

APPLICATIONS OF SPECTROSCOPY TO STRUCTURE DETERMINATION. PART I. INFRARED SPECTRA AND OLEFINIC DOUBLE BONDS. P. S. Kalsi (Punjab Agricultural Univ., Ludhiana, India). *Perfumery Essent. Oil Record. 58, 796-805 (1967)*. An informative review is given of the application of infrared spectroscopy to complex organic molecules.

EASY STATISTICAL TESTS FOR LABORATORY AND PLANT TESTS. W. M. Wooding (Carter Products Res., Carter-Wallace, Inc., Cranbury, N.J. 08512). *J. Soc. Cosmetic Chemists, 19, 95-107 (1968)*. Rank tests and other nonparametric procedures can be used to take advantage of the objectivity available to an experimenter by application of statistical methods to data. Three well-known rank tests are described: the Wilcoxon Two Sample Rank Sum Test, The Wilcoxon Signed Rank Test for Paired Data, and the Multiple Rank Test for Paired Data. Examples of the application of each test are given.

THERMAL CAPACITY AND SPECIFIC HEAT OF COCOABUTTER, CHOCOLATES AND ICINGS AT DIFFERENT TEMPERATURES. K. Becker and J. Bauermeister (Inst. Food Technol. and Packaging, Munchen, Ger.). *Fette Seifen Anstrichmittel* 69, 593-597 (1967). The thermal capacity of chocolate doughs in relation to the temperature is of great importance in the designing of the heating and cooling parts of the chocolate producing machines. In spite of this, there are very little data available in this field. To fill up this gap, a simple calorimeter is described with the help of which such thermal capacities can be measured. With the help of a few determinations with different chocolate doughs, it is shown that, depending on compositions, the thermal capacities of such doughs at the same temperature can be quite different. A method and the necessary data are presented for a simple and rapid calculation of the thermal capacities of chocolate doughs containing any proportions of sugar, milk powder and cocoa components, between 0C and 65C.

AN APPARATUS FOR THE AUTOMATIC DETERMINATION OF UBBEHOHDE'S FLOW-/DROP-POINT OF WAXES. D. Roemer and A. Hochreiter (Farbwerke AG, Werk Gersthofen). *Fette Seifen Anstrichmittel* 69, 646-651 (1967). An apparatus for automatically determining the flow and drop-points of twelve wax samples at a time is described. A thermostat is heated by programming to high temperature. A twelve-point recorder records the temperature of the wax samples. As soon as the flow begins, a semispherical head breaks the path of a light beam, the recorder current is short circuited and with it the flow point is indicated. As the wax drop falls, the light path is freed, the contacts acquire their original positions and the dropping temperature is registered.

DETECTION OF SMALL QUANTITIES OF HIGHER SATURATED FATTY ACIDS IN MIXED FATTY ACIDS OF OILS BY LEAD SALT SEPARATION AND THIN-LAYER CHROMATOGRAPHY. M. M. Chakrabarty, K. Talapatre and J. M. Roy (Dept. Appl. Chem., Calcutta Univ., Calcutta, India). *Fette Seifen Anstrichmittel* 69, 642-644 (1967). A combination of Twichell's lead salt separation procedure and reverse phase thin-layer chromatography on Plaster of Paris plates has enabled easy separation and identification of C20-C24 minor saturated acids in mustard seed oils. This has further demonstrated the inapplicability of Bellier's turbidity point test for mustard oils by showing the quantitative variation in the proportion of C20-C24 acids naturally present in these oils. Expected augmentation of minor acid spots in chromatograms could be shown by an adulteration with peanut oil. The method can be adapted for the general detection of adulteration of fats and oils.

POLAROGRAPHIC DETERMINATION OF TOCOPHEROLS AND TOCOPHERYLQUINONES IN OILS AND FATS. A. Niederstebuck and I. Hinsch (German Patentamt, Munchen, Ger.). *Fette Seifen Anstrichmittel* 69, 559-570 (1967). A method for the polarographic determination of alpha, gamma and delta tocopherols and the corresponding tocopherylquinones in oils and fats was developed. After saponification of the samples and extraction of unsaponifiable matter with ether, the tocopherylquinones originally present in oils and fats are directly determined polarographically. Tocopherols present in the sample are oxidized quantitatively with cerium (IV) sulfate to the corresponding tocopherylquinones and then determined polarographically. The presence of substances accompanying tocopherols in the unsaponifiable matter does not interfere with the determination of tocopherols or tocopherylquinones. The tocopherol contents of different oils and fats are given.

POLAROGRAPHIC DETERMINATION OF HYDROPEROXIDES IN OILS. *Ibid.*, 637-642. The application of direct current polarography for the determination of hydroperoxides in oils has the following advantages over other methods, specific for hydroperoxides, independent of the structure of hydroperoxides, even very small amounts (up to 10^{-6} mol/liter) are detectable, and relatively short time is required. In comparison to chemical determination the accuracy of the polarographic determination is plus and minus 3% and in case of very small amounts of hydroperoxides (less than 10^{-5} mole/liter) it is plus and minus 10%.

THIN-LAYER CHROMATOGRAPHIC DETECTION OF SOYBEAN OIL IN SUNFLOWER OIL. G. Biernoth (Unilever Lab., Hamburg, Ger.). *Fette Seifen Anstrichmittel* 69, 635-637 (1967). Small amounts of soybean oil in sunflower oil can be detected on the basis of delta tocopherol. A thin-layer chromatographic method in which the negligible delta-tocopherol content of sunflower oil (approx. 5 ppm) does not interfere is described. The addi-

tion of 3 and 5% respectively of soybean oil to sunflower oil can be detected in a reproducible manner.

SYSTEMATIC QUANTITATIVE ANALYSIS OF NATURAL WAXES WITH THE HELP OF ION EXCHANGE, COLUMN AND THIN-LAYER CHROMATOGRAPHY. G. H. Scholz (Inst. for Pharmacy, Univ. of Graz). *Fette Seifen Anstrichmittel* 69, 565-570 (1967). A method is presented for the quantitative separation of natural waxes into classes. The hydrocarbons were separated by absorption chromatography on a silica gel/carbon disulfide column. The separation of acids from alcohols was achieved on a two-phase ion exchange column after saponification. The isolation of the individual homologues, C16 to C32, from the alcohol and acid mixtures was conducted with the help of reverse phase column chromatography through a stepwise increase in temperature and acetic acid concentration.

INFORMATION ABOUT FATS CONTAINING SULFUR AND THEIR BEHAVIOR DURING HYDROGENATION. J. Baltes (Harburger Oeliverken Brinckman and Merzell, Hamburg-Hamburg, Ger.). *Fette Seifen Anstrichmittel* 69, 512-514 (1967). Commercial marine oils, whale and fish oil, can contain combined sulfur which cannot be eliminated by means of normal refining and therefore can cause considerable difficulty during hydrogenation. An analytical method for the determination of sulfur in fats is described. The quantitative determination of 0.5 to 100 micrograms sulfur per gram fat with an accuracy of 0.2 micrograms sulfur per gram of fat is possible. Any fat containing more than 2 micrograms sulfur should be desulfurized by hydrogenating with nickel at 120C to 130C. Complete desulfurization is obtained without any noticeable hydrogenation or isomerization of the unsaturated fat constituents. Such pretreated fats can be hydrogenated as usual. Rapeseed oil, which sometimes contains sulfur constituents, can be desulfurized in the same way.

NEW METHODS FOR THE TOCOPHEROL DETERMINATION AND THEIR APPLICATION IN VEGETABLE OILS. M. Jaky (Inst. Agr. Res., Iregszemese, Hungary). *Fette Seifen Anstrichmittel* 69, 507-511 (1967). Methods for the determination of tocopherols in oils were examined. A new method was developed which permits the separation of tocopherols and their rapid determination without decomposition. Thin-layer chromatography was used for the separation. Using TLC and data available in the literature, two modified methods for the determination of total tocopherols and the homologous compounds, side by side, was developed. The saponification step was eliminated and direct methods of determination used.

DETERMINATION OF CYCLIC FATTY ACIDS ON UREA COLUMN. A. N. Sagredso (Unilever Res. Lab., Hamburg, Ger.). *Fette Seifen Anstrichmittel* 69, 707-711 (1967). Cyclic monomeric fatty acids (CFA) in a mixture of straight chain saturated and unsaturated fatty acids were determined after methylation (CFA-Me) as non-adducts on a urea column. The method gives quantitative results with mixtures containing 5% or more cyclic fatty acids. The determination is easy and rapid.

COMPARATIVE STUDIES ON THE GAS CHROMATOGRAPHIC, RESOLVING PROPERTIES OF POLYESTERS FROM ETHYLENE GLYCOL AND ALIPHATIC DICARBOXYLIC ACIDS. F. Falk (Inst. for Fat Chem. Ger. Acad. Sci. of Berlin, Berlin-Adlershof, Ger.). *Fette Seifen Anstrichmittel* 69, 699-706 (1967). Ethylene glycol polyesters of aliphatic dicarboxylic acids (C4-C10) were synthesized. In the gas chromatographic analysis, the relative retention values for *n*-paraffins, alpha-*n*-olefins, fatty acid methyl esters, fatty alcohol acetates, and dicarboxylic acid methyl esters are independent of the molecular weights and the end group distribution of the said liquid phases. With the help of the closely agreeing IR-values, GLC-spectra were drawn, which enable a rapid identification of the compounds mentioned above with the aid of a few test substances. Mixed polyesters behave in the same way.

ROLE OF TOCOPHEROL AS AN ANTIOXIDANT IN SAFFLOWER OIL. M. K. Govind Rao and K. T. Achaya (Res. Lab., Hyderabad, India). *Fette Seifen Anstrichmittel* 69, 711-714 (1967). In a mixture of oleic and linoleic acids, in equal proportions, the latter dominates the autoxidation pattern. At 63C, gamma tocopherol offered the best protection to linoleate-rich substrates, with alpha and delta next in order. Safflower oil is insufficiently protected by its own tocopherol. Doubling the tocopherol content by supplementation or increasing the cephalin content effected only slight improvement. Safflower oil is best stabilized by a combination of synthetic phenolic antioxidants and synergists.

NEW PROCESSES FOR THE RENDERING AND UTILIZATION OF ANIMAL BY-PRODUCTS. R. DeVita. *Riv. Ital. Sostanze Grasse* 45, 7-9 (1968). A newly developed process for the rendering of animal by-products is described.

TECHNOLOGICAL PREMISES FOR A RATIONAL UTILIZATION OF EDIBLE AND INEDIBLE TALLOW. G. B. Martinenghi (Univ. of Milan, Milan, Italy). *Riv. Ital. Sostanze Grasse* 44, 484-7 (1967). A review.

SPECTROFLUOROMETRY OF ESTERIFIED OLIVE OILS. III. ISOLATION OF THE FLUORESCENT SUBSTANCE. G. Kaderavek (Min. of Agr., Milan, Italy). *Riv. Ital. Sostanze Grasse* 44, 469-70 (1967). The isolation and tentative identification are described of the compound which imparts their characteristic fluorescence to esterified olive oils. This compound is believed to be a β -diketoacid derived from linoleic acid and present as a glyceride.

NEEDS OF THE OLIVE OIL INDUSTRY AND RESEARCH POSSIBILITIES. L. Montanari (Edible Oil Center, Rome, Italy). *Riv. Ital. Sostanze Grasse* 44, 524-8 (1967). A review.

CHARACTERISTICS OF OLIVE OIL PRODUCTION IN THE ITALIAN PROVINCE OF IMPERIA. V. Soderi (Ital. Ministry of Agr., Imperia, Italy). *Riv. Ital. Sostanze Grasse* 44, 535-44 (1967). A detailed breakdown of olive oil production costs for the Italian province of Imperia is reported. Between 55 and 65% of total production costs are attributed to labor.

GAS CHROMATOGRAPHIC STUDIES OF TURKISH OLIVE OILS FROM THE AEGEAN REGION. M. Colakoglu (Univ. of Ankara, Turkey). *Riv. Ital. Sostanze Grasse* 44, 529-34 (1967). The gas chromatographic analyses of 50 samples of Turkish olive oil from the Aegean region are reported, along with results on one Greek and one Tunisian sample. A few differences have been noted between the Tunisian and the Turkish oils, for example a slightly higher content of palmitic, palmitoleic and linoleic acids.

COMPOSITION OF THE UNSAPONIFIABLE OF SOME AVOCADO OILS. E. Fedeli, A. Lanzani and G. Jacini (National Center for Lipochem., Milan, Italy). *Riv. Ital. Sostanze Grasse* 44, 519-23 (1967). The unsaponifiable fractions of some avocado oils of different origins have been studied in order to correlate possible differences of composition with differences in pharmacological activity. The hydrocarbon, alcoholic, sterolic and terpene alcoholic fractions were separated by TLC and only small quantitative differences in composition were found among the different oils. An unknown component was found both in the triterpenic and in the sterolic fraction of each one of the oils. With respect to the unsaponifiable of soybean oil, the unsaponifiable of avocado oil also contains a moderate amount of a fifth, more polar fraction.

RHEOLOGICAL STUDIES ON THE CENTRIFUGATION OF OLIVE PASTES. J. M. Martinez Moreno, C. Gomez Herrera and C. Janier Del Valle (Inst. de la Grassa, Seville, Spain). *Riv. Ital. Sostanze Grasse* 44, 545-7 (1967). The centrifugation of ground olive pastes, hulled or containing fragments of their ligneous endocarp, is an increasingly adopted method of olive oil extraction. The effects on oil yield during 1,000 g centrifugation of the mechanical preparation of the paste (without addition of water) have been studied. It has been shown that results equivalent to those obtained through the use of filter presses are possible.

THE OCCURRENCE OF POLYCYCLIC AROMATIC HYDROCARBONS IN COCONUT OIL AND THEIR REMOVAL. G. Biernoth and H. E. Rost (Unilever Research Lab., Hamburg, Germany). *Chem. Ind. (London)* 47, 2002-3 (1967). Coconut oil samples obtained by extraction of fresh coconuts, copra which had been treated with slaked lime, hot air-dried copra and commercially available coconut oil obtained from smoke-dried copra were analyzed for their contents of 13 polycyclic hydrocarbons. The results show that oil obtained from fresh coconuts contains a small amount of those hydrocarbons (24 $\mu\text{g}/\text{Kg}$) and that any further handling or treatment of copra significantly increases the hydrocarbon content of the oil (up to 3000 $\mu\text{g}/\text{Kg}$ for the smoked-dried copra). It was found that, even at the highest concentrations encountered in this study, the polycyclic aromatic hydrocarbons could be removed almost entirely by stirring the oil with activated charcoal for 30 min. at 90-95C, either before or after steam deodorization. The activity of the charcoal was not influenced by the presence of bleaching earths, which appear to be unable to adsorb polycyclic hydrocarbons from coconut oil.

• Fatty Acid Derivatives

EPOXIDATION WITH PERACETIC ACID. V. EPOXIDISED TECHNICAL MONOGLYCERIDES. G. Schiemann and W. Schneider (Inst. for Ind. Chem. of the Tech. Inst. Hannover, Ger.). *Fette Seifen Anstrichmittel* 69, 749-752 (1967). Technical monoglycerides as well as mixtures of linseed oil and a number of monoglycerides were epoxidized with peracetic acid. In all cases where a preprepared peracetic acid in acetic acid or especially in acetic acid ester was used, epoxide yields ranging from 84% to nearly 95% were obtained. Linseed oil monoglyceride, when treated by *in situ* procedure with DOWEX-50 resin as an acidic catalytic also gave 84% yield of epoxides. The comparison of different epoxidations and the contents of the secondary products at the maximum level of epoxides, showed that the reaction takes the most favorable course in homogeneous phase. Free glycerin had no effect on the yield of epoxides from glycerin monooleate.

SEPARATION OF THE OLIGOMERS OF POLYESTERS OF THE TYPE DIOL-MONOOL-DICARBOXYLIC ACID. R. Schollner (Inst. for Chem. Tech. of the Karl Marx Univ., Leipzig, E. Ger.). *Fette Seifen Anstrichmittel* 69, 759-766 (1967). The separation of oligomers of polyesters of the type diol-mono-ol-dicarboxylic acid could be achieved by Craig's partition, column chromatography, and especially thin-layer chromatography. Ethylene glycol, glycerin-1-methyl ether and glycerin-2-methyl ether were used as diols and octadecyl alcohol was the mono-ol. Adipic and phthalic acids were the diacids used. Oligomers which have the same end group and built of polyester chains blocked on one side and two sides could be separated by thin-layer chromatography. Oligomers which do not have the same end groups but otherwise the same structure could also be separated by thin-layer chromatography.

SEPARATION OF LINEAR AND NON-LINEAR OLIGOMERS OF THE POLYESTER TYPE OF UREA-ADDUCT. R. S. Schollner and J. Schmidt (Inst. for Chem. Tech. of the Karl-Marx Univ., Leipzig, E. Ger.). *Fette Seifen Anstrichmittel* 69, No. 10, 766-773 (1967). The formation of urea adducts of linear, non-linear and oil modified low molecular polyesters was studied. The lower and upper limit of adduct formation for the linear polyesters of glycol, octadecyl alcohol-adipic acid type was determined. Branched chain oligomers of the type, octadecyl alcohol-adipic acid, especially tri- and diglycerides containing adipic acid-mono-octadecylester groups, formed adducts with urea. Under definite conditions, polyester chains from glycol and adipic acid gave urea adducts after incorporation of glycerin.

THE STRUCTURE OF CYCLIZED FATTY ACID ESTERS. H. Lange and J. D. v. Mikusch (Unilever Res. Lab., Hamburg, Ger.). *Fette Seifen Anstrichmittel* 69, 752-759 (1967). It has been shown that the cyclic fatty acids which are obtained from tung and linseed oils by alkali-treatment contain mainly two types of products. Approximately 30% of these consist of 1,2 disubstituted cyclohexadiens, which one double bond of the ring is in the 1-position and the other one is conjugated to the former. Approximately 60% of the mixture is comprised of omega-(2-alkyldien-cyclohexenyl)-fatty acid esters. The double bond in the ring is predominantly in the 3-position. As a result of the rearrangement of double bonds before cyclization, R' varies from C2 to C11 and R' from zero to C9.

OXIDATION OF METHYL CONJUGATED OCTADECADIENOATE WITH MONOPERPHTHALIC ACID. Y. Suhara, Y. Shibuya and H. Otsuru. *Bull. Chem. Soc. Japan* 40, 1702-5 (1967) Methyl *trans*-9-*trans*-11-octadecadienoate was oxidised with monoperphtalic acid under various conditions. The products obtained were separated into several fractions by washing them with an alkaline solution and then submitting them to column chromatography. From the results of chemical tests, periodic acid cleavage and spectroscopic observation in the I.R. and U.V. regions, it is inferred that the oxidation products in all cases contain methyl *trans*-9,10-epoxy-*trans*-11- and methyl *trans*-11,12-epoxy-*trans*-9-octadecenoates, methyl dihydroxy-*trans*-octadecenoate and methyl 9(10)-hydroxy-10(9)-(o-carboxy)benzoyl-oxy-*trans*-11- and methyl 11(12)-hydroxy-12(11)-(o-carboxy)benzoyloxy-*trans*-9-octadecenoates. (Rev. Current Lit. Paint Allied Ind. No. 307.)

CULINARY MIXES CONTAINING ALKALI METAL SULFATES. R. R. Cooke (Procter & Gamble Co.). *U.S. 3,367,781*. Crusts of white cakes prepared from dry white cake mixes containing shortening emulsifiers are strengthened by using an alkali metal C₈-C₁₈ alkyl sulfate in the mix.

(Continued on page 274A)

The Complementary Functions of the American Association of Cereal Chemists and the American Oil Chemists' Society in Feeding the World in the 21st Century

Address by Raymond Reiser, President of The American Oil Chemists' Society at the joint meeting of the American Association of Cereal Chemists and the American Oil Chemists in Washington, D.C., March 31-April 1, 1968.

It is my pleasure and privilege to bring greetings from the American Oil Chemists' Society to the American Association of Cereal Chemists. This joint meeting gives promise of being a very successful one. Only the future can tell what it portends.

A joint meeting of the AACC and the AOCS is a logical phenomenon. The interests of the two societies, though differing in detail, are highly complementary. The Cereal Chemists, and certainly the cereal industry, are concerned with all cereal products: oil, protein, and carbohydrates as well as flour and the whole cereal. Although the Oil Chemists developed along independent and narrower lines, originally its interests were much broader. Many of you may not be aware that the AOCS started in 1910 as the Society of Cotton Products Analysts. Their principal objectives were to define grades for cottonseed and to develop methods for preparing both oil and meal from the seed. Oil meal is still one of the great interests of the Oil Chemists' Society. It is pertinent that as research in both lipids and proteins has become more specialized, the interests of lipid and protein chemists are coming back together. One example is in the field of lipoproteins. In this province, first developed by biochemists studying serum proteins, the lipid and protein chemists find themselves working in each other's pastures in both plant and animal products. I foresee a big future for this area of research to which both of our groups can contribute cooperatively.

The fact that the substances of concern to the industries and the sciences represented by these two societies originate

ful production of animal fat and protein. As much as we all like steaks and roasts, the time will come when we just will not be able to afford the pounds of cereal or the acres of land it takes to produce them.

Because that shift will not be enough, we will then reach the point where the chemist, the engineer, and the biochemist come into the picture. Oils and proteins will have to be manufactured. This problem lies squarely on the shoulders of the industry and the technologists represented by the AACC and the AOCS. If we are not alert to these facts of life and continue along, blithely unaware of the dangers ahead, we may find ourselves supplanted by those who are conscious of the future.

Actually, we have already lost the initiative. Most of you are probably aware of the efforts of the petroleum chemists to produce fatty acids and protein from their product. Basically, there is no reason why this cannot be done. The problems are only technological. The economic and practical incentives lie around the corner with the inevitable shortages.

The production of all our food in fields will be impossible. We must turn to chemistry and engineering. Most of the solutions so far offered are only stopgap, and some are bound to be disappointing. The role of genetics in selecting plants with more oil and protein in place of starch will help. But these can do no more than push back the date.

Our societies and the people in them must come up with an imaginative solution.

I can think of two directions in which we can move,

For full report of March 31-April 4 Joint Meeting see page 301A

in plant seeds, is bound to bring them much closer together in the future than they have been in the past. The force pushing in that direction is the great population growth and the inevitable food shortages which will inexorably develop. Most of the world has never been adequately fed. While some segments have been living in luxuriant nutrition, in a sense they have been also living in a fools' paradise. There is simply not enough oil and protein to go around, and as the population grows the available food will have to be spread thinner and yet thinner. Gradually more and more of the "haves" will join the "have-nots."

It has been predicted that in spite of our superior methods of agriculture, food shortages are bound to be felt in the West within 25 years, even in peace. Certainly beyond that time we can look for problems in feeding even the people of the United States. Further advances in agriculture which will produce more on less land, or bring marginal lands into production, can only push the critical times back a little. It is inevitable that the day will arrive when some supplementary sources must be found for our food and for industrial oils and proteins. Of course an early shift will have to be made in the waste-

in addition to and, in the long run, possibly more practical than the petroleum solution.

One of these is an extension of the microbial solution being used by the petroleum people, but where carbon dioxide may be used as a source of carbon rather than hydrocarbons.

An even more sophisticated idea would be to utilize our steadily growing knowledge of the mechanisms of genetics and protein synthesis. As the biochemist delves deeper into the mechanisms of living processes he looks forward even to the production of life itself in forms of his own choosing. It appears to me that the commercial production of food: oil, protein, and carbohydrate, should be the logical fallout of these advances in molecular biology—or, even sooner, of advances in knowledge of photosynthetic mechanisms.

It is not a day too soon for the oil and fat and the cereal industries, and the technologists and scientists concerned with oil and protein foods, to start working in these directions. If we do not, we will either be supplanted by an upstart industry and new societies, or we will all starve together.

(Continued from page 270A)

• Biochemistry and Nutrition

SEPARATION AND CHARACTERIZATION OF PHYTANIC ACID-CONTAINING PLASMATRIGLYCERIDES FROM A PATIENT WITH REFSUM'S DISEASE. S. Laurell (Lab. for Clin. Chem., Univ. Hosp., Lund, Sweden). *Biochim. Biophys. Acta* 152, 75-9 (1968). Three types of triglycerides were isolated from the plasma of a patient with Refsum's disease: one without, one with 1 and one with 2 moles of phytanic acid per mole of glycerol. Glycerol triphytanate was missing. Five triglycerides containing phytanic acid in different positions were synthesized and compared by thin-layer chromatography with those of the patient. A new method was used for the analysis of glycerol and fatty acids of triglycerides. Competition between phytanic acid and linoleic acid for binding sites in plasma triglycerides may be responsible for the low linoleic acid content in adipose tissue of patients with Refsum's disease.

THE ACTION OF LIPOPROTEIN LIPASE ON GLYCERYL-TRIPHYTANATE. *Ibid.*, 80-3. Tritium-labelled glyceryl-tripphytanate and glyceryl-tripalmitate- 1^{14}C were incorporated in an artificial lipid emulsion and incubated with human post-heparin plasma containing lipoprotein lipase. The tripalmitin was hydrolyzed at the same rate as the bulk of the triglycerides in the emulsion. Glycerol-tripphytanate was not attacked. The results may explain the remarkably low content of phytanic acid in adipose tissue from patients with Refsum's disease.

FORCES INVOLVED IN CHYLOMICRON BINDING BY ISOLATED CELLS OF RAT LIVER. Joan A. Higgins (Dept. of Biochem., Univ. of Liverpool, Liverpool, Great Britain). *J. Lipid Res.* 8, 636-41 (1967). The binding of chylomicrons by isolated liver cells has been found to decrease as temperature increases. It is greatest at the isoelectric point of the chylomicrons; although it occurs both above and below this pH, it decreases most rapidly as the pH is increased. Urea, guanidine hydrochloride, dimethylsulfoxide, dioxane, and sodium chloride at concentrations known to disrupt bonding in proteins have no effect on the removal (by centrifugation) of chylomicrons bound to liver cells. The binding is reduced by treatment of chylomicrons with phospholipase D or by addition of chylomicron "membrane" fraction, lecithin micelles, or lecithin-triglyceride-cholesterol micelles. This evidence implicates phospholipids in the binding. Treatment of liver cells with neuraminidase increases binding of chylomicrons but not the extent of lipolysis that accompanies the binding. Removal of divalent cations from the system with EDTA results in a rise both in chylomicron binding and lipolysis. It is suggested that the binding sites are accessible to the lipase that is responsible for hydrolysis.

ABSORPTION OF PHYTOL FROM DIETARY CHLOROPHYLL IN THE RAT. J. H. Baxter and D. Steinberg (Lab. of Metabolism, National Heart Inst., NIH, Bethesda, Maryland 20014). *J. Lipid Res.* 8, 615-20 (1967). The fate of ingested chlorophyll, particularly of the phytol portion of the molecule, was studied. Uniformly ^{14}C -labeled pheophytin a (the Mg-free derivative of chlorophyll a) was prepared from an extract of tobacco leaves grown in $^{14}\text{CO}_2$, and was administered by stomach tube to rats in which the thoracic duct had been cannulated. Only about 2% of the administered radioactivity was absorbed in 24 hr, largely into the thoracic duct lymph. Moreover, only a fraction of this lymph radioactivity was derived from phytol (i.e., was found in phytol, phytanic acid, or phytanic acid). The results indicated that not more than 1-2% of chlorophyll phytol is available for absorption by the rat. Similarly, after the administration of whole spinach or spinach extract (not labeled) to rats, only about 1% of the total phytol content was absorbed into the intestinal lymph. Nearly all of the administered phytol was found in the feces and the contents of the colon, and was still largely in the form of pheophytin. The study also indicated that little of the nonphytol portion of the chlorophyll molecule is absorbed.

EFFECT OF PROPIONATE ON LIPOGENESIS IN ADIPOSE TISSUE. L. Reshef, J. Niv, and B. Shapiro (Dept. of Biochem., the Hebrew Univ.-Hadassah Med. School, Jerusalem, Israel). *J. Lipid Res.* 8, 682-7 (1967). The metabolism of propionate in adipose tissue and its effect on lipogenesis was investigated. Fasting induced changes in propionate metabolism of adipose tissue, drastically reducing higher fatty acid synthesis and increasing glyceride-glycerol formation from low concentrations of propionate (0.25 mM). Propionate also promoted lipogenesis from acetate- 1^{14}C in tissues of fasted rats, while it inhibited lipogenesis and CO_2 formation from acetate in the fed animal. Treatment with actinomycin D or ethionine abolished both the

increased glyceride-glycerol formation from propionate and the promoting effect on lipogenesis from acetate. Synthesis of long-chain fatty acids from propionate- 1^{14}C was increased by actinomycin treatment. The change in propionate metabolism induced by fasting is, however, not entirely due to its conversion to glyceride-glycerol, since the latter was almost completely blocked by malonate while part of the promoting effect on fatty acid synthesis persisted.

EFFECT OF PROPIONATE ON PYRUVATE METABOLISM IN ADIPOSE TISSUE. *Ibid.*, 688-91. Glyceride-glycerol formation in rat adipose tissue from pyruvate- 2^{14}C is increased by fasting, while fatty acid synthesis is markedly depressed. In tissues of fasted animals glyceride-glycerol formation is maximal with concentrations of pyruvate exceeding 2.5 mM. With 0.25 mM pyruvate- 2^{14}C , glyceride-glycerol formation is increased severalfold by the addition of 0.25 mM propionate. No further increase in synthesis is caused by propionate when pyruvate is supplied in optimal amounts. Addition of equimolar concentration of acetate or pyruvate does not replace propionate. The effect of propionate on glyceride-glycerol synthesis from pyruvate is also given by a series of even-chain fatty acids. However, only propionate promotes fatty acid synthesis in tissues of fasted and fed animals. Fixation of $^{14}\text{CO}_2$ in glyceride-glycerol is dependent on the presence of propionate and is maximal in tissues of fasted rats and when pyruvate is also added. Succinate has no significant effect. Actinomycin treatment blocks glyceride-glycerol synthesis in tissues of fed and fasted animals, in the presence and absence of propionate. At the same time, fatty acid synthesis in tissues of fasted rats is markedly increased.

COMPOSITION OF PHOSPHOLIPIDS AND OF PHOSPHOLIPID FATTY ACIDS AND ALDEHYDES IN HUMAN RED CELLS. J. T. Dodge and G. B. Phillips (Dept. of Med., College of Physicians and Surgeons, Columbia Univ., N. Y. 10032). *J. Lipid Res.* 8, 667-75 (1967). Improved methods for lipid analysis that have been developed recently were employed to reevaluate the phospholipid composition, the fatty acid and fatty aldehyde composition of the total phospholipids, and the fatty acid composition of the individual phospholipids of normal human red cells. Thirty-three fatty acids and five fatty aldehydes were estimated and tentatively identified in the total phospholipid of normal human red cells. Additional minor components were evident. The major individual phospholipids were isolated by silicic acid thin-layer chromatography and quantified. The fatty acid compositions of phosphatidyl ethanolamine, phosphatidyl serine, lecithin, and sphingomyelin were determined. Each of these phospholipids showed a distinctive and characteristic fatty acid pattern.

COMPOSITION OF PHOSPHOLIPIDS AND OF PHOSPHOLIPID FATTY ACIDS OF HUMAN PLASMA. G. B. Phillips and J. T. Dodge. *Ibid.*, 676-81. The composition of the phospholipids and of the total phospholipid fatty acids was determined in the plasma of 10 normal subjects. In addition the fatty acid composition of the plasma phosphatidyl ethanolamine, phosphatidyl serine, lecithin, sphingomyelin and lysolecithin of 6 of the subjects was measured. A wide array of fatty acids was found in the plasma total phospholipid similar to that found previously in red cell total phospholipid. The fatty acid composition in the plasma phospholipids of a given subject reflected that in his red cell phospholipids. Each individual phospholipid displayed a distinctive fatty acid pattern, which was generally similar to that of the corresponding phospholipid of red cells, although some marked differences in individual fatty acid levels between the corresponding phospholipids of plasma and red cells were evident. The high percentage of unsaturated fatty acids found in plasma lysolecithin suggests that this phospholipid did not arise entirely through the enzymatic cleavage of lecithin.

DISSOCIATION OF LOW DENSITY LIPOPROTEIN-ANTIBODY PRECIPITATES AT ALKALINE PH. J. Chung and T. Nishida (The Burnside Res. Lab., Univ. of Ill., Urbana, Illinois 61801). *J. Lipid Res.* 8, 631-5 (1967). The effect of alkaline pH on the dissociation of immunoprecipitates of low density lipoproteins (LDL) of the S_r 0-10 class was studied by immunological and ultracentrifugal methods. The precipitates prepared at the equivalence point were dissolved and centrifuged in sodium chloride solutions of density 1.063 and pH's between 10.25 and 11.5. Analytical centrifugation of the top fraction, which floated at density 1.063, after dialysis against 0.9% sodium chloride of pH 7.4 revealed the presence of LDL and of soluble LDL-antibody complex. The amount of soluble complex was greater for the preparations obtained at lower pH than those obtained at higher pH and was undetectable at pH 11.5. The yield of immunoglobulin from the bottom fractions was maximal when the pH of the centrifugation medium was 11.0. Below

pH 11.0, the greatly reduced yield of immunoglobulin was due partly to incomplete dissociation and partly to aggregation of soluble complex, while above pH 11.0 the decreased yield was possibly due to alkaline denaturation of the globulin. The immunoglobulin separated at pH 11.0 and dialyzed to pH 7.4 was reprecipitable by LDL, and the reactivity did not seem to be appreciably influenced by the alkaline treatment.

ALTERATIONS IN THE MOLECULAR SPECIES OF RAT LIVER LECITHIN BY CORN-OIL FEEDING TO ESSENTIAL FATTY ACID-DEFICIENT RATS AS A FUNCTION OF TIME. L. M. G. Van Golde, W. A. Pieterse and L. L. M. Van Deenen (Dept. of Biochem. Lab. of Org. Chem., The State Univ. Utrecht, The Netherlands). *Biochim. Biophys. Acta* 152, 84-95 (1968). The present paper describes, as a function of time, the qualitative and quantitative alterations in the molecular species pattern of rat liver lecithin which are observed when corn oil is fed to essential fatty acid-deficient rats. One of the most important changes observed was a very rapid replacement of 1-palmitoyl-2-eicosatrienoyl- and 1-stearoyl-2-eicosatrienoyl-lecithin by 1-palmitoyl-2-arachidonoyl- and 1-stearoyl-2-arachidonoyl-lecithin, respectively. Whereas this event occurred during a period of 9 days of corn oil feeding, the increase of 1-palmitoyl-2-linoleoyl- and 1-stearoyl-2-linoleoyl-lecithin had already reached the maximum level after 3 days. On the other hand a very rapid disappearance of the species di-octadecenoyl- and 1-hexadecenoyl-2-octadecenoyl-lecithin was observed during this period. The decrease of the species 1-stearoyl-2-octadecenoyl-lecithin was rather slow, whereas 1-palmitoyl-2-octadecenoyl-lecithin started to diminish only 9 days after the change in diet. The results presented here suggest that different metabolic pathways may contribute, to a different extent, to the replacement of the individual molecular species of rat liver lecithin induced by a change of diet.

EFFECTS IN VITRO AND IN VIVO OF SYNTHETIC PHOSPHATIDATE PHOSPHATASE INHIBITORS. A. F. Rosenthal and S. Ching-Hsien Han (Dept. of Labs., The Long Island Jewish Hosp., New Hyde Park, N. Y.). *Biochim. Biophys. Acta* 152, 96-103 (1968). The non-hydrolyzable phosphatidate analogs 2-hexadecyloxy-3-octadecyloxypropylphosphonate and 2-octadecyloxy-3-octadecyloxypropylphosphonate inhibit solubilized pig kidney phosphatidate phosphatase (L- α -phosphatidate phosphohydrolase, EC 3.1.3.4), but less effectively than they inhibit the particulate enzyme. Dihexadecyl phosphate acts as a fairly good substrate for the soluble enzyme. The action of 2-hexadecyloxy-3-octadecyloxypropylphosphonate when administered intraperitoneally to mice was studied. The major effect is to induce a large but transient and reversible increase in liver triglycerides, reaching a maximum at about 6 hr after administration and disappearing within a few days. This is accompanied by histological evidence of regenerative activity but not of distinct fatty changes in the livers. 2-Hexadecyloxy-3-octadecyloxypropylphosphonate inhibits the stimulatory action of liver supernatant fractions on palmitate or oleate incorporation into triglycerides by microsomal fractions, supporting the view that the stimulatory activity is due to a phosphatidate phosphatase present in the supernatant.

ACYLATION OF LYSO-PHOSPHATIDYLETHANOLAMINE BY SOLUBLE ENZYME(S) RELEASED FROM MITOCHONDRIA AFTER SONICATION. Pirkko R. Turkki and J. L. Glenn (Dept. of Biochem., Albany Medical College, Albany, N. Y.). *Biochim. Biophys. Acta* 152, 104-113 (1968). Sonication of rat-liver mitochondria released (a) soluble enzyme(s) which catalyzed the acylation of lyso-phosphatidylethanolamine and lyso-lecithin. The incorporation of stearate- ^{14}C into phosphatidylethanolamine was markedly inhibited by lyso-lecithin. The inhibitory action of lyso-lecithin appeared to be directly upon the reaction, since the lyso-lecithin was not acting merely as a better acceptor for the fatty acid. Lyso-phosphatidylethanolamine inhibited the acylation of lyso-lecithin with oleate- ^{14}C or linoleate- ^{14}C . In this instance, the inhibition appeared to be due to competitive inhibition as well as the ability of lyso-phosphatidylethanolamine to serve as an acceptor of these fatty acids. Phospholipase A (EC 3.1.1.4) treatment of phosphatidylethanolamine and lecithin, which were formed by acylation of lyso-phosphatidylethanolamine and lyso-lecithin, gave divergent results with stearic and linoleic acids. These results are discussed in light of the known specificity reported for phospholipase A.

LIPID GENESIS IN HUMAN ADIPOSE TISSUE. D. J. Galton (New England Med. Centr. Hosps. and the Dept. of Med., Tufts Univ. School of Med., Boston, Mass. 02111). *J. Lipid Res.* 9, 19-26 (1968). The pathways and some critical enzymes involved in lipogenesis in adipose tissue from 82 patients have been studied. Of the glucose- ^{14}C metabolized to lipid by isolated adipose cells, approximately 0.6% was recovered in fatty acids

and the rest in glyceride-glycerol. Palmitate- ^{14}C was readily incorporated into neutral lipid. Homogenates of human adipose tissue contained an active α -glycerophosphate dehydrogenase which was approximately twice as active as malate dehydrogenase. Mitochondria of human adipose tissue contained an NAD-independent α -glycerophosphate dehydrogenase; the reaction product, dihydroxyacetone phosphate, was recovered extramitochondrially. Homogenates of human adipose tissue also contained an active fatty acyl CoA synthetase which required ATP, CoA, and Mg^{++} for maximal activity. The activity of acyl CoA synthetase varied greatly in a group of 40 patients. By contrast, the range of activity of malate dehydrogenase assayed in the same group of patients was much smaller.

LIPIDS OF MINERALIZING EPIPHYSEAL TISSUES IN THE BOVINE FETUS. R. E. Wuthier (Forsyth Dental Center, 140 The Fenway, Boston, Mass. 02115). *J. Lipid Res.* 9, 68-78 (1968). Because lipids had been consistently detected histologically at sites of new calcification, the lipids of epiphyseal cartilage and bone in various stages of mineralization were examined. Lipids were extracted before and after demineralization and analyzed. Lipid content increased during proliferation and calcification of epiphyseal cartilage. Much less was seen in the adjacent cancellous bone; this corroborates histochemical findings. Similar phospholipid compositions were seen in the total lipids of cartilage and bone. Neutral (dipolar) phospholipids accounted for nearly 90% of the total lipid P and were almost completely extracted before demineralization. Serine- and inositol-containing phospholipids and two other, unidentified, acidic lipids could not be effectively extracted from calcifying tissues until after demineralization. Since the extraction of the acidic lipids was closely related to the degree of mineralization, it is possible that they form part of a lipoprotein-mineral complex in the calcifying matrix.

PATHWAYS OF ABSORPTION OF RETINAL AND RETINOIC ACID IN THE RAT. N. H. Fidge, T. Shiratori, J. Ganguly and D. S. Goodman (Dept. of Med., Columbia Univ. College of Phys. and Surgeons, N. Y. 10032). *J. Lipid Res.* 9, 103-9 (1968). The chemical and anatomical pathways of absorption of dietary retinal, retinoic acid and retinol were examined in rats containing lymph, bile and duodenal cannulae. The experiments were designed to maintain physiological conditions to the greatest possible extent. In each rat an uninterrupted flow of bile into the duodenum was maintained by connecting the duodenal cannula to the bile duct of a second rat. Labeled vitamin A compounds were introduced into the duodenum in very small amounts (7-14 μg) in the form of a bile-lipid mixture resembling normal intestinal contents. Under these conditions, most (70-80%) of the radioactivity recovered after the feeding of labeled retinol or retinal was found in the lymph, predominantly in saturated retinyl esters. In contrast, 92-95% of the radioactivity recovered after the feeding of labeled retinoic acid was found in the bile, and was contained in a mixture of polar metabolites, most of them more polar than free retinoic acid. Two-thirds of the small amount of radioactivity found in lymph after retinoic acid- ^{14}C feeding was in the form of free retinoic acid.

YELLOW PIGMENTS EXCRETED BY VITAMIN A-DEPLETED SHEEP. R. Tucker, G. Mitchell, Jr. and C. Little (Animal Sciences Dept., Univ. Kentucky, Lexington, Kentucky). *J. Nutr.* 93, 519-22 (1967). The possibility of gastrointestinal synthesis of vitamin A precursors which would benefit sheep was investigated. Wethers that had been fed a low carotene ration for 30 months were found to excrete from 1.6 to 3 times their carotene consumption. Results of spectrographic analysis of the excreted pigment indicated that it was not pure β -carotene. The pigment was neither beneficial nor toxic when fed to vitamin A-depleted chicks at levels equivalent to NRC requirements for β -carotene. Possible absorption of carotene from the cecum or colon was studied by injecting ^{14}C -labeled β -carotene into ligated loops of the cecum and colon of four anesthetized wethers. Although average recovery of radioactivity from ether extracts of the loops was only 86%, activity was not detected in the ether extracts of venous blood, liver, or kidneys and it was concluded that little carotene was absorbed under these conditions.

LIPEROXIDATION OF LUNG LIPIDS IN RATS EXPOSED TO NITROGEN DIOXIDE. H. V. Thomas, P. K. Mueller and R. L. Lyman (Calif. State Dept. of Public Health, and Dept. of Nutritional Sciences, Univ. of Calif., Berkeley). *Science* 159, 532-34 (1968). Absorption spectra characteristic of diene conjugation and typical for peroxidized polyenoic fatty acids can be induced in rat lung lipids after the rats have been exposed to a scant amount of nitrogen dioxide (1 part per million) for 4 hours. The

peroxidative changes do not occur immediately but appear to reach a maximum between 24 and 48 hours after the exposure. The prooxidant effect of this atmospheric pollutant in rat lungs lipids may be partially prevented by prior treatment of the animal with large doses of alpha-tocopherol.

METABOLISM OF CIS-11, CIS-14- AND TRANS-11, TRANS-14- EICOSADIENOIC ACIDS IN THE RAT. E. Stearns, Jr., J. Rysavy and O. Privett (The Hormel Inst., Univ. of Minnesota, Austin, Minn.). *J. Nutr.* 93, 485-90 (1967). The metabolism of the *cis,cis* and the *trans,trans* isomers of 11,14-eicosadienoic acids was studied with essential fatty acid-deficient adult male rats of the Sprague-Dawley strain. Analysis of liver phospholipids showed that whereas the *trans,trans*-diene isomer was catabolized quickly, the *cis,cis* isomer built up in the liver and was converted to arachidonic acid. The conversion of both the *cis,cis* and the *trans,trans*-20:2 dienes to 18:2 dienes was demonstrated by isolation and structural analyses of the latter compounds. The conversion of the 20:2 *cis,cis*-diene isomer to linoleic acid and it, in turn, to arachidonic acid was demonstrated by isotope experiments in which methyl *cis*-11, *cis*-14-eicosadienoate-3-¹⁴C was injected intraperitoneally into EFA-deficient rats. The retention of 20:2 *cis,cis*-diene appeared to occur as a result of the animal's ability to conserve its stores of EFA. As a facet of this mechanism, the catabolism of the 20:2 *cis,cis*-diene appeared to be arrested with the formation of linoleic acid which was preferentially converted to arachidonic acid.

DEFECTIVE DIETARY CONTROL OF FATTY ACID METABOLISM IN FOUR TRANSPLANTABLE RAT HEPATOMAS: NUMBERS 5123C, 7793, 7795, AND 7800. J. Sabine, S. Abraham and H. Morris (Dept. of Physiology-Anatomy, Univ. of Calif., Berkeley, Calif. 94720). *Cancer Res.* 28, 46-51 (1968). Fat-free and high-fat (15% corn oil) diets were offered for 2-3 days, with and without prior fasting, to normal rats (Buffalo strain) and to rats bearing the minimal deviation hepatomas: 5123C, 7793, and 7800. Liver and tumor slices were then assayed for their ability to synthesize long-chain fatty acids from acetate-1-¹⁴C and to oxidize palmitate-1-¹⁴C. In addition, homogenates prepared from these same tissues were examined for their activities of various glycolytic and Krebs-cycle enzymes. The different dietary regimes greatly altered metabolic and enzymic activities in normal and host liver, but not in the hepatomas (with the possible exception of palmitate oxidation by hepatoma 7795). This pattern of insensitivity of the metabolic activity of the hepatomas to the nutritional state of the animal is essentially similar to that already found in the mouse hepatoma BW7756, and may reflect a functional aberration that is fundamental to the neoplastic process.

CERAMIDE AND GANGLIOSIDE ACCUMULATION IN FARBER'S LIPOGANULOMATOSIS. A. Prensky (Dept. Neurology, J. P. Kennedy, Jr. Memorial Lab., Mass. Gen. Hosp., Boston, Mass.). *Proc. Soc. Exp. Biol. Med.* 126, 725-28 (1967). An analysis of the lipids of various organs of an 11-month-old female dying of Farber's disease indicated a marked increase in ceramide varying from 8 times normal in the kidney to 66 times in the liver. Ceramide made up 13% of the liver lipids. There was also a slight increase in the lipids in the liver, but aside from the ceramide, only the gangliosides were increased in all organs tested. The increased ganglioside was more marked in subcutaneous nodule and varied proportionally with the number of foam cells seen in the tissue.

METABOLIC ASPECTS OF ACUTE STARVATION. H. J. Krzywicki, C. F. Consolazio, L. O. Matoush and H. L. Johnson (U. S. Army Med. Res. and Nutr. Lab., Fitzsimons Gen. Hosp., Denver, Col.). *Am. J. Clin. Nutr.* 21, 87-97 (1968). Body composition changes were observed in six healthy adult males 21-52 years of age, while fasting for 10 days. Fluid was available *ad libitum*. The mean loss in body weight (7.30 kg) was densitometrically partitioned into a 3.46 kg loss of fat and a 3.84 kg loss in the fat-free body mass, which included a loss of 0.77 kg of dry protein. The U. S. Army Med. Res. and Nutr. Lab. fat-predicting nomogram described fat losses adequately; however, urinary potassium and creatinine excretion, or potassium-40 counting, exceeded densitometric estimates of the dry-protein compartment of 22 and 21%, respectively. The triceps and scapula skin folds demonstrated the greatest decrease (24.1 and 21.6%) while extremity girths decreased from 9.8 to 3.2% with the circumferences of the waist and buttocks diminishing by 5.8%. Blood, plasma, and red blood cell volumes were significantly lowered during the fast in accordance with the severe hypohydration that was exhibited. No sequelae were noted during and after 40 days of rehabilitation when body weight was virtually restored to control levels. Use of D₂O

as a tracer to demonstrate total body water appeared to be inapplicable during the starvation phase of the study.

BIOSYNTHESIS OF SURFACE LIPIDS. P. E. Kolattukudy (Dept. of Biochem., Connecticut Agr. Expt. Station, New Haven, Conn.). *Science* 159, 498-505 (1968). Lipids are responsible for the familiar water repellent character of the surfaces of plants, animals and insects. In chemical composition the surface lipids differ from the internal lipids. Collectively they are called waxes because of their peculiar physical properties, although in strict chemical terms, wax refers to esters of long-chain alcohols with longchain acids. Identification of wax components has been progressing at a rapid rate because of modern analytical techniques. The biosynthesis of such compounds has been the subject of much conjecture, but only in the past few years have we gained any knowledge based on experimental evidence concerning the formation of surface lipids in nature.

LIPID TRANSPORT IN EXPERIMENTAL DIETARY HEPATIC INJURY IN RATS. P. Gyorgy, E. Cardi, Catherine Rose, M. Hirooka and B. Langer, Jr. (Dept. Pediatrics, Phila. General Hosp., Philadelphia, Pa.). *J. Nutr.* 93, 568-78 (1967). The effect of lipotropic factors on lipid transport was studied in rats fed hypolipotropic rations rich in protein (extracted peanut meal with or without added small amounts of casein). With such a basal ration which permits at least initially satisfactory growth, the serum levels of cholesterol and lipoproteins fell precipitously. This was prevented by methionine and choline when mixed with the diet. However, given separately, the effect of methionine was not demonstrable and with choline, in general, significantly reduced. Vitamin B₁₂ had not prevented an initial drop in the serum levels of cholesterol and lipoproteins, which gradually reverted toward the norm. Homocystine mixed with the diet, especially in combination with other lipotropic factors, produced significant hypercholesterolemia. Supplements of vitamin B₁₂ greatly reduced in the liver the amount of total lipids with proportionate increase of the phospholipid fraction. In contrast, the total lipids were increased in the serum, together with phospholipids. Choline and to an even greater extent methionine, when fed separately were unable to prevent fatty liver in the long-term experiment.

TOCOPHEROL IN INFANTS FED DIETS RICH IN POLYUNSATURATED FATTY ACIDS. S. Hashim and R. Asfour (Nat. Heart Inst., Bethesda, Maryland). *Am. J. Clin. Nutr.* 21, 7-14 (1968). In contrast to the infants on evaporated milk or on breast feeding, those on cottonseed oil (*group I*) showed a striking increase in the C 18:2 (linoleate) content of red cell and adipose tissue lipids after 1 month. During the same interval their plasma tocopherol levels remained the same or decreased (mean \pm DS, 0.20 \pm 0.08 mg/100 ml) while the sensitivity of erythrocytes to peroxide hemolysis increased. Linoleate-rich diets such as that provided by the cottonseed oil formula may promote tocopherol depletion of infants during the 1st month of life and induce certain transient hematologic changes similar to those described in premature infants maintained on PUFA-rich diets.

MILK LEVELS OF SELENIUM AND VITAMIN E RELATED TO NUTRITIONAL MUSCULAR DYSTROPHY IN THE SUCKLING LAMB. R. Gardner and D. Hogue (Dept. Animal Sci., New York State Coll. of Agr., Cornell Univ., Ithaca, N.Y.). *J. Nutr.* 93, 418-24 (1967). Selenium, as Na₂SeO₃, was added to ewes' rations containing raw and autoclaved kidney beans to compare bean-heating effect on utilization of Se in preventing nutritional muscular dystrophy (MND) in suckling lambs. Effects on digestibility, milk production, milk composition and daily lamb intake of Se and vitamin E were examined. Observations were also made on distribution of Se in lamb tissues in relation to treatment effects. Supplemental Se and heat treatment of beans reduced the incidence of MND. Autoclaving increased the apparent digestion of bean Se, as well as increasing milk production and daily milk yield of Se and vitamin E. Addition of Se appeared to reduce milk fat but no other treatment effects on major chemical components were noted. Se consumed in the ewes' milk was distributed in lamb tissue in approximately equal proportion due to treatments, with the possible exception of the pancreas.

THE RED BLOOD CELL IN THE VITAMIN E-DEFICIENT MONKEY. C. D. Fitch (Depts. of Med. and Biochem., Univ. of Arkansas Sch. of Med., Little Rock, Ark.). *Am. J. Clin. Nutr.* 21, 51-56 (1968). Vitamin E-deficient monkeys develop anemia due to ineffective erythropoiesis. The anemia can be effectively treated with vitamin E but not with other well-known hematopoietic

(Continued on page 282A)

Banff Conference Features Symposium on Margarine and New Edible Oil Products

As part of the technical program of the Annual Conference of the Canadian Institute of Food Technology, to be held at the Banff School of Fine Arts, Banff, Alberta, from June 9-12, 1968, the Food Products Branch of the Department of Industry is sponsoring a Symposium entitled "Margarine and New Edible Oil Products." Chairman is L. G. Rupert, Chief, Bakery, Cereals and Edible Oils Division, Food Products Branch, Department of Industry, Ottawa, Ontario.

Papers to be presented include the following:

1) *Margarine Manufacture and Quality Standards in Western Europe*, K. F. Gander, Technical Director of the Margarine-Union, Hamburg, Germany.

2) *Margarine Manufacture and Quality Standards in Canada*, R. F. Sweeney, Manager of Quality Control, Kraft Foods Ltd., Montreal, P.Q.

3) *The Technical Application of Vegetable Oils in the More Recent Substitute Dairy Products*, I. C. Graham, Industrial Food Products Research Supervisor, Proctor & Gamble Ltd., Hamilton, Ontario.

4) *The Manufacturing and Quality of Dairy Substitutes*, H. D. Hamilton, Technical Director, Drew Chemical Corporation, Boonton, New Jersey.

5) *The Nutritional Significance of Fats in Our Diet*, D. M. Hegsted, Professor of Nutrition, Harvard School of Public Health, Boston, Mass.

This symposium will be held on Tuesday morning, June 11, 1968. There will be taste panels to sample the various new products.

You are invited to attend the Conference. For further information regarding registration and accommodation, please contact Mr. H. S. Murdy, Continental Can Company of Canada Ltd., P.O. Box 20, New Westminster, B.C.

Symposium on the Synthesis and Use of Labeled Lipids and Sterols

Milan, Italy—Sept. 12, 1968

The Symposium on the Synthesis and Use of Labeled Lipids and Sterols will be held in Milan, Italy, on September 12 of this year, immediately following the Third International Symposium on Drugs Affecting Lipid Metabolism which will be held Sept. 9-11, 1968.

This symposium is being organized by the Institute of Pharmacology of the University of Milan in collaboration with the International Society for Biochemical Pharmacology and will be sponsored by Euratom. The Scientific Secretaries are: Prof. Enrica Grossi-Paoletti of the Institute of Pharmacology, Milan, and Dr. J. Sirchis of Euratom, Bruxelles.

Lectures will be by invitation only and will be followed by a discussion period. The official language will be English.

For registration forms and programs will you please contact: Miss Hasel J. Prain, Secretary, Institute of Pharmacology, University of Milan, Via Andrea del Sarto 21, 20129 Milan, Italy (Tele. 72 30 66/719 060).

• New Products

A new "all-in-one" synthetic detergent in powdered form for heavy soil conditions has been announced by PENNSALT CHEMICALS CORPORATION. Called "Versal Extra," the new detergent was formulated to give excellent performance regardless of soil or water conditions. The product does not require a separate alkali. It reduces detergent consumption in hard water and helps to eliminate loss of whiteness caused by redeposited soils and soaps, reports Pennsalt's Laundry & Drycleaning Department. (Laundry & Drycleaning Department CS-9, Pennsalt Chemicals Corporation, 3 Penn Center, Philadelphia, Pa. 19102.)

(Continued on page 300A)

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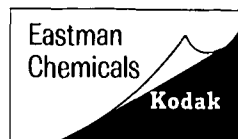
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NEW BOOKS

edited by f w quackenbush

CHROMATOGRAPHIC METHODS by R. Stock and C. B. F. Rice (Barnes and Noble, Inc., New York; 256 p; 2nd ed., 1967; \$7.50, \$4 in paper).

This volume gives a well-written, concise description of the most important chromatographic methods. Much useful information on the subject, especially with respect to the practical considerations, is presented by the two Englishmen. The authors' consideration of the advantages and disadvantages of the various forms of chromatography should be particularly helpful to the beginning chromatographer.

A brief introduction to the chromatographic method is followed by chapters on liquid-phase chromatography with adsorption, partition, ion-exchange, and gel filtration columns, paper chromatography including a brief discussion of zone electrophoresis, gas chromatography, and thin-layer chromatography. Paper chromatography and gas chromatography are treated in the most detail. The final chapter contains model experiments which complement the text well. Each chapter has good line drawings and references that are useful to the reader. Conditions for attaining some specific separations are given in easily accessible tabular form.

Of particular interest is the chapter on model experiments. Herein are 22 specific experiments with emphasis being placed on paper chromatographic separations of both inorganic (metals, halides) and organic (amino acids, sugars) mixtures. Several variations in technique (ascending, descending, horizontal, reversed phase) are illustrated. Experiments with gas chromatography and thin-layer chromatography also demonstrate well the fundamental aspects of the methods. The appendix serves as a guide to the preparation of the various location reagents and color reactions associated with the experiments. Details for constructing a simple katharometer and flame ionization detector are also included.

The book will be of much value to teachers at all levels and to students who need an introduction to chromatography.

HAROLD B. WHITE, JR.
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Jackson, Mississippi

DUNNSCHICHT-CHROMATOGRAPHIE. EIN LABORATORIUMSHANDBUCH, 2nd edition, Editor E. Stahl (Springer Verlag, Berlin-Heidelberg-New York, 1967, 979 p, DM 98, \$24.50).

The necessity for a new edition of Stahl's book reflects the wide use the first edition has found and the progress which thin-layer chromatography has made during the span of 5 years. The editor's statement that the second edition is a newly written book is well warranted. Twenty-five authors wrote nearly 1000 pages whereas previously seven authors had filled 550 pages.

The general part of this edition represents about one fifth of the book and topics have been reorganized. Chapters on *Adsorbents, Apparatus, Coupled Analyses, Quantifications, Gradient and Two-Dimensional Separations* are among them. *Electrophoresis* has been added, *Theoretical Aspects of Thin-Layer Chromatography* of the former edition has been omitted. The book appears more streamlined than before.

Most of the chapters in the special part begin with simple explanations of compounds and source materials.

Many workers at the laboratory bench will welcome these introductions. The chapter *Aliphatic Lipids* (Mangold, 54 p) follows such a pattern and begins with nomenclature, extractions, chemical procedures to prepare the sample, and similar information. Separation of classes of lipids (neutral lipids and their products of hydrolysis; phospholipids, sulfolipids and glycolipids) and separation within classes are then treated in about equal volume. Applications and results are grouped according to sources (microorganism, plant, animal, human). New lipids, such as neutral glyceride ethers and diol esters as well as forgotten lipids, for example, chaulmoogric acid, are quoted several times. Argentation chromatography is thoroughly discussed, in accord with the high rank this method has lately reached. The chapter is well organized and quotes numerous references from 1966.

The number of references (225) in this chapter is modest in view of the flood of literature. The careful selection permitted survival of only 40 or 50 references from "*Aliphatic Lipids*" in the first edition. Discussion of minor specialties or tricks is often deferred to other reviews. This is much to the advantage of the chapter since completeness in such detail would make it an obstacle course.

Lipids other than aliphatic are found in *Steroids and Related Compounds* (Neher, 48 p, 235 references), *Vitamins-Carotenoids-Chlorophyll-Quinones* (Bolliger and König, 49 p, 153 references), and in "*Lipids and Steroids*" (10 p) of *Clinical Diagnosis* (Zöllner and Wolfram). Last but not least, *Radioactive Methods* (Mangold, 25 p, in the general part) brings many examples from the lipid field. Other special chapters are on amino acids, carbohydrates, alkaloids, phenols and other plant materials, amines, dye-stuffs, different food additives, industrial products, and so on, in wide range and in successful coordination by the editor.

Several indexes relieve the text of material that would otherwise become a repetitious burden. Lists are given of addresses of manufacturers, recipes of reagents for detection, reagents for characteristic groups and of name reagents. Terminology of TLC in German, English and French, and author and subject indexes complete the array.

The method of thin-layer chromatography conquered the laboratories, so to speak, on a dime. Impressively complex apparatus can now be grouped under the inexpensive core of the method. Fortunately, the book addresses investigators on any level of budget and experience. The method and with it the second edition of Stahl's book appears to be beyond the phase of conquest. For example, pictures of chromatograms have not increased in proportion to pages: it is not necessary anymore to convince the reader with such material. However, in the trend of mission, the editor might consider in the future an article on procedures and examples particularly suitable for laboratory group courses.

The second edition of Stahl's DUNNSCHICHT-CHROMATOGRAPHIE is comprehensive and up-to-date without being unwieldy. It is highly recommended for any laboratory dealing with separations or with pure substances that are not pure. The production of the book is excellent in print, in reproductions of instructive chromatograms and figures, and in quality of paper and binding.

HERMANN SCHLENK
Hormel Institute
University of Minnesota
Austin, Minnesota

Bailey Award . . .

(Continued from page 264A)

III. As Head of Chemical and Physical Properties Investigations for the Oilseed Crops Laboratory, Dr. Dutton is eminently qualified as the recipient of the eighth Bailey Award. Since joining the USDA in 1941 his primary concern has been lipid chemistry relative to the stability of edible soybean oil. The first of his more than 140 publications dates back some 30 years to his predoctoral work at the University of Wisconsin.

Dr. Dutton has received the USDA's Superior Service Award, the 1956 Glycerine Research Award, the 1962 AOCS Canadian Award of Merit and numerous other honors. He has been an active member of The American Oil Chemists' Society for 23 years.

Following a social hour and a delightful dinner North Central Section President R. A. Reiners called the meeting to order and officers for the coming year were elected. The new officers are: President, F. A. Norris; Vice President, G. C. Rimnac; Secretary, G. R. Jackson; Treasurer, J. G. Endres.

Members at large to serve two-year terms are Antonette Trinchese and Melvin Ott.

R. J. Evans, Chairman of the Bailey Award Committee and immediate Past President of the North Central Section, then introduced J. C. Cowan, Chief, Oilseeds Laboratory, Northern Utilization Research & Development Division, USDA and 1961 Bailey Award Medalist, who discussed Dr. Dutton's many contributions to the industry and his work at the Laboratory.

Presentation Made by Dr. Reiners

The Bailey Award Medal was presented by R. A. Reiners. Dr. Dutton's medalist address was entitled "Kinetics in Hydrogenation," which emphasized the fact Alton E. Bailey's work continues to serve as the foundation for the most sophisticated work in this important field today.

Sponsoring Companies

Sponsoring companies for this award are Anderson Clayton & Co.; Ashland Chemical Company, Division of Ashland Oil and Refining Company; Cargill, Inc.; Corn Products Company; The DeLaval Separator Co.; Distillation Products & Industries; Durkee Famous Foods; General Mills, Inc.; The Johnson's Wax Fund; Meade Johnson; National Dairy Products Corp.; Oscar Mayer Foundation, Inc.; and E. H. Sargent & Co.

June Chromatography Courses Scheduled for New York, Chicago

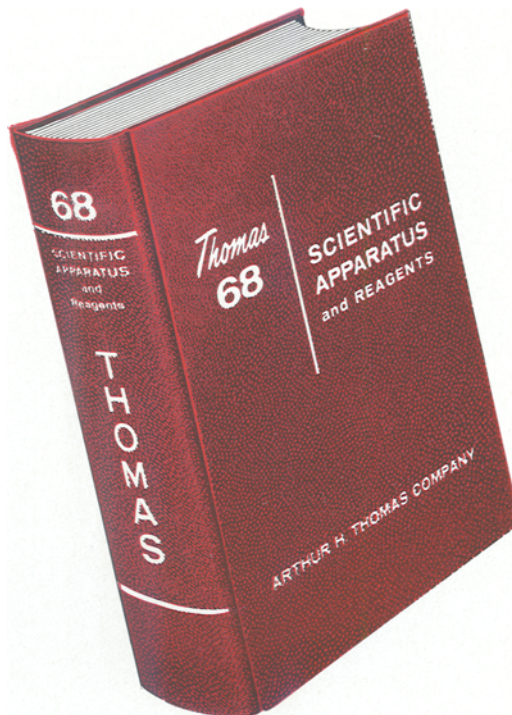
A two-day Short Course on Thin-Layer Chromatography and Instant Thin-Layer Chromatography will be held in Chicago on June 17 and 18 at the Ramada Inn. The course will be repeated in New York City, June 20 and 21 at the Holiday Inn. Sponsorship is by the Gelman Instrument Company of Ann Arbor, Mich.

Noted speakers for the courses will be James Muldrey (1963), Associate Professor of Obstetrics and Gynecology, Tulane University, and Helmut Mangold (1960), Professor of Biochemistry at the University of Minnesota.

Participants will have the opportunity of running separations under the expert guidance of these men.

Dr. Muldrey will cover the basic theory of ITLC applications, and perform separations of triglycerides, fatty acids, phospholipids, steroids, barbiturates and free bile acids. Dr. Mangold will work with techniques for slurry preparation, spreading, sample application, and the separation of water-soluble compounds, sugars, amino acids, and nucleic acid constituents.

The registration fee of \$65 includes lunches as well as TLC and ITLC support materials. For reservations write to Program Coordinator, Gelman Instrument Company, P.O. Box 1448, Ann Arbor, Michigan. 48106.



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(Continued from page 278A)

substances. However, treatment with a coenzyme Q that is native to the monkey (coenzyme Q₁₀) causes reticulocytosis, and treatment with hexahydrocoenzyme Q₁ induces a complete remission of the anemia. In related experiments, we found evidence that vitamin E and coenzyme Q can act together to improve the stability of cellular membranes, and we suggest that this interaction may explain the response of vitamin E-deficient animals to coenzyme Q therapy.

LIPID AND CARBOHYDRATE STUDIES IN CORONARY ARTERY DISEASE. H. L. Falsetti, J. D. Schnatz, D. G. Greene and I. L. Bunnell (Dept. Med., State Univ. of N. Y. at Buffalo and Buffalo Gen. Hosp., Buffalo, N. Y.). *Circulation* 37, 184-191 (1968). Twenty-seven patients with arteriographically proved coronary artery disease, aged 27 to 59 years, were studied for abnormalities of lipid or carbohydrate metabolism. All patients were referred because of cardiac symptoms and none had any prior history of lipid or carbohydrate abnormality. Twenty-three patients were found to have some lipid or carbohydrate metabolism abnormality, and four had none. Seventeen patients had an abnormal lipoprotein electrophoretic pattern, 12 had elevated serum cholesterol concentrations, and 15 elevated serum triglyceride values. Eighteen patients had an abnormality of carbohydrate metabolism, 11 as determined on standard glucose tolerance tests and seven on cortisone glucose tolerance tests. These abnormalities of carbohydrate and lipid metabolism were not related to age or ponderal-index ratio. This high incidence of carbohydrate and lipid abnormalities in association with coronary artery disease may be important in the pathogenesis of the vascular disease as well as management of these patients and their progeny.

THE EFFECTS OF ACTINOMYCIN D ON THE BIOSYNTHESIS OF PLASMA LIPOPROTEINS. G. Faloona, B. Stewart and M. Fried (Res. Div., Veterans Admin. Hosp., Dallas, Texas). *Biochemistry* 7, 720-5 (1968). Intraperitoneal administration of actinomycin D, particularly when supplementary injections were given, severely inhibited ototic acid incorporation into the trichloroacetic acid precipitate of rat liver for several hours and resulted in a decrease in the principal low density lipoprotein component of rat serum, which was still apparent after 21 hours. At the same time the concentration of high density lipoproteins was found to increase slightly. The biosynthesis of lipoproteins was measured by following L-(³H)lysine incorporation into the lipoprotein protein moieties, both *in vivo* and in the isolated perfused liver. In both cases actinomycin D pretreatment caused a greater inhibition of low density lipoprotein synthesis than that of high density lipoprotein. Specific activity determinations on a number of protein fractions isolated from the perfusate and from the liver after a liver perfusion demonstrated that the decreases in synthesis observed after actinomycin D treatment vary considerably for different proteins, indicating a general heterogeneity of hepatic template stability.

ANTIDYSTROPHIC EFFECT OF SELENIUM AND OTHER AGENTS ON CHICKS FROM VITAMIN E-DEPLETED HENS. Lillian Ewen and K. Jenkins (Dept. Nutr., Univ. of Guelph, Guelph, Ontario, Canada). *J. Nutr.* 93, 470-74 (1967). A study was undertaken to determine the relation of dietary lard and body vitamin E stores to the protective efficacy of selenium against nutritional muscular dystrophy in the chick. Flocks of vitamin E-depleted hens were used for the production of eggs with very low levels of α -tocopherol. Chicks hatched from these eggs and fed a purified diet containing negligible amounts of vitamin E had indeterminably low stores of α -tocopherol after the 5-week experimental period. Selenium supplementation of the "fat-free" basal diet provided partial protection against myopathy in the severely vitamin E-depleted chicks indicating that at least part of the anti-dystrophic activity of the element does not require vitamin E. Selenium protectivity was markedly inhibited in both vitamin E-deficient and control birds by the inclusion of 4% of lard in the diet. These findings confirm previous observations from this laboratory that 4% of lard, or its equivalent content of linoleic acid, may act as a selenium antagonist. The present data suggest that in the chick, lard (or linoleic acid) may directly interfere with the antidystrophic activity of selenium rather than solely by the destruction of feed and tissue vitamin E.

ORIGIN OF GLYCEROL ETHERS. BIOSYNTHESIS FROM LABELED ACETATE, STEARIC ACID, STEARALDEHYDE AND STEARYL ALCOHOL. J. Ellingboe and M. L. Karnovsky (Dept. of Biol. Chem., Harvard Med. School, Boston, Mass. 02115). *J. Biol. Chem.* 242, 5693-9 (1967). Pieces of the digestive gland of the

starfish, *Asterias forbesi*, were incubated *in vitro* with various radioactive lipid precursors in order to follow the biosynthesis of the alkyl and alkenyl glycerol ethers. Acetate-1-¹⁴C was incorporated readily into alkyl glycerol ethers of both neutral lipid and phospholipid fractions, but very poorly into the alkenyl glycerol ethers. Stearic acid-1-¹⁴C and stearaldehyde-1-¹⁴C were both incorporated into alkyl glycerol ethers, but the fatty aldehyde was a much better precursor of alkenyl glycerol ethers than was the fatty acid. When stearyl alcohol-1-¹⁴C-1-³H was compared with stearaldehyde-1-¹⁴C-1-³H, it was found, from isotope ratios and relative specific activities, that the fatty aldehyde served as a better precursor than the fatty alcohol in the biosynthesis of alkenyl ethers; on the other hand, the fatty alcohol was more efficiently incorporated into the alkyl ethers. In each of these cases, sufficient tritium was retained on the primary carbon of the lipid product to preclude the obligatory involvement of fatty acids as intermediates in the biosynthesis of lipid ethers. The evidence presented militates against a direct precursor-product relationship between alkyl and alkenyl lipid ethers.

EFFECT OF DIETHYLSTILBESTROL AND CHOLESTEROL ON THE FATTY ACID METABOLISM OF TURKEYS. R. Chung, R. Munday and Y. Lien (Dept. Food Sci. and Tech., Tuskegee Inst., Tuskegee Inst., Alabama 36088). *Poultry Sci.* 46, 1517-21 (1967). The liver and serum 16:1 and 18:1 concentration increased and 18:0 and 20:4 concentration decreased as a result of cholesterol (C), diethylstilbestrol (DES), and C + DES treatments regardless of the type of dietary fat (corn oil (CO) or hydrogenated coconut oil (HCO)). Des and C + DES increased the proportion of 16:0 with CO and HCO and decreased the proportion of 18:2 with HCO. C + DES increased the proportion of 18:2 with CO, whereas C increased the proportion of 18:2 with CO and HCO except in the serum with HCO.

FAT ABSORPTION BY GERM-FREE CHICKS. F. Boyd and H. Edwards, Jr. (Poultry Disease Res. Center, Biol. Dept., Northeast Louisiana State Coll., Monroe, Louisiana). *Poultry Sci.* 46, 1481-83 (1967). The germ-free chick retained greater amounts of palmitic and stearic acid than chicks in conventional environments. This difference in absorption was apparent whether stearic acid was present at relatively high level in the diet (1.19%) or low level (0.10%). The environment did not appear to influence the chicken's absorption of oleic acid or linoleic acid.

MODIFIED-FAT DIETARY MANAGEMENT OF THE YOUNG MALE WITH CORONARY DISEASE. M. Bierenbaum, D. Green, A. Florin, A. Fleischman and Anne Caldwell (45 Elm St., Montclair, N. J. 07042). *J. Am. Med. Assoc.* 202, 1119-23 (1967). One hundred young male outpatients with coronary disease who were under dietary management with a 28% fat diet were group-matched to a non-dietary-managed group in regard to age, age at infarction, number of infarctions, prevalence of hypertension, degree of angina, and value of serum cholesterol, among other factors. The diet-managed group experienced a significant reduction in serum cholesterol value, while the non-dietary-managed group did not. No significant differences were noted between the two groups in levels for serum total lipids, phospholipids and triglycerides. Under the experimental conditions employed, the degree of unsaturation of the diet did not appear to influence serum cholesterol value or mortality. The non-dietary-managed group had a 160% higher recurrent infarction rate and a 233% higher mortality rate than did the dietary-managed group during the first five years of observation.

CONTROL OF FIBRINOGEN BIOSYNTHESIS: THE ROLE OF FREE FATTY ACID. L. Pilgeram and L. Pickart (Gerontology Res. Inst., Sansum Clinic Res. Found., Santa Barbara, Calif.). *J. Atheroscler. Res.* 8, 155-166 (1968). The plasma of older human patients who have recovered from a myocardial infarction is shown to induce a significant increase above normal in the synthesis of fibrinogen in an *in vitro* system based upon human liver biopsy samples. The probable identity of the plasma factor is free fatty acid (FFA). Palmitate will induce up to a 9.45 fold increase in the uptake of glycine-1-¹⁴C into the protein molecule. Short chain and unsaturated long chain fatty acids induce a lesser but significant increase in the synthesis of fibrinogen. Introduction into the plasma of a young normal subject of an amount of stearate or palmitate equivalent to the difference in the plasma level of FFA between the normal and arteriosclerotic subjects raised the rate of *in vitro* synthesis of fibrinogen to the level noted in a mouse liver system batched with the plasma of the arteriosclerotic patient. This biosynthetic control manifested by FFA appears to provide a connecting metabolic link between metabolism and blood clotting in the genesis of arteriosclerosis.

REGULATION OF TRIGLYCERIDE SYNTHESIS IN THE PARTURIENT GUINEA-PIG MAMMARY GLAND. N. J. Kuhn (Univ. of Oxford, England). *Biochem. J.* 105, 225-31 (1967). The specific activity of the enzyme palmitoyl-CoA-L-glycerol-3-phosphate palmitoyltransferase (EC 2.3.1.15) in the mammary tissue of guinea pigs has been shown to increase 37-fold at parturition. Increases also occur in tissue concentrations of glycerol-3-phosphate, CoA and free fatty acid, but not in that of acid-insoluble CoA. The isolation and fatty acid composition of plasma triglycerides and of mammary tissue free fatty acid, diglyceride and triglyceride are described. The findings are discussed in relation to the regulation of milk fat synthesis.

FATTY ACID COMPOSITION OF DIFFERENT SERUM PHOSPHOLIPIDS IN MEN AND WOMEN. M. A. Antar, M. A. Ohlson and M. O. Osborn (Univ. of Iowa, Iowa City, Iowa). *Biochem. J.* 105, 117-9 (1967). Eight young healthy persons, 4 men and 4 women, were maintained for a total of 2 months on a diet in which 40%, 16% and 44% of the total calories were present as fats, proteins and carbohydrates respectively. The ratio of complex to simple carbohydrates in the diet was 1:4. The fatty acids of serum kephalins, lecithins, lysolecithins and sphingomyelins were determined by gas-liquid chromatography. Lysolecithins in both men and women had the highest content of saturated acids, followed by sphingomyelins, lecithins and kephalins in that order. The degrees of saturation and of polyunsaturation of the fatty acids in the different phospholipid fractions were significantly different, except for the differences in the polyunsaturation of the kephalins and lecithins. No sex difference was found in the fatty acid composition of the different phospholipids.

FATTY ACID CHANGES IN LIVER AND PLASMA LIPID FRACTIONS AFTER SAFFLOWER OIL WAS FED TO RATS DEFICIENT IN ESSENTIAL FATTY ACIDS. R. R. Johnson, P. Bouchard, J. Tinoco and R. L. Lyman (Univ. of California, Berkely, Cal.). *Biochem. J.* 105, 343-50 (1967). Fatty acid patterns of liver and plasma triglycerides, phospholipids and cholesteryl esters were determined at intervals during 24 hrs. after essential fatty acid-

deficient rats were given one feeding of linoleate as safflower oil. Liver triglyceride, phospholipid and cholesteryl ester fatty acid compositions did not change up to 7 hrs. after feeding. Between 7 and 10 hrs., linoleic acid began to increase in all fractions, but arachidonic acid did not begin to rise in the phospholipid until 14-19 hrs. after feeding. Oleic acid and eicosatrienoic acid in liver phospholipid began to decline at about the time that linoleic acid increased or about 9 hrs. before arachidonic acid began to increase. Changes in linoleic acid, arachidonic acid and eicosatrienoic acid in phosphatidylcholine resembled those of the total phospholipid. Phosphatidylethanolamine had a higher content of arachidonic acid before feeding than did phosphatidylcholine, and after feeding the fatty acid composition of this fraction was little changed. Behavior of the plasma lipid fatty acids was similar to that of the liver lipids, with changes in linoleic acid, eicosatrienoic acid and arachidonic acid appearing at the same times as they occurred in the liver. The results indicate that linoleic acid was preferentially incorporated into the liver phospholipid at the expense of eicosatrienoic acid and oleic acid. The decline in these fatty acids apparently resulted from their competition with linoleic acid for available sites in the phospholipids rather than from any direct replacement by arachidonic acid.

HEMOLYTIC ANEMIA IN VITAMIN E DEFICIENCY. F. A. Oski and L. A. Barness (Dept. of Pediatrics, Hosp. of Univ. of Penn. and Univ. of Penn. Sch. of Med., and Dept. of Pediatrics and Clin. Res. Cntr., Philadelphia Gen. Hosp., Philadelphia, Penn.). *Am. J. Clin. Nutrition* 21, 45-50 (1968). Vitamin E deficiency in the premature infant is associated with a hemolytic anemia. This anemia responds to tocopherol and the response is characterized by a rise in the hemoglobin and a fall in the reticulocyte count. Treatment of premature infants from birth with supplemental vitamin E reduces the severity of anemia and prevents the marked reticulocytosis commonly observed in these infants of low birth weight.

(Continued on page 286A)

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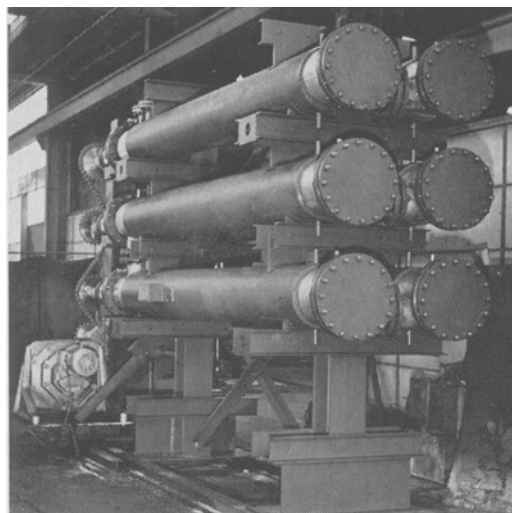
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(Continued from page 283A)

VITAMIN E RESPONSE IN INFANTS FED A LOW-FAT FORMULA. L. A. Barness, F. A. Oski, M. L. Williams, G. Morrow III and S. B. Arnaud (Dept. of Pediatrics, Hosp. of Univ. of Penn. and Univ. of Penn. Sch. of Med., Philadelphia, Penn.). *Am. J. Clin. Nutr.* 21, 40-44 (1968). A concentration of 11.5 mg of vitamin E per reconstituted quart of Alacta was insufficient to prevent uniformly the development of vitamin E-responsive anemia in four premature infants. This was possibly due to poor absorption of the vitamin E. In this study, in addition to the hemolysis reversal, vitamin E administration appeared to increase total serum proteins and to decrease methylmalonate excretion.

VITAMIN E AND LINOLEIC ACID IN THE FEEDING OF PREMATURE INFANTS. T. Panos, Barbara Stinnett, G. Zapata, J. Eminians, B. Marasigan, and Alice Beard (Dept. of Pediatrics, Univ. of Arkansas Med. Center, Little Rock, Arkansas). *Am. J. of Clin. Nutrition* 21, 15-39 (1968). Premature infants fed a vitamin E-free milk mixture, with or without inclusion of 5% of calories or fat in the form of linoleic acid, develop no apparent clinical evidence of tocopherol deficiency within a period as long as 195 days. Results of this study indicate that anemia of prematurity is not basically related to vitamin E deficiency or linoleic acid deficiency, or both, for at least 6 months. Identification of clinical evidence of biochemically demonstrable signs of vitamin E deficiency remains extremely elusive in premature infants under 6 months.

LONG CHAIN FATTY ACID ACTIVATION IN SUBCELLULAR PREPARATIONS FROM RAT LIVER. S. Pande and J. Mead (Dept. Biol. Chem., Univ. of Calif., Los Angeles, School of Med., Los Angeles, Calif. 90024). *J. Biol. Chem.* 243, 352-61 (1968). A study of the activation of several long chain saturated and unsaturated fatty acids by rat liver preparations was undertaken. Investigation of reaction requirements and appropriate modifications revealed that rat liver is extremely active in long chain acyl-coenzyme A synthetase or synthetases (acid:CoA ligase (AMP), EC 6.2.1.3) activity. With palmitate as substrate, the cell membrane fraction was found richest in activating enzyme, with the microsomal fraction next. In the microsomal activation of saturated fatty acids, maximal activity was reached with palmitate. The coenzyme A requirements found were very similar with palmitate, stearate, and erucate (K_m 3.3 to $3.9 \times 10^{-5}M$), but these were markedly different from the coenzyme A requirements with oleate, linoleate, linolenate, and arachidonate (K_m 1.56 to $3.3 \times 10^{-4}M$); this suggests the possible occurrence of at least two different long chain acyl CoA synthetases in rat liver microsomes. In experiments with oleate, linoleate, linolenate, and arachidonate, the activating enzyme was found to be markedly susceptible to substrate inhibition, which complicated exact assay. The stimulation of activation of these unsaturated fatty acids by a heated microsomal fraction was traced mainly to their fatty acid-binding ability. Liver phospholipids greatly stimulated oleate activation, and this was thought to be due to the association of oleate with phospholipid. For the palmitate-activating enzyme, it appeared that bound phospholipid was essential for activity.

THE EFFECT OF CHLOROPHENOXISOBUTYRATE ON PLASMA COMPOSITION OF CHOLESTERYL ESTERS AND ON LEVELS OF NEUTRAL LIPIDS. M. Hagopian and R. Robinson (Res. Lab., Memorial Hosp., Worcester, Mass.). *J. Atheroscler. Res.* 8, 21-27 (1968). The plasma composition of cholesteryl ester fatty acids and levels of triglycerides and cholesterol were determined individually in 13 patients with coronary heart disease. Measurements were made before, during and after treatment with CPIB. In all patients CPIB decreased the proportion of cholesteryl linoleate and increased oleate and palmitoleate. Serum triglyceride levels were reduced in more patients and to a greater extent than cholesterol. The relationship of these findings to those in the recent literature are discussed.

NATURAL OCCURRENCE AND BIOLOGICAL ACTIVITY OF VITAMIN A DERIVATIVES IN RAT BILE. K. Nath and J. Olson (Dept. Biochem., Univ. of Florida Coll. Med., Gainesville, Florida). *J. Nutr.* 93, 461-69 (1967). A study was made to determine the biological activity of retinoyl β -glucuronide, a major biliary excretion product of administered retinoic acid in the rat, to evaluate the significance of the biliary excretion of vitamin A derivatives under normal nutritional conditions, to analyze the rate of excretion of vitamin A derivative, and to determine the chemical nature of the excreted products. Retinoyl β -glucuronide has a biopotency 30 to 100% as great as all-*trans* retinol or as all-*trans* retinoic acid. A more accurate estimate cannot be given because of the unknown effect of the isolation proce-

dures on the glucuronide's biopotency. Similarly, a nonpolar retinoate derivative in bile (fraction I) which presumably is methyl retinoate, has a biopotency 50 to 200% as great as all-*trans* retinoate by like criteria. The biliary secretion of vitamin A derivatives, presumably glucuronides, appears to be a normal physiological process, inasmuch as labeled compounds were secreted at the rate of about 0.3 $\mu g/ml$ in the bile of vitamin A-depleted rats from 6 to 32 days after the administration of labeled retinol. Finally, the rate of excretion of labeled retinoic acid derivatives in the excreta closely paralleled the rate of their secretion into bile. Most of the radioactivity appeared in the feces, mainly as retinoic acid but with a lesser amount as the glucuronide. A labeled derivative, presumably the glucuronide, appeared earlier in the urine but in much smaller amounts.

ACYL CARRIER PROTEIN: EFFECTS OF ACETYLATION AND TRYPTIC HYDROLYSIS ON FUNCTION IN FATTY ACID SYNTHESIS. P. Majerus (Depts. of Biol. Chem. and Internal Med., Univ. School in Med., St. Louis, Missouri 63110). *Science* 159, 429-30 (1968). Acetylation of the four lysine residues and the amino group of the terminal serine residue of *Escherichia coli* acyl carrier protein has no effect on the ability of this protein to function in fatty acid synthesis. Subsequent trypsin hydrolysis resulting in complete inactivation cleaves a single arginyl peptide bond, releasing the amino terminal hexapeptide from the molecule.

INFLUENCE OF PERIODICITY OF EATING ON ENERGY METABOLISM IN THE RAT. G. Leveille, E. O'Hea (Div. Nutr. Biochem., Univ. of Illinois, Urbana, Ill.). *J. Nutr.* 93, 541-45 (1967). Previous studies had shown that rats having access to food for a single daily 2-hour period (meal-fed) utilized their food for weight gain more efficiently than *ad libitum*-fed (nibbling) rats. This observation suggested that the energy expenditure of meal-fed and nibbling rats was determined during the day (8 AM to 4:30 PM) and night (4:30 PM to 8 AM). Meal-fed animals had a significantly lower level of activity than the nibbling rats, particularly during the evening hours when activity was reduced by 57%. The basal oxygen consumption and heat production were not reduced in meal-fed animals. These data are interpreted as showing that the greater feed efficiency of the meal-fed rat is the result of reduced activity level and consequently energy expenditure. The similarities between the obese human and meal-fed rat are discussed.

AVAILABILITY TO THE CHICK OF ZINC PHYTATE COMPLEXES ISOLATED FROM OIL SEED MEALS BY AN IN VITRO DIGESTION METHOD. J. Lease (Dept. Food Science and Biochem., Coll. of Agr. and Biol. Sci., Clemson Univ., Clemson, S. Carolina). *J. Nutr.* 93, 523-32 (1967). Studies were made of the form in which zinc was found after digestion *in vitro* of oil seed meals which varied in zinc availability *in vivo*. Regardless of *in vivo* differences, the zinc of two sesame meals and one safflower meal was present in an insoluble, nondialyzable Ca Mg Zn phytate complex at intestinal pH. The zinc was little available to the chick as shown by low uptake of ^{65}Zn from the labeled complexes. For a soybean meal digest, about 75% of the extracted zinc, 40% of the phytate phosphorus and 90% of the calcium and magnesium were soluble at intestinal pH. About 50% of the zinc was dialyzable in a 4-hr period. The zinc of the soybean meal digest was bound in a water-soluble and dialyzable complex which was more stable than zinc phytate. The binding agent was termed a "carrier." Three isolated soy proteins contained low or no "carrier" properties.

EFFECT OF CARNITINE ON FREE FATTY ACID UTILIZATION IN EHRLICH ASCITES TUMOR CELLS. A. A. Spector (National Heart Inst., Bethesda, Maryland). *Arch. Biochem. Biophys.* 122, 55-61 (1967). The oxidation of palmitate- $1-^{14}C$ to $^{14}CO_2$ in homogenates of Ehrlich ascites tumor cells was increased approximately 2.5 times by the addition of carnitine. Carnitine palmityltransferase and long chain fatty acid thiokinase activities were demonstrated in this homogenate. It is postulated that, as in non-neoplastic tissues, an acyl-carnitine intermediate probably is involved in the oxidation of long-chain fatty acids by the tumor homogenate. Radioactive carnitine was taken up by the intact tumor cell, and a small fraction of this was incorporated into long-chain acylcarnitine. When exogenous palmitate was available, the incorporation of radioactive carnitine into long-chain acylcarnitine was doubled. However, exogenous palmitate- $1-^{14}C$ oxidation by the intact tumor cell was not stimulated by addition of carnitine to the incubation medium, and dextro-carnitine did not inhibit palmitate oxidation by the intact cell. Added carnitine also had no effect on palmitate- $1-^{14}C$ incorporation into the total lipid, phospholipid, triglyceride, or free fatty acid fractions of the intact cell.

POSSIBLE DESATURATION OF PRESYNTHESIZED TRIGLYCERIDES IN AFTER-RIPENING LINSEED. A. R. S. Kartha (Indian Agr. Research Inst., New Delhi, India). *Chem. Ind. (London)* 41, 1749-50 (1967). Unripe linseed capsules detached from the plant in the early stages of ripening and allowed to after-ripen at room temperature are known to exhibit a large increase in the degree of unsaturation of the oil, frequently also accompanied by an increase in the percentage oil content (dry basis). Linseed is the only oil which exhibits such a rapid and large increase in iodine value during after-ripening and thus represents the only suitable biological material so far known which may yield evidence of possible desaturation of presynthesized triglycerides as a step in the biosynthesis of vegetable fats. To rule out the possible alternative hypothesis that more unsaturated fats may be synthesized during after-ripening, unripe seeds were cut out from the fresh unripe capsules as quickly as possible after removal from the plants, so as to eliminate all possible food supplies. Oil content and iodine value of the oil were measured after up to 12 days' aging at room temperature. The results showed no detectable increase in I.V. during the after-ripening period, thus suggesting that the carbohydrates normally present in the unripe seed are required for other purposes and cannot be converted to fat by the fat cells. When the seeds after-ripen in the capsules, nutrient from the capsules is transferred to the fat cells for fat synthesis and an increase in degree of unsaturation may or may not be evident. The same process may be expected to take place during normal ripening. The increase in iodine value of oil in after-ripening linseed thus appears to be due entirely to total synthesis of more unsaturated triglycerides.

DE NEVO SYNTHESIS OF FATTY ACID IN PERFUSED RAT LIVER AS A DETERMINANT OF PLASMA LIPOPROTEIN PRODUCTION. H. G. Windmueller and A. E. Spaeth (National Inst. of Health, Bethesda, Maryland). *Arch. Biochem. Biophys.* 122, 362-9 (1967). The quantitative relationship between fatty acid synthesis *de novo* and production of plasma lipoproteins by perfused liver has been investigated. Rat livers were perfused *in situ* for 3-5 hrs. with a suspension of erythrocytes in one of three perfusing media. Tritium oxide was added in each case. Livers were from young rats fed *ad libitum* or fasted and re-fed. Rates of hepatic fatty acid synthesis ranged from 1.4 to 14.1 μ moles/gm liver/hr, as determined from the tritium content of fatty acids in the liver plus perfusate. A high correlation was found between the number of micromoles of fatty acid synthesized by livers and the numbers of micromoles of esterified fatty acid released by livers into the perfusing medium. When the perfusate was prepared with only plasma, 0.9 moles of total fatty acid was released per mole synthesized. With all perfusing media, net release of triglycerides, and to a lesser extent cholesterol, was highly correlated with rate of fatty acid synthesis. The additional amounts of triglycerides and cholesterol resulting from accelerated fatty acid synthesis were all released into the perfusate β -lipoprotein fraction, identified immunologically and by ultracentrifugation. Livers with similar rates of fatty acid synthesis released more triglycerides, cholesterol and newly synthesized fatty acid when the perfusing medium contained plasma. Net release of phospholipids was nearly independent of the rate of fatty acid synthesis or the presence of plasma in the perfusate. The rate of fatty acid synthesis *de novo*, which varied widely even among carefully selected rats, is an important determinant of lipid release by the perfused liver.

DIET AND CORONARY HEART DISEASE: DIETARY ANALYSIS ON 100 MALE PATIENTS. Aileen Finegan, N. Hickey, B. Maurer and R. Mulcahy (Coronary Heart Disease Res. Unit, St. Vincent's Hosp., Dublin, 2, Ireland). *Am. J. Clin. Nutr.* 21, 143-48 (1968). A preliminary report on the dietary findings of 100 men with CHD shows that they consumed an average of 3,555 kcal per day. This is similar to the experience of the general Irish population whose daily calorie intake is reported to be the highest in the world. No obvious abnormalities were noted in other measured dietary factors in these patients when compared to data derived from apparently healthy populations or subjects. It is considered that, while general overnutrition with the consequent pattern of high saturated fat intake may increase the coronary proneness of a population, it is unlikely to be a high-grade risk factor in individuals. The serum cholesterol of the patients was correlated with their fat, carbohydrate, calories and cholesterol intakes.

(Continued on page 288A)

• *Industry Items*

CHEMICAL PLANTS DIVISION OF BLAW-KNOX COMPANY has received a contract from Cotton Producers Association, Atlanta, Ga., for the engineering and procurement of facilities for a soybean processing plant to be located at Valdosta, Lowndes County, Georgia. The facilities to be engineered by Blaw-Knox include bean preparation equipment, a 1500 ton-per-day ROTOCEL extractor, a toaster-desolventizer system, and related equipment. The Association plans to export some of the soybean oil, with the rest of the oil and soybean meal to be sold throughout the Southeast. The plant will produce both a 44% protein meal and a 50% protein meal.

AIR PRODUCTS AND CHEMICALS, INC. has named the Gulf Oxygen Company, Inc., 1641 Federal Road, as a distributor for the Houston area.

Gulf Oxygen will distribute the company's complete line of industrial gases in cylinder and bulk quantities, specialty and medical gases, compressed gas apparatus and welding and cutting equipment. Storage and pumping facilities are now being built for liquid oxygen, nitrogen and argon.

HCL SCIENTIFIC, INC., started by P. Hercz, P. Cobert and C. Lantz will manufacture and market gas chromatography products. As an initial step on providing a good basic chromatograph, HCL has acquired the Warner-Chileott (Research Specialties) line of gas chromatography instrumentation from American Optical Instrument Company, effective March 1, 1968. HCL Scientific will now handle all service and future sales of this equipment. They will also offer a complete line of accessories and column materials.

Chemical Plants Division of BLAW-KNOX COMPANY has received an order from Clinton Corn Processing Company, a Division of Standard Brands Inc., for a desolventizer unit for processing extracted corn germ. The new desolventizer will have a capacity for handling a total feed of 15 tons per hour.

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Monterrey Section

The Monterrey Section of the American Oil Chemists' Society (Instituto Mexicana de Quimicos en Aceites y Grasas, A. C.) has announced the election of its new Executive Board. The election was held March 1, 1968, in the Luis XV Salon of the Ancira Hotel in Monterrey.

New officers are: President: Ing. Enrique Chávez López, Anderson, Clayton & Co., S. A., Monterrey, N. L.; Vice President: Ing. Humberto Garza M., Raul Garcia y Cia., Monterrey, N. L.; Secretary: Ing. Ramón Terrazas V., Quimotecnica, S. A., Monterrey, N. L.; Treasurer: Ing. Fernando Sánchez Aguilar, Anderson, Clayton & Co., S. A., Monterrey, N. L.; Consultant to the Executive Board: Frank Khym, Anderson, Clayton & Co., S. A., Monterrey, N. L.

Northeast Section

The last of the 1967-1968 Northeast Section meetings will be held at Whyte's Restaurant, New York City, June 4, 1968.

N. O. V. Sonntag, Director of Process Development for Glyco Chemicals, Inc., will be the guest speaker and will discuss "The Manufacture of Synthetic Fatty Acids."

Dr. Sonntag's academic background is extensive, and includes experience with many well-known industrial oil companies. Since he received his PhD in 1951, he has held positions with Colgate-Palmolive Co., Celanese Corporation, Emery Industries, Inc., The National Dairy Products Corporation, Emery Industries, Inc., The National Dairy Products Corporation, and Glyco Chemicals, Inc.

With Karl Zilch of Emery Industries, he co-authored the chapter, "Synthetic Fatty Acids" in *Industrial Fatty Acids*. Further, the January 1968 *Journal* includes a panel discussion and symposium on the subject of synthetic fatty acids which he chaired at the 57th Annual Spring Meeting at Los Angeles, April 1966.

ACS Symposium on Chemical and Biochemical Polymers

The Western New York and Rochester sections of the American Chemical Society will conduct a Symposium on Chemical and Biochemical Polymers at the State University of New York at Buffalo on June 14 and 15, 1968. The topics and speakers will be as follows:

- 1) C. G. Overberger, University of Michigan, "Polymers with Imidazole Side Chains: Specific Catalysts";
- 2) J. C. Sheehan, M.I.T., "Macrocyclic Peptides: Structure and Synthesis";
- 3) A. Scheraga, Cornell University, "Synthetic Biopolymers as Models for Natural Ones";
- 4) B. H. Sells, St. Jude Children's Research Hospital, "Biogenesis of Ribosome Particles";
- 5) Kenneth Hickman, Rochester Institute of Technology (Dinner Speaker), "The Identification of the Skin on the Surface of Water";
- 6) A. S. Michaels, Amicon Corp., "Microstructure and Transport Properties of Anisotropic Permselective Membranes";
- 7) Milton Salton, New York University Medical Center, "Structure of Bacterial Membranes."

For registration blanks write to: State University of New York at Buffalo, Continuing Education Extension Center, 5430 Main Street, Williamsville, N. Y. 14221 (Attention: Mrs. Ethel G. Schmidt).

(Continued from page 287A)

INHIBITION OF THE CHRONIC ETHANOL-INDUCED FATTY LIVER BY ANTIOXIDANT ADMINISTRATION. A. Hartman and N. Di Luzio (Dept. of Physiol. and Biophys., Univ. of Tennessee Med. Units, Memphis, Tenn. 38103). *Proc. Soc. Exp. Biol. Med.* 217, 270-76 (1968). Female rats were maintained for 21 days on nutritionally adequate liquid diets containing either "low" or "high" fat content and supplemented with ethanol or isocaloric sucrose as 35% of the calories. Liver triglyceride concentrations were significantly elevated in animals maintained on both diets supplemented with ethanol. However, a greater increment in triglyceride concentrations was manifested in the "high" fat ethanol group under conditions of similar caloric intake. The intraperitoneal administration of the lipid antioxidant, N,N'-diphenyl-p-phenylenediamine (DPPD), prior to, and during the dietary period significantly inhibited the ethanol-induced increment in hepatic triglyceride concentration. The inhibition of the chronic ethanol-induced steatosis, in conjunction with our previous studies of antioxidant modification of the acute ethanol-induced hepatic lesion, further accents the possible role of lipid peroxidation as a determinant in cell injury and the role of antioxidants as liver protective agents.

AFLATOXIN TOXICITY IN BEEF CATTLE. W. Garrett, H. Heitman, Jr. and A. Booth. (Univ. Calif., Davis, Calif. 95616). *Proc. Soc. Exp. Biol. Med.* 127, 188-90 (1968). Under simulated practical conditions, graded levels of aflatoxin fortified cottonseed meal were fed to young beef cattle. The levels of aflatoxin B₁ fed in the ration to groups of 10 steers for 133-196 days were 0, 100, 300, 700 and 1,000 parts per billion (ppb). Significant growth inhibition, decreased feed efficiencies, and increased liver and kidney weights were observed in the steers fed 700 and 1000 ppb. Gross evidence of liver damage in these groups was also detected. No apparent abnormalities were seen in the groups fed 100 and 300 ppb aflatoxin.

THE 1- AND 2-OCTADECYL GLYCERYL ETHERS AS MODEL COMPOUNDS FOR STUDY OF TRIGLYCERIDE RESYNTHESIS IN CELL FRACTIONS OF INTESTINAL MUSCOSA. Linda Gallo, G. Vahouny and C. Treadwell (Dept. Biochem., School of Med., George Washington Univ., Washington, D.C. 20005). *Proc. Soc. Exp. Biol. Med.* 127, 156-9 (1968). The 1- and 2-octadecyl-1-¹⁴C-glycerol ethers have been used as model compounds to study triglyceride synthesis. The data suggest that: (a) the rat mucosa utilizes 2-monoglyceride for the formation of triglyceride; (b) the 1,2-diglyceride is the intermediate which is acylated to form triglyceride in the monoglyceride pathway; (c) and that utilization of the 1,3-diglyceride in triglyceride synthesis probably involves preliminary isomerization to the 1,2-diglyceride.

HEPATIC LIPID METABOLISM IN EXPERIMENTAL DIABETES. IV. INCORPORATION OF AMINO ACID ¹⁴C INTO LIPOPROTEIN-PROTEIN AND TRIGLYCERIDE. H. Wilcox, G. Dishmon and M. Helmsberg (Dept. Pharmacol., Vanderbilt Univ. School Med., Nashville, Tennessee). *J. Biol. Chem.* 243, 666-75 (1968). The incorporation of radioactive amino acids into serum proteins by isolated perfused livers from alloxan diabetic rats was depressed in comparison to the normal. The incorporation of amino acids into the major classes of serum lipoproteins (density 1.020; density 1.020 to 1.063; density 1.063 to 1.210) also was impaired in alloxan diabetes. The incorporation of ¹⁴C into the total serum proteins and into the lipoproteins was also depressed with livers from chronic alloxan diabetic rats maintained on insulin, and was not further depressed after withdrawal of the insulin from the animals. The incorporation of amino acids into serum proteins was not restored to normal levels upon treatment of the diabetic rats with insulin under our experimental conditions. The incorporation of amino acids into hepatic protein also appeared to be depressed below normal in livers from diabetic rats.

THE SULPHUR COMPONENTS OF RAPESEED MEALS: THEIR ORIGIN AND DETERMINATION. II. EXAMINATION OF SEVERAL DETERMINATION METHODS. J. Gasset. *Rev. Franc. Corps Gras* 14(11), 649-657 (1967). Isothiocyanates can be accurately determined by the methods of Wetter (argentimetric) and Appelquist (UV spectrophotometry). Oxazolimidethiones can be determined by Appelquist's UV method. Parameters influencing the methods were intensively investigated (temperature, time and nature of hydrolysis reagent). The identification of these compounds through the use of thin-layer chromatography was investigated.

RELATION OF ETHANOL INHIBITION OF HEPATIC FATTY ACID OXIDATION TO ETHANOL-INDUCED FATTY LIVER. D. Zakim and J. Green (Metabolic Div., U.S. Army Med. Res. and Nutr. Lab., Fitzsimons General Hosp., Denver, Colorado 80240). *Proc. Soc. Exp. Biol. Med.* 127, 138-42 (1968). The quantitative importance of the inhibition of hepatic fatty acid oxidation for the pathogenesis of ethanol fatty liver has been investigated in perfused rat liver. Advantage has been taken of the fact that octanoate is poorly esterified in rat liver. Thus, by using octanoate the effects of ethanol on hepatic fatty acid esterification can be separated from effects on fatty acid oxidation. Comparison of the effect of ethanol perfusion on the metabolism of octanoate-1-¹⁴C and palmitate-1-¹⁴C indicated that ethanol decreased fatty acid oxidation to CO₂ for both acids. However, in contrast to the palmitate data, inhibition of the oxidation of octanoate to CO₂ did not lead to an increase in the recovery of ¹⁴C from octanoate in the liver. Ethanol inhibition of CO₂ production from fatty acids did not itself lead to an accumulation of fatty acids in the liver. Thus, the data suggest that ethanol inhibition of CO₂ production from fatty acids does not contribute to the accumulation of fatty acids (in the form of triglycerides) seen in livers from ethanol treated rats.

REVERSIBILITY OF ATHEROSCLEROSIS IN CHOLESTEROL-FED RABBITS. W. Bortz (Div. of Res., Lanckenau Hosp., Phila., Pa. 19151). *Circulation Res.* 22, 135-9 (1968). Rabbits were fed cholesterol until their serum levels reached at least 1000 mg/100 ml; cholesterol feeding was then discontinued. Serum cholesterol values rapidly returned to normal levels. Some were killed at the time of discontinuance of the cholesterol diet and the others at periods up to 300 days thereafter. The aortas were removed and analyzed chemically for cholesterol content. The results demonstrate that cholesterol feeding of short duration produces a significant lesion whose cholesterol content may decrease markedly some weeks after the serum cholesterol has returned to normal levels.

ACETOACETYL COENZYME A DEACYLASE ACTIVITY IN LIVER MITOCHONDRIA FROM FED AND FASTED RATS. R. Burch and D. Triantofillou (Columbia Univ. Res. Serv., Goldwater Mem. Hosp., New York, N.Y. 10017). *Biochemistry* 7, 1009-13 (1968). The disappearance of acetoacetyl-CoA corresponded very closely to the appearance of free acetoacetate, thus validating this type of assay in whole mitochondria. Acetoacetyl-CoA disappearance increased 42% in iodoacetamide-treated liver mitochondria from rats fasted for 24 hr when compared to fed rats. This effect was seen in rats of all ages and was still apparent after 48-hr fast. Thus free acetoacetate production *via* the acetoacetyl-CoA deacylase pathway would be effectively reduced.

ALPHA-TOCOPHEROL REQUIREMENTS FOR EQUINE ERYTHROCYTE STABILITY. H. Stowe (Dept. Veterinary Science, Univ. of Kentucky, Lexington, Ky.). *Am. J. Clin. Nutr.* 21, 135-41 (1968). Foals were tocopherol depleted by feeding a pelleted semipurified ration containing Torula yeast, cornstarch, alpha-cellulose, ground limestone, trace mineral salt, MgO, and vitamins A and D₂. The layering hemolysis (LH) test was used to estimate the alpha-tocopherol requirements for equine erythrocyte stability. The layering hemolysis was coincident with serum tocopherol levels below 1.15 µg/ml and occurred approximately 200 days after tocopherol depletion began. In tocopherol repletion-depletion studies an average of 27 µg of parenteral or 233 µg oral alpha-tocopherol/kg body wt per day was required for maintenance of equine RBC stability (prevention of LH). Tocopherol deficient erythrocytes in peripheral blood were protected from LH between 4 and 5 hr postparenteral tocopherol administration. The addition of 1 and 10 µg alpha-tocopherol/ml of 0.8% saline, 0.1 and 1 µg alpha-tocopherol/ml saline, respectively, were required to prevent LH *in vitro*. The average alpha-tocopherol requirement per million equine erythrocytes was estimated at 7.96 mµg.

(Continued on page 291A)

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Conference on Cold Adaptation Membranes and Lipid Metabolism

A conference on Cold Adaptation and Lipid Metabolism will be held at the Institute of Arctic Biology, University of Alaska, Fairbanks, Alaska, July 22-24, 1968. This



R. G. Simon

Conference will be sponsored by the Institute of Arctic Biology and American Institute of Biological Sciences (founded by NASA). Attendance will be limited. Conference organizer is R. Gerald Simon, Presbyterian-St. Luke's Hospital, Chicago, Ill.

The work in the area of cell membranes and lipid metabolism has been progressing at a great pace. The area of cold adaptation has been studied at the physiological level to a great extent and to a more limited extent on the molecular level, especially as it applied to the highly important level of lipid metabolism. The two areas are beginning to meet. This has resulted in the use by persons in one area of data acquired by investigators in the other area. Most of the investigators in one area do not know or understand the problems involved in the opposite area and this understanding is essential to the fruitful investigation of both groups.

This conference is intended to enhance cooperation between laboratories and disseminate a maximum amount of knowledge in a minimum of time. The conference is not primarily intended as a vehicle for the presentation of reams of data, but rather as a means of presenting interpretations, sounding out areas to be explored and the significance of each area as it interrelates with other areas.

J. H. Quastel will chair the conference. The speakers will be: F. S. Sjöstrand, W. Stoeckenius, C. Fleischer, and B. Fleischer. J. M. Steim, R. Post, G. Rouser, G. Colociceo, T. G. Thompson, D. Branton, D. Papohadjopoulos, G. Nelson, K. K. Carroll, and R. G. Simon.

Some representative titles are: 1) A New Approach to the Analysis of the Molecular Structure of Cellular Membranes by Means of Electrons Microscopy; 2) Effects of Freezing Temperatures on Membrane Structure; 3) The Phospholipid Bilayer as a Structural and Functional Element on Biological Membranes; 4) Correlation of Surface Activity with Chemical Structural and Biological Function of Proteins and Lipids in Membranes; 5) Phospholipid Changes Resulting from Cold Acclimation.

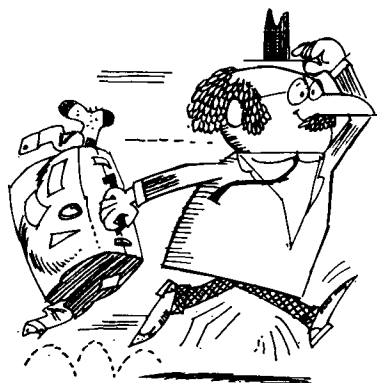
Symposium on Gnotobiology June 10-11, 1968

A symposium, Gnotobiology: Experimental and Clinical Aspects, will be held in Buffalo, New York, June 10-11, 1968. Co-sponsored by the Roswell Park Memorial Institute and the Department of Biochemical Pharmacology, School of Pharmacy, State University of New York at Buffalo, the symposium is under the auspices of the Association for Gnotobiotics, Inc.

The symposium has been divided into the following sessions: Leukemia in Germ-Free Rodents; Disease Resistance of Germ-Free Animals; Experimental Biology; Physiology; Nutrition; Immunology; Technology; Carcinogenesis; Patient Care in Sterile Environments.

Deadline for advanced registration and hotel reservations is May 15, 1968.

Further information and forms may be obtained from Dr. E. A. Mirand, Professor and Assistant Director, Roswell Park Memorial Institute, 666 Elm Street, Buffalo, New York 14203. Tel. (Ac 716) 886-2700, ext. 253.



Meetings

AOCS National Meetings

1969—San Francisco, San Francisco Hilton, April 20–24.
Minneapolis, Leamington Hotel, Oct. 5–8.

AOCS Section Meetings

Southwest Section—May 15, 1968, Michael's Los Feliz,
Los Angeles, Calif.

Other Organizations

- May 19–24, 1968—28th Annual Meeting, Institute for Food Technologists, Philadelphia, Civic Center, Philadelphia, Pa.
- May 20–24, 1968—Inter-American Conference on Materials Technology (Sponsored by ASTM and other Societies), Southwest Research Institute, San Antonio, Texas.
- June 10–14, 1968—Conference on Lipid Metabolism, Kimball Union Academy, Meriden, N. H.
- June 11–12, 1968—Food Science Symposium, Cornell University, New York State Experimental Station, Geneva, N. Y.
- June 16–20, 1968—The 72nd Annual Conference of the Association of Food and Drug Officials of the United States (AFDOUS) Hartford Hilton Hotel, Hartford, Conn.
- * June 17–18, 1968—Gelman Instrument Co. Short Course, "Thin-Layer Chromatography and Instant Thin-Layer Chromatography," Ramada Inn, Chicago.
- * June 20–21, 1968—Gelman Instrument Short Course, "Thin-Layer Chromatography and Instant Thin-Layer Chromatography, Holiday Inn, New York City.
- June 25–28, 1968—Gas Chromatography and Its Exploitation, 7th International Symposium, Falkoner Centret, Copenhagen, Denmark.
- * July 22–26, 1968—Air, Water, and Waste Disposal Engineering, Boettcher Center, Denver, Colo.
- * Aug. 11–16, 1968—Heat Transfer Conference and Exhibit, Bellevue-Stratford Hotel, Philadelphia, Pa.
- Aug. 19–21, 1968—The 48th Annual Convention of the American Soybean Convention, Roosevelt Hotel, New Orleans.
- * Sept. 1–5, 1969—Second Meeting of the International Society for Neurochemistry (ISN), Milan, Italy.
- Sept. 9–11, 1968—Third International Symposium on Drugs Affecting Lipid Metabolism, Milan, Italy.
- Sept. 12, 1968—Symposium on the Synthesis and Uses of Labelled Lipids and Sterols, Milan, Italy.
- Sept. 8–12, 1968—The 12th International Conference on the Biochemistry of Lipids, University of Loughborough, England.
- Sept. 12–13—Society of Cosmetic Chemists, Seminar, Sheraton Hotel, Boston, Mass.
- Sept. 16–21, 1968—IXth Congress of International Society for Fat Research (ISF), Rotterdam, Netherlands.
- Oct. 14–17, 1968—82nd Annual Meeting of the Association of Analytical Chemists, Marriott Motor Hotel, Twin Bridges, Washington, D. C.
- * Oct. 23–25, 1968—46th Annual Meeting and 33rd Paint Industries' Show of the Federation of Societies for Paint Technology, New York Coliseum, New York City.

* Additions to previous calendar

• AOCS Past Presidents Series

C. E. MORRIS, 1954

Charles E. Morris, the 45th President, was born in Chicago in 1907. He received his B.S. degree from the Illinois Institute of Technology in 1930, a ChE in 1933, and his Master's in 1935. He also undertook graduate work at the University of Chicago and at Northwestern University.



C. E. Morris

From 1930–1958 he worked for Armour and Company, holding various positions in Research and Development, Operating Superintendent in the Edible Fat Area and Production Manager.

Since 1958 he has been Director of Research and Development for the National Flaxseed Processors Association.

Charlie holds patents on the hydrogenation, deodorization and bleaching of fatty oils and product patents on shortening products.

Two publications cover "Linseed Oil Protection of Concrete Surfaces" (JAOCS) and "A New Look at Linseed Oil" (*American Paint Journal*).

He served on the Chicago Convention Committee for several years and was Chairman in 1948. He also served as Chairman of the Special Check Sample Commission, 1944–46; Chairman, Special Commission on Finances, 1949–50; Special Commission on Convention Locations, 1950–51; Special Commission on Convention Manual, Referee Board, 1953–55; Special Commission on Office Location, 1961–63, and Finance Commission, 1966–.

Some significant achievements of his administration were: 1) Six associate editors were appointed to lighten the work load of Editor-in-Chief of the *Journal*. 2) The North Central Section was admitted into the AOCS and the sectional movement was furthered within the Society. This involved investigation of possibility of creation of foreign sections. (Note—the English section has not yet developed but Monterrey, Mexico, now has a section.) 3) Action was taken on committee reports to streamline the constitution of AOCS, leaving it as a general statement of aims while making the by-laws the code under which the Society operates. In addition, those changes involved modifications in Referee Board procedures. 4) A student class of membership was created. 5) Employment of outside consultants to review and recommend revisions in general office procedures.

Charlie and his wife Marie have four sons and nine grandchildren and live in Chicago, Illinois.

Joint Conference on Cosmetic Sciences

Technical sessions of the Joint Conference on Cosmetic Sciences, sponsored by The Toilet Goods Association, Inc., and Society of Cosmetic Chemists, were presented April 21–23, 1968, in cooperation with The Food and Drug Administration. The meeting took place at the Washington Hilton Hotel, Washington, D. C.

The conference was held to exchange technical information on cosmetic sciences; to promote a free interchange of current scientific information among scientists in industry and Government; to explore ways to improve methodology and communications between Government and industry; and to provide maximum assurance of quality products for the public.

The two-day technical meeting, featuring 17 speakers from Government and industry, was highlighted by a speech by James Goddard, Commissioner, Food and Drug Administration.

(Continued from page 289A)

EVIDENCE FOR IN VIVO ACTIVITY OF POSTHEPARIN PLASMA LECITHINASE IN MAN. W. Vogel and E. Bierman (Med. Services, Veterans Admin. Hosp., Seattle, Washington 98108). *Proc. Soc. Exp. Biol. Med.* 127, 77-80 (1968). Plasma lecithin level decreased 15 min after 5000 units of intravenous heparin in 11 out of 12 subjects. For all subjects the average decrease was $3.5 \pm 4.3\%$ (mean \pm SD) ($p < .02$). The expected decrease in plasma TG ($27 \pm 14\%$; $p < .001$) also was observed. In contrast, no significant change in plasma sphingomyelin or cholesterol occurred. Changes in plasma lysolecithin were highly variable and not significant although 8 out of the 12 subjects showed some increase.

THE 6-O-METHYLGLUCOSE-CONTAINING LIPOPOLYSACCHARIDE OF MYCOBACTERIUM PHLEI. IDENTIFICATION OF D-GLYCERIC ACID AND 3-O-METHYL-D-GLUCOSE IN THE POLYSACCHARIDE. M. Saier, Jr., and C. Ballou (Dept. Biochem., Univ. Calif., Berkeley, Calif. 94720). *J. Biol. Chem.* 243, 992-1005 (1968). An organic acid having the chromatographic and electrophoretic properties of glyceric acid was isolated from acid hydrolysates of MGP. The glyceric acid was oxidized by 1 mole of sodium periodate, with the release of 1 mole of formaldehyde and 1 of glyoxalate. It was shown to have the D configuration. 3-O-Methylglyceric acid was obtained by hydrolysis of methylated MGP, showing that the linkage to the polysaccharide involved the 2-hydroxyl group. The intact lipopolysaccharide, MGLP, was not associated with purified *M. phlei* cell wall or particulate preparations.

DIAGNOSTIC VALUE OF SERUM LIPIDS AND FREQUENCY OF LIPO-PROTEIN PATTERNS IN MYOCARDIAL INFARCTION. B. Rifkind, D. Lawson and Morna Gale (Univ. Dept. of Med., Royal Infirmary, Glasgow, Great Britain). *J. Atheroscler. Res.* 8, 167-176 (1968). The comparative powers of cholesterol or triglyceride or combined cholesterol-triglyceride levels to segregate subjects with ischaemic heart disease, as manifested by myocardial infarction, from control subjects were measured in a study of 98 males with ischaemic heart disease and 196 controls. Combined cholesterol-triglyceride levels best segregated the groups. The frequency of various lipoprotein patterns in the ischaemic heart disease group was assessed from knowledge of cholesterol and triglyceride levels. Hypercholesterolaemia alone was found in only 10% of subjects with ischaemic heart disease; hypertriglyceridaemia with or without hypercholesterolaemia was observed in 34%. Raised levels of low density and very low density lipoproteins were inferred to be the commonest pattern; raised levels of either fraction alone occurred with a similar frequency. Estimation of triglyceride as well as cholesterol is necessary to identify all ischaemic heart disease subjects with hyperlipoproteinaemia.

MAMMARY GLAND FATTY ACIDS IN RATS OF DIFFERENT SUSCEPTIBILITY TO MAMMARY CARCINOMA INDUCTION. E. Rees and Hazel Ackermann (Dept. Med. and Clinical Res. Center, Univ. of Kentucky, Coll. of Med., Lexington, Ky. 40506). *Proc. Soc. Exp. Biol. Med.* 127, 106-9 (1968). Although young female rats of the Sprague-Dawley and Osborne-Mendel strains are quite vulnerable to the induction of mammary cancer by intragastric instillation of 7,12-dimethylbenz(a)anthracene and rats of Fischer, Marshall, and Long-Evans strains are relatively resistant, the fatty acid composition of mammary glands from rats of these five strains were comparable. A sex difference was noted in three strains with males having a somewhat greater proportion of 18:2 and a lower proportion 16:1 than females. The phospholipid levels of the breasts tissue of both male and females in all five strains were quite low relative to the total lipid.

INCORPORATION OF ACETATE-1-¹⁴C INTO THE LIPIDS OF AORTAS OF DIFFERENT SPECIES. A. Ramaachandra Rao and B. Narasinga Rao (Natr. Res. Lab., Indian Council of Med. Res., Hyderabad, India). *J. Atheroscler. Res.* 8, 59-67 (1968). Total lipids and *in vitro* incorporation of acetate-1-¹⁴C into different lipid fractions of abdominal and thoracic aortas of monkeys, rabbit, rat and chick have been compared. Percentage of total lipids in thoracic aorta was generally higher than in the abdominal part. Some differences were also observed in the incorporation of acetate-1-¹⁴C into lipids of the two segments of the aorta. Percentage of total lipids in monkey aorta was lower than in other species. Highest incorporation of radioactivity was observed in the phospholipid fraction, while that into the cholesterol fraction was poor in all the species studied. Incorporation of radioactivity into all lipid fractions of aorta was considerably higher in chick than in other species. Incorporation into the cholesterol fraction occurred consistently

(Continued on page 292A)



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J. J. Emery Resigns Influence on Company Expansion Reviewed

John J. Emery, who built the Emery Candle Company founded by his forebears into Emery Industries, Inc., producer of oleochemicals, has resigned as Chairman of the Executive Committee. He will continue to maintain an active interest in the company as a member of the Board of Directors.

Mr. Emery joined the Emery Candle Company as President in 1924 and remained in that position with the firm until 1960, when he became Chairman of the Board and A. W. Schubert was named President. In 1966, he became Chairman of the Executive Committee, when D. R. Hinkley was named President and Mr. Schubert moved to Board Chairman. Emery Industries was incorporated in 1935.

The company was started back in 1840, when Thomas Emery, Sr., Mr. Emery's grandfather, decided to convert the pungent by-products of Cincinnati's thriving meat-packing industry into lard oil and tallow candles.

Under Mr. Emery's leadership, the company began to expand from candle-making to the manufacture of a broad line of fatty acids and fatty acid derivatives for a wide variety of industrial applications.

Mr. Emery relied heavily on technological innovations. The first significant achievement was the development of the Twitchell reagent for the splitting of fats which soon became known world-wide. Then came Sanitone, the dry-cleaning process that revolutionized the industry and is today used by Sanitone licensees in all parts of the world.

Following World War II, continued research in the processing of fats and fatty acids led to the patented Colgate-Emery process for the high-pressure hydrolysis of fats, and to the Emersol process of solvent crystallization for separating mixtures of solid and liquid fatty acids.

Still another major advance made under Mr. Emery's leadership was the development of the firm's exclusive ozone oxidation technique for splitting oleic acid into two completely new products—azelaic and pelargonic acids, which are important ingredients in resins for surface coatings and varnishes, specialty plasticizers and polymers, rocket propellents and synthetic lubricants.

Emery Industries also pioneered the commercial development of dimeric acid, a fatty acid derivative which is widely used in the preparation of polyamide and polyester polymers, epoxy resins, urethane intermediates, soaps, corrosion inhibitors and surface coatings.

(Continued from page 291A)

only in chick aorta while in other species incorporation was absent or negligible. Monkey aorta incorporated acetate- ^{14}C relatively more into the phospholipid fraction than did the aortas of other species. Radioactivity in total lipids, cholesterol, free fatty acid and the triglyceride fraction was lower in monkey aorta than in rat or rabbit aorta. The significance of these findings in relation to the susceptibility of these species to atherosclerosis is discussed.

THE EFFECT OF BILE ON VITAMIN A ABSORPTION IN THE RAT. M. Gagnon and A. Dawson (Dept. Med., Royal Free Hosp., London). *Proc. Soc. Exp. Biol. Med.* 127, 99-102 (1968). Two groups of 11 Sprague-Dawley rats were fed vitamin A- ^{14}C in corn oil; both had thoracic duct fistulas, one group in addition had bile fistulas. There was a poor total recovery of vitamin from the animal tissue and gastrointestinal contents of both groups of animals and this was less in the bile fistula animals where less vitamin A was absorbed. This is most likely explained by the degradation of lipid soluble vitamin A into water soluble metabolites by bacteria in the large intestine. In the control animals more radioactivity was recovered from the intestinal lymph than the liver and other tissues, suggesting that most of the absorbed vitamin A was transported by the lymphatic route. In the absence of bile, however, when the absorption of vitamin A was grossly impaired, there was a tendency for more to be recovered from the liver than the lymph, suggesting that an alternative route of transport of the absorbed vitamin was used.

THE CHROMATOGRAPHIC SEPARATION OF PHOSPHOLIPIDS AND CHOLESTEROL ESTERS IN MALIGNANT DISEASES. F. Musil, Z. Musilova and J. Suva (Central Lab. of the Hosp. of Skoda-Werke in Pilsen, USSR). *Fette Seifen Anstrichmittel* 69, 714-717 (1967). The phospholipids and cholesterol in the blood of 66 patients who had cancers of the alimentary tract, respiratory organs and mammary glands were investigated for a period of up to 2 years after the operation. An increased cholesteremia, which normalized at the end of the period of investigation, was caused by cholestin esters, whose fatty acids, on testing with paper chromatography, showed differences in the degree of unsaturation. From the phospholipids and lecithins as well as sphingomyelin, no significant conclusions could be drawn on the origin or the development of the tumorous diseases.

STUDY OF THE NATURE AND THE BIOGENESIS OF FATTY ACIDS IN YEASTS. A. Maurice and J. Baraud (Lab. of Biochem. of the Faculty of Sci., Bordeaux, Fr.). *Rev. Franc. Corps Gras* 14(12), 713-723 (1967). The fatty acids of 10 wine yeasts and three specially cultivated yeasts were studied. The fatty acids of the free lipids were compared to the fatty acids of the lipoproteins. Differences were always found. Two fatty acids were found, never before reported for yeasts, phytanic acid (3,7,11,15-hexadecanoic acid) and farnesanoic acid (3,7,11-trimethyldodecanoic acid). Acetic, malonic and succinic acids accelerate cellular multiplication and fatty acid production. Propionic acid promotes the formation of odd chain fatty acids especially C17. Carbon dioxide promotes chain elongation.

COMPARISON OF GOITRIGENIC ACTIVITY OF DEFATTED GROUNDNUT, SOYBEAN AND RAPESEED MEALS. A. Rutkowski, J. Chudy and H. Kozłowska (Dept. Nutr., College of Agr., Olsztyn, Poland). *Rev. Franc. Corps Gras* 14(11), 641-644 (1967). A study was made to determine the effect of defatted groundnut, soybean and rapeseed meals would have upon the thyroid gland. Four lots of 200 chickens each were fed the above meals added to a base feed. In each case, the total protein content of the feed was kept constant at 18.5%. This meant that the level of added meal varied as follows: groundnut, 3.1%; soybean, 3.3%; toasted and untoasted rapeseed, 2.9%. The goitrogenic character of the meals was compared using the content of thiocyanate and goitrin as the basic relationship. Groundnut meal does not modify the thyroid gland as evidenced by histological microphotographs of the thyroid gland. The other meals are not as good as groundnut.

MYOCARDIAL LIPOPROTEIN LIPASE LEVELS IN HAMSTERS WITH CONGESTIVE HEART FAILURE. T. Kelly (Instrumentation Lab. Inc., Watertown, Mass. 02172). *Proc. Soc. Exp. Biol. Med.* 127, 337-40 (1968). The levels of lipoprotein lipase (LPL) in the myocardium of healthy hamsters and of hamsters afflicted with an inherited dystrophy-like disease were examined. There was a marked elevation in myocardial LPL activity in myopathic hamsters in severe congestive heart failure as compared to symptom-free animals of the same strain and age. LPL from hamster myocardium was enzymatically similar in many respects to myocardial LPL from other species.

ALPHA TOCOPHEROL CONTROL OF SEXUALITY AND POLYMORPHISM IN THE ROTIFER ASPLANCHUA. J. Gilbert (Dept. Biol. Sci., Dartmouth Coll., Hanover, N.H.). *Science* 159, 734-6 (1968). A dietary component that initiates both the transition from parthenogenetic to sexual reproduction and the production of lateral, posterodorsal, and posterior outgrowths of the body wall of females was isolated from the neutral lipids of dried grass and identified as α -tocopherol. The smallest concentrations eliciting both responses were below 100 nanograms per milliliter. Relative activities of α -, β -, and γ -tocopherol and α -tocopherylquinone were roughly 100:100:20:0.4. The synthetic antioxidants tested were without activity.

HYPERLIPOPROTEINEMIA IN RABBITS INDUCED BY INTRAVENOUS ADMINISTRATION OF FAT EMULSIONS AND HEPARIN. M. Hollmann and D. Steinberg (Lab. Metabolism, National Heart Inst., Nat. Inst. of Health, Bethesda, Md.). *J. Atherosclerosis Res.* 8, 1-20 (1968). The data presented show that intravenous infusion of triglycerides into normal rabbits in the presence of heparin induces elevation in the concentration of plasma very low density lipoproteins. No exogenous free fatty acid mobilizing hormone was given. The effect is therefore referred to metabolic consequences of the fat infusion itself. The data are compatible with the possibility that rapid hepatic uptake of triglycerides, like uptake of free fatty acids, stimulates production and secretion of lipoproteins, but other possible mechanisms cannot be ruled out.

SYNTHESIS OF PHOSPHOLIPIDS IN ARTERIAL WALLS. PART 2. EFFECTS OF AGE AND THE ADDITION OF ADRENALIN AND ACETYLCOLINE ON THE INCORPORATION OF ^{32}P INTO PHOSPHOLIPIDS OF RAT AORTAS. M. Nakatani, T. Sasaki, T. Miyazaki and M. Nakamura (Res. Inst. of Angiocardiology, Kyushu Univ. Med. School, Fukuoka, Japan). *J. Atherosclerosis Res.* 7, 759-766 (1967). Incorporation of orthophosphate- ^{32}P into acid soluble fraction and phospholipids decreased in terms of counts/min/mg of dried tissue weight with advancing age. The amounts of total phospholipids in rat aorta decreased with age but the incorporation of ^{32}P into total phospholipids in terms of counts/min/ μg of lipid phosphorus was not decreased and rather slightly increased. The percentage of radioactivity (counts/min) in the phosphatidylinositol fraction to that in total phospholipids increased, and that in lecithin decreased with advancing age. Adrenalin and acetylcholine enhanced oxygen uptake, and ^{32}P incorporation into the acid soluble fraction and phospholipids of rat aorta, particularly in young aorta. The labeling ratio of phosphatidylinositol to total phospholipids was increased, but that of lecithin was decreased by these substances. This effect appeared to be more obvious in young than in old.

EFFECT OF N-CYCLOHEXYL LINOLEAMIDE ON CHOLESTEROL METABOLISM IN RATS. D. Kritchevsky, Pauline Sallata and Shirley Tepper (Wistar Inst. Anatomy and Biol., Philadelphia, Pa. 19104). *Proc. Soc. Exp. Biol. Med.* 127, 132-5 (1968). Male Wistar rats were fed 0.3% N-cyclohexyl linoleamide (Clinolamide; Linolexamide) for 21 days. In a series of 5 experiments it was found that the drug did not significantly affect serum, liver, or kidney cholesterol levels. The livers of the Clinolamide-fed rats were larger (% body weight) than those of the controls. The serum plus liver cholesterol pool was generally higher in the control animals as was skin cholesterol. Synthesis of cholesterol from either sodium acetate- ^{14}C or mevalonic acid- ^{14}C by liver slices of rats fed 0.3% Clinolamide was not affected. Liver slices from rats fed 0.6% of the test compound synthesized significantly less cholesterol from either substrate than did slices from control rats. Addition of N-cyclohexyl linoleamide (1.5×10^{-5} M) to normal rat liver slices significantly depressed cholesterol synthesis from acetate- ^{14}C . Liver mitochondrial preparations from rats fed 0.3% of Clinolamide do not oxidize significantly more cholesterol- $26\text{-}^{14}\text{C}$ to $^{14}\text{CO}_2$ than do similar preparations from control rats.

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• Drying Oils and Paints

CYCLIC COMPOUNDS SEPARATED FROM HEATED OILS AND FATS. I. CYCLIC MONOMER OBTAINED FROM HEATED LINSEED OIL IN THE PRESENCE OF ALKALINE SOLVENT. Hyozi Kusaka and Noboru Matsuo (Seikei Univ., Tokyo). *Yukagaku* 17, 22-6 (1968). Hydrogenated cyclic monomer consisted of 7 components by chromatography. IR spectra indicated the presence of aromatic structure by the absorption at 3030, 1603, 1495 and 750 cm^{-1} . Details of the method of preparation of cyclic monomer from heated linseed oil are given.

POLYMERIZATION OF NON-DRYING OILS IN AZEOTROPIC SALT BATH. S. N. Koley and A. N. Saha (Dept. App. Chem., Univ. of Calcutta, India). *Fette Seifen Anstrichmittel*. 69, 774-777 (1967). Peanut oil and castor oil were passed through an azeotropic salt bath to yield heterogeneous masses. Both oils yield acetone soluble and insoluble fractions. In both cases, acetone insoluble fractions show the presence of benzenoid rings, ether linkages and oxiranes. The average molecular weights of acetone-soluble fractions vary from 974 to 979 with castor oil. This shows that these oils are capable of polymerization by this method.

THE VACUUM DEHYDRATION OF CASTOR OIL BY ION-EXCHANGE RESINS AND ITS SUBSEQUENT BODYING. N. A. Ghanem (Nat. Res. Center, Cairo, U.A.R.). *Paint Technol.* 32, 10-11 (1968). Dehydrated castor oil is produced using Dowex-50 ion exchange resin as catalyst at 250C under reduced pressure (30 mm). An improved product, lighter in color and with a lower acid value than conventional products is obtained.

THE APPLICATION OF GAS CHROMATOGRAPHY TO THE ANALYSIS OF COATING SOLVENTS. B. Hundert (Fairleigh Dickinson Univ.). *Paint Technol.* 40, (516) 33-48 (1968). A review of the use of gas chromatography for the analysis of coating solvents by the New York Society for Paint Technology, Technical Subcommittee No. 76. For qualitative identification of solvents, relative retention time data abstracted from the literature, together with new data are tabulated for three column types: an ester, a silicon and a polyalkalene glycol. Data for 21 other columns are given. Essentially, all solvents useful in the protective coating industry have been included. The use of confirmatory techniques and quantitative applications are discussed. An example illustrates the steps in the complete analysis.

ULTRAVIOLET IRRADIATION OF CASTOR OIL. G. V. Rudnaya *et al.* *Lakokras. Mat.* 1967, No. 2, 23-5. The effect of U.V. radiation on castor oil and N.C. lacquer films containing plasticisers and raw castor oil has been investigated. The I.R. spectra of the films and their deformation and weight losses have been determined and the results correlated. It was shown that chemical transformations took place and the hard film formed was due to the oxidative polymerisation of castor oil. (Rev. Current Lit. Paint Allied Ind. No. 307.)

METHODS FOR THE DETERMINATION OF UNSATURATION IN DRYING OILS. G. Zaitoin. *Bull. Liaison Lab.* 1965, No. 16, 70-6. The approved I.U.P.A.C. chemical methods are given in detail. Wijs' method is given for oils with non-conjugated double bonds, and the Woburn method when conjugated double bonds are present. The diene value (measure of *trans-trans* conjugation) is calculated from the amount of maleic anhydride which reacts with the oil on heating to 100C for 20 hr. in acetone solution in a closed ampoule. The pandiene value (a measure of total conjugation) is determined in a similar manner, but the *cis* isomers are first converted to *trans* with iodine. (Rev. Current Lit. Paint Allied Ind. No. 307.)

• Detergents

LAUNDERING COMPOSITIONS. H. E. Wixon (Colgate-Palmolive Co.). *U.S.* 3,360,470. A composition is claimed, consisting essentially of: (a) a quaternary ammonium textile softener tending to yellow textile materials upon treatment in water containing colored colloidal particles, and having the general formula $[N(R_1)(R_2)(R_3)(R_4)]^+ X^-$, where R_1 and R_2 are C_1 to C_3 alkyl groups, R_3 and R_4 are C_{12} to C_{22} alkyl groups and X is either chlorine, bromine or methyl sulfate; and (b) an alkali metal carboxymethyl cellulose in which the alkali metal is either sodium or potassium; the weight ratio of (a)/(b) being from about 1.5:1 to about 4:1 and sufficient to inhibit the said yellowing effect.

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• Names in the News

The appointment of M. J. CHERTKOFF as Director of Business Development of Givaudan Corporation has been announced by Salvador Sanz de Acedo, President of the company. He will be responsible for Corporate Planning and New Business Development of the firm. Dr. Chertkoff had been previously associated with the pharmaceutical industry in Long Range Planning, Marketing, Manufacturing, Quality Control and Personnel Management activities.



M. J. Chertkoff



H. J. Buehler

H. J. BUEHLER has joined Scientific Associates, Inc., St. Louis, in the chemistry and microbiology departments and has been appointed the head of the antibiotic feed laboratory, according to J. Eibert, Jr., President. Buehler comes to Scientific Associates from Sigma Chemical Co. where he was a chemist engaged in the production of protamines, phospholipids, proteins and enzymes. Prior to this he was a biochemist, bacteriologist and analytical chemist in Central Research at Anheuser-Busch, Inc., both of St. Louis.

During a recent tour of Japan and Taiwan, National Renderers Association officials, STANLEY FRANK, president, and D. A. SPECHT, executive director, met with feed industry executives and soap and detergent industry people to discuss technical and marketing programs for this year. J. Y. Iso, Far East director for NRA with offices in Tokyo accompanied them on the tour.



R. M. Starr

R. M. STARR (1952) chief chemist of Honeymead Products Co. of Mankato, Minn., has been appointed technical director for the Soybean Council of America in Madrid, Spain.

He will leave for Madrid June 1 on a leave of absence from Honeymead to serve in the industry-wide post. The council is a nonprofit organization of the soybean processors of the United States intended to expand markets and uses for the products through fairs, demonstrations and exhibitions. The council

also attempts to lower trade barriers and remove import restrictions on soybeans.

Working out of the supervisory office in Madrid, Starr will be responsible for developing and disseminating technical information on soybean oil and meal.

He will make contact with the agricultural attaches of United States embassies in the countries around the Mediterranean Sea to visit government and industry officials in those countries.

Mr. Starr has been with Honeymead for the past 18 years.

53rd Annual Report of the Smalley Committee 1967-68

The Smalley Committee has completed its 53rd year of continuous activity. During the past year a total of 12 series of check samples were offered on a wide variety of commodities and products. The interest shown in the program has increased materially during past years, and the number of participants continues to show an annual increase. During the past year we showed an increase of two percent in the number of collaborators over a year ago, and it is anticipated that the coming year will show an additional increase. The following table outlines the program as conducted during the past year as compared to the previous year.

Check Sample Series	Number of Samples	No. of Collaborators	
		1967-68	1966-67
Gas Chromatography	6	34	29
Cottonseed Oil	4	67	71
Soybean Oil	4	79	83
Tallow and Grease	5	82	75
Edible Fats	5	61	61
Drying Oils	6	14	15
Cellulose Yield	10	10	11
Cottonseed	10	42	40
Soybeans	10	39	37
Peanuts	7	16	14
Safflower	7	17	16
Oilseed Meals	15	149	146
	Totals	610	598

No new series of check samples were added during the year, but at the present there is a possibility than one or two additional series of check samples may become necessary as a result of inquiries received from various sources. It will be of interest to note that foreign collaboration in different check series continues to show a decided increase. During the past year all of the check series offered by the Committee, with the exception of one, was subscribed to by foreign collaborators, with a total of 73 different samples being mailed or shipped regularly. Samples sent to collaborators in foreign countries totaled as follows:

Canada	47	Australia	1
Brazil	10	Philippines	1
Japan	6	France	1
Mexico	3	Finland	1
Sweden	3		

We have had inquiries recently regarding the availability of check samples for a number of additional laboratories located in Europe and Central America.

Collaborators in each series of check samples continues to show a relatively high degree of analytical proficiency as has been observed in the past. Certificates are being awarded to collaborators in each series who maintain the highest levels of proficiency in their work. These certificates will be mailed this year to those participants receiving the highest ratings in each series as well as those receiving the second highest ratings. In addition on the Oilseed Meal Series, the Smalley Cup will be presented to the analyst making the highest rating for Combined Moisture-Oil-Nitrogen; the Barrow-Agee Cup will be presented to the analyst making the highest rating on the analysis of Cottonseed. Winners of each cup retain the cup for one year. When a collaborator wins the cup three times, he then retains the cup for his permanent possession.

A complete list showing the winners of the respective cups and certificates for First and Second Places follows:

SERIES	COLLABORATORS	SCORE
Drying Oils		
1)	Vernard F. Bloomquist Minnesota Linseed Oil Company Minneapolis, Minnesota	95.00
2)	Charles V. Bacon, Jr. Chas. V. Bacon Laboratories, Inc. New York, New York	94.25

Edible Fats

- 1) Fred A. Adams
The Procter and Gamble Company
Long Beach, California 64.22
- 2) Thoburn C. Bond
Swift & Company
Los Angeles, California 56.84

Gas Chromatography

- 1) Ragnar Ohlson
AB Karlshamns Oljiefabriken
Research Laboratory
Karlshamn, Sweden 98.19
- 2) Fred F. Rudolph, Jr.
Durkee Famous Foods Division
The Glidden Company
Louisville, Kentucky 97.66

Oilseed Meals (Moisture-Oil-Nitrogen Combined)

- 1) (and winner of the Smalley Cup)
William J. Johnson — Proficiency Index
Buckeye Cellulose Corporation
Memphis, Tennessee 0.355
- 2) J. P. Minyard, Jr. — Proficiency Index
Mississippi State University
State College, Mississippi 0.360

Oilseed Meals (Moisture)

- 1) William J. Johnson — Proficiency Index
Buckeye Cellulose Corporation
Memphis, Tennessee 0.322
- 2) Milledge A. Clark — Proficiency Index
Hartsville Oil Mill
Hartsville, South Carolina 0.370

Oilseed Meals (Oil)

- 1) Edwin R. Jackson — Proficiency Index
Mississippi State University
State College, Mississippi 0.264
- 2) Joe G. Bowling — Proficiency Index
Woodson-Tenent Laboratories
Des Moines, Iowa 0.328

Oilseed Meals (Nitrogen)

- 1) W. D. Simpson — Proficiency Index
Woodson-Tenent Laboratories
Wilson, Arkansas 0.308
- 2) Edward R. Hahn — Proficiency Index
Hahn Laboratories
Columbia, South Carolina 0.322

Oilseed Meals (Crude Fiber)

- 1) Phil Maiers — Proficiency Index
Doty-Wilhoit Laboratories
Minneapolis, Minnesota 0.409
- 2) D. A. Bradham, Jr. — Proficiency Index
Barrow-Agee Laboratories of Miss.
Greenville, Mississippi 0.516

Cottonseed Oil

- 1) Frank E. Gross
Hunt Wesson Foods
Gretna, Louisiana 90.00
- 2) A. G. Thompson, Jr.
Hunt Wesson Foods
Memphis, Tennessee 88.80

Soybean Oil

- 1) W. W. Wynn, Jr.
Barrow-Agee Laboratories, Inc.
Memphis, Tennessee 97.00
- 2) Frank E. Gross
Hunt Wesson Foods
Gretna, Louisiana 96.80

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FLOATING SOAP. S. N. Cratsa (Koppers Co., Inc.). *U.S. 3,359,206*. A floating soap is described, consisting essentially of a block of water soluble soap having intimately incorporated and uniformly dispersed in itself discrete particles of foam polystyrene having closed cells.

DETERGENT COMPOSITION. A. Cahn and T. J. Kaniecki (Lever Bros. Co.). *U.S. 3,359,208*. A detergent composition is claimed, consisting essentially of a compound of the formula: $RCHOHCH_2N(\rightarrow O)CH_2CH_2SO_3M$, where R is a C_8 to C_{18} alkyl group and M is either hydrogen or an alkali metal. The compound is used in an amount sufficient to impart detergency to the composition, together with an inorganic builder salt in an amount effective to improve the detergency of the composition.

BIODEGRADABLE CLEANING COMPOUND. B. Kwiatkowski (Sterling Drug, Inc.). *U.S. 3,360,471*. A biodegradable fluid cleaning concentrate base for mixing with water comprises at least about 55% by wt. of a tall oil soap dissolved in a tripropylene glycol methyl ether solvent with a solvent to soap ratio of about 1:1 to 3.5:1 by wt., 1-5% by wt. of terpineol, the remainder of the product being substantially water. The fluid base contains less than 0.05% by wt. of free alkalinity, calculated as potassium hydroxide.

WASHING TEST BY NATURAL SOIL. I. REPRODUCIBILITY OF WASHING TEST BY NATURALLY SOILED CLOTHS. Kunishige Kondo, Tetsuya Fujii, Atsushi Nishida and Masutaro Suzuki (Lion Fat & Oil Co., Tokyo). *Yukagaku* 17, 31-5 (1968). Washing tests of naturally soiled cloths with different detergents indicated that relative detergent effect of detergents at different areas, time and storage of naturally soiled cloths were consistent and highly reproducible.

THE EFFECT OF THE EMULSIFICATION CONDITIONS ON THE QUALITY OF ANIONIC WAX EMULSIONS. J. Lange and H. Jachinke (Farbwerke Hoechst AG, Frankfurt/M.-Hoechst, Ger.). *Fette Seifen Anstrichmittel* 69, 718-724 (1967). The effect of the conditions during the emulsification on the quality of anionic self polishing emulsions and their films was investigated with the help of two ester waxes. Viscosity, surface tension, pH and the transparency of the emulsions as well as the gloss of the film are dependent, among other variables, on the wax- and water-temperature, the changes in the emulsifier system and the rates of emulsification and cooling. Furthermore, some observations on film formation and the technical problems related to testing are reported.

THE BIOLOGICAL DEGRADABILITY OF NON-IONIC DETERGENTS UNDER AEROBIC CONDITIONS. C. Borstlap and C. Kortland (Shell Res., Amsterdam, Holland). *Fette Seifen Anstrichmittel* 69, 736-738 (1967). The relation between the structure and the biological degradability of non-ionic detergents was studied by determining the non-volatile organic matter after a fixed degradation time. It was found that benzene rings, branched alkyl chains and long ethylene oxide chains influence the degradation adversely.

PROTEOLYTIC ENZYMES IN DETERGENTS. K. P. Duesing (Fa. Kenkel and Cie., GmbH., Dusseldorf, Germany). *Fette Seifen Anstrichmittel* 69, 738-741 (1967). The chemical nature of the enzymes and their function as biocatalysts in the cellular metabolism has been reviewed. Analysis, specificity, solubility, activity and stability of the enzymes as well as their recovery and purification are described. The behavior of the proteolytic enzymes towards surfactants and builders, that is, their suitability for detergent formulations, is investigated. The testing of the finished products is discussed.

THE EFFECT OF SMALL CONCENTRATIONS OF SURFACTANTS ON FILTRATION AND SEDIMENTATION. M. N. Battiston (Polytech. Inst., Milan, Italy). *Riv. Ital. Sostanze Grasse* 45, 10-4 (1968). Experiments have been conducted for the purpose of determining the effect of surface active substances at a concentration of 0.5-5 ppm on the rate of settling of suspended non-colloidal particles and on the rate of filtration through glass filters and through beds of particles of known granulometry. The surfactants studied have been sodium alkylbenzene sulfonate and sodium lauryl sulfate. The presence of these amounts of surfactants has been found to have very small effects, sometimes increasing and sometimes decreasing the settling and filtration times, depending on the nature of the surfactant and on the chemical composition of the solid. Such effects are certainly smaller than those caused by variations of pH, by the orientation of asymmetrical particles and by flotation effects.

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• Committee Members Named . . .

(Continued from page 260A)

Entertainment Committee, Eugene Marshack, Eugene Marshack Associates, New York; Co-Chairman, Manuehehr Eijadi, Drew Chemical Corp., Boonton, N. J.

Women's Committee, Mrs. Lee Lawrence (not pictured), Port Washington, N. Y.; Mrs. Peter Kalustian, Boonton, N. J.

Publicity Committee, Robert Casparian (not pictured), Carver-Greenfield Corp., Summit, N. J.; Co-Chairman, Daniel Meshnick (not pictured), Drew Chemical Corporation, Boonton, N. J.

• Hans Kaunitz Symposia . . .

(Continued from page 260A)



Hans Kaunitz

The theme of the New York program is "Fats and Oils—Progress on All Frontiers." The biochemistry and nutrition symposia described here represent only one area of the "frontiers" to be explored at the AOCs Fall Meeting. Other Symposia in the fats and oils field will be included in the final program.

The Technical Program Committee is now actively soliciting research and development papers relating to lipids, fats and oils. Please submit two copies of a 100- to 200-word abstract, with title, author or authors, and

speaker, to Dr. Stephen S. Chang, Department of Food Science, Rutgers, The State University, New Brunswick, N. J. 08903, if you wish to present a paper at this meeting. The deadline is July 1, 1968.

Carter Named U. of Illinois Vice Chancellor

H. E. Carter (1950) was named vice chancellor for academic affairs and J. W. Briscoe, associate chancellor for administration of the University of Illinois at Urbana effective Sept. 1, 1967, by the Board of Trustees.



H. E. Carter

Professor Carter has been a member of the faculty since 1931. He was named head of the department of chemistry and chemical engineering in 1954 and served as acting dean of the Graduate College 1963-65.

A native of Mooresville, Ind., he received an A.B. in 1930 from DePaul University and A.M. in 1931 and Ph.D. in 1934 from University of Illinois.

Professor Carter received the Eli Lilly Award in Biochemistry in 1943 and the Nichols Medal Award in 1965. He was elected to the National Academy of Sciences in 1953 and American Academy of Arts and Sciences in 1966 and served as president of the American Society of Biological Chemists, 1956-57. In 1966 he received third AOCs award in Lipid Chemistry.

As Vice Chancellor for Academic Affairs, Professor Carter will serve as chief academic officer under Chancellor-elect J. W. Peltason who will assume duties on the Urbana campus during the summer.