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

• Oils and Fats

Ralph W. Planck, Abstractor
Dorothy M. Rathmann, Abstractor

The component acids of the fats of some Indian fresh-water fishes. S. F. Pathak, G. D. Pande, and S. S. Mathur(Dept. Ind. Chem., Banaras Hindu Univ., India). *Biochem. J.* **57**, 449 (1954). The composition of body and visceral fats from rohu *(Lobeo rohita)* and nain *(Cirrhina mrigala)* have been studied. Preliminary separations of the fatty acids into groups differing in unsaturation were carried out using the lithium and lead salts in acetone and ethanol respectively. Their compositions were studied by the ester-fractionation procedure. Significant differences between the rohu and nain were found in the proportions and degrees of unsaturation of their C_{16}, C_{18}, C_{20}, and C_{22} groups of unsaturated acids and in the amounts of total saturated acids and of stearic acid. The fat content of the viscera of these fish is about 45%.

Animal Fats. 3. The component acids of ostrich fat. F. D. Gunstone and W. C. Russell(Chem. Dept., Univ. of Glasgow, Scotland). *Biochem. J.* **57**, 459(1954). A quantitative study of the component acids of ostrich fat is reported, and the results are correlated with those previously reported for other bird fats. Palmitic (24.8%), oleic (39.8%), and octadecadienoic acids (17.1%) are the major components, while myristic, stearic, arichidic, hexadecenoic, polyethenoid C_{16}, octadecatrienoic and higher unsaturated acids are also present.

Animal Fats. 4. The component acids of crocodile fat. F. D. Gunstone and W. C. Russell(Chem. Dept., Univ. of Glasgow, Scotland). *Ibid.*, 463(1954). The component acids of two samples of crocodile fat, *Crocodylus porosus* and *C. niloticus* are reported. Each oil contained similar quantities of saturated acids (33-35%), mainly palmitic (24-27%), but differed in the proportions of the various unsaturated acids. These differences are particularly evident in the content of hexadecenoic acid, octadecadienoic acid, and the unsaturated C_{20-22} acids.

Distribution of short-chain fatty acids in water and carbon tetrachloride at 20°, 25°, and 30°C. G. N. Bhat, B. C. Y. Lu, and A. I. Johnson(Univ. of Toronto, Ont., Can.). *Can. J. Tech.* *32*, 151(1954). Modified Othmer-Tobias plots have been presented for results on the distribution of short-chain fatty acids in water and carbon tetrachloride at 20°, 25°, and 30°C., and an equation was derived representing the data.

Some observations on volatile fatty acids in the sheep's rumen. E. F. Annison(Rowett Research Inst., Bucksburn, Aberdeenshire and A.R.C. Inst. of Animal Physiol., Babraham, Cambridge, England). *Biochem. J.* **57**, 400(1954). The presence of *iso*butyric, *iso*valeric and dextrorotatory 2-methylbutyric acids in the rumen of sheep maintained on various diets has been demonstrated.

Total free acids of olive oil as influenced by the variety and the storage method of olives. S. Castorina. *Olivicoltura* **6**(7), 12-16(1951). The free fatty acid content of oil from 6 varieties of fresh olives was found to be 0.28-0.56% soon after extraction, 0.33-0.62% after a month's storage, and 0.41-0.62% after 6 months' storage. For oils from olives that were stored one month on a trellis, the corresponding values were 0.62-2.76, 0.76-2.96, and 0.90-3.47%. Additional data for other storage conditions are included.

Inhibition of the oxidized flavor of milk with chelating compounds. L. R. Arrington and W. A. Krienke(Florida Agr. Exp. Station, Gainesville). *J. Dairy Sci.* **37**, 819-824(1954). Samples of normal milk were treated with copper to induce oxidized flavor and at the same time were treated with certain chelating compounds. The chelates, which were the disodium salt, the disodium calcium salt, and the tetrasodium salt of ethylenediamine tetraacetic acid (EDTA), were effective in preventing development of the oxidized flavor. Quantities of the chelates which were five times the amount of added copper on a molar basis provided complete protection, and smaller quantities of the chelates gave some inhibitory action. The chelates were equally effective when added either before or after pasteurization or when added prior to or after the addition of copper.

Fatty acids. Part II. The nature of the oxygenated acid present in Vernonia anthelmintica (willd.) seed oil. F. D. Gunstone (Univ. of Glasgow, Glasgow, Scotland). *J. Chem. Soc.* **1954**, 1611-16. Vernolic acid, reported to be 11-hydroxyoctadec-9-enoic acid (Vidyarthi, *Patna Univ. J.* 1, 51[1945]) was shown to be 12:13-epoxyoctadec-9-enoic acid. The approximate composition of *V. anthelmintica* seed oil has been determined.

Ignition behavior of the hexanes. J. E. Johnson, J. W. Crellin, and H. W. Carhart(Naval Research Laboratory, Washington, D. C.). *Ind. Eng. Chem.* **46**, 1512-16(1954). The ignition patterns developed in the present study gave a clear picture of the differences in ignition character of compounds as affected by changes in oxygen partial pressure and temperature. Particularly under conditions in which ignition was controlled by the mechanism of low temperature oxidation, the results revealed the effects of molecular structure on ignition and illustrated the complexity of the processes involved.

Detection of adulteration of butter with vegetable oils by means of the tocopherol content. J. H. Mahon and R. A. Chapman(Food and Drug Laboratories, Ottawa, Canada). *Anal. Chem.* **26**, 1195-98(1954). The tocopherol content of butter oil should be a valuable index of adulteration with vegetable oils other than coconut. In order to take advantage of this fact, a rapid procedure for the determination of total tocopherol in butter oil has been developed employing a modification of the Emmerie and Engel colorimetric method. Butter oils with tocopherol values of less than 50 γ per gram oil should not be considered adulterated on the basis of the tocopherol values, although such butters might be adulterated with lard, tallow, or coconut oil. Butter oils with tocopherol values of 50 to 60 γ per gram of oil should be considered suspicious and tocopherol values in excess of 60 should definitely indicate adulteration.

Characterization of essential oils by chromatography. R. H. Reitsema(A. M. Todd Co., Kalamazoo, Mich.) *Anal. Chem.* **26**, 960-63(1954). A method for the rapid inspection of a large number of essential oils was needed. It was desirable that the method characterize various oils by the patterns they produced as well as give tentative identification of major constituents. Chromatoplates were prepared by coating glass plates with silicic acid using starch as a binder. After development, the plates were inspected under ultraviolet light for ultraviolet-active materials. The plates then were sprayed with an acidic solution of 2,4-dinitrophenylhydrazine and inspected under visible and ultraviolet light to detect ketones. After heating, the plate was again inspected under visible and ultraviolet light to detect heat- and acid-sensitive materials. As a result of this study the identity of many essential oils could be indicated. Variation in condition of the adsorbent was minimized by use of the plates. The five-stage inspection of the plates gave opportunity for characterization not often possible in a single chromatogram.

Constituents of the seeds of Corchorus olitorius, L. Part II. Isolation of β-Sitosterol and Corchorolic acid. G. Soliman and W. Saler(Alexandria University, Moharram Bey, Alexandria). *J. Chem. Soc.* **1954**, 1506-8. β-Sitosterol occurs in the seeds of *Corchorus olitorius* and *C. capsularis.* The sterol isolated from the Indian jute seeds and claimed to be new was not found in the Egyptian varieties. The yellow substance obtained from the alcoholic extract of the seeds proved to be a mixture of a phenol and an aliphatic hydroxy-acid, corchorolic acid, $C_{26}H_{52}O_3$.

A method for the determination of total lipides and water in brain tissue. W. M. Sperry(Columbia Univ., New York, N. Y.). *J. Biol. Chem.* **209**, 377-86(1954). A method was described for the semimicro, gravimetric determination of lipides in brain tissue; it was designed to avoid the errors which may result from non-representative sampling, evaporation of water during the disintegration of the tissue, incomplete extraction, the presence of non-lipide contaminants, and oxidative degradation. Water was also determined in the same sample of tissue from which the lipides were extracted. The procedure avoided the errors which result from drying tissue at high temperature. An apparatus was described for the disintegration of a tissue in a closed space without the addition of a liquid or any other substance.

Cottonseed contents variation, influence of variety and environment on oil content of cottonseed kernels. M. F. Stansbury, A. F. Cucullu(Southern Reg. Res. Lab., New Orleans, La.), and G. T. D. Hartog(U.S.D.A., Beltsville, Md.). *J. Agr. Food Chem.* 2, 692-96(1954). The oil contents of moisture-free cottonseed kernels from the seed of 8 commercial varieties of cotton grown at 13 locations during 3 years ranged from 26.8 to 43.4%. Analysis of variance indicated that both variety and environment have a highly significant influence on the oil content. Correlations on a basis of years in locations between oil content of the kernels and temperature for six periods of boll and seed development showed that the highest correlation was obtained for mean maximum temperature during the maturation period. Similarly, the highest correlation between oil content and rainfall for rain-grown cottons was obtained for the same period. Rainfall had a significant influence on oil content even when temperature was held constant, and maximum temperature significantly influenced oil content when rainfall was held constant. Maximum temperature and rainfall appeared to be of nearly equal importance in influencing oil content under the conditions of investigation. A considerable part of the environmental variation in oil content is due to other factors. There was no statistically significant difference in the response of any of the varieties to variations in temperature and rainfall.

Production of fatty alcohols by sodium-alcohol reduction. II. Influence of monoglycerides and diglycerides on these reductions. F. Ramos Ayerbe, J. A. Fiesta and A. Rey Saez. *Anales de la Real Sociedad Espanola de Fisica Y Quimica Serie B—Quimica* **50**, 427-430(1954). Analogous results were obtained whether transesterified fats or fats not subjected to such treatment were reduced by sodium and alcohol. Monoglycerides were reduced successfully by sodium alone and in as good a yield as that obtained when ethanol was used in conjunction with the metal. A sodium-glycerol reducing mixture gave lower yields of fatty alcohols than those obtained when monoglycerides were treated directly with the metal or when reduction of the glycerides was effected with sodium and ethanol. From these results it is concluded that the hydroxyl groups in the monoglycerides are more reactive than those of glycerol under the given experimental conditions.

Technology of German margarine. J. Kremerskothen. *Seifen-Ole-Fette-Wachse*, **80**, 295-297(1954). The principles and techniques of margarine production are surveyed briefly.

A simple rapid method for the determination of "solids" in tallow fatty acids. M. M. Loury and Mme. M. Juillard. *Revue Francaise des Corps Gras* **1**, 137-143(1954). Crystallization from symmetrical dichloroethane at —20°C. provides a relatively simple method for the separation of the solid and liquid fatty acids of tallow and vegetable oils. The simplest form of the procedure gives results which come within several percent of the values obtained by the Bertram method. Possibilities of applying the procedure on a routine basis and adapting it to a micro scale are indicated.

The evolution of vegetable oil technology in Italy. T. N. Plebani. *Olii Minerali-Grassi e Saponi-Colori e Vernici* **31**, 83-92 (1954). Changes and improvements in the recovery and refining of seed oils and olive oil in Italy are reviewed.

Sin'itiro Kawamura, Abstractor

Higher fatty acids-dehydrogenase in plant seeds. I. In green soybeans. H. Fukuba and H. Komaru(Univ. Tokyo). *J. Agr. Chem. Soc. Japan* **28**, 74-8(1954). The extract of green soybeans had the enzymic action of dehydrogenating myristic, palmitic, stearic, oleic, linoleic, and α hydroxy, 12-hydroxy, 9,10-dihydroxy-, and 9,10,12-trihydroxystearic acids. This enzyme had maximum activity at pH 6.8 and 35-40°. By the use of 2,3,5-triphenyltetrazolium chloride, as the hydrogen acceptor and the indicator, the enzyme reaction was proved to proceed linearly with time.

Higher fatty alcohols. VII. Sodium reduction and alkali isomerization of linseed and soybean oils. S. Masuyama(Osaka Municipal Tech. Res. Inst.). *J. Agr. Chem. Soc. Japan* **28**, 383-6(1954). The 2 oils were reduced by means of Na and ethylene glycol monoethyl ether (Cellosolve) by the Bouveault-Blanc reaction with good yields of alcohols. Soybean oil alcohols were obtained in good yield by using urea instead of water to decompose the Na alkoxides. The fatty alcohols were isomerized by alkali treatment and examined by ultraviolet spectrography to determine the degree of conjugated unsaturation.

Rapid method for the determination of fats in foods. H. Fukuba, N. Yamazawa, and C. Inagaki(Ochianomizu Women's Univ. Tokyo). *J. Agr. Chem. Soc. Japan* **28**, 59-62(1954). The saponification method of Van de Kamer *et al.* (*J. Biol. Chem.* **177**, 347[1948]) was modified. For starchy foods the concentration of alcohol used in the saponification should be sufficiently high.

Cuttle-fish oil. II. The constituents of free fatty acids. I. Tsujino(Hokkaidō Univ.). *J. Agr. Chem. Soc. Japan* **28**, 56-9 (1954). The dark oil (acid no. 124) obtained from the foots produced by purifying crude cuttle-fish oil contained as free fatty acids about 31.1% solid acids and about 68.9% liquid acids; saturated acids found were C_{14} to C_{22} acids inclusive and unsaturated acids found were $C_{16}H_{30}O_2$, $C_{18}H_{34}O_2$, $C_{20}H_{38}O_2$, $C_{22}H_{42}O_2$, $C_{18}H_{30}O_2$, $C_{18}H_{28}O_2$, $C_{20}H_{32}O_2$, $C_{22}H_{36}O_2$, and $C_{22}H_{34}O_2$.

The effect of kneading on butter (margarine) emulsions. S. Horiki and J. Mikumo. *Res. Rept. Nagoya Ind. Sci. Res. Inst.* **2**, 49-51(1950). In making margarine emulsion the type of emulsion became water-in-oil type after kneading irrespective of the type before kneading. Experiments were made with varying amounts of NaCl solution, and with monostearyl glyceride or K oleate as emulsifier. The mechanism of the inversion of emulsion type was discussed.

Phosphatide components in the foots of petroleum naphtha-extracted soybean oil, and the preparation and refining of the phosphatide. Yoshiyuki Toyama and T. Toyama. *Res. Rept. Nagoya Ind. Sci. Res. Inst.* **4**, 56-61(1951). Commercial soybean phosphatide from the foots was investigated and lecithin, kephalin, diglyceride phosphoric acid ester, monoglyceride phosphoric acid choline ester (lysolecithin), and jecorin were detected. The phosphatide was purified by steaming and H_2O_2 treatment. The purified phosphatide was applicable as the emulsifier for coconut oil and water emulsion.

Bleaching of rice-bran oil of high acid number. Yoshiyuki Toyama, T. Toyama, and N. Hachiya. *Res. Rept. Nagoya Ind. Sci. Res. Inst.* **3**, 46-52(1951). Several samples of dewaxed rice-bran oil were successfully decolorized by the simultaneous application of sulfuric acid, oxalic acid, active clay, and hydrogen peroxide. Dilute (1 or 5%) H_2SO_4 was more suitable than concentrated (66° Bé). $HNaSO_4$ solution was also a good decolorizing agent. Experiments were made with iron vessels as decolorizing apparatus and as the container of bleached oil.

Solvent fractionation of rice-brain oil of high acid number. Yoshiyuki Toyama and Yasuhisa Toyama. *Res. Rept. Nagoya Ind. Sci. Res. Inst.* **4**, 61-7(1951). Comparatively low concentration (70-85%) of either methanol or ethanol was suitable for extraction of dissolved free fatty acids. Methanol was more efficient extractant of free acids than ethanol. Single treatment with methanol was insufficient; repeated extraction with more concentrated methanol or repeated treatment at elevated temperature was favorable.

The highly unsaturated acids in sardine oil. XIX. Ultraviolet absorption measurements of highly conjugated acids obtained by the alkali isomerization. Y. Toyama and T. Yamamoto (Nagoya Univ.). *J. Oil Chemists' Soc., Japan* **2**, 250-2(1953). Highly unsaturated fatty acids (neutralization no. 176.6, I no. 390.0) obtained from dewaxed sardine oil was isomerized in N_2 stream with 21% KOH-glycol at 180° for 15 min. Pale yellow solid conjugated acids chiefly of C_{22} acids were fractionated into 4 fractions by successive crystallizing from hexane. Ultraviolet absorption measurements were made on these 4 fractions. The fraction melting at 110-120° gave the following specific absorption coefficients: 330 mμ, 300.0; 346 mμ, 274.7; 316 mμ, 222.2; and 374 mμ, 60.7. This corresponds to conjugated pentaenoic acid.

Oils of plants grown in Kyushu (Japan). I. Components of the oil of Machilus thunbergii. T. Takeshita(Univ. Kagoshima). *J. Oil Chemists' Soc., Japan* **2**, 239-41(1953). This oil, d^{25}_{25} 0.9340, n^{25}_{D} 1.4619, acid no. 13.6, saponification no. 242.5, I no. (Wijs) 52.6, unsaponifiable matter 1.97%, contained capric and lauric acids as the chief components (about 60%), some oleic acid, and small amounts of linoleic, palmitic, and stearic acids.

Properties and composition of some Japanese vegetable oils. S. Ueno(Kinki Univ., Fuse, Osaka). *J. Oil Chemists' Soc., Japan* **2**, 241-6(1953). The botanical name of the plant from whose seeds the oil was obtained, fat content of dry seeds, the properties of seed oil (d, n^{20}_{D}, saponification no., I no., unsaponifiable matter X %), and the composition of seed oil follow. *Perilla frutescens* var. *crispa*, 31.2%, 0.9308/20°, 1.4820, 190.0, 190.0, 1.2, palmitic, stearic (a little), lauric trace), oleic (a little), linolenic (main). *Nandina domestica*, 4.6%, 0.9355/15°, 1.4742, 181.8, 132.1, 4.56, palmitic, stearic, oleic, linoleic, linolenic (trace) acids. *Sorbus japonica*, 26.5%, 0.9284/15°, 1.4752, 202.1, 124.0, 1.91%, stearic, palmitic, linoleic acids and acids with 1, 2, and 3 (trace) double bonds. *Cleodendron tricotomum*, 35%, 0.9236/15°, —, 187.2, 101.0, 1.0, palmitic, higher saturated (small amounts), linoleic, other acids with 2 double bonds, and a conjugated dienoic acid.

The liver oil of a cod, Lotella phycis. T. Agawa, Y. Hirao, and S. Komori(Osaka Univ.). *J. Oil Chemists' Soc. Japan* **2**, 246-9 (1953). This oil (2 samples), acid no. 5.2, 4.2, saponification no. 173.9, 180.6, I no. 115.8, 108.4, unsaponifiable matter 16.2%, 34.9% (very high), Ac value of unsaponifiable matter 171.1, 163.4, I no. of unsaponifiable matter 85.6, 73.9, vitamin A 1000, 1000 I.U./g., contained 13-14% solid fatty acids (palmitic and a little myristic) and more than 50% octadecenoic acid. The unsaponifiable matter contained cetyl alcohol, docosanol, and eicosanol. The unsaponifiable matter was hydrogenated to give hardened wax of m.p. 58-62° and distilled glyceride was a good material for hydrogenated oil.

PATENTS

Production of palmitic acid. H. G. Kirschenbauer (Colgate-Palmolive Co.). *U. S. 2,682,549.* Fatty material containing polyunsaturated fatty acids is selectively hydrogenated so as to convert the polyunsaturated acids to oleic acid, and heated in the presence of excess alkali so as to convert oleic to palmitic acid.

Solvent treatment. H. H. Young and H. C. Black (Swift and Co.). *U. S. 2,682,550.* Material causing reversion in flavor and odor of superglycerinated refined fats is removed by treating the crude monoglycerides with lower alkyl ester of phosphoric acid at temperatures resulting in the formation of a single phase. This mixture is cooled until two phases form. The phase containing purified monoglycerides is separated from the phase containing color and flavor-reversion materials.

Recovery of fatty oils. R. Miller (The Chemical Foundation). *U. S. 2,682,551.* Oil is separated from a mixture of oil and nonoleaginous solids by countercurrent extraction with a liquefied, normally gaseous, hydrocarbon.

Refining of vegetable, marine and animal oils containing phosphatides. D. W. Dron (The DeLaval Separator Co.). *U. S. 2,683,155.* In a continuous process, a hydrating medium is injected into and mixed with a stream of crude oil; a caustic refining agent is added in an amount sufficient almost to neutralize the free fatty acids; the mixture is immediately centrifuged to remove precipitated phosphatides; the oil phase is mixed with more caustic refining agent to complete the neutralization of the fatty acids; the mixture is re-centrifuged to remove soaps. Throughout this process, contact with the atmosphere is avoided.

Antioxidant composition. A. E. Hoffman, J. A. Chenicek and H. E. Whitmore (Universal Oil Products Co.). *U. S. 2,683,694.* The antioxidant consists of solid particles containing 50-90% by wt. of butylated hydroxyanisole and 10-50% by wt. of propyl gallate.

• Biology and Nutrition

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

Studies on the metabolism of Mycobacterium tuberculosis. IV. The effect of fatty acids on the growth of M. tuberculosis var. hominis. Anne S. Youmans and G. P. Youmans. *J. Bacteriology* **67**, 731-3 (1954). The rate of growth of H37Rv strain of *M. Tuberculosis* var. *hominis* was determined on synthetic media containing fatty acids (C_1 to C_{18}) in place of glycerol. With the exception of formic acid, all fatty acids supported growth to some degree but the effective range was narrow for each. Lower fatty acids were more effective than higher ones. Caprylic and capric acids stimulated growth to about the same extent as 2% glycerol in the media. Among the fatty acids having 12 carbons or less, there was an inverse relationship between molecular weight and effective concentration.

A procedure for demonstrating the presence of carotenoid pigments in yeasts. W. J. Peterson, T. A. Bell, J. L. Etchells and W. W. G. Smart, Jr. *J. Bacteriology* **67**, 708-13 (1954). When pigmented yeasts of the *Rhodotorula* genus were grown in nonsynthetic media which were highly buffered or contained complex organic materials, such as peptone or casein hydrolyzate, the pigments were released for extraction with acetone only by the use of strong acid and heat. Yeasts grown in Wickerham's synthetic broth (containnig 2% glucose) contained pigments which could be extracted readily with cold acetone. Carotenoids could be found in all red and orange species of yeasts grown in nonsynthetic media (i.e., glucose broth) by heating the cells with 0.5 *N* HCl for 15 min. at 100°, followed by extraction with acetone. This acid treatment destroyed or altered pigments from certain yellow pigmented-yeasts.

Studies of the incorporation of palmitate-1-C^{14} into tissue lipides in vitro. Lillian A. Jedeikin and S. Weinhouse (Lankenau Hosp. Research Inst. for Cancer Research, Phila., Pa., and Dept. of Chem., Temple Univ.). *Arch. Biochem. Biophys.* **50**, 134-147 (1954). Coenzyme A was found to stimulate incorporation of palmitate into phospholipids. This indicates that the fatty acid ester bonds of phosphatides are formed by stepwise transesterification between acyl coenzyme A and either glycerophosphorylcholine or glycerophosphate. A similar mechanism is probably not involved in the formation of the glyceride ester bond.

Studies of the mechanism of vitamin E action. II. Inhibition of the unsaturated fatty acid oxidation catalyzed by hematin compounds. A. L. Tappel (Dept. of Food Tech., Univ. of Calif., Davis, Calif.). *Arch. Biochem. Biophys.* **50**, 473 (1954). Further studies of the possible biological role of α-tocopherol as an inhibitor of the unsaturated fatty acid oxidation catalyzed by hematin compounds are reported. The phenolic antioxidants: α-tocopherol, nordihydroguaiaretic acid, propyl gallate, and butylated hydroxyanisole were effective inhibitors of linoleate oxidation catalyzed by hemoglobin and cytochrome c. Vitamin A and carotene were cooxidized during hemin-catalyzed oleic acid oxidation. α-Tocopherol inhibited vitamin A and carotene cooxidation and the rate of total oxidation. Methylene blue strongly inhibited hemin-catalyzed oxidation of oleic acid, cod-liver oil, and linseed oil emulsions but was not an effective inhibitor of auto-catalytic oxidation. The compounds which have *in vivo* vitamin E activity or their structural analogs strongly inhibited hemin, hemoglobin, and cytochrome c-catalyzed oleic acid oxidation. The evidence in favor of α-tocopherol functioning as an inhibitor for *in vivo* unsaturated fatty acid oxidation catalyzed by hemin compounds is discussed.

Suppositories of cacao butter: transfer of water-soluble medicines in vitro. A. Del Pozo. *Galenica Acta* (Madrid) 6, 91-101 (1953). The rate of dialysis of KI from a cacao butter suspension was improved by the incorporation of lanette wax and Aerosol OT. (*C. A.* 48, 5443)

Orange carotenoids, polyoxygen carotenoids of Valencia orange juice. A. L. Curl and G. F. Bailey (U. S. D. A., Albany 6, Calif.). *J. Agr. Food Chem.* 2, 685-690 (1954). Because the carotenoid pigments of stored orange juice products may be a potential source of off flavors, the composition of the pigment mixture in fresh Valencia orange juice has been investigated. The saponified carotenoids were separated by counter-current distribution into six fractions, three of which were previously reported to yield a total of eight constituents on chromatography. The other three fractions yielded 17 constituents, 10 of which were apparently different xanthophylls, the other seven stereoisomers. Five components were very probably antheraxanthin, mutatoxanthin, violaxanthin, auroxanthin, and zeaxanthin epoxide-furanoxide. Two other components were tentatively identified, while three were apparently previously undescribed. All 17 were apparently either xanthophyll epoxides or the corresponding furanoxides, which are, in general, less stable than the simpler carotenoids, especially in an acid medium.

"Antilipotropic" effect of methionine in rats fed threonine-deficient diets containing choline. A. E. Harper, D. A. Benton, M. E. Winje, and C. A. Elvehjem (Univ. Wis., Madison). *J. Biol. Chem.* 209, 159-163 (1954). The normal level of fat was deposited in the livers of rats fed 9 percent casein diets containing choline but, when such diets were supplemented with as little as 0.1 percent DL-methionine, fat deposition was increased. The increased fat deposition was prevented, in confirmation of earlier reports, by reducing the food intake of the animals or by supplementing the diet with threonine. The results were discussed in relation to other work of a similar nature, and it was suggested that this "antilipotropic" action of methionine was the result of a partial deficiency of threonine, induced when methionine was added to the methionine-deficient diet.

On the lipotropic action of protein. A. E. Harper, D. A. Benton, M. E. Winje, and C. A. Elvehjem (Univ. Wis., Madison). *J. Biol. Chem.* 209, 171-76 (1954). The effects of choline, methionine, and additional protein on fat deposition in the livers of rats fed low protein (casein) diets have been studied. Neither choline nor methionine in amounts sufficient to meet the stated requirements of the rat for these compounds for growth and the prevention of fatty infiltration prevented some excess of fat from accumulating in the liver. Only when either the protein or the threonine content of the diet was increased was the fat content of the liver reduced to what is considered the normal range. It is suggested that this secondary lipotropic effect of protein (the sparing of choline by methionine being the primary effect) is not a choline-sparing action but results from the provision of certain amino acids, deficiencies of which (with low casein diets, threonine deficiency) cause fat to accumulate in the liver. This effect was apparent only when the diet contained either choline or methionine in amounts approaching what was considered to be the requirement.

Effect of threonine on fat deposition in the livers of mature rats. A. E. Harper, D. A. Benton, M. E. Winje, W. J. Monson, and C. A. Elvehjem (Univ. Wis., Madison). *J. Biol. Chem.* **209**, 165-70 (1954). The amount of fat that was deposited in the livers of young rats fed a 9 percent casein diet containing methionine and choline decreased gradually as the animals matured and their protein requirement decreased. However, when the protein content of the diet was reduced to 5 percent, fat accumulated in the livers of mature rats. This accumulation of fat was reduced when the 5 percent casein diet was supplemented with either threonine or glycine. Analysis of the livers and the fat indicated that, although there were increases in both the cholesterol and phospholipide fractions, the accumulation consisted mainly of neutral fat. It is suggested that fat deposition in the livers of mature rats, like that in the livers of young rats, fed low protein diets is affected by the balance of amino acids in the diet.

Egg production, diet consumption, and live weight in relation to the free gossypol content of the diet. B. W. Heywang and H. R. Bird (U.S.D.A., Bureau of Animal Industry, Glendale, Ariz., and Beltsville, Md.). *Poultry Sci.* **33**, 851-54 (1954). Two experiments were conducted for 180 and 168 days with groups of 25 laying White Leghorn pullets. In the first experiment, raw decorticated cottonseed was in the diets as the source of free gossypol at about the .008, .012, .016, .020, .025, and .033 percent levels. In the second experiment, raw decorticated cottonseed was the source of some of the diets and solvent-extracted cottonseed meal was the source in other diets, of free gossypol at about the .008, .012, .016, and .020 percent levels. Considered collectively, the data from the two experiments showed that both egg production and diet consumption were adversely affected when the diets contained .020 percent or more free gossypol. The results indicate, but do not show clearly, that the lowest dietary level at which free gossypol had adverse effects on egg production and diet consumption was .016 percent.

Feed analysis, determination of free gossypol in mixed feeds. R. W. Storherr and K. T. Holley (Georgia Exp. Station, Experiment, Ga.). *J. Agr. Food Chem.* **2**, 745-47 (1954). As less toxic cottonseed meals are becoming commercially available, methods for free gossypol assay in mixed feeds are needed for experimental use and for control. The method here proposed was based on the color developed in the reaction of phloroglucinol with gossypol in strong acid at room temperature. The extracting solvent excluded many substances that react with phloroglucinol. Interference by reactive substances brought in by the solvent was minimized by carrying out the reaction at room temperature.

Abnormal lipid in coronary arteries and aortic sclerosis in young rats fed a choline-deficient diet. G. F. Wilgram, W. S. Hartroft, and C. H. Best (University of Toronto, Toronto, Canada). *Science* **119**, 842-43 (1954). One hundred thirty-seven young male rats (120 g.) of the Wistar strain were used. Thirty-six of these were fed the basal diet supplemented with 0.85 percent choline chloride. These controls were offered and, over the experimental period of 4 weeks, consumed the same amount of food as did the 101 experimental animals of the same age and weight that ingested the basal, unsupplemented diet *ad libitum*. Half of the animals on the low-choline diet succumbed to acute hemorrhagic renal lesions before the end of this period. Gross and microscopic examinations revealed that abnormalities of the cardiovascular system were absent in all 36 choline-supplemented controls but had developed in 22% of the choline-deficient rats.

Studies in steroid metabolism. II. Metabolism of testosterone by human tissue slices. H. H. Wotiz, J. M. Lemon, and A. Voulgaropoulos (Boston Univ., Boston, Mass.). *J. Biol. Chem.* **209**, 437-45 (1954). It has been shown that a variety of malignant and non-malignant human tissues metabolize testosterone, forming androstenedione as a major metabolite. Normal skin and malignant breast tissues metabolized far greater amounts of testosterone than did any of the other tissues. Prostatic and testicular tissues were able to reduce androstenedione to testosterone.

• Drying Oils

Raymond Paschke, Abstractor

Natural vs. accelerated paint storage tests. J. F. H. Van Eijnsbergen. *F.A.T.I.P.E.C.* **1953**, 113-24. A good acceleration of time was found for skinning and settling at 50° for 16 paints, based on drying-oil and alkyd-resin vehicles of simplified formulas. Storage in glass jars at 50° for 7-15 days could be correlated with 30-day storage at room temperature. A higher temperature was unsatisfactory. Accelerated measurements for consistency and gelation at 50° were unsatisfactory. (*C. A.* **48**, 5518)

Modern processes for the improvement of drying oils. J. D. Von Mikusch (F. Thorl's Vereinigte Olafbriken A.-G., Hamburg-Harburg, Ger.). *Seifen-Ole,-Fette-Wachse* **79**, 533 (1953). Solvent fraction, fractional distillation of fatty acids, and separation by means of urea adducts are discussed. (*C. A.* **48**, 5520)

Polymers of unsaturated esters of substituted cyclohexane carboxylic acids. R. C. Morris, E. C. Shokal, and V. W. Buls (Shell Development Co.). *U. S. 2,671,060.* (*C. A.* **48**, 7342)

The rare metal soaps and the paint industry. W. J. Stewart (Nuodex Products Co.). *Off. Dig. Federation Paint Varnish Production Clubs* **26**, No. 353, 413 (1954). An evaluation, on a comparable basis, of the effectiveness of metals as drying catalysts is given.

D. C. O. and its after tack. M. A. Sivasamban, S. A. Saletore, and S. H. Zaheer. *Paintindia Annual* **4**(1), 132 (1954). The theoretical aspects and solutions of this problems are discussed.

Visible masonry protection and beauty. M. E. Schleicher (McDougall-Butler Co., Inc.). *Paint Ind. Mag.* **69**(6), 23 (1954). A review of the use of resin emulsion paints, cement paints, and rubber paints.

A semi-micro molecular still for quantitative use. D. F. Rushman and Elizabeth M. G. Simpson (Paint Res. Sta., Teddington, Eng.). *Oil & Colour Chemists' Assoc. J.* **37**, 319 (1954). Quantitative analyses for monomer, dimer, etc., in polymerized systems can be made on samples of about 100 mg. The apparatus is essentially a micro-hotplate running in a high vacuum. On the hotplate is a small dish which contains the sample and by weighing this dish before and after heating for a given time at a suitable temperature the amount of material distilled is found. No attempt is made to collect and weigh the distillate directly. Typical results with known mixtures of methyl esters of acids from thermally polymerized linseed oil and also of mixtures of triglycerides and polymeric triglycerides show the method to be very accurate.

Copolymers for water base paints from vinyl acetate and long chain vinyl esters. W. S. Port, F. A. Kinel, and D. Swern (U. S. Dept. Agriculture). *Off. Dig. Federation Paint Varnish Production Clubs* **26**(353), 408 (1954). These have the advantage of being (1) internally plasticized, (2) cheap, (3) are compositionally homogeneous, and (4) show increased water resistance.

Dehydrated castor oil. N. N. Narayanan and S. K. K. Jatkar. *Paintindia Annual* **4**(1), 131 (1954). An improved method for dehydration using $Na_2SO_4 \cdot 0.6\ H_2SO_4$ in a hydrocarbon gives an oil of low viscosity, high conjugation and low acetyl value.

A quantitative study of the autoxidation products of elaidic acid. G. King (St. Mary's Hospital, London). *J. Chem. Soc.* **1954**, 2114. Elaidic acid has been oxidized with gaseous oxygen at 47° and at 78° with and without a cobalt catalyst. Confirmatory evidence has been obtained for the formation of ketol derivatives, and formic acid has been identified among the volatile autoxidation products. Methods of estimating ketol and other carbonyl compounds have been developed, and the course of oxidation has been followed by the systematic quantitative analysis of the products.

The paint research station (Teddington). L. A. Jordan. *Chemistry and Industry* **1954**, 584. This article discusses the program and research tools of the Station.

Vinyl emulsion polymers and their use in coatings. C. E. Hollis and J. H. W. Turner (Distillers Co., Ltd., Epsom, England). *Oil and Colour Chemists' Assoc. J.* **37**, 283 (1954). An outline of the mechanism of radical-initiated vinyl polymerization is given, and the effects of radical-transfer reactions are shown, with particular reference to styrene, vinyl acetate and butadiene. A general survey of the properties of emulsion paints based on polystyrene or polyvinyl acetate is given, and the inter-related questions of sedementation, paint consistency and ease of application are discussed. Particle size of the polymer emulsion, and the protective colloids present both have an important influence on stability and flow properties. Secondary changes in the film which follow the first film integration step are shown to be important, if as yet little understood. General conclusions are given, based on several years' work as to the principles which must be followed in the formulation of a satisfactory emulsion paint based on polyvinyl acetate or polystyrene.

Ultrasonics and the paint industry. F. W. Hightower (Branson Instruments, Inc., Stamford, Conn.). *Am. Paint J.* 38(38), 66(1954). A review including a description of applications and equipment.

Processed oils for paints and coatings. B. Henderson. *Can. Chem. Processing* 38(5), 26(1954). A review of chemically modified oils manufactured in Canada is given.

The styrenation of alkyd resins. A. R. Hempel (Monsanto Chemical Co.). *Paint Ind. Mag.* 69(5), 21(1954). A suggested procedure for the alkyd esterification and styrenation is given in detail.

The formulation of short oil alkyd resins. A. R. Hempel (Monsanto Chemical Co.) *Off. Dig. Federation Paint Varnish Production Clubs* 26(353), 426(1954). Resins were formulated with 2.4 mols of glycerine to 3 mols of phthalic anhydride (viscosity was controlled with ethylene glycol, benzoic acid and large amounts of excess glycerol).

Pentaerythritol drying oils as paint media. S. Gourley (Imperial Chemical Industries, Ltd., Eng.). *Paint Manuf.* 24(5), 143(1954). The change from glycerol to pentaerythritol esters in fatty oils for paint media leads not only to faster polymerization and harder films but also to better outside durability, according to the results of experiments described. The oil obtained by esterifying linseed oil fatty acids with pentaerythritol has been tested against linseed oil in orthodox oleoresinous white paints based on nine commercially available hard resins.

Preparation of metal surfaces for industrial finishes. R. C. Gibson (Parlser Rust Proof Co., Detroit). *Am. Paint J.* 38(40), 38(1954). Foreign material such as oil, scale and corrosion products should be removed from the metal surface before paint is applied. Coating of a cleaned metallic surface, such as steel, zinc and aluminum, with phosphate changes it to a non-metallic, electrically nonconductive, and more adsorptive surface, thereby materially increasing the adhesion and durability of applied paint finishes. Oxide and chromate coatings for aluminum and chromate coatings for zinc also aid in obtaining more durable paint life.

The prevention of defects in emulsion paints. A. C. Fletcher, S. H. A. Hirsch and J. E. O. Mayne (Vinyl Products, Ltd., Carshalton, Eng.). *Oil and Colour Chemists' Assoc. J.* 37, 316(1954). The paper describes a systematic investigation of the most common failures of polyvinyl acetate emulsion paints and shows how the information obtained can be used to prevent the occurrence of defects. The following problems are discussed: viscosity and shade variations during storage, stability to freezing, the development of uneven finishes, pinholing and cratering, drag on recoating, loss of adhesion including blistering and flaking, discoloration, and the effects of efflorescence.

Moisture resistance of paint films. E. J. Dunn, Jr. (Nat. Lead Co.). *Off. Dig. Federation Paint Varnish Production Clubs* 26 (353), 387(1954). A review with 8 references. Discussed are (1) water permeability of paint films, (2) moisture sorption, (3) swelling of paint films, (4) thermal expansion, (5) solubility of paint films in water, and (6) blistering.

Polyvinyl acetate as a paint vehicle. R. J. Davis (Celanese Corp. of America). *Paint Ind. Mag.* 69(6), 15(1954).

Effect of excess polyol on maleic-alkyd preparation. B. G. Brand, A. D. Sill, E. R. Mueller (Battelle Memorial Institute). *Paint Varnish Production* 44(6), 23(1954). Excess polyol exerts a marked effect on vehicle bodying rate, a noticeable effect on storage stability, and a slight effect on cold-water resistance. Drying rate and adhesion appear to be essentially unaffected. Excess glycerol over the range from 0 to 25 percent and pentaerythritol from 0 to 10 percent were studied. Data are presented in graphic form for viscosity development and storage stability.

Measurement and prevention of sedimentation. C. Boller (Inst. Lackforschung und Materialprüfung, Giesen/Lahn, Ger.). *Fette-Seifen-Austrichmittel* 56(2), 81(1954). An instrument has been developed to measure and register the formation of sediments in lacquers and oil-paints. A number of surface-active agents has been tested for suitability of preventing sedimentation of pigments. The production of non-sediment-forming pigments is possible.

Bhilawan nut shell oil. G. M. Asmani (Joy Engineering Works, Ltd., Calcutta). *Paintindia Annual* 4(1), 90(1954). The oil polymerized at 280° in 45 minutes to a resinous mass which when dissolved in turpentine yields a jet black enamel with excellent heat resistance and electrical properties.

Epoxy modified rosin esters. R. O. Austin and J. Drew (Crosby Chemicals, Inc., Deridder, La.). *Paint Oil Chem. Rev.* 117(11), 14(1954). Epoxy resins are reacted with rosin acids or rosin acid adducts by esterification. The resultant resins have good adhesion and flexibility, are compatible with many types of resins and drying oils, and have good solubility in petroleum solvents.

A history of paints and varnishes in Great Britain. 4. Foundations of the modern industry. F. Armitage (Lewis Berger, Ltd., Eng.). *Paint Manuf.* 24(5), 153(1954). The development of the paint industry in the eighteenth century is described. That it saw the laying of the foundations of the industry as it is now known is shown by such discoveries as Prussian Blue and the comparatively large number of patents taken out for oils, varnishes, and colours. These developments, coupled with increased mechanization, paved the way for the establishment of the modern industry.

The spectroscopic examination of snake gourd oils. N. H. E. Ahlers and A. C. Dennison (Paint Res. Sta., Teddington, Eng.). *Chemistry and Industry* 1954, 603. The oils of *T. cucumeroides* and *T. anguina* were examined by ultraviolet and infrared methods and found to be similar to pomegranate seed oil, which contains punicic acid, a sterio isomer of eleostearic acid. No curves are given.

Driers in paints and varnishes. J. S. Aggarwal (Nat. Chem. Lab., Poona). *Paintindia Annual* 4(1), 93(1954). A review.

• Waxes

R. L. Broadhead, Abstractor

Wool wax. Part VI. The synthesis and stereochemistry of the straight-chain α-hydroxy-acids. D. H. S. Horn and Y. Y. Pretorius (National Chem. Res. Lab., Pretoria, South Africa). *J. Chem. Soc.* 1954, 1460-64(1954). A series of optically active straight-chain α-hydroxy-acids of known configuration has been synthesized from an optically active half-ester of (—)-malic acid by anodic coupling with aliphatic acids. The naturally occurring α-hydroxy-acids of wool wax and the derived 1:2-diols, phrenosinic (cerebronic) acid, and the 2-hydroxypentadecanoic acid from ustilic acids were assigned the D_s-configuration.

Chemical study of the peats of Quebec. II. Lac-a-La-Tortue bog, Laviolette county. III. Lanoraie bog, Berthier and Joliette counties. IV. Farnham bog, Missisquoi and Iberville counties. V. Riviere-Du-Loup bog. Riviere-Du-Loup county. J. Risi, C. E. Brunette, D. Spence, and H. Girard. *Can. Dept. Mines, Lab. Branch,* Quebec, P. R. No. 281, 29 pp., P. R. No. 282, 40 pp. (1953). The bogs were sampled by auger every 1000 feet, and analyses were run on samples from each foot of depth, by the systematic methods of both Vermynck (*C. A.* 42, 1039) and of Souci (*C. A.* 32, 2713). The authors discuss the potential industrial utilization of the chemical constituents by the use of a fractionation scheme, yielding large tonnages of substances soluble, respectively, in hot water (pectins, simple sugars, fulvic acids), in alcohol (resins), hydrocarbons (waxes and fatty acids), dimethyl formamide (lignin), and in alkalies (humic acids). (*C. A.* 48, 7282)

Polycyclic hydrocarbons in human hair wax. F. W. Hougen (Natl. Chem. Research Lab., Pretoria, S. Africa). *Chemistry and Industry* 1954, 192. Fractionation of non-saponifiable material from Johannesburg Bantu (negro) hair wax by complex formation, chromatography, and distillation yielded strongly fluorescent crystals. Ultraviolet spectra indicated that these might be anthracene and chrysene. Separate experiments gave indications of the presence of phenanthrene, pyrene, and fluoranthene. These compounds are postulated to originate from atmospheric soot. (*C. A.* 48, 6628)

Candelilla wax. J. D. MacNair. *Soap Sanit. Chemicals* 30(4), 163-5(1954). Descriptive. (*C. A.* 48, 6718)

Sin'itiro Kawamura, Abstractor

Purification of crude wool fat. J. Mikumo and T. Gotô. *Res. Rept. Nagoya Ind. Sci. Res. Inst.* 1, 29-31(1949). Dark brown crude wool fat was purified by filtration followed by heating to 50-80° with alcohol and adding H_2O_2 (1-2% for crude wool fat) and NaOH (150% of the theoretical amount to neutralize free acids).

The relation between some characteristic properties and components of Japan wax. I. H. Hirai and Yoshiyuki Toyama. *Research Rept. Nagoya Ind. Sci. Research Inst.* 1, 27-9(1949). Japan wax (I) was fractionated into insoluble and soluble parts in 85 to 90% ethanol at 60° and each part was examined for m.p., saponification no., I no., Ac no., unsaponifiable matter %, dibasic acid %, and tenacity. Tenacity of Japan wax was attributed to mixed glycerides containing 5-20% dibasic acid. Japan wax contained some mono- and di-glycerides, as revealed from Ac no. determination.

The relation between some characteristic properties and components of Japan wax. II. H. Hirai and Yoshiyuki Toyama. *Ibid.* 2, 45-9(1950). Triglycerides containing palmitic and one of some dibasic acids (phthalic, azelaic, succinic, hexadecanedicarboxylic, and octadecanedicarboxylic acids) had no tenacity comparable to Japan wax. When higher fatty acids or fatty alcohols prepared from rice-bran wax were mixed with glycerides and the m.p. and hardness of the product were controlled to be similar to those of Japan wax, the product acquired some tenacity.

The relation between the characteristic properties and chemical components of bees' wax. Y. Toyama and H. Hirai. *Research Rept. Nagoya Ind. Sci. Research Inst.* 3, 42-5(1951). Saponified Japanese bees' wax was fractionated into various parts and each part was examined for plasticity. The characteristic property (good plasticity observed by kneading with thumb and fingers) of bees' wax was concluded to be attributable mainly to the esters of higher alcohols with fatty acids, especially with hydroxy acids (such as 14-hydroxypalmitic acid discovered by the authors), and partly to free higher alcohols and hydroxy acids and free higher fatty acids.

Properties and refining of rice-bran wax. Y. Toyama and T. Takagi. *Research Rept. Nagoya Ind. Sci. Research Inst.* 4, 53-6(1951). The solid part ("waxy oil") was removed by filtration from raw rice-bran oil at different temperatures (20, 25, 30, or 40°), and was examined for free acid content, and acid no., saponification no., I no., Ac no., unsaponifiable matter content, and glycerol content of waxy oil itself as well as of neutral part and of free fatty acids. The higher the temperature of filtration, the lower the yield of waxy oil and the higher the wax content. Superior wax could be obtained by solar bleaching and H_2O_2 treatment of the product obtained by filtering (at 70°) purified waxy oil (with active carbon and H_2O_2).

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Detergents

Lenore Petchaft Afrik, Abstractor

Synthetic detergent compositions. J. Ross(Colgate-Palmolive Co.). *U. S. 2,679,482.* A detergent composition with improved foaming and detergent properties consists of a detergent selected from the group of water-soluble organic sulfate and sulfonate detergents and a minor proportion from about 1 to about 10% by weight of a higher alkane 1,2-diol having a straight-chain of about 10 to 20 carbon atoms such as hexadecane 1,2-diol.

Process of producing a milled non-soap detergent in bar form. J. A. V. Turck, Jr.(Colgate-Palmolive Co.). *U. S. 2,678,921.* Milled synthetic detergent bars are prepared from sulfated or sulfonated detergents with low moisture content and a plasticizer such as a normally solid ether-alcohol fatty acid ester, e.g., diethylene glycol monostearate.

Antiseptic detergent composition. D. J. Beaver, P. J. Stoffel and R. S. Shumard(Monsanto Chemical Co.). *U. S. 2,678,302.* An antiseptic detergent composition is prepared consisting of a detergent soap and a minor weight proportion of the antiseptic 4,4′-(*p*-hydroxy benzylidene)-bis-(3-methyl-6-tert. butyl phenol).

Improvements in or relating to the manufacture of detergent powders. Imperial Chemical Industries, Ltd. *Brit. 709,475.* Free flowing, non-caking detergent powders are prepared by heating the detergents, preferably ethylene oxide condensation products, and an alkali metal bicarbonate under conditions such that at least 35% of the bicarbonate is converted to carbonate.

Improvements relating to liquid synthetic detergent compositions. Colgate-Palmolive-Peet Co. *Brit. 708,000.* The detergency properties of a liquid synthetic detergent composition consisting essentially of a water-soluble anionic sulfated or sulfonated detergent containing an aliphatic chain of at least 8 carbon atoms, are improved by the addition of a dialkylolamide of a fatty acid containing from 10 to 14 carbon atoms, and a suitable solvent for the detergent and amide.

A rapid method for the analysis of soaps. A. Vazquez de la Torre. *Farm. nueva* (Madrid) 18, 549-51(1953). A scheme for the determination of free alkali, fatty acids, combined alkali, and percentage builders from a single sample of soap is outlined. The moisture is determined by difference. (*C. A.* 48, 6146)

Liquid detergents. D. H. Terry(Bon Ami Co., New York, N. Y.). *Soap Sanit. Chemicals* 30(5), 46-7, 207(1954). The properties of liquid detergents are reviewed and their future discussed.

Surface-active agents and their far-reaching influence in the textile industry. P. J. Sullivan(National Aniline Division, Allied Chemical & Dye Corp.). *Am. Dyestuff Reptr.* 43, 331-4 (1954). The development of synthetic detergents is reviewed. Their use in the textile industry has greatly influenced the growth of textiles especially new synthetic types. Some of these applications include wool scouring and fulling, various wet processing techniques for wool, various cotton and synthetic fiber processing applications and general plant applications such as sanitation, etc.

Use of surface active agents in phosphate rock acidulation. E. J. Fox, H. E. Batson, Jr., and A. V. Breen(U. S. Dept. of Agr., Beltsville, Md.). *J. Agr. Food Chem.* 2, 618-23(1954). The effects of anionic and nonionic types of surface active agents on reaction phenomena during the acidulation of phosphate rock were studied in the laboratory to obtain information on their influence in industrial practice. The surfactants tended to accelerate the primary reaction between phosphate rock and sulfuric acid, but had no significant effect on the extent of the over-all reaction in the period of 1 to 24 hours after mixing. The physical character of the product denned 20 hours at 70°C. was altered in varying degrees depending upon the type and chemical composition of the surfactant, the type of rock and the method of ore dressing used in its production, and the type of superphosphate produced. Results obtained in this study indicate the need for a comprehensive examination of the problem of surfactant use in fertilizer technology.

The skin reaction, and protection of the skin by synthetic detergents. H. Stupel. *Chem. Ztg.* 77, 714-18, 755-8, 782-6(1953). A review with 114 references. (*C. A.* 48, 5439)

Soap cost accounting. W. I. McNeill. *Soap Sanit. Chemicals* 30(6), 89, 91, 93, 178(1954). Various methods of cost accounting in the soap industry are outlined.

Ethylenediaminetetraacetic acid in soaps. R. L. Smith and P. Womersley(Norman Evans & Rais, Ltd., Manchester, Eng.). *Perfumery Essent. Oil Record* 45, 163-5(1954). The development of stable sequestering agents of the amino carboxylic acid class such as ethylenediaminetetraacetic acid (EDTA) has made soap more competitive to synthetic detergents. EDTA improves the clarity and storage properties of liquid soaps, is effective in liquid shampoos and in solid soaps not only counteracting the hardness in water but ensuring good foaming and preventing rancidity. EDTA is contrasted with sodium hexametaphosphate and under conditions which cause hydrolysis of sodium hexametaphosphate, the use of EDTA is more economical.

New soap germicide. E. I. Stoltz and C. H. Rogers(R. T. Vanderbilt Co., East Norwalk, Conn.). *Soap Sanit. Chemicals* 30 (6), 38-40, 109(1954). Captan or "Vancide 89" (N-trichloromethylmercapto-4-cyclohexene-1,2-dicarboximide) is a new bactericide-fungicide that possesses an extremely wide germicidal spectrum. Laboratory and field trials have shown that the new compound is non-toxic and non-irritating for human use in soaps and cosmetic preparations. It is a low cost product and can be used in bar, liquid, and powdered soaps in a 1.0 percent concentration. Daily use reduces and maintains at a minimum the bacteria and fungi responsible for dermatitis and secondary skin infections. Captan does not discolor white bar soap during shelf-life.

Sin'itiro Kawamura, Abstractor

Teepol. F. Udagawa(Tokyo Kasei Gakuin). *J. Oil Chemists' Soc. Japan* 2, 253-5(1953). Physicochemical properties were compared among Teepol (I) (Shell Chem. Co.), Na lauryl sulfate (II), and Na alkyl benzene sulfonate (from alkyl benzene, b.p. 270-300°, of Oronite Co.). Teepol was intermediate and a little inferior to the sulfate in surface tension and foaming power (I was best at concentrations lower than 0.05%). Teepol was intermediate in penetrating power, lowest in detergent action, similar in stability against acids and alkalies to the sulfate, and was easily decomposed by heat.

The emulsion containing oil-soluble emulsifiers, especially α-stearyl monoglyceride. S. Horiki and J. Mikumo. *Research Rept. Nagoya Ind. Sci. Research Inst.* 4, 67-71(1951). The type (water in oil or oil in water) was determined of the emulsions prepared from water and benzene with oil-soluble emulsifiers (α-stearyl monoglyceride, crude stearyl monoglyceride, sorbitan monolaurate, polyoxyethylene alkyl ether and ester, Mg oleate, and lanolin) and with different manners of addition: stepwise addition with interval stirring, violent addition, slow addition, reverse addition, etc. The factors determining the type of the emulsion were discussed.