

ABSTRACTS

R. A. REINERS, Editor. ABSTRACTORS: J. G. Endres, J. Iavicoli,

K. Kitsuta, F. A. Kummerow, C. C. Litchfield, Louise R. Morrow, E. G. Perkins, and T. H. Smouse

• Fats and Oils

BETA-APO-8'-CAROTENAL—A NEW FOOD COLOR. J. C. Bauernfeind and R. H. Bunnell (Hoffmann-La Roche Inc., Nutley, N. J.). *Food Tech.* 6, 76-82 (1962). β -Apo-8'-carotenal, a new carotenoid made available by chemical synthesis, is an aldehydic carotenoid with vitamin A value that occurs widely in nature. Market forms of β -apo-8'-carotenal were prepared similar to those prepared for β -carotene, and included oil solutions, oil suspensions, emulsions and beadlets. These market forms were used to color various foods such as cheese, carbonated beverages, cakes, etc., a light to dark orange shade. Stability of the β -apo-8'-carotenal, in both the market forms and the various foods, was good. β -Apo-8'-carotenal should therefore find use in the food industry for coloring either water- or oil-base food where an orange to reddish-orange shade is desired.

PRINCIPLES OF COLUMN PERFORMANCE IN LARGE-SCALE GAS CHROMATOGRAPHY. J. C. Giddings (Dept. of Chemistry, Univ. of Utah). *J. Gas Chromatog.* 1, 12-21 (1963). The loss of efficiency in large preparative columns is a combined result of many detracting influences. These are summarized and their importance is discussed. Particular attention is given to the way in which resolution is lost as column diameter is increased. Simplified theoretical treatments are given to show the variables which must be controlled for optimum performance. In particular the column plate-height contributions are formulated and shown to have altogether different and unusual properties when compared to analytical column characteristics. These results have many practical implications, and on this basis a number of approaches are suggested for improving the performance of large columns.

GAS CHROMATOGRAPHY OF FREE FATTY ACIDS USING GOLAY COLUMNS. W. Averill (The Perkin-Elmer Corp., Norwalk, Conn.). *J. Gas Chromatog.* 1, 22 (1963). When using Golay columns for the analysis of free fatty acids with such a liquid phase as Trimer Acid, definite tailing can be observed. In 1961 Averill demonstrated that with the addition of small amounts of highly polar components to the solution used in coating open tubular columns, the adsorption by the column wall can be prevented, resulting in symmetrical peaks. This technique was used in the present case. Best results were obtained by coating the Golay column 200 ft. long, 0.020 in. i.d. with a solution containing 10% Trimer Acid and 0.4% dinonylnaphthalenedisulfonic acid in toluene.

SOME APPLICATIONS OF AN R.F. OSCILLATOR IN GAS CHROMATOGRAPHY. T. D. Andrew, C. S. G. Phillips, and J. A. Semlyen (Inorganic Chemistry Lab., Oxford, England). *J. Gas Chromatog.* 1, 27-30 (1963). A simple R.F. oscillator has been used as a flash vaporizer for liquid samples, for the pyrolysis of solid samples, to investigate discharge reactions and as an ionizing source in a modified argon detector. A relatively simple radio frequency oscillator has a number of useful applications in a gas chromatographic laboratory. Details of its construction are given and four examples given, namely (1) for the rapid vaporization of liquid samples on to a gas chromatographic column, (2) for the pyrolysis of solid samples at the inlet of a column, (3) to study the discharge reactions of small quantities of vapors, which may themselves be isolated from a gas chromatogram and (4) as an alternative to the normal radioactive ionizing source in an argon detector.

GAS CHROMATOGRAPHY OF FATTY ACIDS AND RELATED LONG-CHAIN COMPOUNDS ON PHOSPHORIC ACID-TREATED COLUMNS. L. D. Metcalfe (Res. Div., Armour Ind. Chem. Co., McCook, Ill.). *J. Gas Chromatog.* 1, 7-11 (1963). Gas chromatograph columns using 20% diethylene glycol succinate polyester and 3% phosphoric acid as the liquid phase and coated upon 77% (w/w) 60-80 mesh Celite gave well-defined symmetrical peaks with fatty acids when using a thermal conductivity detector and a column temperature of 222°C. Quantitative analysis using these columns varies from column to column; a series of calibration factors are required for each individual column. In addition to the analysis of fatty acids, the phosphoric acid-treated columns are useful in the analysis of other long-chain compounds, including nitriles, amides, and sulfonated compounds.

CAPILLARY COLUMN GAS-LIQUID CHROMATOGRAPHY WITH THERMAL CONDUCTIVITY DETECTORS. R. D. Schwartz, D. J. Bras-

seaux, and G. R. Shoemaker (Shell Development Co., Houston, Texas). *J. Gas Chromatog.* 1, 32-33 (1963). Capillary gas-liquid chromatographic columns may be used with small volume thermistor or hot-wire filament thermal conductivity detectors. Provided that the columns are not overloaded and that proper flow rates are maintained, the efficiency and resolution obtained are quite satisfactory. Samples of 1-10 microliters may be injected directly without the use of auxiliary splitting devices. Because of the sample size utilized and non-destruction by the detector, it is possible to trap fractions for analysis by mass, ultraviolet, or infrared spectroscopy or for further analysis with chromatographs fitted with more sensitive detectors.

IN-PLACE COATING OF THE SOLID SUPPORT FOR GAS CHROMATOGRAPHY. W. Averill (The Perkin-Elmer Corporation, Norwalk, Conn.). *J. Gas Chromatog.* 1, 34-35 (1963). In-place coating of the support material is a very practical technique; moreover, it also makes it possible to recoat packed columns in place. A solution of the liquid phase in a suitable solvent is placed in a reservoir and then forced through the column under pressure using an inert gas. After the excess solution is eluted, the column is heated to remove the solvent using an inert carrier gas. The proper concentration of the solution for best results depends on the viscosity of the solution as well as the surface characteristics of the solid support and must be determined by experimentation. The liquid/solid ratio in the column is reproducible on the same solid support material but will vary from support to support depending on its surface area and density. To determine this ratio, it is necessary to weigh the solid support placed in the column and to obtain the weight of liquid phase by extraction from the columns with solvent. The column can then be coated under identical conditions. A column may deteriorate or become contaminated such that it may no longer be useful. With this coating technique, the old coating may be removed with solvent and then be recoated with the same or a completely new liquid phase.

STUDIES ON REFINING OF COTTONSEED. III. PILOT PLANT STUDIES ON THE EFFECT OF DEGUMMING AND ADDITION OF CHEMICALS ON REFINING OF CRUDE COTTONSEED OIL BY WET AND DRY METHODS. A. Krishnamurthy and K. S. Murti (Oil Tech. Res. Inst., Anantapur, India). *Indian Oilseeds J.* 6, 14-19 (1962). The relative merits of wet and dry methods of refining crude cottonseed oil, the effect of degumming prior to alkali refining and the effect of certain chemicals on the refining characteristics of cottonseed oil were studied in the pilot plant. The dry method of alkali refining is found to be more advantageous than the wet method for cottonseed oil. Degumming the crude prior to refining results in less total refining loss and easier handling than straight refining of the oil. Addition of salicylic acid and tetrasodium pyrophosphate in small quantities during alkali refining reduces the refining loss significantly. The effect on color reduction of the final bleached oil is slight but not significant.

LIPIDS OF EPIPHYSEAL CARTILAGE. V. Zambotti, I. Cescon, B. Banfersoni, and L. Bolognani (Inst. of Chem. Biology, Univ. of Milan, Italy). *Experientia* 18, 318-19 (1962). The analysis of pooled samples of epiphyseal plates of newborn pigs was 6.60% lipid (2% referred to fresh tissue), total phosphorus 3.3%, lipidic phosphorus 0.70%, total nitrogen 8.37%, P/N 0.38%, total cholesterol 0.35%, free cholesterol 0.14%, saturated fatty acids 43.00, unsaturated fatty acids (mono) 47.50, and polyunsaturated fatty acids 9.50%.

STORAGE STUDIES OF COTTONSEED OIL: II. EFFECT OF STORAGE ON CRUDE, REFINED, AND BLEACHED COTTONSEED OILS. C. C. Ninan, A. Krishnamurthy, V. V. Krishna Rao, and K. S. Murti (Oil Tech. Res. Inst., Anantapur, India). *Indian Oilseeds J.* 6, 89-94 (1962). Storage studies on crude, refined, and bleached cottonseed oils were carried out for 6 months. Refining loss, color, and free fatty acid content increased during storage but not markedly. Color fixation takes place in crude oil. The extent of color fixation increases as time of storage increases. The bleachability of crude oil decreases correspondingly. Refined and bleached cottonseed oil does not undergo a reduction in color or an increase in free fatty acid content to any marked extent during storage.

CHEMICAL COMPOSITION OF GROUND NUT KERNELS AND CHANGES DURING STORAGE. K. M. Ramanathan, R. Natarajan, and D. M. Samuel (Agr. Coll. and Res. Inst., Coimbatore, India). *Indian*

Oilseeds J. 6, 95-105 (1962). Three commercial types of peanuts (coromandel, peanut, and red natal) were stored in gunny, gunny lined with polythene, drum, and mud pot. Peanut and red natal types had a low free fatty acid content after storage in gunnies lined with polythene. Even though peanut type had a higher initial moisture content than coromandel, coromandel developed a higher free fatty acid content. A still lower initial moisture content is desirable for coromandel variety.

PLACE OF OILSEEDS IN INDIAN ECONOMY. M. S. Patel, and M. Ramakrishna Rao. *Indian Oilseeds J.* 6, 67-83 (1962). A summary is given of oilseed production and uses of meal and oil in India.

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PROCESS FOR THE PREPARATION OF A COCOA BUTTER SUBSTITUTE AS WELL AS FOR THE PREPARATION OF CHOCOLATE AND THE SHAPED PRODUCTS THUS OBTAINED. Y. A. Sinnema (N. V. Twincen, Koog-Zaandijk). *U. S.* 3,070,445. A cocoa butter substitute from Mowrah fat which, when mixed with cocoa butter in any given proportion gives a mixture with properties (solidification point, dilatations, iodine value) which lie between those of the substitute and those of cocoa butter, comprises a monounsaturated triglyceride fraction of Mowrah fat obtained by removing from the Mowrah fat at least 60% of the weight of the lowest-melting fraction by fractionation with a total quantity of 2 to 20 liters of acetone per kg. of the fat at a temperature between 0 and 12C.

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Customer Service Report No.

1536F



The Case of the Hot Spot Gunk

The sample from the rendering plant was labeled "gunk deposited on tank from 3 to 9 o'clock."

An accompanying letter explained that this black, gummy material was a wall deposit found in certain areas of a resin-coated iron storage tank for lard. The customer also sent samples of the resin with which the tank was coated.

The customer had contacted us, naturally, because a possibility existed that the trouble was being caused by the Tenox 2 antioxidant used to stabilize the lard. Our laboratory went to work, and this is what they found:

A deposit similar to the black gunk was formed when lard was held in contact with iron at 400°F. for 30 hours. Treating the iron with the coating resin minimized the deposit, as did treating the lard with Tenox 2. When temperatures were maintained at 200°F. for 30 days, no gunk formed under any circumstances. The lab concluded: "...the gunk is caused by local overheating in the storage tank."

And so it proved to be. Knowing the cause of the trouble, the customer was able to eliminate the hot spots—and the gunk.

**IT PAYS TO
DO BUSINESS
WITH EASTMAN**

The expert advice of Eastman's Food Laboratory personnel is available to all users of TENOX antioxidants. Highly trained, with a broad knowledge of antioxidants plus invaluable practical experience, these technologists are well equipped to help solve your oxidation and rancidity problems.

Tenox[®]
Eastman food-grade antioxidants

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; Atlanta; Boston; Buffalo; Chicago; Cincinnati; Cleveland; Dallas; Detroit; Greensboro, North Carolina; Houston; New York City; Philadelphia; St. Louis. **Western Sales Representative:** Wilson & Geo. Meyer & Company, San Francisco; Los Angeles; Salt Lake City; Seattle.

• Fatty Acid Derivatives

MONOLAYERS OF MYRISTYL, AND CETYL ESTERS OF OXALIC, MALONIC, SUCCINIC, GLUTARIC, ADIPIC, AND PIMELIC ACIDS. J. L. Shereshefsky, H. T. Carter, E. Nichols, and P. L. Robinson (Chem. Dept. Howard University, Washington, D. C.). *J. Phys. Chem.* **66**, 1846-50 (1962). Monolayers of dicetyl esters of the first six members of the homologous series of dicarboxylic acids were studied, including dimyristyl oxalate, monocetyl oxalate, and monocetyl malonate. The study included measurements of surface pressure vs. area and surface potential vs. area. Monolayers are dependent upon the concentration of the spreading solution, and also on the maximum spreading area. These substances form condensed and liquid-expanded films; vapor-expanded films tend to form when spread from very dilute films. The oxalates tend to form a condensed film of high stability that folds upon itself. Orientations of the head-groups are given. The calculated vertical components of the dipole moments are in good agreement with the measured values.

PREPARATION OF MONOGLYCERIDES FROM CASTOR OIL. I. P. K. Kochhar, S. K. Dey, and P. K. Bhatnagar (Shri Ram Inst. for Ind. Res., Delhi, India). *Indian Oilseeds J.* **6**, 20-23 (1961). Monoglycerides are prepared from castor oil by a unique process. A 2:1 ratio of 98% glycerol and refined castor oil is charged into a autoclave. Carbon dioxide is bubbled through the oil at 50C to remove air. The reaction is carried out at 250C with 200 p.s.i.g. of carbon dioxide for two hours. Gas pressure was then released and the charge cooled to 150C, held for 15 min, then finally cooled to 50C. Residual glycerol was removed by water washing. The composition after removal of glycerol was analyzed to 91% a monoglycerides. The process is applicable to other fats.

II. EFFECT OF TEMPERATURE, TIME AND PRESSURE. P. K. Kochhar, S. K. Dey, and P. K. Bhatnagar. *Ibid.* 144-152. Superatmospheric pressure (50-200 p.s.i.g.) that retains the water normally present in the commercially pure glycerol is highly conducive to the attainment of high monoglyceride concentration at equilibrium. The rate of formation and the concentration of monoglycerides at equilibrium increase rapidly with temperature above 200C. Heating beyond equilibrium at 250C, or over causes low analysis of monoglycerides. Heating for 15 minutes either at 250C or below beyond equilibrium and after the release of pressure is quite sufficient to reduce the free fatty acid content of the product to a low value. Yields over 90% are achieved.

ON THE DAMPING OF WATER WAVES BY MONOMOLECULAR FILMS. F. C. Goodrich (Calif. Res. Corp., Richmond, Calif.). *J. Phys. Chem.* **66**, 1858-1963 (1962). Some features of a generalized theory of monolayer rheology are described, with particular reference to the problem of wave damping by surface-active substances. Experiments on wave attenuation by fatty alcohols are reported and discussed in terms of theory.

SPREADING AND COLLAPSE PHENOMENA IN THE FATTY ALCOHOL SERIES. J. H. Brooks and A. E. Alexander (Dept. Phys. Chem., Univ. of Sydney, N.S.W., Australia). *J. Phys. Chem.* **66**, 1851-53 (1962). The formation of monolayers of pure fatty alcohols by spreading from the crystal and their behavior at the air-water interface was studied. The existence of hydrates of fatty alcohols was shown.

SYNTHESIS OF ESTERS FROM SIMPLE ALKYL HALIDES AND TERTIARY AMINE SALTS OF CARBOXYLIC ACIDS. R. H. Mills, M. W. Farrar, and O. J. Weinkauff (Monsanto Chemical Co.). *Chem. & Ind. (London)* **1962**, 2144. The reaction is carried out by heating approximately stoichiometric amounts of a mixture of the carboxylic acid, alkyl halide, and tertiary aliphatic amine (usually triethylamine) for a few hours after which the ester is washed free of the amine hydrohalide and purified by any convenient method such as distillation, crystallization, etc. Best results are obtained with primary halides; secondary halides give high yields by employing a longer reaction time. Tertiary halides generally give a poor yield. In general, the reactivity of the halogen is in the order: $I > Br > Cl$.

SELECTIVE ALCOHOLYSIS OF EPOXY FATTY ACID ESTERS. F. E. Kuester and J. L. Ohlson (Swift & Co.). *U. S. 3,070,608*. A method for preparation of esters of oxirane containing fatty acids by alcoholysis consists of the following steps: mixing oxirane containing higher fatty acid ester or an unsubstituted aliphatic alcohol selected from the group consisting of mono-, di-, and polyhydric alcohols, the alcohol having from 1-20 carbon atoms and containing no more than 6 hydroxyl groups,

an excess of a material selected from the group consisting of unsubstituted aliphatic alcohols having from 1-20 carbons and no more than 6 hydroxyl groups, and tertiary amine substituted aliphatic alcohols in which the substituents on the amine are hydroxy alkylene groups, and an alkaline inter-esterification catalyst at a temperature sufficient to maintain refluxing but not in excess of 125C.

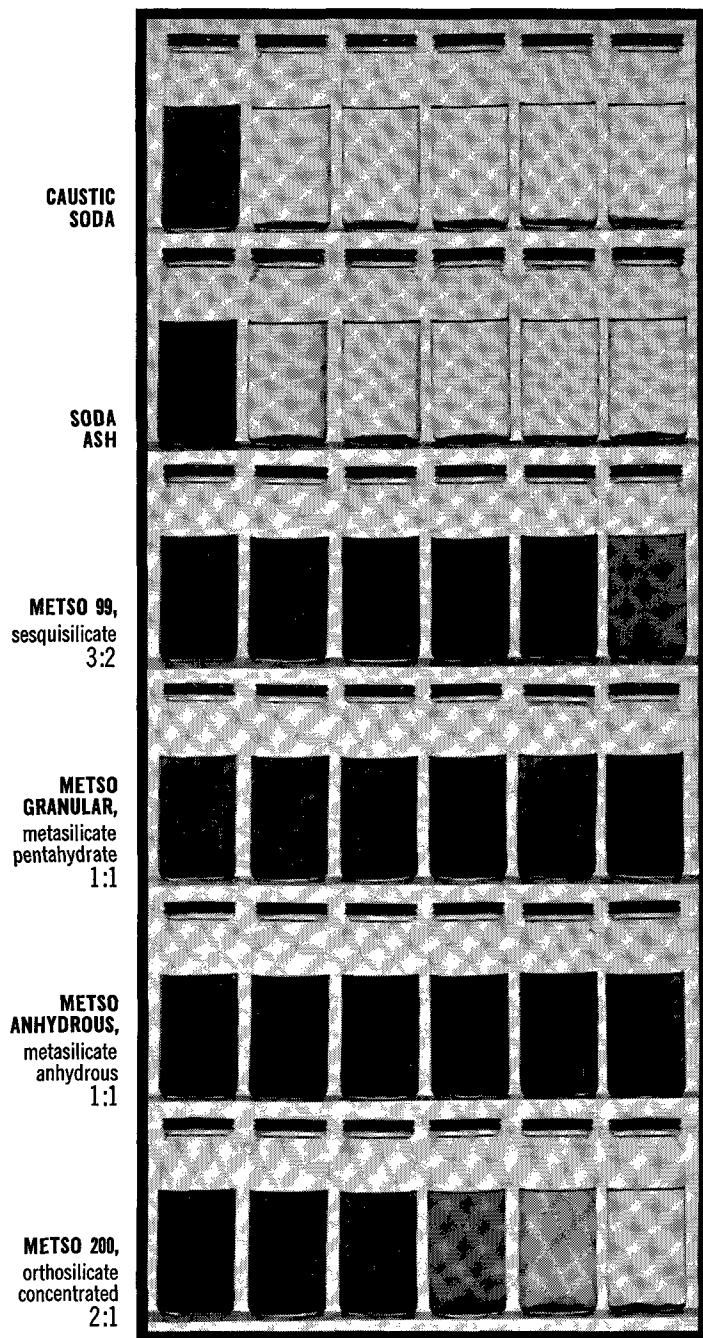
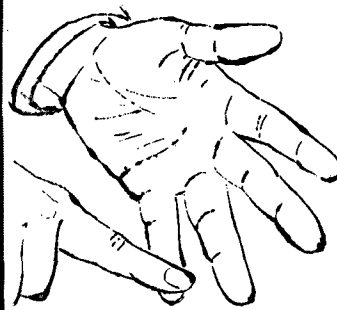
PREPARATION OF LIGHT-COLORED FATTY ACID ESTERS. A. G. Mohan and W. R. Christian (Nopco Chemical Co.). *U. S. 3,071,604*. From 0.05 to 2.00% of hydrophosphorus acid (on weight of fatty acid and alcohol) is added to a mixture of at least 1 fatty acid, at least one member of the group consisting of monohydric and polyhydric aliphatic alcohols having the hydroxyl substituent as the sole reactive substituent, and containing from 1 to 20 carbon atoms, and an esterification catalyst. The mixture is esterified, the acid material contained in the resultant product is neutralized with a base, and a substantially color-free ester is recovered.

• Biology and Nutrition

FAT TRANSPORT IN THE LOCUST. A. Tietz (Israel Inst. for Bio. Research, Ness-Ziona, Israel). *J. Lipid Research* **3**, 421-426 (1962). When fat-body tissue from locusts was incubated with palmitate- $1-C^{14}$ in phosphate-saline, the acid was readily taken up by the tissue; 80-90% of that taken up was esterified and recovered in the glyceride fraction. When the pre-labeled tissue was incubated in hemolymph, glycerides were released from the tissue into the medium. The effect of hemolymph was specific; glycerides were not released into phosphate-saline, bovine serum, or buffered solutions of bovine serum albumin or egg albumin. The release of glycerides was inhibited by fluoride and by cyanide. The amount of glyceride released was proportional to the amount of hemolymph that was added. Effectiveness of the hemolymph in this regard was not affected by prolonged dialysis, but was destroyed by heating. The specific activity of the glycerides released was at least 10 times higher than the average specific activity of the glycerides inside the tissue. A considerable fraction of the released glycerides was incorporated into the lipoprotein fraction of the hemolymph. Uptake of glycerides by body-fat tissue was also demonstrated.

THE INFLUENCE OF EXOGENOUS CHOLESTEROL ON HEPATIC LIPID COMPOSITION OF THE RAT. R. J. Morin, S. Bernick, J. F. Mead, and R. B. Alfin-Slater (Dept. of Physiological Chem., School of Med., Univ. of Calif., Los Angeles). *J. Lipid Research* **3**, 432-438 (1962). Rats were fed diets containing cottonseed oil and/or cholesterol, cholic acid, methyl esters of long-chain fatty acids, and tocopherol. Livers, hearts, and aortas were examined histologically; liver lipids were fractionated by silicic acid chromatography; and the fatty acid composition of the sterol esters, triglycerides, and phospholipids were determined by gas-liquid chromatography. The degree of deposition of liver sterol esters seemed to be related to the availability of dietary fatty acids for esterification with exogenous cholesterol. No differences in sterol ester deposition were noted among the groups in which the dietary cholesterol was supplemented with methyl esters of fatty acids of different degrees of unsaturation. Fatty acid analysis revealed an accentuation by cholesterol feeding of the increase in monoenoic fatty acids and the decrease of linoleic and arachidonic acids characteristic of essential fatty acid deficiency. Two eicosatrienoic acids, occurring primarily in the phospholipids, were identified. The 5,8,11-eicosatrienoic acid appears to be related to essential fatty acid deficiency, whereas the 9,11,14-isomer is probably an intermediate in the conversion of linoleic to arachidonic acid and is increased when exogenous cholesterol induces an increased arachidonic acid synthesis.

TWO-DIMENSIONAL THIN-LAYER CHROMATOGRAPHY OF RAT LIVER PHOSPHATIDES. W. D. Skidmore and C. Entenman (U. S. Naval Radiological Defense Lab., San Francisco, Calif.). *J. Lipid Research* **3**, 471-475 (1962). A system of two-dimensional thin-layer chromatography was developed that separated rat liver phosphatides into several phosphate-positive spots in about 2 hr. developing time. Characteristic hydrolysis products derived from phosphatidyl serine, phosphatidyl ethanolamine, phosphatidyl inositol, phosphatidyl choline, sphingomyelin, and lysophosphatidyl choline were identified. The hydrolytic products of "phosphatidic acid" were not definitely characterized. The application of thin-layer chromatography as described for rat liver phosphatides can be extended to phosphatide extracts of other tissues.



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SEPARATION OF PHOSPHATIDYL ETHANOLAMINE, PHOSPHATIDYL SERINE, AND OTHER PHOSPHOLIPIDS BY THIN-LAYER CHROMATOGRAPHY. V. P. Skipski, R. F. Peterson, and M. Barclay (Div. of Exptl. Chemotherapy, Sloan-Kettering Inst. for Cancer Research, Rye, N.Y.). *J. Lipid Research* 3, 467-470 (1962). Thin-layer chromatography of phospholipids and cerebrosides was performed on Silica Gel G plates using a mixture of chloroform-methanol-acetic acid-water as development solvent. Two types of chromatoplates were used: "neutral" plates, prepared from Silica Gel G slurry made in water, and "basic" plates, prepared from Silica Gel G slurry made in 0.01 M sodium acetate or sodium carbonate solutions. Only chromatograms run on "basic" plates showed good and reproducible separations of phosphatidyl serine from other phospholipids, independent of the amount of phosphatidyl serine present in the sample. However, "neutral" plates gave better separation of cerebrosides from phospholipids. A practical method of applying these systems for separation of phospholipids extracted from rat liver and human serum is presented.

THE DIFFERENTIAL MIGRATION OF STEROL ACETATES ON SILICA GELS AND ITS APPLICATION TO THE FRACTIONATION OF STEROL MIXTURES. P. D. Klein and P. A. Szczpanik (Div. of Biological and Med. Research, Argonne Nat'l Lab., Argonne, Ill.). *J. Lipid Research* 3, 460-466 (1962). The retention volumes of 12 sterol acetates relative to cholesteryl acetate were determined on four well-characterized silica gels of different body structure. These values illustrate the contribution of silica gel structure to the chromatographic process and permit the selection of appropriate gels for a given separation. The application of these values to the fractionation of model and biological mixtures of sterol acetates is illustrated.

THE STRUCTURE OF PLASMOGENS: VI. CONFIGURATION OF THE DOUBLE BOND IN THE α,β -UNSATURATED ETHER LINKAGE OF PHOSPHATIDYL CHOLINE. W. T. Norton, E. L. Gottfried, and M. M. Rapport (Dept. of Biochem., Neurology, and Med., Albert Einstein College of Med., Yeshiva Univ., N. Y. 61, N.Y.). *J. Lipid Research* 3, 456-459 (1962). The infrared data permit the assignment of the *cis* configuration to the double bond in the α,β -unsaturated ether linkage.

THE LIPOLYTIC ACTIVITY OF RAT KIDNEY CORTEX AND MEDULLA. C. H. Hollenberg and I. Horowitz (Univ. Med. Clinic, The Montreal Gen. Hosp., Montreal 25, Canada). *J. Lipid Research* 3, 445-447 (1962). Slices of rat kidney medulla and cortex were incubated for 30 min. in a triglyceride medium with and without heparin; the slices were then removed and the lipolytic activity of the medium measured over the following 30 min. Heparin markedly increased the activity in the medium when medullary slices were used; it had a much smaller effect with cortical preparations. Protamine sulphate and 1 M sodium chloride inhibited the activity released by medullary slices. Homogenates of rat kidney medulla hydrolyzed activated triglyceride to a greater extent than nonactivated substrate. The activity of medullary homogenates was enhanced by heparin and inhibited by protamine and strong salt solutions. Cortical homogenates hydrolyzed activated substrate to only a slightly greater extent than nonactivated substrate, and the activity of these homogenates was not affected by heparin or by protamine sulphate. The results suggest that lipoprotein lipase is present in rat kidney medulla and that a lipase differing from this enzyme in a number of respects is present in rat kidney cortex.

METABOLISM OF LABELED LINOLEIC-1- C^{14} ACID IN THE SHEEP RUMEN. R. D. Wood, M. C. Bell, R. B. Grainger, and R. A. Teekell (Agr. Res. Lab., Univ. of Tennessee, Oak Ridge). *J. Nutrition* 79, 62-68 (1963). Four western wethers with ligated reticulo-omasal orifices were used to conduct ruminal fat studies using labeled linoleic-1- C^{14} acid. Tagged compounds appeared in the jugular blood about 4 hours after dosing and increased rapidly between the eighth and twelfth hours. Most of the activity appeared in the non-steam distillable fraction, indicating that the compound absorbed from the rumen contained 10 or more carbons. About 0.3 to 0.5% of the total dose appeared in the rumen mucosa and muscularis. Activity also appeared in the liver, lungs, kidneys, spleen, and kidney fat. Of the total dose, from 0.6 to 1.0% was degraded in the rumen. Eighty-five to 96% of the dose was recovered from the rumen of which only 3 to 6% was the original linoleic acid. Approximately 45% was hydrogenated to saturated acids, whereas 33 to 50% had been hydrogenated to oleic or elaidic acids. Unidentified acids accounted for only 5 to 17% of the recovered dose.

DNA SYNTHESIZING CELLS IN RABBIT HEART TISSUE AFTER CHOLESTEROL FEEDING. S. C. Spraragen, V. P. Bond, and L. K.

Dahl (Med. Research Center, Brookhaven Nat'l. Lab., Upton, Long Island, N. Y.). *Circulation Res.* 11, 982-986 (1962). Suggestive evidence that cholesterol feeding may increase the number of thymidine- H^3 labeled cells in the heart tissues of rabbits was presented. This increment appeared to be primarily restricted to the interstitial cells and was not related to associated degenerative, necrotic, or inflammatory changes. Evidence of DNA synthesis was also found in capillary endothelial cells and, rarely, in what were considered to be myocardial muscle cells.

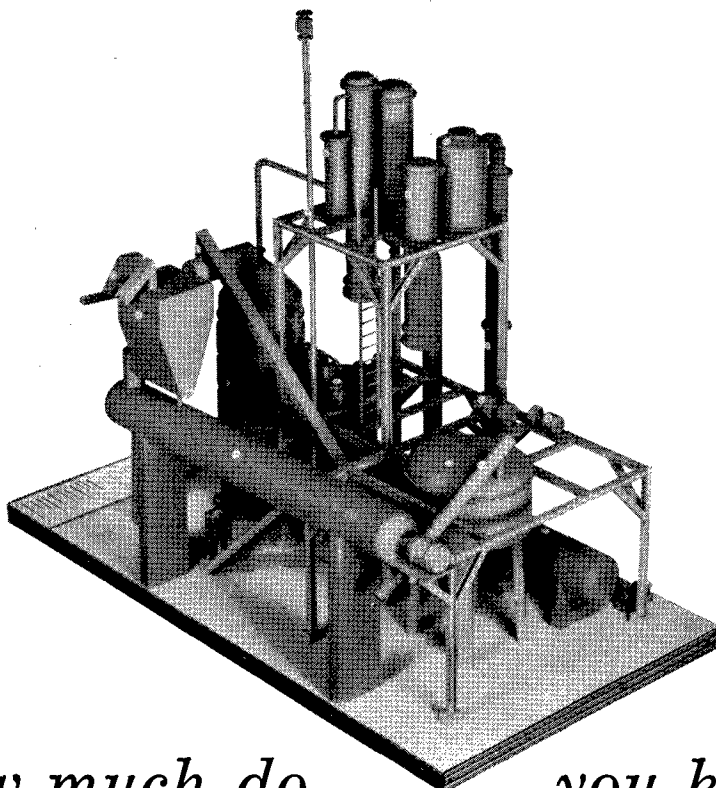
THE SUPPLY OF PRECURSORS FOR THE SYNTHESIS OF FATTY ACIDS. A. F. Spencer and J. M. Lowenstein (Graduate Dept. of Biochem., Brandeis Univ., Waltham 54, Mass.). *J. Biol. Chem.* 237, 3640-3647 (1962). The rapid incorporation of citrate into fatty acids has been demonstrated with high-speed supernatant preparations of lactating mammary gland. The rate of incorporation of citrate is faster than that of acetate in the presence or absence of citrate or malonate. Experiments with asymmetrically labeled citrates show that the incorporation of citrate proceeds chiefly via acetyl coenzyme A produced on the citrate cleavage enzyme reaction, but a small percentage is incorporated via oxaloacetate produced in the same reaction. Malonate is incorporated into fatty acids at an appreciable rate, which is, however, slower than the rates of incorporation of citrate, or of acetate in the presence of citrate or malonate. The rate-limiting step in the incorporation of malonate is the activation of malonate to malonyl coenzyme A.

INFLUENCE OF PYRIDOXINE AND DIETARY FAT ON THE DISTRIBUTION OF SERUM FATTY ACIDS IN DOGS. L. Söderhjelm (Bruce Lyon Memorial Res. Lab. of the Children's Hosp. of the East Bay, Oakland, Calif., and the Dept. of Nutritional Sciences, Univ. of California, Berkeley). *J. Nutrition* 78, 438-444 (1962). Studies were performed concerning the relative distribution of fatty acids in the blood serum of 6 adult Beagle dogs, two German short-hair puppies, and 6 mongrel puppies that received diets deficient in linoleic acid or vitamin B_6 or both. The presence or absence of linoleic acid caused marked changes in the fatty acid spectrum in the serum, whereas the presence or absence of pyridoxine in the diet did not influence the relative content of arachidonic acid in the blood serum. With two rapidly growing young animals (the German short-hair puppies), however, it was noted that arachidonic acid increased somewhat more rapidly in the serum of the animal receiving pyridoxine in the diet than in the littermate fed a diet without pyridoxine, although the magnitude of change was about the same. Apparently the conversion of linoleic acid to arachidonic acid is possible without the presence of vitamin B_6 in the diet.

INFLUENCE OF LINOLEIC ACID CONTENT OF MILK LIPIDS ON OXIDATION OF MILK AND MILK FAT. L. M. Smith, W. L. Dunkley, and M. Ronning (Dept. of Food Science and Tech. and Animal Husbandry, Univ. of Calif. Davis). *J. Dairy Science* 46, 7-10 (1963). The concentration of linoleic acid in milk lipids was increased by infusing two cows with a cottonseed oil emulsion, and changes in the oxidative stability of the milk and milk fat were determined. Infusing 150 g of cottonseed oil (as Lipomul I.V.) tripled the linoleic acid content of the milk fat in the next milking. Linoleic acid in the milk phospholipids increased to a smaller extent, and not until the second milking after the infusion. Little change was noted in the concentration of other fatty acids. No significant change occurred in milk production, fat percentage, or the amounts of copper, tocopherols, and carotenoids. A decrease in oxidative stability of the milk fat appeared to be related to the increase in its linoleic acid content. Furthermore, an increase in susceptibility of the milk to copper-induced oxidized flavor, as measured by the thiobarbituric acid test, appeared to be dependent on increased linoleic acid content of the phospholipids rather than the milk fat.

UTILIZATION OF ALFALFA CAROTENE AND VITAMIN A BY GROWING CHICKS. D. B. Parrish, R. A. Zimmerman P. E. Sanford, and E. Hung (Kansas State Univ., Manhattan). *J. Nutrition* 79, 9-17 (1963). A comparison was made of utilization of vitamin A activity of the ANRC vitamin A standard, USP reference solution and low and high quality alfalfa meals. Effect of furazolidone and ethoxyquin on utilization of vitamin A activity of alfalfa meal also was studied. Furazolidone did not affect utilization of provitamin A of alfalfa meal. Ethoxyquin at 0.02% of diet did not significantly affect gain, or serum and liver vitamin A levels; gains were improved when 0.10% of ethoxyquin was used.

(Continued on page 40)



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Essential Oils . . .

(Continued from page 6)

fume chemicals (compatibility), etc., must be tested repeatedly, and the material should pass routine tests for non-irritation of human skin.

The commercial production may turn out slightly different from the small-scale synthesis, and a typical problem arises; can we establish specifications and can we correlate these with acceptable odor of this new product? Chemical analysis is an inevitable and necessary companion to the odor evaluation of all synthetic perfume chemicals. It is well known, although not always understood by other industries, that the perfume industry emphasizes odor purity above chemical purity in the sense that impurities which do not impair the odor, the effect or the stability of a perfume chemical, may be accepted if the odor of the chemical is accepted by experts in this olfactory evaluation. A product consisting of 99% Octyl aldehyde and 1% Octanoic (caprylic) acid will most conceivably be turned down on olfactory evaluation, while a product consisting of 99% Octyl aldehyde and 1% Octyl alcohol may pass the olfactory test. Analysis will, of course, show the difference, but the manufacturer may be surprised to know that 99% aldehyde is not always a guarantee of perfumery purity.

Thus, to convert the natural raw materials and the basic chemicals into suitable perfumery materials, skill and experience from organic chemists, analytical experts, extraction and distillation specialists are employed by the suppliers of such raw materials, and by the larger manufacturers of finished perfumes. Uniformity and high olfactory quality of raw materials is the beginning and the background for success in the creation of good fragrances.

Among the most important perfume types is the soap perfume. Important not only because of its considerable volume when compared to other perfume types, but particularly in view of the fact that every 2500 pounds of soap perfume helps sell one million bars of soap—or more. The soap perfume may very well mean the difference between a mediocre sales figure from the soap factory—or a mushrooming success in the sale of a soap bar.

The creation of a successful soap perfume may demand as much art and imagination but considerably more technical and scientific skill and experience than is normally required of the perfumer who specializes in handkerchief perfumes. Soap is a chemically active material containing several additives which may further affect the perfume: fillers, stabilizers, rancidity inhibitors, deodorants, etc.

Handkerchief perfume is a solution of perfume oil (the "compound") in Ethylalcohol, and this type of perfume is therefore comparatively stable, provided the original oil is so. Competition within the soap and detergent industry is the main factor deciding the low cost of a soap perfume. However, the soap manufacturers realize that the success of a soap is highly dependent upon the fragrance, and therefore they can see the advantage of having the perfume amount to a considerable percentage of the total cost of the soap.

The soap perfumer is therefore faced with a many-sided problem: odor and color stability of the materials, compatibility with the soap base and its strange, sometimes even unknown components, cost of perfume raw materials, etc. One characteristic about his work is that he cannot judge the effect of his perfume when applied directly on the skin, not even in suitable dilution. He must try it out in soap—preferably in the customer's own soap base. Tables and entire books have been written about the stability of individual materials in soap bases, the amount of discoloration or breakdown of odor to be expected, etc., but the experienced soap perfumer will know that the rules of these books and tables are rules with an unusually high percentage of exceptions. In other words, if he went strictly according to all these more or less theoretical findings, he would eliminate so many good and useful raw materials that he would hardly have any left when he took cost and other factors into consideration.

But the soap perfumer's work is to a certain degree

inhibited by the above factors. A successful soap perfume, successful in fragrance and appealing in cost to the manufacturer, is only obtained by many and lengthy experiments, often with numerous disappointments and discouragements. It is true to a certain degree that in perfumery "simplicity above all" is a safe rule to follow, but it is not always possible to arrive at the desired fragrance with 12 or 15 ingredients in the perfume formula. The fewer ingredients the perfumer uses, the more of each ingredient is needed. Certain materials are only available in limited amounts, and this is particularly true about natural perfume materials. This is one reason why soap perfumes often contain a higher proportion of synthetic materials than do the handkerchief perfumes or other cosmetic perfumes. Synthetic materials are, furthermore, easier to control chemically in the sense that we can predict the possible reaction with more accuracy than in the case of the very complex essential oils and other natural materials.

The "construction" of a soap perfume is different from that of other perfume types due to the special virtues demanded for soap perfumes. Power and diffusiveness in the fragrance itself should be balanced and chained properly by the skillful use of fixatives of which there are many types. Some fixatives work simply by the physical lowering of the vapor pressure in the perfume mixture, others have a much more intangible but no less perceptible effect.

Years ago it was fashion to make snow-white soap cakes. This placed very strict limits upon the choice of materials available to the soap perfumer. Today, many successful soaps appear in various lively colors under the protection of which the soap perfumer enjoys the use of a much larger variety of materials. The recent improvement in soap packaging, the aluminum foil wrapper, has been a great help to solving the problem of stability of the perfume in the soap cake, although the foil had other missions, too. The rancidity on long-time shelf storage was greatly reduced, and this fact was in turn a welcome improvement in the stability of the perfume.

The usage of germicides or "deodorants" in soap cakes has been an addition to the many problems of the soap perfumer. The bactericidal ingredients are often of considerable odor themselves, and it may be necessary first to "mask" the odor of the germicide before introducing the soap perfume specially designed for this purpose.

In brief, a soap perfume, like any other perfume, presents a variety of problems beyond that of creating an attractive fragrance. Long experience and professional skill, a thorough knowledge of perfume raw materials including the newest synthetic chemicals, good taste and understanding of the customer's actual preference are among the prerequisites for the perfumer who wants to produce a fragrance for soaps that will yield that price-less extra sales appeal.

Heart Disease Research Symposium to Highlight U of I Lab Dedication

A symposium correlating four research areas in heart disease will be held June 16-18, 1963 at the University of Illinois in connection with dedication of The Burnside's Research Laboratory. These research areas involve: one, the clinical aspects of heart disease; two, the pathology and the composition of lipids in the aorta and the chemistry of the low density lipoproteins; three, the metabolism of lipids which may play a possible role in the development of atherosclerosis and four, factors or specific enzyme systems involved in lipid oxidation or metabolism. Complete accommodations for conference participants will be available in University dormitories. The Burnside's Research Laboratory, a new stone and glass structure consisting of two main stories, a basement and a penthouse with a total area of 21,232 square feet is occupied by the Food Chemistry Division of the Department of Food Technology. For further housing information and a copy of the program, write to: F. A. Kummerow, The Burnside's Research Laboratory, University of Illinois, Urbana, Ill.

Spectroscopy Report . . .

(Continued from page 14)

Tentative Methods "Isolated *trans* isomers—Infrared spectrophotometric method" CD 7-58, have been available from the Society through the Chairman of the Spectroscopy Committee (1 a, b, c). Approximately 50 sets of these standards have been furnished to various laboratories using this procedure. The provision in the revised procedure as published in the AOCS book of methods that the isolated *trans* content of long-chain fatty acids containing more than 15% *trans* isomers may be analyzed directly, required secondary standards for determination of *trans* isomer contents of fatty acids. These secondary standards were prepared by collaborative studies in eleven laboratories. Collaborative data from these studies is shown in Table II. Two standards for the determination of *trans* isomers in long-chain fatty acids were established, one with a high *trans* content (59.93%), and the second with a relatively lower *trans* acid content (29.99%). These values were obtained by averaging results reported by all collaborators excluding collaborator No. 9 (Table II). Results from collaborator No. 9 were excluded as their measurements were made by direct comparison with a primary oleic acid standard, rather than by the base-line technique of the official procedure. These secondary standards along with the standards for the determination of *trans* isomers and methyl esters and triglycerides will continue to be available through the Society. Questions regarding them should be addressed to the Chairman of the Instrumental Techniques Committee, American Oil Chemists' Society, P. O. Box 19687, New Orleans 19, La.

Collaborative Testing—Near Infrared Method for Hydroxyl Value

Following decisions made by the Spectroscopy Committee at the meeting in 1960 in Dallas (1c), a collaborative study was made of published methods for the determination of hydroxyl value of primary alcohols by means of near infrared spectroscopy. Results from eleven laboratories participating in this collaborative study are shown in Table III. The collaborators analyzed five Adol mixtures after calibration of their infrared spectrometers by the use of a series of highly purified primary alcohols. The results indicate reasonably satisfactory reproducibility and precision. However, in a discussion of these data at the 1962 meeting in New Orleans, considerable doubt was cast upon the value of the method because of its limited scope. From measurements in the near infrared in the overtone region at approximately 1.4 microns or from the fundamental stretching vibration at 2.8 microns analysis is limited to the determination of a primary OH group in samples containing no secondary hydroxyl groups. Considerable discussion was had at the New Orleans meeting regarding the implications of the limited scope and no specific recommendations for future activities of the Spectroscopy Committee were reached. One of the main decisions of the Spectroscopy Committee during the coming year will be to decide whether or not further collaborative studies should be made of the methods for hydroxyl value using the overtone region in the near infrared, approximately 1.4 microns, the fundamental stretching vibration region at about 2.8 microns, the bending OH vibrations near 9 microns, or to abandon use of infrared spectroscopy for hydroxyl value in favor of infrared spectrophotometric methods for other determinations which may not be so limited in scope.

Realignment of Technical Committees by the American Oil Chemists' Society's Governing Board

During the past year, a study of the organization of the American Oil Chemists' Society's various committees was initiated by the Governing Board. The study was conducted by an Organization Committee under the Chairmanship of former Society President R. W. Bates. At the 53rd Annual Meeting this Committee reported to the Governing

Board; and as a result of their recommendations, the Governing Board has established a new Committee to be designated as the Instrumental Techniques Committee. This Committee will be comprised of three Subcommittees: a) Spectroscopy, b) Gas-liquid chromatography, and c) Color. Establishment of a new Instrumental Techniques Committee has now been completed as follows:

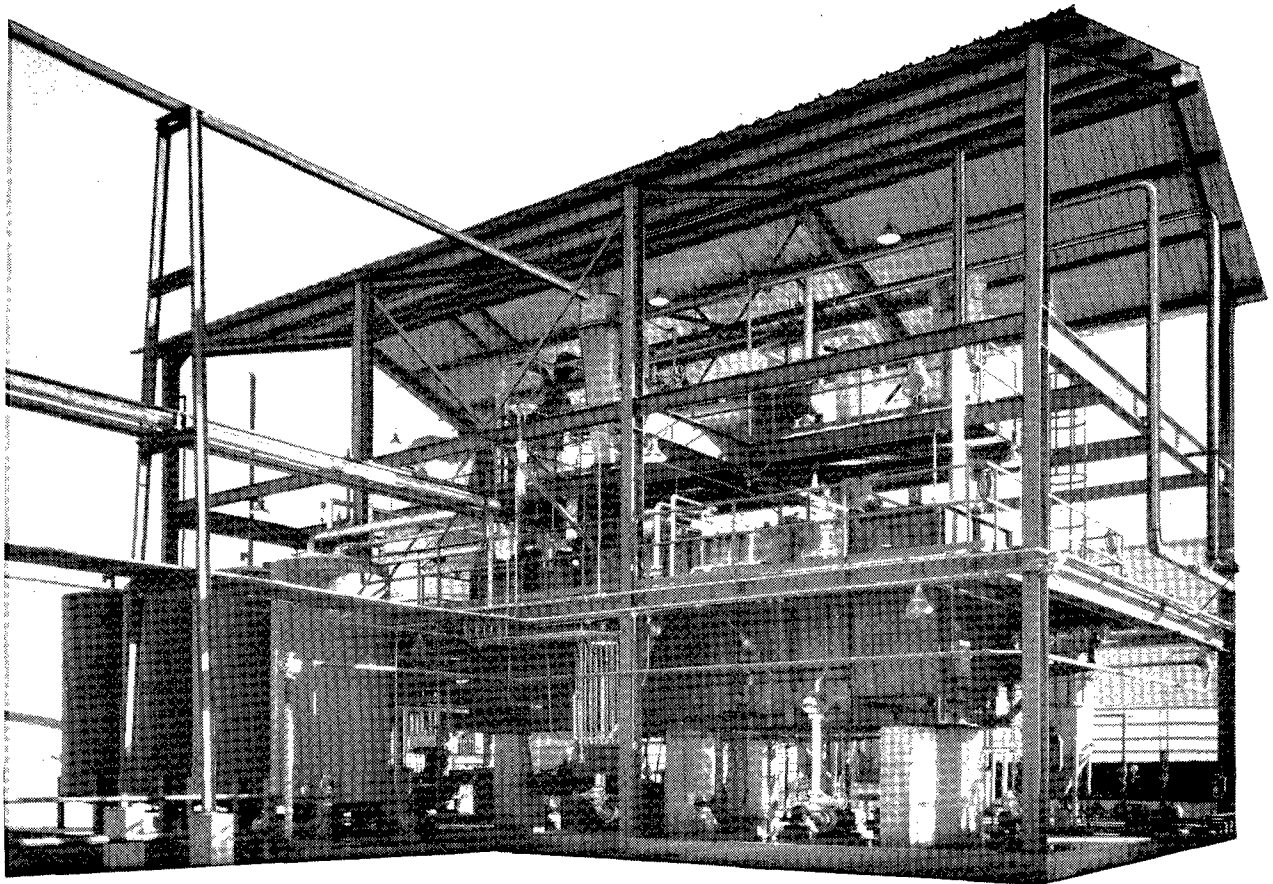
Instrumental Techniques Committee, R. T. O'Connor, Chairman.

(a) Spectroscopy Subcommittee, R. R. Allen, Chairman.

(b) Gas Chromatography Subcommittee, E. M. Sallee, Chairman.

Collaborator No.	Date and instrument	Secondary Standards					
		Fatty acids High <i>trans</i> (#5)			Fatty acids Low <i>trans</i> (#6)		
		<i>a</i>	% <i>Trans</i>	Deviation from mean	<i>a</i>	% <i>Trans</i>	Deviation from mean
1	1st day	0.274	61.2	0.21	0.141	31.9	0.55
	2nd day	0.331	62.3	1.35	0.199	39.3	0.15
2	1st day	0.298	61.7	4.35	0.117	31.9	1.25
	2nd day	0.342	61.8	0.45	0.159	32.6	1.95
3	1st day	0.215	55.8	2.55	0.128	29.7	0.95
	2nd day	0.259	52.8	4.35	0.126	29.8	0.35
4	1st day	0.266	56.7	3.35	0.131	28.4	2.25
	2nd day	0.274	58.2	2.15	0.133	25.7	1.95
5	1st day	0.278	63.9	1.35	0.129	29.8	1.85
	2nd day	0.272	61.3	1.45	0.126	28.3	1.85
6	1st day	0.234	59.2	1.15	0.142	39.6	1.05
	2nd day	0.284	59.5	0.65	0.146	30.0	0.65
7	1st day	0.269	61.0	0.55	0.140	40.8	0.65
	2nd day	0.264	60.0	0.45	0.140	31.7	1.05
8	1st day	0.298	59.0	0.85	0.136	39.5	1.15
	2nd day	0.283	59.1	0.35	0.136	29.4	1.25
9	1st day	0.318	64.7	4.85	0.133	37.2	6.55
	2nd day	0.324	65.1	4.75	0.132	38.5	7.35
10	1st day	0.296	55.6	1.75	0.142	28.1	2.55
	2nd day	0.296	52.2	3.15	0.143	28.3	1.35
11	1st day	.....	57.5	2.55	.....	29.4	1.25
	2nd day	.....	56.0	2.45	.....	28.0	2.65
Average		60.95		30.65			
Average not including #9		(59.93)		(29.99)			
Confidence interval:							
95%		±1.7		±0.8			
99%		±2.4		±1.2			
Agreement to be Expected When Comparing Estimates Made on the Same Material							
		Ratio (larger/smaller) within which the estimates should fall the stated proportion of times					
Estimate		90	95	99	999		
1. Two det'n made at same time in same lab.		1.038	1.047	1.067	1.099		
2. Two det'n made at different times in same lab.		1.046	1.057	1.082	1.121		
3. Two averages made at different times in same lab (each avg from 2 det'n made at same time in same lab).		1.037	1.046	1.066	1.097		
4. Two averages made at different times in same lab (each avg from 2 det'n made at different times).		1.032	1.040	1.057	1.084		
5. Two averages made at different times in same lab (each avg from 4 det'n, 2 det'n at each of 2 times).		1.026	1.032	1.047	1.066		
6. Two det'n made in different labs.		1.119	1.143	1.213	1.330		
7. Two averages made in different labs (each avg from 2 det'n made at same time).		1.116	1.144	1.211	1.319		
8. Two averages made in different labs (each avg from 2 det'n made at different times).		1.114	1.142	1.203	1.315		
9. Two averages made in different labs (each avg from 4 det'n, 2 det'n at each of 2 times).		1.112	1.140	1.205	1.310		

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TABLE III
Determination of Hydroxyl Value of Adols by Means of Near Infrared Spectroscopy

Collaborator Number	Date and instrument	Samples									
		Adol 14		Adol 32		Adol 52		Adol 60		Adol 62	
		% OH	Deviation from mean	% OH	Deviation from mean	% OH	Deviation from mean	% OH	Deviation from mean	% OH	Deviation from mean
1	1st day	8.34	0.14	6.51	0.24	6.93	0.05	5.65	0.03	6.39	0.04
	2nd day Beckman DK-2	8.28	0.20	6.64	0.11	6.84	0.14	5.56	0.12	6.39	0.04
2	1st day	8.50	0.02	6.75	0.00	6.99	0.01	5.68	0.00	6.48	0.05
	2nd day Cary 14	8.80	0.32	6.75	0.00	6.95	0.03	5.63	0.05	6.31	0.12
3	1st day	8.74	0.26	7.14	0.39	7.16	0.18	6.20	0.52	6.59	0.16
	2nd day Beckman DK-2	8.70	0.22	7.13	0.38	7.06	0.08	6.01	0.33	6.72	0.29
4	1st day	8.48	0.00	6.76	0.01	6.98	0.00	5.70	0.02	6.42	0.01
	2nd day ¹	8.52	0.04	6.78	0.03	6.98	0.00	5.60	0.08	6.47	0.04
5	1st day	8.33	0.15	6.56	0.19	6.84	0.14	5.56	0.12	6.27	0.16
	2nd day Cary 14	8.22	0.26	6.50	0.25	6.88	0.10	5.49	0.19	6.28	0.15
6	1st day	8.32	0.16	6.61	0.14	6.80	0.18	5.48	0.20	6.28	0.15
	2nd day Beckman DK-2	8.25	0.23	6.54	0.21	6.82	0.16	5.55	0.13	6.28	0.15
7	Lab #1	8.73	0.25	6.72	0.03	7.10	0.12	5.73	0.05	6.44	0.01
	Lab #2 Cary 14	8.68	0.20	6.81	0.06	7.09	0.11	5.71	0.03	6.28	0.15
8	1st day	8.39	0.09	6.69	0.06	6.92	0.06	5.68	0.00	6.49	0.06
	2nd day Beckman DK-2	8.41	0.07	6.77	0.02	7.13	0.15	5.77	0.09	6.48	0.05
9	Avg of samples	1&2 8.46	0.02	6.83	0.08	7.06	0.08	5.68	0.00	6.44	0.01
	Avg of samples Cary 14 ²	3&4 8.47	0.01	6.74	0.01	6.95	0.03	5.62	0.06	6.40	0.03
9	Avg of samples	1&2 8.40	0.08	6.80	0.05	6.98	0.00	5.66	0.02	6.45	0.02
	Avg of samples Beckman DK-2 ²	3&4 8.47	0.01	6.81	0.06	6.98	0.00	5.66	0.02	6.48	0.05
10	1st day	8.00	0.48	6.51	0.24	6.84	0.14	5.43	0.25	6.18	0.25
	2nd day Beckman DK-2	8.00	0.48	6.36	0.39	6.76	0.22	5.25	0.43	6.22	0.21
11	1st day	8.86	0.38	7.14	0.39	7.27	0.29	5.92	0.24	6.68	0.25
	2nd day Beckman DK-2	9.12	0.64	7.07	0.32	7.31	0.33	6.12	0.44	6.79	0.36
Average.....		8.48	0.20	6.75	0.15	6.98	0.11	5.68	0.14	6.43	0.12
Standard deviation.....		.....	0.257	.....	0.206	.....	0.140	.....	0.207	.....	0.152

¹ Collaborator did not identify instrument used.

² Collaborator did not indicate whether two sets of samples were analyzed on two different days.

(c) Color Subcommittee, W. T. Coleman, Chairman.

(d) Special Task Group for the Preparation of Methyl Esters, J. R. Chipault, Chairman.

A complete roster of all the members of the Instrumental Techniques Committee and of its Subcommittees appears in the 1962 Society Directory.

Acknowledgments

For whatever success it can obtain in its collaborative testing program, the Spectroscopy Committee is aware that it is indebted to several individuals for assistance in making spectral measurements, compiling data, and offering suggestions.

The Committee acknowledges receipt of the samples of fatty acids of low *trans* content used in establishing the secondary standards and the data reported in Table II of this report, and of the highly purified primary alcohols used for the calibration of the instruments in obtaining the data reported in Table III by near infrared spectroscopy from R. O. Crisler and the Procter and Gamble Company; receipt of the sample of fatty acids of high *trans* content reported in Table II from R. R. Allen and the Anderson Clayton and Co.; and of the Adols analyzed in a collaborative study reported in Table III from W. E. Link, Archer-Daniels-Midland Company. The Committee acknowledges also the considerable assistance of Elizabeth R. McCall in compiling, recomputing, and arranging the collaborative data reported in Tables II and III, of compiling results of various polls of the members of the Committee, and in the distributing of secondary standards for the AOCs tentative methods "Isolated *Trans* Isomers-Infrared Spectrophotometric Method"; and E. F. Schultz, Jr. for the statistical analysis of the data in Table II.

REFERENCES

- AOCs Spectroscopy Committee Report, JAOCs
 - 1958-59, JAOCs 36, 627-631 (1959).
 - 1959-60, *Ibid.*, 38, 180-184 (1961).
 - 1960-61, *Ibid.*, 39, 32-34 (1962).

R. T. O'CONNOR, Chairman
J. R. CHIPAULT, Subcommittee Chairman

• New Literature

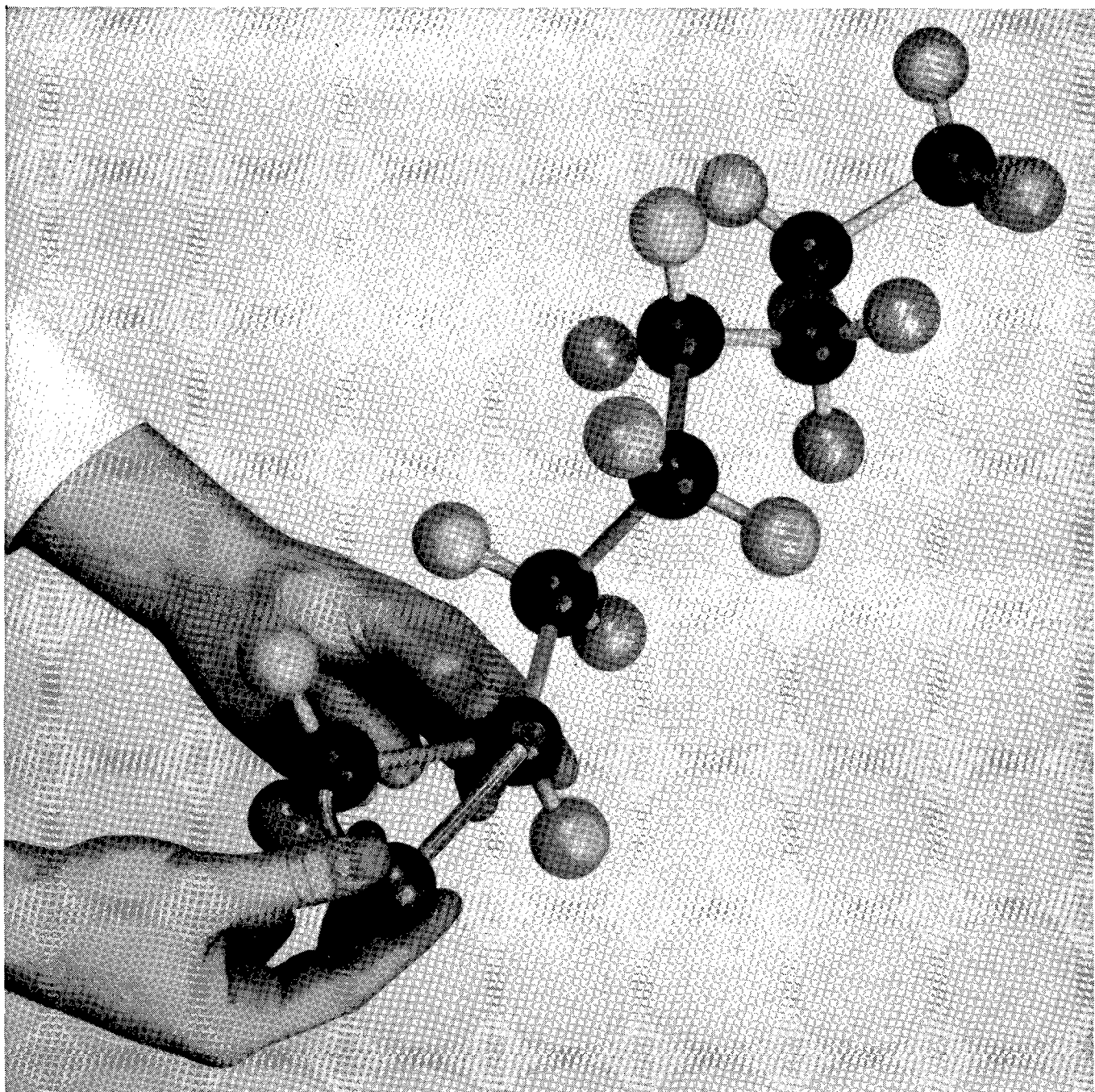
SCHAAR SCIENTIFIC COMPANY, recently released a 16-page brochure featuring several new product lines of special interest to laboratory personnel. (7300 W. Montrose Ave., Chicago, Illinois.)

U.S. DEPARTMENT OF COMMERCE, National Bureau of Standards has announced the availability of new publication entitled "Controlled Temperature Oil Baths for Saturated Standard Cells," by Patrick H. Lowrie, Jr. (Superintendent of Documents, Technical Note 141, U.S. Government Printing Office, Washington, D. C.)

WORTHINGTON CORPORATION, now offers a new, 20-page bulletin describing Back Pull-Out (BPO) centrifugal pumps designed for the chemical process industries. The illustrated bulletin gives detailed information on the design, construction and application. (Advertising and Sales Promotion Dept., Harrison, N. J.)

E. H. SARGENT AND COMPANY recently released its new bulletin ST-1 describing Spectrophotometric and Potentiometric Automatic Titrators. (4647 W. Foster Ave., Chicago, Illinois)

(Continued on page 39)



...and Becco will supply the active oxygen. Inserting active oxygen into an octene chain is just one of many epoxidation reactions possible with BECCO hydrogen peroxide or peracetic acid. And the development of practical, low-cost in-situ epoxidation processes stems largely from BECCO's extensive experience in the application of peroxygen chemicals. Manufacturing and technological leadership have made BECCO the foremost supplier of active oxygen to the chemical process industry. If you require active oxygen—for virtually any oxidation—BECCO is ready to provide valuable assistance. Why not give us a call?

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Lost and Found . . .

(Continued from page 10)

SOYBEAN

"Lost and Found Department" by quarters and annual
(millions of bushels)

Season	First quarter	Second quarter	Third quarter	Fourth quarter	Year
1952-53	3.6 Found	11.1 Lost	.7 Lost	2.7 Found	5.4 Lost
1953-54	3.0 Lost	5.5 Lost	2.6 Lost	9.4 Found	1.8 Lost
1954-55	10.3 Found	11.0 Lost	13.3 Lost	15.3 Found	1.4 Found
1955-56	.7 Found	12.2 Lost	.4 Lost	9.5 Found	2.5 Lost
1956-57	7.7 Lost	10.5 Lost	8.8 Lost	12.1 Found	14.4 Lost
1957-58	13.4 Found	22.4 Lost	10.4 Lost	14.5 Found	5.0 Lost
1958-59	10.0 Found	17.4 Lost	8.1 Lost	15.7 Found	.1 Lost
1959-60	13.6 Found	20.1 Lost	10.2 Lost	8.9 Found	7.9 Lost
1960-61	13.6 Found	26.2 Lost	10.6 Lost	15.8 Found	7.4 Lost
1961-62 original	.8 Found	16.4 Lost	26.9 Lost	28.1 Found	16.0 Lost
1961-62 revised	9.5 Found	13.2 Lost	26.9 Lost	28.1 Found	2.6 Lost
1962-63	11.1 Lost				

Derived by subtracting reported crush plus exports (plus seed in April-June) from reported beginning supply for the season or quarter.

exports to date, the possibility of a little over-estimation; the U.S.D.A. forecasts appear excessively pessimistic. The Lost and Found Department will have a considerable bearing on the market this season.

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• New Members

Active

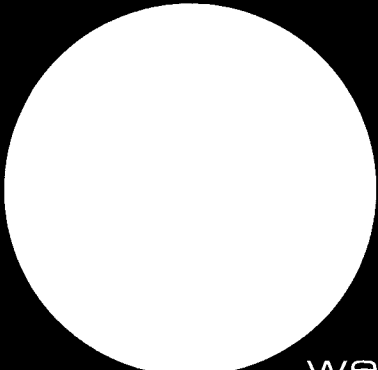
- Frank G. Armantrout, Chemist, Swift and Co., So. St. Paul, Minn.
George W. Bleffert, III, Analytical Control Chemist, Best Foods Div., Corn Products Company, Bayonne, N. J.
Mario J. Cabrera, Technical Director, Industries "Lavador" C. A., Santo Domingo, Dominican Republic.
Richard P. Choi, In charge of Research Analytical Laboratory, Hunt Foods and Industries, Inc., Fullerton, Calif.
William D. Fellows, Chemist, Proctor & Gamble Co., Cincinnati, Ohio.
Wm. David Jenkins, Chemical Engineer, R & D Dept., Magnus Chemical Co., Garwood, N. J.
Antonio R. Pandolfi, Independent Consultant, Montevideo, Uruguay, South America.
Awyer Garland Payne, Jr., Analytical Chemist, Procter and Gamble Co., Cincinnati, Ohio.
John Peterson, Vice President and General Manager, The Blanton Co., St. Louis, Mo.
Rafael J. Puente-Duany, Chemist, Corn Products Co., Bayonne, N. J.
Walter A. Schnyder, Head, Technical Service Dept., Hoffmann-La Roche Co., Nutley, N. J.
Raymond J. Sobatzki, Quality Control Supt., Rohm & Haas Co., Philadelphia, Pa.
Richard L. Tracy, Sales Engineer, Croll-Reynolds Co., Inc., Westfield, N. J.

Individual Associate

- George H. Patterson, Superintendent, Drew Chemical Corp., St. Louis, Mo.

Active Junior

- Robert Allison Harris, Graduate Student, Purdue University, Biochemistry Dept., West Lafayette, Ind.
Thomas C. Hutsell, Junior Chemist, Purdue, Biochemistry Dept., West Lafayette, Ind.
John E. MacNintch, Graduate Student, Purdue University, West Lafayette, Ind.
Ronald C. Reitz, Graduate Student, Tulane Graduate School, New Orleans, La.
Esther E. Sandmeyer, Graduate Student, Ohio State University, Columbus, Ohio.



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• Names in the News

R. P. Hutchins (1942) has been appointed Vice President of the Solvent Extraction Division, French Oil Mill Machinery Co., Piqua, Ohio. Mr. Hutchins, well known in the oil chemical field is the author of several articles. Prior to joining French, was active in vegetable oil solvent recovery research.

E. T. Marshack (1950) announced the opening of Eugene Marshack Associates, an international consulting firm. Mr. Marshack, who heads the firm, had been associated with Bunge Corporation for eighteen years.

E. P. McFee (1944) has been elected Vice President of Research, Development, and Quality Control of Gorton's of Gloucester, Inc.

R. P. Trauth (1951) has been named Manager of the Chemical Division, Darling and Company. Mr. Trauth was formerly Sales Manager of the Division.



R. P. Hutchins



J. J. Ganuchau

J. J. Ganuchau (1918), has been appointed to serve as Consultant in Chemistry and Chemical Engineering for Woodson-Tenent Laboratories. Mr. Ganuchau, who has been very active in AOCS activities, is a retired District Chemist of Wesson Division, Hunt Foods & Industries.

R. S. Wayman (1962) has been appointed Conference Chairman of the 46th Annual Conference and Exhibition of the Chemical Institute of Canada. The conference will be held June 6-8, 1963 at the Royal York Hotel in Toronto. Over 1500 delegates from chemical industries, government, and universities are expected to attend.

• Local Section News

North Central Section

On January 23, the North Central Section met at the Builders' Club for the first meeting of the new year. Dinner was preceded by a social hour.

After dinner the section was introduced to Dr. McGee, President, of the National AOCS. Following the introductions and announcement, an intriguing talk was delivered by Mr. Herbert T. Iveson of Central Soya Company, Inc., on the role of "The Chemistry of Soybean Lecithin" in fats and oils.

• New Products

MECHROLAB, INC., Mountain View, Calif., has released the new Model 501 High Speed Membrane Osmometer provides a rapid means of determining number-average molecular weights in the 20,000 to 1,000,000 region. Measurement of single concentrations ranges typically from 3 to 15 minutes.

HYDROPOISE, INC., Scottsdale, Ariz., has announced the new Hydropoise Model 1008 Preset Computing Totalizer, developed as a read-out instrument for turbine flowmeters. It is to be used primarily for batching operations in the chemical industry, food industry, and other related process industries.

BECKMAN INSTRUMENTS, INC., SPINCO DIVISION, Palo Alto, Calif., has designed the Accu-Flo Pump for the precise reproductible metering of small liquid volumes. It is expected to have wide application in column chromatography, industrial process systems, and laboratory control systems.

INSTRUMENTS INC., Tulsa, Okla., recently introduced a completely new concept in laboratory gas chromatographs, "The Valved Gas Chromatograph." One of its most unique features is "high temperature valves," which are offered for up-dating chromatographs already in service. The valves are thoroughly described and illustrated in their catalog #2500.

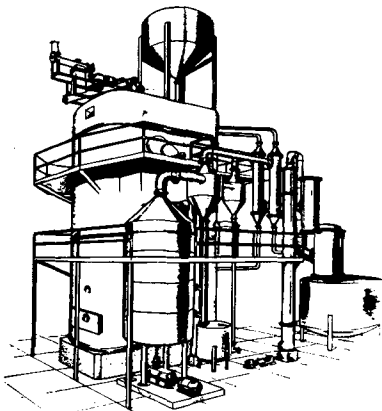
BAUSCH AND LOMB INC., Rochester, N. Y., has announced a new line of DynaZoom Phase Contrast Microscopes. Twelve individual models have been designed to meet the requirements of every microscopist for observing specimens which are colorless or differ little in refractive index from their surroundings.

ACE GLASS, Vineland, N. J., has developed the Dannley Pressure Filter Funnel, which is particularly useful with volatile solvents and hot solutions which leave a residue on the underside of the disc when vacuum is employed. This difficulty is eliminated by positive pressure.

NEEDS CORPORATION, Jackson, Michigan, has announced a new line of unbreakable graduated cylinders and hydrometer jars made of a new glass-transparent polycarbonate plastic. The plastic used is indestructible in normal use and will resist temperatures to 280°F. It has improved chemical resistance and is safe with petroleum ether, hexane, ethanol, water, aliphatic and cyclic hydrocarbons, alcohols, aqueous acids and salt solutions, mineral, animal and vegetable oils, ink soaps and detergents.

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The country's leading processors of oil seeds have specified French Solvent Extraction Equipment again and again because of its versatility—ease of operation — economy — efficiency — safety — and finer and more profitable end products — all at no extra cost.

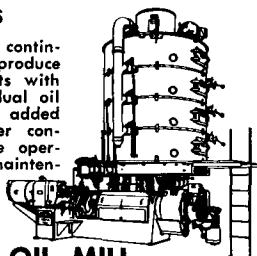


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New Literature . . .

(Continued from page 34)

PERKIN-ELMER CORP., has published a new report on recent developments in gas chromatographic analysis of fatty acids. Authors are L. S. Ettre, W. Averill, and F. J. Kabot, all of Perkin-Elmer. The report is available upon request. (Instrument Division, 1001 Main Ave., Norwalk, Conn.)

APPLIED SCIENCE LABORATORIES INC., has just released Catalog #5 which lists over 100 high purity fatty acid chemicals, triglycerides, cholesteryl esters, uniformly tagged C¹⁴ fatty acid chemicals and calibration standards for gas chromatography. The catalog also lists over 20 different solid supports, 150 stationary phases, column packings and a variety of accessories for gas chromatography. (State College, Pa.)

THE NATIONAL ASSOCIATION OF MARGARINE MANUFACTURERS has released a 1963 edition of its "Directory of Margarine Manufacturers in the United States." It lists the headquarters, addresses, phone, plants and the known persons to whom inquiries should be directed for all known margarine manufacturers in the U.S. A \$5.00 per copy charge is the cost of production. (545 Munsey Building, Washington 4, D. C.)

(Continued on page 42)

• Crude Glycerine Production Down

According to the U. S. Department of Commerce, production of crude glycerine (including synthetic) for the month of December 1962 was 22.1 million lb, down 1.3 million lb from November, and down 2.0 million lb from crude production reported for December 1961. Crude production for 1962 totalled 249.3 million lb, compared to 279.2 million lb for 1961.

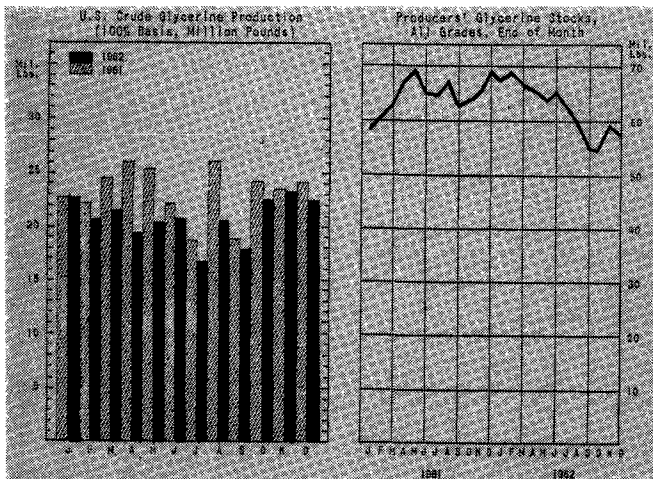
At the end of December, crude and refined glycerine stocks in the hands of producers totalled 57.5 million lb,

down 2.0 million lb from November and down 11.8 million lb from December the previous year.

Production of ethylene glycol, propylene glycol and pentaerythritol (Millions of lb)

	Ethylene Glycol	Propylene Glycol	Pentaerythritol	Total**
Year:				
1957	1,199.9	98.4	56.5	1,354.9
1958	1,145.5	42.0 ^b	53.9	1,240.6
1959	1,214.5 ^a	151.5 ^a	64.1 ^a	1,430.2
1960	1,297.5 ^c	152.0 ^c	64.3 ^c	1,513.5
1961 ^d	1,183.3	160.3	62.4	1,406.0
1960:				
October	111.7	19.7	5.6	121.0
November	104.9	8.7	5.2	118.8
December	108.6	..	5.1	113.8
1961:				
January	119.5	12.0	5.5	137.0
February	101.0	12.7	4.4	118.1
March	101.8	14.0	5.8	120.7
April	95.7	14.1	5.4	115.3
May	92.4	15.4	5.8	113.1
June	97.0	15.1	5.1	117.2
July	94.4	16.0	4.6	115.1
August	99.3	15.3	5.0	119.7
September	87.7	10.7	5.2	103.6
October	97.5	12.3	5.9	115.6
November	95.2	10.8	4.9	110.9
December	37.8	11.8	5.1	114.3
1962:				
January	91.5	19.1	5.8	116.1
February	86.8	15.4	1.3	103.7
March	87.9	16.0	4.7	108.5
April	88.8	12.2	5.0	106.0
May	98.4	17.2	4.8	120.4
June	105.7	13.6	4.5	123.7
July	119.1	15.2	4.9	137.2
August	122.0	12.7	5.4	140.0
September	106.4	13.0	5.5	124.9
October	112.9	9.9	6.6	129.4
November	114.4	23.4	5.5	143.3

* Totals may not agree exactly because of independent rounding of figures.
^a Revised, but does not agree with total of monthly figures.
^b Incomplete—sum of five monthly figures only. Tariff Commission did not publish an official 1959 annual figure for propylene glycol.
^c Official figure, but does not agree with total of the months.
^d Final, official figures.



DECEMBER (Million lb) Preliminary

Glycerine 100% Basis	Factory production		Factory & Warehouse Stocks (Producers')	
	Dec. 1962	% Change from Nov. 1962	End of Dec. 1962	% Change from Nov. 1962
Crude	22.1 ^a	-5.6	29.0	-0.1
Refined, all grades	21.3	-7.4	28.5	-6.6
			57.5	-5.4

^a Includes Synthetic glycerine

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(Continued from page 29)

• Drying Oils and Paints

BINARY OIL-IN-WATER SURFACE COATING EMULSIONS. R. J. Carney and F. J. Hahn (Monsanto Chemical Co.). *U. S. 3,069,368*. A stable non-flocculating oil-in-water emulsion consists of (a) 100 parts of a fatty acid ester of a copolymer of an ethylenically unsaturated alcohol and a styrene monomer, (b) from 2-30 parts of an etherified aminoplast, (c) an emulsifier consisting of an amino salt of a fatty acid present in a total molar proportion equivalent to (1) the molar proportion of the corresponding free fatty acid which would theoretically be required to provide an acid number of from 2-12 in comixture with the esterified copolymer plus (2) a molar proportion of free fatty acid equivalent to from 5-25% by weight of the etherified aminoplast and (d) from 65-900 parts of water. A similar composition is described in *U. S. 3,069,371* by the same inventors.

• Detergents

AN ULTRACENTRIFUGAL METHOD FOR THE QUANTITATIVE DETERMINATION OF EMULSION STABILITY. R. D. Vold and R. C. Groot (Dept. of Chem., Univ. of So. Calif., Los Angeles 7, Calif.). *J. Phys. Chem.* **66**, 1969-75 (1962). A method was developed for the use of the ultracentrifuge to determine the rate of separation of Nujol from Nujol-water emulsions stabilized with sodium dodecyl sulfate (SDS). This rate remains constant throughout separation of a large proportion of the oil in the emulsion and can be used as a measure of the stability.

GERMICIDAL DETERGENT COMPOSITION. J. Blodinger (American Cyanamid Co.). *U. S. 3,069,358*. The described composition consists of (1) from 1 to 40% of a nonionic surface-active agent selected from the group consisting of the reaction product of octylphenol with from 6 to 30 moles of ethylene oxide and the reaction product of nonylphenol with from 6 to 30 moles of ethylene oxide, (2) from 5 to 40% of a water-soluble organic anionic detergent, (3) from 0.5 to 5% of hexachlorophene, (4) about 2.5% of a water-soluble derivative of lanolin, (5) from 0.1 to 3% of a therapeutically effective form of neomycin, and (6) sufficient water to total 100%. The resulting composition has a pH of between 5 and 7 and is storage-stable for at least a year at 25°C. A similar composition, described in *U. S. 3,069,359*, contains a water-soluble organic anionic detergent, neomycin, the nonionic active agent, a non-toxic organic acid, and water.

DETERGENT COMPOSITIONS FOR REMOVING SILICONE GREASE. A. Mankowich (Sec'y of the Army, U.S.A.). *U. S. 3,069,360*. The described composition consists of, by weight: (1) 4.5 to 7.5% of the monobutyl ether of oxyethylene-oxy-1,2 propylene diol in which the weight ratio of ethylene oxide to propylene oxide is 1:1 and in which the total molecular weight of the butyl derivative is greater than 3500; (2) 6 to 10% of a water-soluble alkali metal fatty acid soap such as sodium laurate or sodium oleate; and (3) sodium silicate.

SOAP-SYNTHETIC BAR. R. H. Chaffee (Procter & Gamble Co.). *U. S. 3,070,547*. A milled detergent bar characterized by good lathering performance and a reduced tendency to crack and smear during use, consists of a homogeneous mixture of: (1) a water-soluble, normally solid synthetic detergent that is a potassium salt of an alkyl sulfuric acid containing an alkyl radical of from 10 to 22 carbon atoms; (2) a water-soluble, normally solid alkali metal soap; (3) a hydrated magnesium soap; and (4) an alkali metal salting-out electrolyte (chloride, sulfate, or carbonate salts). The ratio of synthetic detergent to total soap is about 6:1 to 3:1; the magnesium soap constitutes from 15-85% of the total soap, the remainder of the soap being alkali metal soap; the amount of salting-out electrolyte, calculated as NaCl is from 5 to 30% of the sum of synthetic detergent plus alkali metal soap. The moisture content of the finished bar after milling is about 8%.

EMULSIFIER MIXTURE. S. Altscher and T. F. Groll, Jr. (Nopco Chemical Co.). *U. S. 3,071,550*. An emulsifier mixture for preparing emulsion concentrates for use with organic solvent solutions of water-insoluble toxicants consists of: (1) at least one anionic component having the formula (R-Ar-SO₃)_xM in which R is an alkyl group having from 8 to 18 carbon atoms in the chain, Ar is a phenylene radical, M is a cation selected from the group consisting of ammonium, morpholine, sodium, barium and calcium, and x is a whole number 1 or 2; and (2) a nonionic component which is an aliphatic diester of an

unsaturated carboxylic acid selected from the group oleic, linoleic, linolenic and abietic acids and mixtures and a condensate of glycerine and from about 15 to 27 moles of ethylene oxide. The ingredients (1) and (2) are present in an amount of from 35 to 55 parts by weight of the anionic component per 65 to 45 parts of the nonionic component.

North Dakota State U. Announces New Coatings Symposium Program

A. E. Rheineck, Professor of Coatings Technology, has released the program for NDSU's 5th Annual Symposium on "New Coatings and New Coatings Raw Materials". The Symposium, sponsored by the University's Coatings Technology Department, will be held in the Memorial Union Ballroom at the University from June 3rd to noon on June 6th, 1963.

Housing will be available in one of the dormitories or at one of the local hotels. For further information, address inquiries to A. E. Rheineck, North Dakota State University, Fargo, North Dakota.

The program of speakers is as follows:

1. Address—(Subject to be announced), Lyman P. Hunter, President, Federation of Societies for Paint Technology.
2. Address—(Subject to be announced), Robert W. Roland, Ex. Vice President, National Paint Varnish and Lacquer Association.
3. Nitroparaffin Solvent Applications and Effects on Film Properties, R. F. Purcell, Commercial Solvents Corporation.
4. Organo-functional Silanes in Surface Coatings, R. C. Hedlund, Dow Corning Corporation.
5. New Developments in Chemical Resistant Resins, Richard E. Sraile, The Goodyear Tire and Rubber Company.
6. Diphenolic Acid: A New Building Block for Organic Coatings, H. H. Schultz, E. L. Schaut and D. Dill.
7. The Painting of Galvanized Steel, Joseph Bigos, United States Steel Corporation.
8. Methods for Measuring Particle Size in Latex Systems, William Graessley, Air Reduction Chemical and Carbide Company.
9. Recent Advances in New Polymeric High Temperature Coatings, James J. Mattice, Aeronautical Systems Division, United States Air Force.
10. Polymer Properties as a Function of Composition, W. C. Prentiss, Rohm and Haas Company.
11. Partial Formation in Emulsion Polymerization, R. M. Fitch, North Dakota State University.
12. Recent Development in the Chemistry of Epoxy Resins, Joseph R. Weschler, Ciba Products Company.
13. Rigid Urethane Foam; A Versatile Coating Material, Russell Sears, Rinsed-Mason Company.
14. The Improvement of Materials for Electrostatic Spray Methods and a Technique for Using these Methods on Wood and Other Non-Conductors, Emery P. Miller, Ransburg Electro-Coating Corporation.
15. Organic Phosphate Substrate Treatments and Coating Additives, William A. Higgins, The Lubrizol Corporation.
16. Isoparaffinic Solvents for Coatings, Ross A. Garrison and Arthur M. Thomas, Esso Research and Engineering Company.
17. Encapsulation: Versatility in Micro and Macro Packaging, John F. Hanny, The National Cash Register Company.
18. The Chemistry of Thermosetting Acrylic Resins, W. F. Rutherford, Freeman Chemical Corporation.
19. Progress reports on Research in the Coatings Technology Department: a. Titanium Polymers; b. Reaction of Oxirane Groups; c. Some Relationship between Peroxides and Allylic Monomers in the Cross-linking of Polyester Resins.