soon between meals, actually helping to prevent overeating. These facts mean that one must not eliminate fat from his diet or he runs the risk of depriving himself of an essential nutrient and possibly the means of ridding the body of its excess cholesterol.

It is thus not fat in the diet which is harmful, but an unbalance in the kinds of fat. An excess of vegetable fat is also harmful, as is an excess of water. Linseed oil contains very large amounts of the essential fatty acids but cannot be eaten in large amounts. Rats receiving a diet in which the fat is exclusively essential fatty acids fail to grow normally. What is needed is a balance of animal type and vegetable type of fats.

Man is an omnivorous animal; his digestive system is adapted to a variety of plant and animal tissues. His requirements for fat, protein, carbohydrate, minerals, vitamins, energy, and possible roughage can be met only by a broad spectrum diet.

There can be little doubt that the amount and kind of fat in the diet plays some role in the control of the amount of fat and cholesterol in the blood. Probably 40% of dietary calories from animal fat is too much. To attempt to eliminate all fat from the diet is to err in the other direction. To eliminate animal fats or to include disproportionate amounts of animal or vegetable fats have the common faults of all excesses. Moderation and balance should be the watch-word of what we eat as well as all our other behavior.

Let's keep our balance.

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ABSTRACTS . . . . R. A. Reiners, Editor

• Oils and Fats

S. S. Chang, Abstractor
Sin'itiro Kawamura, Abstractor
Dorothy M. Rathmann, Abstractor

Effect of ionizing radiations on carotenoid stability. A. Lukton and G. Mackinney (Univ. of California). *Food Tech.* **10**, 630–2 (1956). The destruction of carotenoid pigments on exposure to gamma radiation is caused by secondary reactions and depends upon the extent to which free radicals or peroxides formed in the surrounding medium are available for reaction. Three carotenoid-containing oils were tested; namely that extracted from the carrot root, corn oil, and salmon oil. The carotenoid in carrot root oil was very stable; of the three oils tested, the pigment in salmon oil was least stable. Crystalline carotene and lycopene, dissolved in petroleum ether solution, in the absence of any antioxidant, are highly unstable. Stability was also markedly decreased when pure lycopene was dissolved in methyl stearate, methyl oleate, and methyl linoleate. Films of pure *beta*-carotene and lycopene in the solid state appear to be remarkably stable, even in the presence of air, and the authors conclude that where destruction occurs, it is initiated by products of other reactions, normally to be sought in the lipid fraction. The differences in stability of the carotenoids in the natural oils examined may be explained in one or more of the following ways: the carotenoids themselves differ in each of the oils, the oils differ in their content of unsaturated fatty acids, and finally in their content of antioxidants.

Relation of stage of lactation to volatile and unsaturated fatty acids of Egyptian cow and buffalo butterfat. M. M. Taha El-Katib (Nile Agr. Co., Egypt). *Oil and Soap* (Egypt) **3**, 331–337 (1956). Samples of butterfat were collected at weekly or fortnightly intervals from 3 cows and 5 buffaloes throughout the entire lactation period and analyzed for Reichert, Polenske and iodine values. The average Reichert values of buffalo and cow butterfat were 29.18 and 25.14, respectively. Throughout the lactation period the Reichert value of the buffalo butterfat was higher than that of the cow butterfat. The Reichert value of the butterfat of both species declined gradually from the beginning to the end of the lactation period. The Polenske value of cow butterfat was higher than that of buffalo butterfat throughout the lactation period. The average iodine values of cow and buffalo butterfat were 33.01 and 32.10, respectively. The iodine value increased as the lactation period advanced.

Extraction of oil by solvents at elevated temperatures. II. A. G. Antonioli and R. Turriziani. *Ann. chim.* (Rome) **45**, 1035–40 (1955). The diffusion coefficients of mixtures of peanut oil and benzene were determined at temperatures between 15.4 and 52.4°. By applying Eyring's theory it was found that the energy of activation of the diffusion process is almost equal to the activation energy of the viscous flow of the solvent. These results confirm that the resistance of cellular membranes is an important factor in extracting oil from seeds. (*C. A.* **50**, 12508)

The ultraviolet absorption of isolated double bonds. O. H. Wheeler and J. L. Mateos (The Inst. de Química, Univ. Nacio. Autónoma de México). *J. Org. Chem.* **21**, 1110–2 (1956). The apparent absorption, in the region 200–215 mμ, of some 40 acyclic compounds containing isolated double bonds has been measured. Substituents on the double bonds, strain effects in the rings, and the proximity of ionic groups increase the apparent absorption intensity.

Crystalline deposit from soybean oil. Yoshiyuki Toyama and Hideko Takai. *Research Rept. Nagoya Ind. Sci. Research Inst.* **8**, 44–5 (1955). Soybean oil remains transparent even in the winter in Japan. However, soybean oil of lower iodine number (126–7) extracted with hexane from soybeans produced in the United States gave a solid deposit. Such deposits consisted of small amounts of wax esters containing fatty acids higher than C_{22} and considerable amounts of diunsaturated and monounsaturated triglycerides containing stearic and higher acids as well as linoleic acid. (*C. A.* **50**, 12509)

Vegetable-oil polymerization. R. P. A. Sims (Can. Dept. Agr., Ottawa). *Chemistry in Can.* **8** (6), 71–4, 76–8 (1956). Review with 43 references. (*C. A.* **50**, 12508)

Utilization of Indian bentonite in the refining of vegetable oils. II. B. Chaliha, R. N. Bagchi, and M. M. Chakrabarty (Univ. Coll. Technol., Calcutta). *Science and Culture (India)* **21**, 161–3 (1955). In Bihar, Kashmir, and Jodhpur two types of bentonite occur: one which absorbs much water and remains suspended; and another which absorbs little water and settles rapidly. The latter after activation can be used for refining of vegetable oils. (*C. A.* **50**, 12507)

Adulteration of fats and its prevention. N. G. Wagle (Univ. Bombay). *Bombay Technologist* **6**, 76–8 (1956). The determination of adulterants in fats and oils is reviewed. (*C. A.* **50**, 12505)

Polyoxyethylene monostearate in the bakery. E. S. Lower and S. C. Cressey. *Food Manuf.* **31**, 277–9 (1956). (*C. A.* **50**, 12318)

Antioxidant action of electron-attracting and electron-repelling substituents in the 2 and 6 positions of phenol. J. Miller (Purdue Univ., Lafayette, Indiana). *Univ. Microfilms* (Ann Arbor, Mich.). *Publ. No. 16481*, 40 pp. (microfilm, $1.00; paper enlargement, $4.00; Dissertation Abstr. 16, 1057 [1956]). (*C. A.* **50**, 11967)

Antioxidants of butter. Yasuro Ozawa. *Bull. Natl. Inst. Agr. Sci. (Japan).* Ser. G, No. 4, 29–39 (1952). To prevent the oxidative deterioration of butter, some practical and effective methods were tested as regards some antioxidants added during the working process. Among water soluble antioxidants tested, vitamin C was superior to hydroquinone and tannic acid. However, vitamin C discolored the butter so excessively that it decreased the market value. Fat-soluble antioxidants, such as ethyl gallate, iso-butyl gallate, nordihydroguaiaretic acid, ethyl protocatechuate, and vitamin C stearate, were inferior to vitamin C in antioxygenic and antihydrolytic activity. Undesirable discoloration of butter was not observed on the addition of vitamin C stearate. (*C. A.* **50**, 12323)

Phase diagrams of oil-solvent systems. J. M. Martinez Moreno. *Anales univ. Hispalense* **15**, 19–104(1954). Methods for fractionation and extraction of fats and oils are described and their applications to industrial processes discussed. Extensive data with ethyl, methyl, ethyl acetate as solvents are included together with 20 ternary and 2 quaternary charts showing isotherms of saturation. The charts are from experiments on vegetable oils, fish oils, solid fats, and unsaponifiable materials. (*C. A.* **50**, 9762)

The nature of glyceryl esters. A. Gavriloff. *Compt. rend. 27^e congr. intern. chim. ind.*(Brussels) **1954**, 3; *Industrie chim. belge* 20, Spec. No., 704–7(1955). Distillation of pure glycerol over sodium acetate-sodium hydroxide in varying proportions yields small amounts of acetates. The acetates are formed by glycerolysis of sodium acetate. Sodium hydroxide, although reducing free acidity in the distillate, does not reduce the conversion to the acetate. The acetates are concentrated in the first fractions. Color is affected only slightly by the presence of the acetates. (*C. A.* **50**, 9762)

Autoxidation of methyl oleate in the presence of acidic substances. C. Paquot and C. Galletaud. *Fette Seifen Anstrichmittel* **57**, 1003–5(1955). Fat-soluble acids, like octanoic, decanoic, lauric, myristic, palmitic, stearic, benzoic, phenylacetic, 1-naphthalenesulfonic, *p*-toluenesulfonic, butylnaphthalenesulfonic, and alkyl sulfonic, and acid sulfates of C_{10}, C_{12}, and C_{16} alcohols were tried as antioxidants for methyl oleate. None of the acids or the acid sulfates tested had any significant antioxidant effect comparable to the usual polyphenols used as standard antioxidants. (*C. A.* **50**, 9761)

Quantitative column chromatographic separation of mixtures of fatty acids. W. Kapitel(Henkel & Cie. G.m.b.H., Düsseldorf, Ger.). *Fette Seifen Anstrichmittel* **58**, 91–4(1956). The saturated fatty acids (C_6–C_{22}) were quantitatively separated in a column of water-repellent (by dichlorodimethylsilane) Kieselguhr impregnated with liquid paraffin. The paraffin-saturated water-acetone eluent was adjusted from 40% acetone for the elution of short chain constituents (C_6–C_8) to 75% acetone for C_{22} acids. The accuracy of determinations of 3 mg. known sample was shown to be excellent. (*C. A.* **50**, 9761)

Elaidinization of oleic acid with ethyl nitrite. G. Rankov and A. Popov(Bulgar. Akad. Wiss., Sofia). *Compt. rend. acad. bulgare sci.* **8**(2), 37-40(1955). Elaidinization in a homogeneous medium is described. Oleic acid was treated in a closed vessel at 0° and 12–15° for 4-48 hours, with various definite quantities of ethyl nitrite in alcoholic solution. The resulting solid and liquid fatty acids had iodine values which were lower than theoretical and contained nitrogen, indicating the formation of addition products. In the presence of low percentages of ethyl nitrite the elaidinization was slow and little elaidic acid was formed. A maximum yield of 60% elaidic acid was obtained from a reaction with 10% ethyl nitrite over 24 hours. The amount of addition products was 1.4–16.0%, which is much smaller than at elaidinization with nitrogen oxides or nitrous acid(3.9–67.3% addition products). (*C. A.* **50**, 9761)

Elaidinization of ricinoleic acid with selenium. G. Rankov and A. Iovchev(Bulgar. Akad. Wiss., Sofia). *Compt. rend. acad. bulgare sci.* **8**(2), 41–4(1955). Ricinoleic acid(50 g.) and 0.25 g. black powdered selenium were heated 4 hours at 220–30° with a current of carbon dioxide. The ruby-red, viscous reaction product, after cooling to normal temperature and separating from unchanged selenium, did not congeal after 4 months at normal temperature or at −5°. The yield of ricinelaidic acid (24.5–31.1%) was about twice that obtained by elaidinization with sulfur. It is assumed that estolidation of ricinoleic acid hinders elaidinization. (*C. A.* **50**, 9762)

The use of wetting tests for the determination of fatty acids. H. Kråmer and H. Heiss(Kalle & Co. A.-G., Wiesbaden-Biebrich, Ger.). *Fette Seifen Anstrichmittel* **58**, 87–90(1956). The higher fatty acids influence the wetting characteristics of water on aluminum to a much higher degree than other hydrophobic substances. Aluminum foils are polished and dipped into the test solution. After drying with an infrared heat lamp, a 0.25% aqueous solution of methyl blue is sprayed on for 15 seconds at 40 cm. The spray nozzle(Dr 0011 by Lechler Co.) is activated with air at 0.2 atm. gage. The droplet size formed is compared to photographic standards. The method is applicable to testing the concentration of fatty acid vapors in atmosphere, fatty acids in mineral oils, etc. Oleic acid concentration was tested in the range of $1.0–5 \times 10^{-5}\%$. (*C. A.* **50**, 9761)

Color test for the presence of linolenic glycerides in oils and a color reaction of some organic compounds with picric acid. T. A. Pkheidze and V. P. Goguadze(Chem.-Pharm. Inst., Tiflis). *Zhur. Anal. Khim.* 11, 91–3(1956). Place 2 ml. of glacial acetic acid saturated with picric acid in a test tube, add 15 drops or if solid 0.2 g. of sample, shake, and heat for 3–5 minutes. The appearance of red color indicates the presence of oils containing linolenic glycerides. Reaction is also positive for the acyclic alcohols geraniol and tetrabutanediol, the terpene limonene, and nonaromatic and nonamine ergosterol, ionone, and methyl ionone. Carotenoids give a green color. (*C. A.* **50**, 9762)

The pigments of whale oil. X. Relation between coloration of oil and degradation of the hemin added to the original oil. Katsunori Mukal(Osake Pref. Univ., Sakai). *Bull. Japan Soc. Sci. Fisheries* **21**, 921–4(1955). Previously decolorized whale oil was heated after addition of various amounts of crystalline hemin and a like volume of water. The color intensity as well as the contents of Fe, N, and pyrrolic substance in the oil layer were larger with a larger amount of added hemin. The acid value of the whale oil has a slight relation to discoloration and rupture of hemin when the oil was boiled with water after addition of hemin, but the peroxide value mainly determine the degree of both changes. When the whale oil was aerated at 80° for different periods and the oxidized oils boiled with and without addition of hemin, the color intensity and acid values increased and the iodine and peroxide values decreased parallel to the period of the aeration, especially in tests containing hemin. (*C. A.* **50**, 12509)

Determination of oil in fish meal. M. E. Stansby and Wm. Clegg(Fishery Technol. Lab., Seattle, Wash.). *Com. Fisheries Rev.* **17**, 16–9(1955). A simplified procedure was used to extract oil from 1-, 15-, and 30-day-old meals prepared from cod and herring. The results compared favorably with data obtained by using the standard procedure of the Association of Official Agricultural Chemists except for a decrease of 1.5% oil in 30-day-old herring meal. (*C. A.* **50**, 10429)

The pigments of whale oil. VIII. The relation between the coloration of whale oil and the amount of hemoglobin added to raw blubber. Katsunori Mukai(Naniwa Univ., Sakai, Osaka). *Bull. Japan. Soc. Sci. Fisheries* **21**, 187–9(1955). The oils collected by the boiling method from raw whale blubbers containing 0, 0.6, and 1.2% crystalline horse hemoglobin had the relative color degree 15, 29, and 38, respectively; iron content 0.42, 1.16, and 2.11 mg. %, respectively; and nitrogen content 62, 152, and 199 mg. % respectively; the amount of pyrrole compounds both in the oil and aqueous layer was also in the above order. Evaporating aqueous layer after removing oil layer, at 50° for 10 days slightly discolored the oil, while leaving the oil in contact with the aqueous layer during evaporation induced discoloration. In the latter case, previous addition of a larger amount of hemoglobin to blubber produced a larger degree of the discoloration.

IX. The relation between the coloration of whale oil and the amounts of porphyric substances added to raw blubber. *Ibid.* 190–3. The presence of increasing amounts of crystalline hemin and methyl ester of protoporphyrin caused larger contents of pyrroles in both the oil and the aqueous layers and larger degrees of discoloration in both. Like treatment of hemin and porphyrin methyl ester without blubber did not produce detectable amount of pyrroles, indicating that the splitting of the porphyrin nucleus occurred in the presence of whale oil. Leaving the oil in contact with the aqueous layer again increased the color, the degrees being parallel to the amount of the porphyrin substances previously added. (*C. A.* **50**, 10429)

Theory of countercurrent distribution in solvent systems near a critical point. C. A. Hollingsworth and J. J. Taber(Dept. of Chem., University of Pittsburgh, Pittsburgh, Pa.) and B. F. Daubert. *Anal. Chem.* **28**, 1901–1906(1956). By the use of the theory of regular solutions, equations were obtained expressing the behavior of partition ratios near the critical temperatures of complete miscibility of two-component solvent systems and near the plait point of three-component, symmetric solvent systems. These results were used with a criterion of separation to predict the optimum conditions for separation by countercurrent distribution in these systems. The theory is then applied to experimentally determined partition ratios of some triglycerides to predict the amount of separation that can be obtained.

Near-infrared spectra of fatty acids and some related substances. R. T. Holman (Hormel Institute, Univ. of Minnesota, Austin, Minn.) and P. R. Edmondson. *Anal. Chem.* **28**, 1533–1538 (1956). The spectral absorption of a series of fatty acids and other lipides has been measured between 0.9 and 3.0 microns. By means of these spectra, band assignments have been made for many organic structures. It is possible to distinguish *cis* double bonds, terminal double bonds, hydroxyl groups, amine groups, acyloin, hydroperoxide, methyl and ethyl esters, acids, CH_2, and CH_3 groups. Near-infrared spectra should simplify characterization of many common chemical structures, and may be valuable in the solution of many problems in lipide chemistry.

Use of 2,4-dinitrophenylhydrazones of p-phenylphenacyl esters as second derivatives in identification of organic acids. H. Ng, A. D. Webb, and R. E. Kepner (Univ. of California, Davis, Calif.). *Anal. Chem.* **28**, 1975–1977 (1956). The 2,4-dinitrophenylhydrazones of the *p*-phenylphenacyl esters of 18 fatty acids were prepared. In several cases a greater difference was observed between the melting points of the hydrazones than between the melting points of the corresponding esters. The double derivatives of the straight-chain saturated acids from acetic through octadecanoic were found separable on silicic acid-nitromethane chromatographic columns. The relative rates of travel with respect to that of the hexanoate derivative were determined and should be of assistance in the identification of small amounts of unknown organic acids.

Comparative studies of lipoproteins by starch and paper electrophoresis. F. Paronetto, Chun-I Wang and D. Adlersberg (Dept. of Medicine and Chem., Mount Sinai Hospital, N. Y.). *Science* **124**, 1148 (1956). The absorption of serum lipids at the point of application in paper electrophoresis interfered with the migration of some of the cholesterol and phospholipid molecules. When starch was used as supporting medium, no accumulation and adsorption of triglycerides were observed at the point of origin. The triglycerides migrated freely and the cholesterol and phospholipid molecules migrated with them.

Olive oil. Extraction of electrophoresis. S. Castorina. *Olearia* **10**, 188–191 (1956). The author, after describing in Part I (published in No. 5–6 of *Olearia* of this year) the chemicophysical bases and the process for the electrophoretic extraction of oil from olives, now describes the pilot plant set up for this purpose. Special reference is made to finely crushing the oleaginous mush and recovery of the oil by electrophoretic separation. The article also gives the industrial oil yield and the utilization of the solid sediment obtained from this extraction method on last year's olives.

Stearine and oleine (technical stearic and oleic acids) by fractionation with hexane. II. Stearic fraction washing. G. B. Martinenghi. *Olearia* **10**, 185–187 (1956). A comparison between the two methods of washing stearic fraction by reprecipitation and by simple washing in which it is shown that simple washing is preferable. By the latter method, precipitating at —20° and washing at 0°, the following results were obtained from fatty liquid acids of the tallow type: 47.4% of stearine with solidification point of 54.7°, I. N. 1.6; 32.6% of oleine with turbidity point (initial) of 3° and clear point 12°, I. N. 85.5; 20.0% of palmitic fraction with turbidity point of 16° and clear point of 25–26°.

A new method of controlling the behavior of refined oils and liquid fatty acids by cold. I. G. B. Martinenghi and C. Balestrini. *Olearia* **10**, 192–194 (1956). The authors criticize the accuracy of *AOCS Cold Test* as an indication of oil invariability to temperature changes. So as to afford a practical test the authors propose a new method which consists of ascertaining in the order of progression stated and with the same apparatus, the following data: turbidity point (initial); solid point (immobility); pour point (fluidity); and clear point. The total time required by this method is less than 30 minutes and according to the author gives the information required.

Auto-oxidation and drying. W. Treibs. *Olii-Grassi-Colori* **33**, 348–352 (1956). The author refers to some of his previous work on this subject in which he studies oxygen absorption by stoichiometric measurements, in which the increase in viscosity is proportional to the increase in polymerization. No hydroperoxides are formed but dialkylperoxides and aldehydic groups are produced which help explain the increase in ester number during the drying process. The author has studied the autoxidation of mixtures of an olefin and an aldehyde, to obtain the semi-ester of the corresponding glycol. It is pointed out that if the material to be autoxidized is diluted in a solvent one obtains a different response.

Identification of colza oil in olive oil. J. Vizern. *Olii-Grassi-Colori* **33**, 345-347 (1956). The suggested method is an extension of the method published in 1953 by the same author concerning a specific reaction of colza oil in the presence of peanut oil. The reaction is based on fractional crystallizations at different temperatures of potassium soaps in acetone. The presence of more than 5% of colza oil is revealed through a characteristic lactescency.

Effects of the spreading solvent on monolayers as determined by the pressure-area and radioactivity-area isotherms. H. D. Cook and H. E. Ries, Jr. (Research Dept., Standard Oil Co. [Indiana], Whiting, Ind.). *J. Phys. Chem.* **60**, 1533–6 (1956). Experiments with radio-stearic acid spread as monolayers showed that benzene, *n*-hexane and chloroform cause no significant differences in the intermediate and high-pressure portions of the pressure-area isotherms. At low pressures, the solvent alters the shape of the isotherm by causing a nonhomogeneous distribution within the monolayer. This effect could not be directly related to the volatility, solubility and polarity of the solvent.

Infrared spectroscopy of dairy products. J. D. S. Goulden (Physics Dept., Natl. Inst. for Research in Dairying, Shinfield, Nr. Reading). *J. Sci. Food Agr.* **7**, 609–13 (1956). Infrared spectra are reported for water, liquid milk, butter, full-cream milk, separated milk, casein, lactose, butterfat, dry mixtures of casein and lactose, freeze-dried separated milk, and freeze-dried cervical secretion. Dried samples were ground, mixed with potassium bromide powder, and pressed into disks. In the case of samples containing fat, clear uniform disks were difficult to prepare. The procedure is particularly useful for studying protein-carbohydrate interactions in dried dairy products.

Analysis of fresh meat. E. J. Benne, N. H. Van Hall and A. M. Pearson (Michigan Agr. Expt. Sta., E. Lansing, Mich.). *J. Assoc. Official Agr. Chemists* **39**, 937–45 (1956). Details are given for analyzing fresh meat and determining ash or mineral water, crude fat or ether extract, moisture and protein. With respect to the fat determinations, the authors found evidence that oxidative effects may influence the apparent moisture contents of fats if samples are heated for prolonged periods in a hot air oven. Hence, such samples are heated for only 5 hrs. at 100 to 105°. Small beakers are recommended to catch any melted fat which may seep through the asbestos mats of the Gooch crucibles during drying of the samples prior to extraction.

Isolation of piperonyl butoxide from oils, fats and waxes. H. L. Williams and J. P. Sweeney (Stored-Product Insects Lab., Savannah, Ga.). *J. Assoc. Official Agr. Chemists* **39**, 975–80 (1956). A procedure is described for the determination of residual piperonyl butoxide in grains, legumes, peanuts, peanut hulls and pulp, and waxed paper. The piperonyl butoxide is isolated by adsorption on florisil, and determined colorimetrically in the eluate.

Vegetable oils. V. The component acids of Cephalocroton cordofanus (Muell.-Arg.) seed oil. K. E. Bharucha and F. D. Gunstone (The University, Glasgow). *J. Sci. Food Agr.* **7**, 606–9 (1956). *Cephalocroton cordofanus* seed oil was obtained in a yield of 32.7%, had an iodine value of 91.4 and saponification equivalent of 304.9. Epoxide compounds comprised 61.7% by wt. of the glycerides. After treatment with acetic acid and alcoholic potassium hydroxide, epoxy acids were converted to dihydroxy acids which were isolated by partition between petroleum ether and methanol, followed by crystallization from methanol, methylation, acetylation and finally distillation. The dihydroxy acid so isolated was identified as *threo*-12:13-dihydroxy oleic acid which was derived from *cis*-12:13-epoxyoleic acid. The fatty acid distribution (as per cent of total acids) was calculated to be: *cis*-12:13-epoxyoleic, 62; linoleic, 17; oleic, 10; *threo*-12:13-dihydroxyoleic, 4; and saturated, 7.

Method of making margarine. W. H. Schmidt and S. I. Shafer (Lever Bros. Co.). *U. S. 2,772,976.* Margarine is prepared by agitating and cooling an emulsion of fat, milk, some salt and water until higher melting glycerides have crystallized, rapidly chilling and agitating the mixture until it is supercooled, and finally adding the remaining portions of salt and water.

Fry kettles with floating covers. H. N. Shaw. *U. S. 2,772,978.* Fat in a heated kettle is protected from surface oxidation by means of a cover placed directly in contact with almost the entire surface when the fat is not being used.

Prevention of hydrogenation odor. L. C. Brown and D. R. Merker (Swift & Co.). *U. S. 2,773,081.* The development of a characteristic hydrogenation odor may be retarded by the use of a fat which has been steam-deodorized and protected by a blanket of inert gas prior to hydrogenation.

Treatment of raw materials containing fats. I. H. Chayen (British Glues & Chemicals Ltd.). *U. S. 2,773,082.* Fats are separated by subjecting the raw material to intense impacts while it is immersed in an organic solvent. The fat-free residue remaining after withdrawal of the fat solution is at least colloidally soluble in water.

Method of imparting a butter-like flavoring to fat-containing food products. D. R. Merker(Swift & Co.). *U. S. 2,773,772.* The butter-like flavor imparted to fat-containing food products by diacetyl is stabilized by the addition of a small amount of butyl alcohol.

Process for the extraction of fatty oils and proteins from oleaginous materials. W. S. Kao. *U. S. 2,773,889.* Oil is obtained from flaked coconut, groundnut, candlenut, soybean, cottonseed or rubberseed by extraction with 0.5 to 1.5% aqueous soap solution at temperatures above 70° but below the coagulation temperature of the proteins. Heating is continued for at least half an hour so as to form a temporary oil-in-water emulsion containing proteins and carbohydrates. Fibrous and insoluble material is removed, and the oil is separated by breaking the emulsion.

Apparatus for the quantitative determination of fats extracted in the pressing of seeds, with a hydraulically driven piston. A. Vitali. *Ital. 492,622.* A direct reading of the percent of fat extracted from seeds, particularly cacao seeds, is given by the measurement of the linear displacement, which is directly proportional to the butter present, of a hydraulically driven piston used in the pressing of seeds. An electric apparatus is used to release the pressure of the piston when a predetermined amount of butter is extracted to give precise results. (*C. A.* **50**, 12511)

Solvent extraction of oil from dry fermentation residues. Metallurgica Naval y Terrestre S. A. *Span. 225,195.* The extraction involves use of the solvent in the vapor phase for better penetration. (*C. A.* **50**, 12512)

Extraction of oleaginous materials. N. A. Lipovatz. *Ital. 489,577.* The extractor, charged with the material, is evacuated. The solvent is admitted while the vessel is heated with a steam coil, so that the operation takes place at elevated temperature and pressure. The micella is transferred to a still for solvent recovery. The exhausted material is stripped free of solvent with live steam. (*C. A.* **50**, 12512)

FATTY ACID DERIVATIVES

Reactions of halogens with the metallic salts of fatty acids. V. Alpha-substituted carboxylic acids. Etsuro Maekawa(Nagoya Inst. Technol.). *Bull. Nagoya Inst. Technol.* **6**, 271–4 (1954). *Alpha*-methyl, -ethyl, $-COOC_2H_5$, -OH, $-NH_2$, -Br, and -oxo substituted *n* fatty acids as well as *alpha*-alkyldecylmalonic acids were prepared from the silver salts of these *alpha*-substituted acids with bromine in carbon tetrachloride. The corresponding bromine derivatives were obtained while the *alpha*-amino and *alpha*-hydroxy acids gave the corresponding aldehydes. (*C. A.* **50**, 11943)

Aliphatic dicarboxylic acids. Fritz Kögler(Badische Anilin- & Soda-Fabrik Akt.-Ges.). *Ger. 871,601.* Mixtures of dicarboxylic acids isolated from the mother liquor resulting from the separation of adipic acid from oxidation mixtures of hydroaromatic compounds (cyclohexanol, esters of cyclohexanol, cyclohexanone, cyclohexene, cyclohexylamine) are recrystallized from dilute strong inorganic or organic acids in order to separate and purify the aliphatic dicarboxylic acids contained in the mother liquor. The concentration of strong acids in solutions used for recrystallization should be above 5%. (*C. A.* **50**, 12103)

Phosphorus derivatives of fatty acids. II. Diethyl acyloxyethylphosphonates. B. Ackerman, T. A. Jordan and D. Swern(Fatty Acid Producers Council of the Association of American Soap and Glycerine Producers, Inc.). *J. Am. Chem. Soc.* **78**, 6025–27(1956). Diethyl acyloxyethylphosphonates derived from acetic, caproic, lauric, myristic, palmitic, stearic and oleic acids were prepared by the reaction of the 2-bromoethyl esters with triethyl phosphite. Various physical properties of these compounds are reported. The free phosphonic acids could not be obtained from the esters by the usual means; hydrolysis even under the mildest acidic conditions liberated the parent fatty acid. A more detailed study of the hydrolysis led to the following conclusions: (1) hydrolysis of the carboxyl ester occurs much more rapidly than that of the phosphonic esters, (2) rate of hydrolysis is not affected by length of acyl chain or size of phosphonic ester groups, and (3) rate of hydrolysis is approximately the same as that of the ethyl ester of the corresponding fatty acid.

Sizing of paper with fatty acid polyalkylenepolyamine compositions. W. F. Reynolds, Jr. and L. A. Lundberg(American Cyanamid Co.). *U. S. 2,772,969.* In the production of sized paper, 0.2 to 5% of a long chain fatty acid polyalkylenepolyamine reaction product is adsorbed on the cellulosic fibers. The desired product contains 3/7 to 2/3 moles of saturated C_{14} to C_{22} fatty acids for each nitrogen atom. The treated fibers are heated for 0.5 to 3 min. at 105° to 150° to develop water-repellent properties.

Oxidation of fatty acids. R. D. Englert and L. M. Richards (Tallow Research, Inc.). *U. S. 2,773,094.* Saturated C_{14} to C_{18} fatty acids are converted to lower molecular weight dibasic acids by oxidation with dilute nitric acid at temperatures of 100° to 250° and pressures of 50 to 500 p.s.i. gage. The molecular ratio of nitric acid to fatty acid is between 4:1 and 30:1.

Production of dibasic acids. R. D. Englert and L. M. Richards (Tallow Research, Inc.). *U. S. 2,773,095.* Dibasic acids are prepared by the oxidation of C_{14} to C_{18} unsaturated acids with dilute nitric acid at temperatures of 125° to 200° and pressures of 10 to 500 p.s.i. gage.

Synergistic compositions of matter comprising the alcohol-soluble moiety of vegetable lecithin. P. L. Julian, H. T. Iveson and S. B. Radlove(The Glidden Co.). *U. S. 2,773,771.* A synergistic emulsifier mixture is prepared to contain 10 to 35% by wt. of the alcohol-soluble moiety of vegetable lecithin in at least one of the following: mixtures of mono- and diglycerides, vegetable oils which have been hydroxylated in the presence of a lower hydroxy carboxylic acid until the iodine value has been reduced at least 20 units, and long chain fatty acid partial esters of anhydrides of hexahydric alcohols. The resultant mixture gives a volume of gelatinized starch of not more than 40 ml. in the Bradley amylose test, and is substantially free of the alcohol-insoluble moiety of vegetable lecithin.

• Biology and Nutrition

F. A. Kummerow, Abstractor
Joseph McLaughlin, Jr., Abstractor

The absorption of oxygen from air by flour batters: changes in the rate of uptake due to ageing of the flour. D. J. Cosgrove (Research Assoc. British Flour-Millers, Cereals Research Sta., Old London Road, St. Albans, Herts.). *J. Sci. Food Agr.* **7**, 668–72(1956). Data are reported on the rate of absorption of oxygen from air by suspensions of flour in phosphate buffer solution at pH 6.5. The absorption depended on the age of the flour and steadily increased to a maximum at 2–3 months after milling. Extraction of the flour with petroleum ether markedly reduced the ability to take up oxygen. Since the oxygen absorbing ability was insignificant after the flour had been successively defatted, heated, and mixed with flour lipides, the behavior of fresh flour is thought to result from the activity of a lipoxidase.

The nature of the gecko visual pigment. F. Crescitelli(Dept. Zoology, Univ. Calif., Los Angeles). *J. Gen. Physiol.* **40**, 217–31(1956). Retinal extracts of the Australian gecko, *Phyllurus milii*(White), were found to contain a photosensitive pigment having an absorption maximum at 524 mμ. The absorption spectrum was identical in form with that of visual chromoproteins from other species. Bleaching revealed that the chromophore was retinene$_1$. The biological significance of this pigment is discussed.

A new photosensitive pigment of the euryhaline teleost, Gillichthys mirabilis. F. W. Munz(Dept. Zoology, Univ. Calif., Los Angeles). *J. Gen. Physiol.* **40**, 233–49(1956). Retinal extracts from the eyes of dark-adapted mudsuckers were examined. The photosensitive pigment was found to have an absorption maximum approximately midway between the peaks of rhodopsin and porphyropsin. However, it was not a mixture of these two known pigments and was found to belong to the retinene$_1$ class.

Essential fatty acids in the chick. I. Development of fat deficiency. J. G. Bieri, G. M. Briggs, M. R. S. Fox, C. J. Pollard, and L. O. Ortiz(Lab. of Nutrition and Endocrinol., N.I.H., Bethesda, Md.). *Proc. Soc. Exptl. Biol. Med.* **93**, 237–240 (1956). Day-old chicks raised on a purified diet containing about 0.046% fat grew normally for 6–8 weeks, at which time weight gains began to decrease slightly. No marked symptoms of deficiency developed, but depigmentation of feathers and scaliness of skin were observed. Fat-deficient male chicks had smaller testes and some females had immature oviducts, when compared with normal chicks. Water consumption by the deficient birds did not increase markedly until the 11th week on the fat-free diet.

Oxidation of unsaturated fatty acids in embryonic and adult tissues of golden hamster. B. T. Cole (Dept. Physiol. and Pharmacol., Duke Univ., Durham, N. C.). *Proc. Soc. Exptl. Biol.. Med.* **93**, 290–294 (1956). The Thiobarbituric Acid Test for oxidative products of essential fatty acids, primarily linolenic, present in tissues *in vivo* and after aerobic oxidation *in vitro*, with and without ascorbic acid, was applied to brain, liver and testes tissues of hamsters of various ages. Minute measurable quantities of oxidative products (probably peroxides) are formed *in vivo*. The quantity of highly unsaturated fatty acid oxidation products (HUFA-P) present in brain tissue increased gradually with *post partum* development of the brain, with constant levels apparent after 10–16 days of age. The quantity of HUFA-P present in testes tissue correlates well with development and function of that organ with constant levels established following a peak during age of sexual maturity. There is a significant rise in total HUFA-P content of liver tissue, associated with emergency of birth. Lack of catalytic activity of ascorbic acid upon *in vitro* oxidative reaction involved in embryonic tissue has been demonstrated.

Effects of short chain fatty acids on hepatic acetate metabolism in cold exposure and fasting. E. J. Masoro and Sylvia S. Panagos (Dept. Physiol., Tufts Univ. Sch. of Med., Boston, Mass.). *Proc. Soc. Exptl. Biol. Med.* **93**, 277–280 (1956). Butyrate, *iso*-butyrate, proprionate, caproate, and acetoacetate failed to reverse the block in acetate-1-C^{14} oxidation found in liver slices from rats fasted at 0–2° for 24 hrs. It appears that the ability of glucose and pyruvate to increase the acetate activity of these liver slices is related to a specific step in carbohydrate metabolism rather than solely to the fact that carbohydrates are excellent sources of energy.

Bioenergetic basis of light-induced fat deposition in the white-crowned sparrow. J. R. King and D. S. Farner (Lab. of Zoophysiol., State College of Washington). *Proc. Soc. Exptl. Biol. Med.* **93**, 354–359 (1956). In *Zonotrichia leucophrys gambelii* there is a striking deposition of fat in subcutaneous and visceral depots following prenuptial molt and preceding beginning of vernal migration. During the last 2 weeks of April, in natural populations, mean lipid indices increase from about 5% to more than 20%. A similar premigratory fat deposition occurs in captive birds under natural conditions of photoperiod and temperature. Measurements of metabolizable energy intake shows that fat deposition is accompanied by a marked increase in energy intake to levels of 30 to 50% above the preceding minima. This increase represents an altered physiologic state rather than simply the effect of more daylight for feeding since, during hyperphagia, the amount of daylight increases only 9%.

Effects of trans fatty acid isomers upon essential fatty acid deficiency in rats. R. T. Holman and E. Aaes-Jorgensen (Dept. Physiol. Chem., Univ. of Minn., Austin). *Proc. Soc. Exptl. Biol. Med.* **93**, 175–179 (1956). Feeding weanling male rats a diet free of essential fatty acids (EFA), containing 1% cholesterol, 2% sulfasuxidine, and 1% hydrogenated coconut oil for 3.5 months induced an EFA deficiency accompanied by severe testicular degeneration. The degeneration was partially corrected by supplementation with linoleate or linseed oil for 3 weeks. However, sperm were not found in the epididymis in any case. *Trans* isomers of linoleic acid were unable to induce recovery of the testis. The *trans* isomers inhibited growth, worsened the skin condition, and were found to be deposited in the animal fat.

Lipide analysis of cellular fractions in liver necrosis. W. E. Cornatzer and D. G. Gallo (Dept. of Biochem., Univ. North Dakota Med. Sch., Grand Forks). *Proc. Soc. Exptl. Biol. Med.* **93**, 287–290 (1956). Lipide analyses of cellular fractions in liver necrosis produced by the administration of bromobenzene was studied in the rat. A statistically significant decrease occurred in the total lipide, lecithin and cephalin phosphorus in the homogenate fraction of the necrotic livers as compared to the controls. However, the total cholesterol content was significantly increased. In the nuclei of the necrotic livers a decrease in the concentration of the lecithin phosphorus and an increase of total cholesterol were noted.

Paper chromatography in steroid determination. L. M. Reineke (Research Lab., The Upjohn Co., Kalamazoo, Mich.). *Anal. Chem.*, **28**, 1853–1858 (1956). Paper chromatography has been applied to the identification and quantitative determination of steroids obtained from microbiological and chemical transformations. A clear indication of the probable structure is obtained by ultraviolet absorption, chemical tests, and mobility (as compared to various known steroids) in a variety of solvent systems of both the Bush and Zaffaroni types. A quantitative procedure using light absorption at 224 and 242 mμ has been developed for progesterone and 11α-hydroxyprogesterone. This procedure eliminates the necessity for running blanks and steroid standards with each determination.

Prevention of inanition in vitamin B_6-deprived rats by insulin treatment. G. H. Beaton, A. M. Haufschild and E. W. McHenry (Dept. of Public Health, Nutrition, Univ. of Toronto, Toronto, Ontario, Canada). *J. Nutrition* **60**, 455–462 (1956). Insulin administration is a means whereby the food intake of vitamin B_6-deprived rats can be increased. This provides another method of separating the effects of inanition from those of the vitamin deficiency. By this method it has been ascertained that vitamin B_6 deficiency *per se* does not impair the deposition of fat in the rat. The decrease in fat storage usually seen in this deficiency is an unspecific effect. Changes in liver transaminase activities seem to be a specific effect of the deficiency.

Carotene in the ration of dairy cattle. II. The influence of suboptimal levels of carotene intake upon the microscopic aspect of selected organs. J. H. Byers, I. R. Jones, and J. F. Bone (Dept. of Dairying and Vet. Medicine, Oregon State College, Corvallis). *J. Dairy Science* **39**, 1556–1564 (1956). The feeding of suboptimum carotene rations for two or three generations resulted in abnormal reproductive behavior and often in damage to the pituitary, adrenal, and sex glands of the later generation animals. Third generation calves dead at birth or blind, weak, and dying, or killed shortly after birth usually showed constriction and degeneration of the optic nerve and a hydrocephalic condition. It would appear that the recommended carotene allowances for dairy cattle are too low if continuously fed beyond one generation.

Malathion in milk and fat from sprayed cattle. H. V. Claborn, R. D. Radeleff, H. F. Beckman and G. T. Woodard (U. S. Department of Ag., Kerrville, Tex.). *J. Agr. and Food Chem.* **4**, 941–952 (1956). Entomological studies have indicated that malathion, S-(1,2-dicarbethoxyethyl) 0,0-dimethyl dithiophosphate, is an effective insecticide against livestock pests, and toxicology studies have shown that it may be safely applied to livestock. However, before it could be recommended for use on beef and dairy cows it was necessary to determine whether its use as a spray would cause contamination of meat or milk. Hereford cattle were sprayed 16 times with 0.5% malathion. Fat samples taken 1 week after the last spraying contained no detectable amounts of the insecticide. When dairy cows were sprayed with 0.5 and 1.0% malathion the insecticide was present in all milk samples taken 5 hours after spraying, ranging from 0.08 to 0.36 p.p.m. Only traces were present 24 hours after spraying and samples taken 3 and 7 days after spraying were free of contamination.

Formation of short-chain fatty acids from cellulose, starch, and metabolic intermediates by ovine and bovine rumen microorganisms. T. V. Hershberger and O. G. Bentley (Dept. of Animal Science, Ohio Ag. Experiment Station, Wooster, Ohio). and J. H. Cline and W. J. Tyznik. *J. Agr. and Food Chem.* **4**, 952–956 (1956). Incubation of ovine rumen microorganisms *in vitro* with starch, maltose, or glucose, in combination with cellulose increased the amount and presumably the rate of formation of acetic, propionic, and butyric acids. Digestion of cellulose by bovine rumen microorganisms *in vitro* was decreased by alanine, α-ketoglutarate, and lactate, whereas the other metabolic acids added increased the formation of short-chain fatty acids. Approximately 40% of the carbon in cellulose and 50% of the carbon of glucose was recovered in the short-chain fatty acids. Further evidence is presented to support the hypothesis that the major pathway of propionic acid formation in rumen bacteria involves succinate decarboxylation.

Nutritional studies on rats on diets containing high levels of partial ester emulsifiers. I. General plan and procedures; growth and food utilization. B. L. Oser and Mona Oser. *J. Nutrition* **60**, 367–390 (1956). The plan of a chronic feeding study is described in which rats were maintained for two years on nutritionally adequate diets composed principally of natural ingredients, supplemented with 0, 5, 10 and 20% levels of partial ester emulsifiers or of hydrogenated vegetable oil. The emulsifiers were Myrj 45, Myrj 52, Span 60, Tween 60, Tween 65, Tween 80 and a mixture thereof. The parent generation consisted of 810 rats. Three successive generations comprising 1440 additional rats were likewise observed for growth, food efficiency and reproductive performance.

Bioassay for toxic factor in trichloroethylene-extracted soybean oil meal. V. Perman, C. E. Rehfeld, J. H. Sautter and M. O. Schultze(School of Vet. Medicine and Dept. of Ag. Biochem., Institute of Ag., University of Minnesota, St. Paul 1, Minn.). *J. Agr. Food Chem.* **4**, 959–963(1956). A bioassay with calves has been developed for estimation of the toxic factor in trichloroethylene-extracted soybean oil meal which is responsible for the production of a fatal aplastic anemia in the bovine. Using the thrombocyte count and the percentage of lymphocytes as the principal and the total leucocyte count and death as supplementary criteria of toxicity, it is possible to differentiate among the biological effects on calves of daily doses of 1/100, 1/40, 1/20, 1/8, 1/6, 1/4 or more pound per day per 100 pounds of body weight of a standard specimen of the toxic meal. Acute or prolonged aplastic anemia of different degrees of severity can be produced in calves by feeding different levels of toxic trichloroethylene-extracted soybean oil meal.

Relative value of carotene from alfalfa and vitamin A from a dry carrier fed at medium to high levels to Holstein calves. J. E. Rousseau, Jr., H. D. Eaton, R. Teichman, C. F. Helmboldt, E. L. Jungherr, and E. L. Bacon(Animal Industries Storrs Ag. Experiment Station, Conn.) and G. Beall. *J. Dairy Science* **39**, 1565–1573(1956). Plasma carotenoids and vitamin A concentrations increased at diminishing rates with an increase in the carotene intake from artificially dehydrated alfalfa. Liver carotenoids and vitamin A concentrations as well as vitamin A depletion time increased proportionally with increased carotene intake.

Effect of carbohydrate upon rancidity in experimental rations. P. Thomson and D. M. Hegsted(Dept. of Nutrition, Harvard School of Public Health, Boston, Mass.). *J. Nutrition* **60**, 361–365(1956). These studies have shown that the kind of carbohydrate used in a purified diet has an important effect upon the rate at which rancidity develops. Diets made with glucose were much more susceptible to auto-oxidation than those made with sucrose. The mechanism of the effect is unknown.

The effect of the thyroid on the conversion of intravenously administered aqueous dispersions of carotene to vitamin A in the rat. N. A. Worker(Biochem. Dept. Massey Ag. College, Univ. of New Zealand, Palmerston North). *J. Nutrition* **60**, 447–454(1956). The effect of the thyroid on the conversion of carotene to vitamin A has been studied in the rat, carotene being administered intravenously as an aqueous dispersion in Tween 40(polyoxyethylene sorbitan monopalmitate). From these results it is concluded that the thyroid is without effect on the conversion of carotene to vitamin A.

Effect of polyoxyethylene-8-monostearate (Myrj 45) on liver function in patients convalescing from hepatic disorders. Oscar R. Kruesi and T. B. Van Itallie(St. Luke's Hospital, New York, N. Y.). *Food Res.* **21**, 565–8(1956). Ten patients convalescing satisfactorily from hepatic disease were given 3 to 6 g. of polyoxyethylene-8-monostearate (Myrj 45) by mouth every day for periods ranging up to 66 days. These subjects were followed carefully from the standpoint of clinical course and liver function tests. During and after the period of Myrj 45 administration the patients continued to convalesce normally, both clinically and in terms of liver function.

Action of high doses of cholesterol upon the function of the adrenal cortex. Suphi Artunkal and Sefik Kayahan(Univ. Istanbul). *Turk Tip Cemiyeti Mecmuasi* **12**, 548–50(1955). Cholesterol was orally administrated to 10 persons and the changes in the 11-hydroxysteroid and the 17-ketosteroid excretion were determined. During cholesterol intake, 11-hydroxysteroid showed an increase of 400%, whereas 17-ketosteroid decreased. (*C. A.* **50**, 12216)

The effect of feeding rendered animal fat on milk production and milk composition. F. G. Harland, J. W. Stull, and R. N. Davis(Washington State Agr. Expt. Sta., Pullman). *Proc. 36th Ann. Meeting Western Div. Am. Dairy Sci. Assoc.* **1955**, 58–9. Feeding a concentrate mixture with 7 per cent added tallow does not significantly affect milk production or milk composition. The high-fat ration was palatable, readily eaten by all animals, and caused no digestive disturbances. Total blood serum lipides increased when the animals were fed the high-fat ration. (*C. A.* **50**, 12211)

Vitamin E content of Swedish margarine. V. Hellström and R. Andersson(Statens Inst. Folkhälsan, Stockholm). *Var föda* **8**, 9–12(1956). The average tocopherol content of margarine samples from 6 products taken over an 18-month period was 171 γ/g. The α fraction, the β, γ, and ζ fraction, the δ and ϵ fraction, and the inactive material accounted for 26, 63, 4 and 5% of the tocopherol content of these margarine samples, respectively. (*C. A.* **50**, 12328)

Relation of fat metabolism and bile acids. VI. Masanori Monzen(Univ. Hiroshima). *Hiroshima J. Med. Sci.* **4**, 305–9(1955). The total amount of fatty acids in the liver of rats(11.9%) fed a mixture of cholin-deficient diet and vitamin B_1 is decreased to 7.3% when cholic acid in daily doses of 0.04 g./kg. is injected simultaneously. Injection of 50 mg./kg. methionine daily with the choline deficient diet and vitamin B_1 produces 11.0% fatty acids, indicating that methionine has no lipotropic action. Simultaneous injection of cholic acid and methionine for 14 days decreased fatty acids to 7.2%. Similarly the injection of 0.04 g./kg. deoxycholic acid or dehydrocholic acid produced 0.3% and no fatty acids respectively. (*C. A.* **50**, 12208)

Nutritive value of whale oil IV. Comparison of nutritive value of glycerides and methyl esters. Hisashi Fujii, Shunichi Okura, and Mikio Mori(Japan Marine Products Co., Odawara). *Repts. Japan Marine Products Co. Research Lab.* **7**, 18–22(1956). The nutritive values of whale oil, oil hydrogenated with Cu and Ni as catalysts respectively, and the methyl esters of each were compared. The order of the nutritive values of glycerides was original, Cu hydrogenated, and Ni hydrogenated, but of methyl esters was Cu hydrogenated, original, and Ni hydrogenated.

V. Seborrhea caused by sperm whale oil and oxidized soya oil. Hisashi Fujii and Shunichi Okura. *Ibid.* 23–7. Rats fed oxidized soya oil had the same symptoms of seborrhea as rats fed whale oil, being especially noticeable with a diet of 20% oil content. Daily feeding of 10 *gamma* of biotin brought no relief.

VI. Nutritive value of hydrogenated whale oil with added essential fatty acid ester. *Ibid.* 28–30. The nutritive value of whale oil decreased upon hydrogenation. Studies were made concerning the effect of adding ethyl linoleate(10% of hydrogenated whale oil) to Ni hydrogenated whale oil and that prepared with Adkins catalyzer. The nutritive value of the former was remarkably improved, but no effect was noticed with the latter. (*C. A.* **50**, 12330)

• Drying Oils and Paints

Raymond Paschke, Abstractor

Detection of shellac in varnish and lacquers. M. V. Benenson, S. I. Gorlovakii, and F. A. Slutskaya(Lacquer and Paint Plant, Leningrad). *Derevoobrabatyvayushchaya Prom.* **4**(6), 17(1955). Shellac in varnish or lacquer is detected by forming a paste of ZnO and the material to be tested; the presence of shellac is shown by the development of a rose color. The test is specific, and is negative for the common natural and artificial resins. (*C. A.* **50**, 6069)

The production of some synthetic resins and their application in the paint and varnish field in France. J. Benveniste(Resin Res. Labs, Inc.). *Paint Ind. Mag.* **71**(11), 16(1956). 28 references.

Definition and determination of adhesion. M. N. M. Boers. *Verfkroniek* **28**, 333–5(1955). The methods for the determination of the adhesion of paints on supports are divided into 2 groups because of the different underlying principles. The methods of group 1 measure the attractive force between paint layer and support directly, namely as the strength at break through the interface, and the dimensions of the adhesion are expressed as force/unit of area; those of group 2 measure the energy required to remove (by stripping or peeling) the paint layer from the support over a fixed area, expressed as force/unit of length, similar to surface tension. The advantages and disadvantages of the methods are discussed. (*C. A.* **50**, 6065)

Bloom in varnished painting. N. Brommeller(Natl. Gallery, London). *Museums J.*(London) **55**, 262–6(1956). The bluish film which appears in varnished oil paintings, usually in damp weather, is more common in England than elsewhere. "Crystalline bloom" is caused by the deposition on the surface of $(NH_4)_2SO_4$ from the products of coal burning in the air. "Crater bloom" on the other hand is produced on a partially hardened varnish film by the impression of minute droplets of water which after evaporating leave shallow craters in the varnish. Bloom can be prevented by keeping the varnished surface dry during the critical stages of film hardening. The blooming of mastic, dammar, and polycyclohexanone varnishes can be lessened by the additions of small amounts of linseed oil. Details of bloom effects are shown by photomicrographs. (*C. A.* **50**, 6067)

The economic significance of organic colorants in coatings. N. S. Cassel(Interchemical Corp., N. Y.). *Am. Paint J.* **41**(5), 107 (1956).

Recent Navy experience with Saran and vinyl coatings. W. W. Crammer(U. S. Naval Shipyard, Philadelphia). *Corrosion* **12**, 245–6(1956). (*C. A.* **50**, 9758)

Maleic anhydride modified fish and linseed oils. A. Doadrio and J. Ma. Fernandez Marzol(Univ. Madrid). *Anales real soc. espan. fis y quim.*(Madrid) **51B**, 531–40(1955). (*C. A.* **50**, 7476)

Polymerization and drying of oils and esters of fatty acids. XII. Isomeric transformations in polymerization of oils and their study by the methods of spectrum analysis. A. Ya Drinberg and H. S. Chervinskaya. *J. Appl. Chem. U.S.S.R.* **27**, 919–25(1945). (*C. A.* **50**, 7476)

Copper-8-quinolinolate (solubilized) for fungus resistant maintenance paints. S. Goldfarb(Scientific Oil Compounding Co., Inc., Chicago.). *Am. Paint J.* **41**(12), 94(1956). Solublized copper-8-quinolinolate performs satisfactorily under all extreme operating conditions in food processing plants at the level of 10–14 ounces per gallon of paint, and eliminates mold growth on painted surfaces as long as the paint film remains intact on the surface. A standard laboratory method has been devised for testing fungicidal paints, the results of which have been correlated with practical use in food plants.

Film formers based on semi-drying oils. A. A. Ivanova. *J. Appl. Chem. U.S.S.R.* **28**, 683–92(1955). (*C. A.* **50**, 7470)

The effect of the particle size of pigments on their oil absorption. W. Kaufmann. *Deut. Farben-Z.* **10**, 45–6(1956). The oil absorption of common pigments, their fines (obtained by sedimentation), and of very finely ground pigments were determined. Milling in jet mills destroys the porosity of porous pigments and in such a case it lowers their oil obsorption. (*C. A.* **50**, 6810)

The curing of silicone resins. W. Krauss and R. Kubens(Farvenfabriken Bayer, Leverkusen, Ger.). *Deut. Farben-Z.* **10**, 1–7(1956). (*C. A.* **50**, 6811)

Products obtained from the catalytic curing of drying oils. F. J. Lopez Morales and A. Doadrio(Inst. Alonso Barba.). *Anales real soc. espan. fix. y quim.*(Madrid) **51B**, 541–8(1955). New catalysts for thermal polymerization of linseed and tuna fish oil were evaluated. The catalysts may in some cases operate by rearranging double bonds so that Diels Alder adducts are formed, but the principal effect on molecule weight increase is seen as interesterification during the process of dimerization. The observed advantages are further ascribed to a smaller proportion of cracking products formed on account of the shorter reaction time required. (*C. A.* **50**, 7476)

Synthetic drying oils. A. A. Peganov, L. I. Dobryakova, and Z. V. Kurochkina. *Akad. Arkhitekt. U.S.S.R. Inst. Stroitel. Tekh., Otdelochnaya Tekh., Sbornik* 1954(2), 51–3. Acid esters are the products of oxidation of kerosine and other light petroleum fractions. A new method gives an 80% yield. (*C. A.* **50**, 6067)

Development of an instrument for the measurement of the permanent elasticity and adhesion of color films. W. Pragst. *Farbe u. Lack* **62**, 59–62(1956). Paint or lacquer is applied to a rubber balloon mounted on a support similar to that used for a terrestrial globe. The balloon is connected to a small rubber bellows and a hand bulb through rubber tubing. The balloon is expanded by squeezing the hand bulb. The coated balloon is repeatedly expanded and deflated. More than one paint sample can be sprayed or brushed on the test balloon. The variation of the balloon volume can be small or great. This test allows a measurement of permanent elasticity while the Erichsen test allows only a single extension of a film. (*C. A.* **50**, 6809)

The formation of bubbles in coating materials. A. W. Rick. *Deut. Farben-Z.* **10**, 22–5(1956). A discussion is given of the conditions which lead to bubble formation. Air, water vapor, and gaseous decomposition products are the major sources of bubbles. (*C. A.* **50**, 9759)

Zinc dust as a protective pigment. O. Roder. *Farbe u. Lack* **62**, 51–8(1956). Zinc dust as a pigment provides cathodic protection for steel. Properly formulated Zn dust paints have excellent adhesion (particularly to Zn-plated steel), brushability and life, good hiding power and color properties, easy spray application, nontoxicity, nonskinning, and rust-preventive properties. However, the paints tend to settle rapidly, and to evolve H on storage. This can be avoided by adding the pigment only before use. (*C. A.* **50**, 6809)

Metal-reinforced linseed oil films. F. Schlenker(Chem. Werke Albrecht, Wiesbaden-Bierbrich, Ger.). A review of aluminum alcoholate catalyst for oil drying. 31 references. (*C. A.* **50**, 6810)

The utilization of sorbitol in the preparation of coating materials. E. Schwenk and Karl Hamann(Forschungs. Inst. Pigmente u. Lacke, Stuttgart). *Deut. Farben-Z.* **10**, 79–83(1956). Increasing sorbitol content increased the drying rate and hardness of the resins, but the sorbitol resins showed poorer through-drying than the glycerol resins. The dried films also were somewhat more water-resistant when more sorbitol was used. Because of the unfavorable functionality, sorbitol is not considered advantageous for use in alkyd resins. 16 references. (*C. A.* **50**, 8226)

Oleic acid as a film former. I. I. T. Taranenko. *J. Appl. Chem. U.S.S.R.* **27**, 745–7(1954). (*C. A.* **50**, 6811)

Comparative tests on the determination of the hardness of paint coatings. D. Wapler and K. Hamann. *Verfkroniek* **28**, 280–7, 305–9(1955). All known hardness-measuring methods and applications comprising those not damaging the coating and the scratch application are reviewed and tests with various types of oil-alkyd resin lacquers described. The importance of constant climatic testing conditions, especially relative humidity, for accurate comparative determinations of the hardness is emphasized. The hardness behavior cannot be expressed by one figure but is characterized by different hardness ''properties'' and one of these properties allows only limited conclusions about the others. The scratch test needs improving. 19 references. (*C. A.* **50**, 6566)

• Detergents

Lenore Petschaft Africk, Abstractor

Some newly developed lauryl ether sulfates. Anon.(Sipon Products Ltd.). *Soap, Perfumery, Cosmetics* **29**, 1367–9(1956). It has been found that the condensation of ethylene oxide with lauryl alcohol before sulfation yields a superior surface active agent with the following characteristics: 1. Viscosity of aqueous solutions decreases with increasing ether chain length. The viscosity is susceptible to addition of sodium chloride and free lauryl ether alcohol as well as being dependent on the concentration and temperature. 2. Cloud points decrease with increasing ether chain length. 3. Foaming properties are superior to those of conventional sodium lauryl sulfate. 4. Solutions of sodium lauryl ether sulfate show surface tension and interfacial tension characteristics which are more akin to those of nonionic ethylene oxide condensates than of sodium lauryl sulfate. 5. Solution of sodium lauryl ether sulfate shows excellent wetting characteristics in both hard and distilled water. Solutions of sodium lauryl ether sulfates remain clear in hard and distilled water.

Spectrophotometric determination of alkyl benzenesulfonate detergents in surface water and sewage. J. D. Fairing and F. R. Short(Monsanto Chem. Co., Dayton, Ohio). *Anal. Chem.* **28**, 1827–34(1956). A method for the determination of alkyl benzenesulfonates in surface water and sewage is based upon the isolation of the alkyl benzenesulfonate from interfering materials by solvent extractions of its 1-methylheptylamine salt, and measurement of the isolated benzenesulfonate by an improved methylene blue method. The procedure will measure less than 1 p.p.b. in water and 50 p.p.b. or less in sewage. It is not subject to any known interference from materials likely to be present in surface water or sewage.

Toxicity of synthetic detergents. C. Gomez Herrera. *Grases y aceites*(Seville, Spain) **7**, 156–61(1956). Toxic qualities of synthetic detergents are reviewed. Only cationic detergents require precautions. (*C. A.* **50**, 17489)

Theoretical investigation of foam drainage. W. M. Jacobi, K. E. Woodcock, and C. S. Grove, Jr.(Syracuse Univ., Syracuse 10, N. Y.). *Ind. Eng. Chem.* **48**, 2046–51(1956). An equation is theoretically derived and presented for correlating foam drainage as a function of liquid viscosity. Experimental data verify the equation through a large percentage of the foam drainage time.

Surface-tension measurements of aqueous solutions of sodium salts of some 18-carbon-atom fatty acids. P. Kivalo(State Inst.

Tech. Research, Helsinki). *Suomen Kemistilehti* 29B, 126–34 (1956). Surface tension of stearate, oleate, linoleate, and tall-oil soaps at 2 millimolar concentration is 53.2, 27.7, 30.3, and 28.0 dynes/cm., respectively. It was 37.0 dynes/cm. for both linolenate and ricinoleate soaps. Surface tension activity decreases as unsaturation increases but the stearate is an exception. (*C. A.* 50, 17488)

The action of sodium carboxymethylcellulose in laundry compositions—adsorption of wetting agents on solids in the presence of sodium carboxymethylcellulose. H. Kramer and P. Hoepfner. *Fette, Seifen-Anstrichmittel* 57, 340–4(1955). The surface tensions of aqueous solutions containing 0.02 and 0.03% Na carboxymethylcellulose (I) with up to 0.5% wetting agent and of a wetting agent alone were compared. The addition of I had no effect on the surface tension. The adsorption of wetting agents on cotton fabrics and suspension of bentonite and chalk were not affected by the presence of I. (*C. A.* 50, 17490)

Changes in pH, alkali resistance, alkali and acid neutralization of skin after different cleaning baths. F. Laube(Stadtischen poliklinik Haut-Geschlechtskrankheiten, Zurich, Switz.). *Dermatologica* 112, 453–67(1956). Strongly alkaline cleaning agents, especially when combined with strongly defatting alcohol sulfonates, lower the pH of the skin for a few hours by at least 2 units and the alkali resistance of the skin is strongly reduced. With mild soap and washing agents made with alcohol sulfonate alone this action is less marked. If the skin was washed with almond bran water, salt solution, tap water, "Sinalca soap" or "Emavon," the pH and alkali resistance were scarcely altered. (*C. A.* 50, 17490)

Stabilization of active oxygen in washing, bleaching, and rinsing agents containing perborate. K. Lindner. *Fette, Seifen-Anstrichmittel* 57, 575–82(1955). An analytical study of the interaction among various components of bleaching and rinsing liquors as well as washing liquors containing perborate and the stabilizers, also between various stabilizers. Among the first is included soaps, polypeptides, alkali silicates, condensed phosphates, and the synthetic washing agents. The stabilizers discussed are those of the Mg binding type and the alkali salts of aminopolycarboxylic acid. (*C. A.* 50, 17489)

Evaluation of detergent power. L. Merlo and C. Coletti(Soc. Montecatini, Milan). *Olii, minerali, grassi e saponi, colori e vernici* 33, 138–41(1956). Various apparatus for the determination of detergent power (launderometer and detergimeter both static or in movement) do not give consistent results. It is proposed to use for comparison a standard soap containing 25% each of Na oleate, laurate, palmitate, and stearate. This soap shows (0.1% solution): pH 10.0, surface tension 41.40 dynes/cm., foam number after 45 minutes 250, dispersing power 10%, viscosity 1.24 centiposes, detergent power of a 0.2% solution determined on the St. Gallen dirt fabric (av. of 20 determinations) 74.5 ± 5.5. (*C. A.* 50, 17489)

Distinction between long-chain cation-active compounds of ampholytes and amine salts. R. Neu(Firma Dr. Willmar Schwabe G.m.b.H., Karlsruhe, Ger.). *Fette, Seifen, Anstrichmittel* 57, 568–70(1955). N. describes a method for analysis of surface-active compounds. Long-chain compounds form colored ammonium complexes which precipitate in the presence of $(Ph_2B)_2O$. The amine salts yield yellow filtrates while those of the cation-active compounds and of the ampholyte-active ones are reddish. Similar short-chain compounds do not precipitate under these conditions. (*C. A.* 50, 17488)

Sugar based detergents. L. Osipow, F. D. Snell, Dorothea Marra and W. C. York. *Soap & Chem. Specialties* 32(12), 47–9, 81 (1956). *Monoacyl* esters of sucrose containing 12 to 18 carbon atoms in the acyl group are readily formed by the alcoholysis of methyl esters with sucrose in the presence of a basic catalyst. Evaluation studies indicate that these esters are emulsifying agents and good detergents. They are sufficiently stable to hydrolysis for use in cotton detergency applications. Nontoxicity indicates particular usefulness in cosmetic, pharmaceutical, and food applications.

Detection of surface-active alkylaryl sulfonates by alkaline fusion and formation of an azo dye. M. J. Rosen and G. G. Goldfinger(Brooklyn College, Brooklyn, N. Y.). *Anal. Chem.* 28, 1979–81(1956). Surface-active agents containing the alkylaryl sulfonate group may be detected by the purple, red, or orange color produced when the phenol obtained from their fusion with potassium hydroxide reacts with diazotized dianisidine. Compounds containing nitro or halo substituents on the benzene ring give false negatives.

Possible applications of the p-toluidine method in analysis of syndets. H. Stupel and A. v. Segesser. *Fette, Seifen, Anstrichmittel* 57, 344–6(1955). The ability of *p*-toluidine to form complexes with alkylarylsulfonates can be utilized effectively for analysis of detergents and for control in production. The method is adaptable for determination of the molecular weight of active detergents, for estimation of hydrophilic groups, such as disulfonates, and for production control of primary raw materials and sulfonation reactions. The suggested procedures are described. (*C. A.* 50, 17489)

Detergent compositions. A. G. Peck(Peck's Products Co.). *U. S. 2,758,092.* The method is described of increasing the stability and volume of suds of an alkyl aryl sulfonate-containing aqueous detergent solution in the presence of grease soil, comprising adding to an alkyl aryl sulfonate selected from the group consisting of the triethanolamine salt of dodecyl benzenesulfonic acid, approximately 10 percent to 50 percent by weight with respect to said sulfonate of an alkali metal N-oleoyl-N-methyl taurate.

Method of amalgamating and extruding soap. D. E. Marshall. *U. S. 2,767,437.* A method and apparatus is described for thoroughly homogenizing and at the same time mechanically refining high viscosity chips or powders to be processed into an extruded bar which is perfectly amalgamated and free from cracks. The apparatus develops the needed pressure without generating heat beyond an amount which can be easily dissipated.

Detergent compositions. A. D. Scott(Lever Brothers Co.) *U. S. 2,768,956.* A detergent composition consists of an alkyl aryl sulfonate detergent and from 1 to 30% by weight of the detergent of a non-detergent compound which improves the persistence of the lather during washing. This additive is an acylphenol or monoether derivative thereof with polyhydric alcohols.

Detergent purification. V. A. Sullivan, Jr. and Z. J. Ptasinski (The Stepan Chemical Co.). *U. S. 2,768,957.* A detergent purification process is described for producing low-sulfate content anionic sulfonated detergents. Following the steps of sulfonating, washing and neutralizing, the water-soluble alkyl aryl anionic sulfonated detergent having a long aliphatic chain of 8 to 22 carbon atoms and 1 to 20 weight percent of alkali metal sulfate salt is further purified by mixing the composition with substantially an equal weight of ethanol and an amide derivative derived from a C_{12}–C_{14} fatty acyl diethanolamide.

Detergent builders. MacLeans, Ltd. *Brit. 750,126.* Jellies or viscous solutions suitable for use as detergent builders, stabilizers, and other purposes, comprise at least two different carbohydrate complexes or derivatives mixed at an elevated temperature in an aqueous medium. The carbohydrate complexes and derivatives may be selected from agar-agar, carragenin, CMC, or gum tragacanth. Mixing should be conducted at a temperature within the range of 45–105°.

Improvements in soapless detergent compositions. Unilever Ltd. *Brit. 751,273.* An all-purpose detergent composition for use in hard and soft water consists primarily of a salt of an aliphatic N-substituted aminocarboxylic acid such as the sodium salts of N-dodecyl-beta-alanine, an aliphatic acyl aminoalkane sulfonate and a C_{10}–C_{18} alkyl sulfate combined with various builders and inert materials.

Detergent compositions. A. H. Lewis and R. D. Stayner(California Research Corp.). *U. S. 2,772,239.* It has been found that upon adding to a detergent composition containing a water-soluble salt of a straight-chain C_8–C_{18} alkyl sulfuric acid as its active organic detergent ingredient, from about 5 to about *50% of para-n*-acylphenol having from 8 to 16 carbon atoms based on the weight of the water-soluble alkyl sulfate, dilute aqueous wash solutions of the resulting detergent composition will produce a stable foam of good quality, capable of persistence under the conditions of agitation in the presence of soiled laundry.

Particulate detergent compositions. L. B. Ricciardi(Colgate-Palmolive Co.). *U. S. 2,770,600.* An organic synthetic detergent of any type has improved flowability, less static, lack of tackiness and is relatively free of caking tendency and dust by the addition of from ¼ to 10% by weight of powdered anhydrous aluminum silicate prepared by calcining kaolin and having the approximate formula $Al_2O_3 \cdot 2SiO_2$, the final composition having an increased bulk density similar to other spray dried formulations.