ABSTRACTS . . . R. A. REINERS, Editor

ABSTRACTORS: Lenore Petschaft Africk, S. S. Chang, Sini'tiro Kawamura, F. A. Kummerow, Joseph McLaughlin Jr., and Dorothy M. Rathmann

• Oils and Fats

Effect of ionizing radiations on fatty acid esters. J. R. Chipault, O. S. Privett, G. R. Mizuno, E. Christense Nickell and W. O. Lundberg(The Hormel Institute, University of Minnesota, Austin, Minn.). *Ind. Eng. Chem.* **49**, 1713–1720(1957). Irradiating fats with high-energy ionizing radiations in the presence of oxygen produces appreciable amounts of peroxides and carbonyl compounds. It also causes flavor and odor changes which do not correlate well with either peroxide values or formation of saturated or unsaturated carbonyl compounds. That flavor and odor changes may be caused largely by carbonyl compounds, however, is not precluded. The flavor and odor components are volatile materials and the volatile carbonyl compounds represent only a fraction of the total carbonyl compounds formed.

Rapid procedure for separating C_2 and C_6 volatile fatty acids by horizontal paper chromatography at elevated temperature. H. R. Roberts and W. Bucek(National Dairy Products Corp., Oakdale, L. I., N. Y.). *Anal. Chem.* **29**, 1447(1957). Use of horizontal solvent development at an elevated temperature in paper chromatography not only increases solvent flow rate but achieves extremely rapid separation of components. The C_2 to C_6 volatile fatty acids can be separated as their ethylamine salts in 1 hour by using water-saturated butanol at 50°.

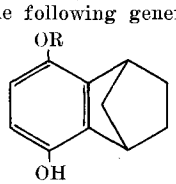
Regeneration of carbonyls from 2,4-dinitrophenylhydrazones with levulinic acid. M. Keeney(University of Maryland, College Park, Md.). *Anal. Chem.* **29**, 1489(1957). Levulinic acid containing 10% of 1*N* hydrochloric acid is a useful general reagent for regenerating carbonyls from their 2,4-dinitrophenylhydrazones. It is particularly applicable to study of flavor and odor compounds.

Volatile saturated aliphatic aldehydes in rancid fat. A. M. Gaddis and R. Ellis(Eastern Utilization Research and Development Division, Agr. Research Service, Beltsville, Maryland). *Science* **126**, 745(1957). In a sample of unheated rancid pork fat (peroxide 86), the saturated aldehydes had the following proportions: 93.6% hexanal, 5.8% propanal, 0.4% ethanal, and 0.2% methanal. The saturated aldehyde class is the major one in uncooked rancid tissue fat. Heating at 165° which approximates the temperature of cooking, produces large increases in total carbonyls, monocarbonyls, and the proportion of the conjugated unsaturated classes.

The isolation of n-heptadecanoic acid (margaric acid) and (+)-14-methylhexadecanoic acid from hydrogenated ox perinephric fat. R. P. Hansen, F. B. Shorland and N. June Cooke (Fats Research Lab., Dept. Sci. & Indus. Research, Wellington, New Zealand). *J. Sci. Food Agr.* **8**, 331–3(1957). By the techniques of low-temperature crystallization and methyl ester fractionation, hydrogenated ox perinephric fat was found to contain *n*-heptadecanoic acid and (+)-14-methylhexadecanoic acid. The properties of these acids are reported. Although quantitative fractionation of the fatty acids was not practical, it is estimated that these two acids constituted, respectively, about 0.4 and 0.3% of the total fatty acids.

Stabilization of organic compounds. R. B. Thompson (Universal Oil Products Co.). *U. S. 2,801,926.* Fatty materials, gasoline and wax are stabilized against deterioration by the addition of a 3,4,5-trialkoxyphenol. *U. S. 2,801,927.* The inhibitor is a 2,4,6-trialkoxyphenol.

Stabilization of fatty materials. R. B. Thompson and T. Symon (Universal Oil Products Co.). *U. S. 2,801,928.* Fatty material is stabilized against oxidative deterioration by the addition of a compound having the following general formula:



Process of recovering rice bran wax. R. O. Feuge and E. R. Cousins(U. S. A., Secy. Agr.). *U. S. 2,802,844.* Crude rice bran oil tank settlings are washed with acetone, then treated with an alkali metal hydroxide, and washed with water. The residue is taken up in 3 parts of isopropyl alcohol at 70° to 80°. The solution is cooled to 26°. The solid which separates is recrystallized from 6 parts by wt. of isopropyl alcohol. The solid which separates is the desired hard rice bran wax.

Production of fatty acids from soaps. F. S. Sadler(The Sharples Corp.). *U. S. 2,802,845.* A process is described for the production of fatty acids by the acidification of soaps in the presence of a dispersing agent.

Refining of soybean oil. H. J. Passino(The M. W. Kellogg Co.). *U. S. 2,802,849.* A method of refining vegetable oils is described. Color bodies and polyfunctional acids are removed by solvent extraction under paracritical conditions. The extract oil is then steam treated.

Deep fat frying. W. E. Buechele and J. W. Adacusky(Brock & Co., Inc.). *U. S. 2,807,203.* A deep fat fryer for potatoes is described as being a tank of fat through which a series of trays mounted on a conveyor is passed.

Process of centrifugally separating glycerides from oil. A. U. Ayres(The Sharples Corp.). *U. S. 2,807,411.* A centrifugal means is described for the removal of solid glycerides from winterized oil.

Coating compositions containing a wax and a methyl polysiloxane. R. H. B. Serey and P. P. Peyrot(Soc. des Usines Chim. Rhone-Poulenc). *U. S. 2,807,554.* A coating composition is prepared from a wax, methyl polysiloxane oils and resins, and triethanolamine titanate. Suitable waxes include paraffin, carnauba, beeswax, montan wax, Japan wax, and oxidized and nonoxidized microcrystalline waxes.

Dry rendering cooker. I. C. Stover. *U. S. 2,807,634.* A cylindrical horizontal cooker is described for the dry rendering of fat from animal matter.

Oral fat emulsions. J. Kalish(Schenley Industries, Inc.). *U. S. 2,808,336.* A palatable fluid fat emulsion for oral ingestion is prepared to contain about 50% of a refined coconut oil having a solidification point about 76°, about 12.5% sucrose, 1.5% glyceryl monostearate containing about 10% by wt. of an alkali-metal stearate, and 2% of polyoxyethylene sorbitan monostearate. These percentages are based upon parts by wt. to parts by volume of the emulsion.

Hydrazides of benzoic acid and derivatives thereof as antioxidants for fats and oils. A. Bell and G. R. Lappin(Eastman Kodak Co.). *U. S. 2,808,416.* Fats and fatty oils are stabilized by the addition of 0.001 to 1% by wt. of an alkyl, aryl and/or amino substitutted benzhydrazide.

Stabilized fatty compositions. C. E. Tholstrup(Eastman Kodak Co.). *U. S. 2,808,417.* Fatty materials are stabilized by the addition of an antioxidant such as 3-methyl-1-phenyl-5-pyrazolidone, 1-phenyl-3-pyrazolidone, 4-(2,5-dihydroxyphenyl)-1-phenyl-3-pyrazolidone, or 1-(*p*-tolyl)-3-pyrazolidone.

Modification of fatty triglycerides with titanium alkoxide catalysts. G. Y. Brokaw(Eastman Kodak Co.). *U. S. 2,808,419.* Vegetable oils can be modified by heating to temperatures between 200° and 300° in the presence of a titanium alcoholate catalyst under anhydrous conditions.

Method for preparing mixed triglyceride compositions. G. Y. Brokaw(Eastman Kodak Co.). *U. S. 2,808,421.* Mixed triglycerides are prepared by the esterinterchange of triglycerides of higher fatty acids with triglycerides of C_2 to C_6 fatty acids in the presence of a titanium alcoholate catalyst under anhydrous conditions at a temperature between 200° and 300°.

FATTY ACID DERIVATIVES

Colorimetric determination of primary amine in fatty amine acetates and fatty amines. A. J. Milun(General Mills, Inc., Minneapolis 13, Minn.). *Anal. Chem.* **29**, 1502(1957). Primary amine in fatty primary amine acetates is determined by using the reaction of primary amine with salicylaldehyde. Intensity of yellow color due to Schiff base is measured at 410 mμ. Secondary and tertiary amines give no color in presence of acetic acid.

Polymerizable derivatives of long-chain alcohols. E. F. Jordan, Jr., W. E. Palm, L. P. Witnauer, and W. S. Port(Eastern Regional Research Laboratory, Philadelphia, Pa.). *Ind. Eng. Chem.* **49**, 1695–1698(1957). Efficiency of plasticization increases with chain length until side chain crystalization starts, but tensile strength decreases with increasing acrylate content.

The influence of dosage on the efficiency of films of fatty alco-

hols for water conservation. K. Durham(Research Dept., Unilever Ltd., Port Sunlight) and I. K. H. McArthur. *Research* **10**, 291–2(1957). The efficiency of fatty alcohol films in reducing evaporation of water increases with dosage up to a maximum value after which efficiency is constant. The dosage required is less and the maximum efficiency is greater for commercial cetyl alcohol containing about 40% stearyl alcohol than for 90% cetyl alcohol.

Fatty alcohol esters. J. W. Rizzo(Chempatents, Inc.). *U. S. 2,801,934.* A process is described for the preparation of controlled-viscosity synthetic drying oils. An ethylenic aliphatic C_{12} to C_{28} monohydric alcohol of the type occurring in drying and semi-drying oils is reacted with a polycarboxylic acid, such as maleic acid, trimellitic acid, pyromellitic acid or their anhydrides, at a temperature between 400° and 480°F. for 4 to 8 hr. The final product has a viscosity between 2 and 70 poises, an acid number less than 10, and hydroxyl number less than 16.

Grease process utilizing the alkali fusion of aldehydes. A. J. Morway, J. H. Bartlett and L. A. Mikeska(Esso Research & Engr. Co.). *U. S. 2,801,973.* A lubricating grease is prepared by mixing a C_{10} to C_{20} aliphatic aldehyde, a C_{12} to C_{22} carboxylic acid and a mineral lubricating oil, heating the mixture to 130° to 180°F., adding a low molecular weight carboxylic acid and alkali, and finally causing alkali fusion of the aldehyde by heating the mixture at a temperature between 400° and 620°F. until gas evolution diminishes.

Grease process utilizing the alkali fusion products of cyclic alcohols. A. J. Morway and J. H. Bartlett(Esso Research & Engr. Co.). *U. S. 2,801,974.* A lubricating grease is prepared by heating a mixture of mineral lubricating oil, a C_{12} to C_{22} fatty acid, a low molecular weight carboxylic acid, a C_{10} to C_{20} cyclic primary alcohol, and alkali.

Polycarboxylates. J. Dazzi(Monsanto Chem. Co.). *U. S. 2,802,016.* The preparation of polycarboxylates from ricinoleates is described.

Diesters of oxo glycols. E. V. Fasce and N. L. Cull(Esso Research & Engr. Co.). *U. S. 2,802,024.* Preparation of the following type of compound is described:

$$R'COOCH(R)CH(R'')CH_2OOCR'$$

wherein R′ is the alkyl radical of C_3 to C_{19} monobasic acid, and R and R″ and C_8 to C_{18} alkyl radicals.

Polyvinyl ester resin plasticized with an epoxy stearic acid ester. F. J. Sprules and H. C. Marks(Wallace & Tiernan, Inc.). *U. S. 2,802,800.* A polyvinyl ester composition is plasticized with a fatty acid ester, such as ethylene glycol monobutyl ether epoxy stearate, tetrahydrofurfuryl epoxy stearate, and ethylene glycol monoethyl ether epoxy steraate.

Photographic stripping film. F. H. Gerhardt and B. R. Harriman(General Aniline & Film Corp). *U. S. 2,805,948.* A photographic stripping film is prepared having a silver halide emulsion layer containing the condensation product of at least one molar equivalent of an alkylolamine other than a primary alkylolamine and one molar equivalent of a monobasic C_{12} to C_{22} fatty acid.

Sustained release pharmaceutical preparation. M. J. Robinson and E. V. Svedres(Smith, Kline & French Labs.). *U. S. 2,805,977.* A sustained release coating for finely powdered solids in an oral liquid medicinal consists of a mixture of a wax, a C_{14} to C_{31} fatty alcohol, a glyceryl ester of a C_{10} to C_{22} fatty acid, a cellulose ether and a cellulose ester.

Production of per-fatty acids. A. Gross(Deutsche Gold- u. Silber-Scheideanstalt cormals Roessler). *U. S. 2,806,045.* Per-fatty acids are produced by the reaction of the fatty acid with a concentrated aqueous hydrogen peroxide solution in the presence of boron trifluoride or its monohydrate.

Alcoholizing fatty oils with polyhydric tertiary alcohols. R. W. Tess(Shell Dev. Co.). *U. S. 2,806,046.* A modified ester product is produced by the reaction of a fatty oil with a polyhydric alcohol containing a tertiary alcohol group in the presence of an alcoholysis catalyst. Rate of alcoholysis is increased by azeotropic distillation of the water as it forms.

Lower alkyl esters of △7,6-ketooctenoic acid. M. W. Bullock (American Cyanamid Co.). *U. S. 2,806,047.* The method of preparing these esters is described.

6,8-Dihydroxyoctanoic acid and related compounds. W. H. Jones (Merck & Co., Inc.). *U. S. 2,806,048.* Preparation is described of compounds having the formula

$$ROOC(CH_2)_4CHOHCH_2CH_2OH.$$

Carboxylic acid chlorides. J. C. Wygant(Monsanto Chemical Co.). *U. S. 2,806,061.* Acid chlorides are produced by the reaction of an alkali metal salt of a C_2 to C_{20} fatty acid with a C_1 to C_3 alkyl polychloride incapable of cleaving out hydrogen chloride under reaction conditions.

Petroleum distillate compositions containing fatty oil pitches. C. T. Brown, R. L. Dinsmore and W. F. Deeter(Richfield Oil Corp.). *U. S. 2,807,527.* Fatty oil pitch is added to a light petroleum distillate for the purpose of inhibiting corrosion.

Ceramic color compositions. O. A. Short(E. I. duPont de Nemours & Co.). *U. S. 2,807,555.* A thermo-fluid vehicle for the application of finely divided vitreous enamel to a surface preparatory to fusing is prepared from the reaction product of stearic acid with an aliphatic mono-amine, a natural vegetable wax, and a polyethylene glycol.

Pyrolysis of ricinoleates. G. Wetroff, G. D'Ivacheff and J. Khaladji(Organico, S. A.). *U. S. 2,807,633.* An undecylenate and *n*-heptaldehyde are produced by the pyrolysis of ricinoleic acid, its lower alkyl esters or glycerides, or castor oil in the presence of water vapor at temperatures between 500° and 700°.

Reaction products of primary fatty amines and aldose sugars. J. G. Erickson(General Mills, Inc.). *U. S. 2,808,401.* An aldose sugar-fatty amine product containing at least 2 fatty amino groups is prepared by the reaction of an excess of a C_{12} to C_{18} fatty amine with the aldose sugar at a temperature between 40° and 100°.

Sulfated fatty urea N-glycosides. J. G. Erickson(General Mills, Inc.). *U. S. 2,808,404.* The products claimed are the sulfated fatty urea *N*-glycosides in which the fatty group contains from 8 to 22 carbon atoms.

Condensation of maleic esters and fatty esters. S. A. Harrison (General Mills, Inc.). *U. S. 2,808,418.* A lower aliphatic ester of a C_8 to C_{22} saturated fatty acid is condensed with a lower aliphatic ester of maleic acid by heating within the range of 100° to 250° in the presence of a hydrocarbon peroxide.

Continuous process for making acid chlorides. W. J. Humphlett (Eastman Kodak Co.). *U. S. 2,808,420.* A continuous process is described for the preparation of acid chlorides by the reaction of thionyl chloride with organic monobasic acids.

Preparation of nitriles. R. H. Potts and R. S. Smith(Armour & Co.). *U. S. 2,808,426.* A C_8 to C_{22} aliphatic or cycloaliphatic nitrile is prepared by the reaction of the corresponding acid with ammonia. The amide which forms first is reacted with additional quantities of ammonia under conditions which permit continuous separation of the nitrile.

• Biology and Nutrition

Pink discoloration in eggs caused by sterculic acid. J. C. Masson, M. G. Vavich, B. W. Heywang, and A. R. Kemmerer(Dept. Agr. Biochem., Univ. of Arizona, Tucson, Ariz., and Southwest Poultry Experiment Station, Glendale, Arizona). *Science* **126**, 751(1957). Pink discoloration of eggs during cold storage is associated with the feeding of cottonseed oil or cottonseed meal to laying hens. This discoloration is a result of the combination of conalbumin of the white with ferrous ion of the yolk to form a pink complex.

Utilization of food for weight maintenance and growth. Hans Kaunitz, C. A. Slanetz, and R. E. Johnson(Dept. of Pathology and the Institute of Comparative Medicine, Columbia Univ., New York, N. Y.). *J. Nutrition* **62**, 551–559(1957). Food requirements for weight maintenance and weight increase were determined by measurements of the food intake of rats kept at constant weight by restricted feeding of a complete, purified diet and of the food intake and weight increase of well-matched rats permitted to eat freely of the same diet. The implications of these findings for studies of food utilization, paired weighing and paired feeding techniques are discussed.

Occurrence of trans fatty acids in human tissue. Patricia V. Johnson, O. C. Johnson, and F. A. Kummerow(Department of Food Technology, University of Illinois). *Science* **126**, 698–699(1957). In the present study, autopsy and biopsy material from 24 human subjects was examined. All the samples of tissue contained *trans* fatty acids. Adipose tissue contained from 2.4 to 12.2%, liver 4.0 to 14.4%, heart 4.6 to 9.3%, aortic tissue 2.3 to 8.8%, and atheroma, from subjects who had died of atherosclerosis, 2.3 to 8.8% of *trans* fatty acids.

Safety of adipic acid as compared with citric and tartaric acid. H. J. Horn, Emily G. Holland, and L. W. Hazelton(Hazleton Laboratories, Falls Church, Va.). *J. Agr. and Food Chem.* **10**, 759–762(1957). Increased usage of adipic acid as a food additive has prompted the comparison of it with citric and tartaric acids. Acute and chronic administration to laboratory animals has shown that adipic acid is comparable to these acids and is a safe food additive.

The effect of vitamin D-deficient diets containing various Ca:P ratios on cats. S. N. Gershoff, M. A. Legg, F. J. O'Connor, and D. M. Hegsted(Department of Nutrition, Harvard School of Public Health). *J. Nutrition* 63, 79–93(1957). Rickets has been produced in kittens fed purified diets lacking vitamin D. More severe rickets was produced by a diet containing 1% of phosphorus than by one containing 2% of calcium and 0.65% of phosphorus. Cats which survive the acute rickets present during their rapid-growing period later develop a spontaneous healing of their rickets, indicating a low vitamin D requirement in young adult cats.

Observations on the cholesterol, linoleic and linolenic acid content of eggs as influenced by dietary fats. H. Fisher and G. A. Leveille(Department of Poultry Husbandry, Rutgers University). *J. Nutrition* 63, 119–129(1957). A practical means of incorporating large amounts of fat into a poultry ration without making it unpalatable because of oiliness, has been achieved through the addition of an absorbent to the diet. In this manner, the effects of tallow, corn, soybean, safflower and linseed oil have been studied in terms of the linoleic and linolenic acid composition of the egg fat. It was found that linseed oil produced a large increase in both the linoleic and linolenic acid content of egg fat, whereas soybean and safflower oil only increased the linoleic acid content, despite the fact that soybean oil contains 7 to 8% of linolenic acid. The cholesterol content of egg fat was essentially unchanged by alterations in the fatty acid composition.

Vitamin A-carotene deficiency affects serum protein and utilization of carotene by steers. E. S. Erwin, C. J. Elam, and I. A. Dyer(Department of Animal Science, State College of Washington). *Science* 126, 702(1957). This study was undertaken to determine whether vitamin A-carotene deficiency would influence the serum protein fractions or alter the utilization of dietary carotene by the beef animal. Under the conditions of this experiment, there was no increase in the liver carotene content of the deficient or normal steers as a result of carotene administration. This marked difference in vitamin A deposition in the liver may suggest a lack of conversion of carotene to vitamin A in the deficient steers.

Polyunsaturated fatty acids in legume-grass silage. Ruth M. Ward and R. S. Allen(Iowa Agricultural Experiment Station, Ames, Iowa). *J. Agr. and Food Chem.* 10, 765–767(1957). The effects of time after ensiling, presence or absence of preservative, and of crop ensiled on the linoleic, linolenic, and total long-chain fatty acids in legume-grass silage were studied employing laboratory silos (glass jars), concrete miniature silos, and a bunker-type silo. There appeared to be no major differences between silages with and without added preservatives as regards the polyunsaturated and total long-chain fatty acids in silages made in the three types of silos. The silage fermentation process caused no major change in the amount of polyunsaturated fatty acid in the total dry matter. However, the percentage of linoleic acid in the total fatty acid or silages was distinctly lower than that in the original forage at the time of ensiling.

The endogenous origin of blood cholesterol. D. M. Tennent, Mary E. Zanetti, D. I. Atkinson, G. W. Kuron, and D. F. Opdyke(Merck Inst. for Therapeutic Research, Rahway, New Jersey). *J. Biol. Chem.* 228, 241–245(1957). Cholesterol was synthesized from acetate and introduced into the blood stream in dog heart-lung-liver preparations set up with minimal trauma to the liver. The specific activity of cholesterol isolated from blood was less than that from liver but greater than that from heart or lung. In heart-lung preparations there was no observed synthesis during the 2½-hour experimental period. These experiments indicate that the liver is a good source of blood cholesterol.

Mitochondrial changes associated with essential fatty acid deficiency in rats. Elinor Levin, R. M. Johnson, and S. Albert (Detroit Inst. of Cancer Research and Wayne State University College of Medicine, Detroit, Michigan). *J. Biol. Chem.* 228, 15–21(1957). Liver mitochondria were prepared from fat-deficient and normal rats and their ability to oxidize a number of the Krebs citric acid cycle intermediates was compared. The fat-deficient mitochondria oxidized the substrates at faster rates than did the normal mitochondria. However, both oxidized pyruvate at approximately the same rate. It appeared that fat-deficient mitochondria differed physically from normal mitochondria; during the process of their isolation they are relatively easily changed in form and perhaps in their biochemical properties as well.

Fatty acid interconversions in lactobacilli. K. Hofmann, D. B. Henis, and C. Panos(University of Pittsburgh, School of Medicine, Pittsburgh, Penna.). *J. Biol. Chem.* 228, 349–355(1957). The relationship between certain alterations in the composition of the culture medium and the fatty acid spectrum of *Lactobacillus delbrueckii* was explored. Tween 40 was found to stimulate fatty acid synthesis by the organism when added to a medium adequate for growth. A metabolic relationship was observed between *cis*-vaccenic acid and a microbiologically active, saturated fatty acid(lactobacillic acid). It was found that *Lactobacillus delbrueckii* and *Lactobacillus arabinosus* fail to elaborate unsaturated octadecanoic acids when lactobacillic acid was supplied in their media. These results are discussed and a route for lactobacillic acid biosynthesis is proposed which involves the addition of a "C_1" fragment to the double bond of *cis*-vaccenic acid.

Metabolism of adipose tissue. II. Incorporation of propionate carbon into lipides by slices of adipose tissue. D. D. Feller and E. Feist(Dept. of Medicine of the Univ. of Washington School of Medicine, Seattle, Washington). *J. Biol. Chem.* 228, 275–284(1957). Slices from adipose tissue and liver were incubated with C^{14}-labeled formate, propionate, succinate, and methyl malonate, and the respiratory carbon dioxide, fatty acids, and non-saponifiable lipides were isolated and analyzed for radioactivity. Organic acids were qualitatively identified by chromatography and radioautography. No C^{14} was recovered as methyl malonate in adipose tissue after incubation with propionate-C^{14} or bicarbonate-C^{14} and propionate carrier under conditions of the experiment. The role of acetate, propionate, succinate, and methyl malonate in the biosynthesis of fatty acids in adipose tissue is discussed.

Synthesis of Phosphatidyl peptides. I. O-(distearoyl-L-α-glycerylphosphoryl)-L-serylglycylglycine. E. Baer, J. Maurukas and D. D. Clarke(Banting and Best Dept. of Medical Research, University of Toronto, Toronto, Canada). *J. Biol. Chem.* 228, 181–191(1957). The synthesis of a phosphatidyl tripeptide has been accomplished. It was prepared by (a) phosphorylation of D-α,β-distearin with phenylphosphoryl dichloride and pyridine, (b) esterification of the resulting distearoyl-L-α-glycerylphenylphosphoryl chloride with N-carbobenzoxy-L-serylglycylglycine benzyl ester in the presence of lutidine, and (c) removal of the protective groups by catalytic hydrogenolysis. The O-(distearoyl-L-α-glycerylphosphoryl)-L-serylglycylglycine was obtained in an overall yield of 12%. The phosphatidyl tripeptide is cleaved by diazomethane with the formation of the dimethyl ester of its phosphatidic acid moiety. This suggests that diazomethane may prove to be a valuable analytical tool in the elucidation of the structure of natural lipopeptides and lipoproteins.

Carotene in the leaves of the carrot. V. H. Booth(Dunn Nutritional Lab., Cambridge). *J. Sci. Food Agr.* 8, 371–6(1957). Leaves from cultivated varieties of carrot plants contained an average of 119 mg. of total carotenes per kg. of fresh wt. of 546 mg./kg. dry wt. The concentrations of total carotenes based on averages of many batches were approximately constant throughout the season but there was variation between individual batches. Reasons for this variation are discussed. Concentration of total carotene in the leaf appears to be independent of the variety among many cultivated types of carrots. There was no correlation between carotene concentration in the leaf and the root although the latter varied several hundredfold in different varieties which included deep red, orange and white types.

The stability of lycopene. I. Degradation by oxygen. E. R. Cole and N. S. Kapur(School of Applied Chem., N. S. W. Univ. of Technol., Sydney, N. S. W., Australia). *J. Sci. Food Agr.* 8, 360–5(1957). Solutions of lycopene were subjected to thermal isomerization at 70° in a slow current of carbon dioxide, and to oxidation by oxygen at 65° and 100° in the absence or presence of copper stearate. Changes in absorption spectra are reported. Solid lycopene was subjected to oxidation by oxygen at 50°. Carbonyl compounds were identified as dinitrophenylhydrazones. In solution, losses of lycopene were 15 and 25% in 3 hrs. at 65° and 100°, respectively; there may have been an induction period at the lower temperature. Losses were increased at 54 and 88.5%, respectively, by the addition of 0.1 mg. % copper stearate to the solution. Solid lycopene was degraded to small fragments which were identified by paper chromatographic methods and shown to include acetone, methylheptenone, levulinic aldehyde, levulinic acid, and probably glyoxal.

II. Oxidation during heating of tomato pulps. *Ibid.*, 366–8. Degradation of lycopene was studied during the heating of serum-free tomato pulps in the presence of oxygen. The rate of breakdown as measured by color loss varied according to the availability of oxygen, temperature, and intensity of illumination. The rate of thermal isomerization in the dark in the absence of oxygen was less than when lycopene solutions were

heated. Oxygen was clearly the most important factor responsible for the loss of color from pulps. Volatile degradation products included acetone and methylheptenone.

The energetics of lipid-protein interactions. D. D. Eley and D. C. Hedge(Dept. Chem., The Univ., Nottingham). *J. Colloid Sci.* 12, 419–29(1957). Activation energies of adsorption and other thermodynamic properties were determined as a means of studying the interactions between monolayers of stearic acid or cholesterol with dissolved proteins (insulin, lysozyme, BPA, or fibrinogen). Since values for the activation energies were small, there was evidently little interaction. Changes in the surface pressures caused by injection of protein under the lipid film are attributed to penetration of the film by the large nonpolar side chains of the protein. About half of the available side chains seem to penetrate stearic acid films but far less are able to penetrate the cholesterol films.

An equation of state for lecithin monolayers. D. C. Hedge (Dept. Chem., The Univ., Nottingham). *J. Colloid Sci.* 12, 417-18(1957). A modified Langmuir equation is derived and shown to be applicable to lecithin monolayers.

The synthesis of milk. J. M. Barry(McCollum-Pratt Inst., Johns Hopkins Univ.). *Sci. Am.* 197, 121–2, 124, 126, 128 (1957). Tracer studies are reviewed showing that the mammary glands use glucose for the synthesis of lactose and can transfer long chain fatty acids from the blood but synthesize shorter chain acids from acetate, and synthesize casein from amino acids.

Vitamin additives. P. C. Anderson and F. N. Rawlings. *U. S. 2,807,546.* An aqueous emulsion of water-insoluble vitamins in oil solution is stabilized against oxidation by the addition of molasses and phosphoric acid. The product is suitable for use as a feed additive for ruminants.

• Detergents

Continuous hydrocarbon sulfonation. Anon. *Chem. Eng.* 64(10), 154, 156(1957). The Girdler and Chemithon processes for continuous hydrocarbon sulfonation for preparation of lube oil additives and synthetic detergents used by several new plants are described. The essentials of the processes and flow sheets are given.

Synthetic detergents from fatty acids. S. C. Banerjee(National Chem. Lab., Poona, India). *Indian Soap J.* 22, 257–61 (1957). The preparation of Igepon T from oleic acid in India is described.

Alkylphenol-ethylene oxide nonionic surfactants. J. M. Cloney and R. L. Mayhew(Antara Products Div., General Aniline & Film Corp.). *Soap & Chem. Specialties* 33(8), 52–4, 109, 111 (1957). A general review of alkylphenol-ethylene oxide products covering preparation of the raw materials, production economics, properties and applications.

Sequestrants in bottle washing. R. B. Colaric, A. T. Ballum, P. Snikeris, and J. V. Karabinos(Blockson Chem. Co., Div. of Olin Mathieson Chem. Corp., Joliet, Ill.). *Soap & Chem. Specialties* 33(9), 47–9(1957). A method for the evaluation of sequestering agents for use in alkaline bottle-washing solutions is presented. It is based on the amount of scale deposited on stainless-steel screen of large surface area when concentrated caustic solutions containing various additives are admixed with hard tap water at 130°F.

Evaluation of soil removal from cotton fabrics. W. J. Diamond and H. Levin(Whirlpool Corp., St. Joseph, Mich.). *Textile Research J.* 27, 787–95(1957). Zirconyl phosphate soil, precipitated in cotton fabric, answers requirements for evaluation and ranking of soil removal ability of washing machines and detergents. Validity of the zirconyl phosphate method is supported by experimental evidence that the independence of ranking is maintained over a wider range of particle size, type of cotton cloth, temperature, time and water-load ratio. It is also supported by a framework of consistency with known expected behavior of cotton cloth in washing machines. Evidence of a high degree of reproducibility is the establishment of a consistent 48 block statistical design over a period of two weeks with reconstitution of the soiling solutions. The average standard error equal to 0.52% for washes of ten swatches testifies to the precision of the method. Measurement of ingrained soil removal is not obscured by redepositions and emulsification.

Thioether nonionic surfactants. J. L. Eaton and W. G. Kayser, Jr.(Pennsalt Chemicals Corp., Philadelphia, Penn.). *Soap & Chem. Specialties* 33(10), 49–51, 115(1957). The thioether nonionic surfactants are characterized by the presence of a thioether linkage joining a polyglycol chain with a highly branched alkyl group containing 12 to 18 carbon atoms. Their derivation, properties and uses are described. Appropriate members of this series of surfactants function well in nonoxidizing and alkaline media as detergents, emulsifiers, wetting, penetrating, dispersing and foaming agents. They are compatible with all ordinary anionics, cationics, as well as nonionics.

On the statistical mechanical theory of micelle formation in detergent solutions. C. A. J. Hoeve and G. C. Benson(National Research Laboratories, Ottawa, Can.). *J. Phys. Chem.* 61, 1149–58(1957). A general theory for micellar solutions is developed with the aid of statistical mechanics. In the case of non-ionic detergents, possible distributions of micellar sizes with a fairly sharp maximum are derived on the basis of a liquid-like structure for the interior of the micelle. When large micelles are formed, the predicted shape is plate-like rather than rod-like. The case of ionic detergents in the absence of extraneous salt is shown to be much more difficult due to long range electrical forces. In previous work the activity coefficients in the equation for the mass law have, at least in principle, been estimated incorrectly.

Contact-angle measurements in aqueous solutions of some 18-carbon-atom, fatty-acid soaps. P. Kivalo(State Inst. Tech. Research, Helsinki). *Suomen Kemistilehti* 29B, 157–53(1956) (in English). The contact angles of air bubbles on electropolished Cu in aqueous solutions of the Na salts of stearic, oleic, linoleic, linolenic and ricinoleic acids and tall oil were measured. A plot of contact angle vs. concentration shows a maximum for all the salts studied. The concentration range over which a finite contact angle is obtained increases with increasing unsaturation. The data show that this behavior is due to a decrease in association of the soap molecules; i.e. the critical micelle concentration shifts toward higher concentrations as the unsaturation increases. The decrease in surface free energies for the above systems are calculated. (*C. A.* 51, 11817)

The practical aspects of neutral grease wool scouring. E. J. McNamara, Jr.(Rohm & Haas Co.). *Am. Dyestuff Reptr.* 46, 731–6(1957). The technology of wool scouring is discussed and diagrams are given showing the various systems in operation. The development of neutral wool scouring is traced. The qualities of nonionic synthetic detergents are emphasized and the effect of the chemical constitution of these materials in neutral scouring is explained.

A new theory of foam formation and its experimental verification. M. Nakagaki(Wayne State Univ., Detroit, Mich.). *J. Phys. Chem.* 61, 1266–70(1957). A thermodynamic theory of foam formation and of foam stability is developed using foam volume and foam life as criteria. According to the theory, foaminess and foam stability in dilute solutions of relatively low viscosity increase with the energy required to transfer the excess solute from the surface into the body of the solution. The systems studied are aqueous alcohol solutions, electrolyte solutions, dyestuff solutions and gelatin solutions.

The electrokinetic behavior of inorganic substances in the presence of surface active agents. H. O. Strange and J. F. Hazel (Univ. of Penn., Philadelphia, Penn.). *J. Phys. Chem.* 61, 1281–2(1957). The electrokinetic behavior of several positive and negative inorganic colloidal systems has been studied in the presence of anionic and cationic surface active agents. Potassium salts of a series of fatty acids, sodium alkyl sulfates, alkyl amine hydrochlorides and alkylpyridinium chlorides were employed as colloidal electrolytes.

The adsorption and desorption of carbon black on cotton in aqueous medium. I. Determination of carbon surface concentration on cotton. W. Strauss(Henkel & Cie. G.m.b.H., Dusseldorf, Ger.). *Kolloid-Z.* 150, 134–6(1957). The amount of C black on cotton was determined by reflectance measurements. The equation of Kubelka and Munk for interpretation of the removal of colored soils is valid only in a low concentration range. (*C. A.* 51, 15154).

Skin cleanser composition. G. E. Morris. *U. S. 2,809,166.* A non-toxic and non-irritating skin cleanser consists of a sulfonated animal or vegetable non-drying oil, sulfonated hydroxylated fatty oil, a sulfonated drying oil and the lower alkyl ester of fatty acids.

Improved germicidal soap. P. Maurice(Monsanto Chemicals Ltd.). *Brit. 776,173.* The darkening and discoloration of soaps containing phenolic germicides may be prevented by the addition of a salt of a sulfur oxyacid that is a reducing agent, such as sodium sulfite.