These oils were deodorized concurrently for five hours at 220°C. and 1-mm. pressure, treated with 0.005% citric acid, and cooled under vacuum.

Sample	A.O.M. (hours)	Lovibond Color	Flavor Panel Scores, Days at 60°C.	
			0	1
1	8	4Y 0.9R	9	8
2	10	10Y 3.0R	8	5.5
3	1	75Y 7.6R	7	5.0

The hydrogenation of samples 1 and 2 was then repeated, stabilizing the hardened, deodorized oils with 0.05% by weight of a solution of 20% butylated hydroxyanisole, 4% citric acid, and 6% propyl gallate in propylene glycol.

Sample	Hydrogenation Time (min.)	Iodine Value	P.V. me./kg.	A.O.M. (hours)	Lovibond Color
1	4	50.6	<0.1	>400	2Y 0.2R
2	4	50.7	<0.1	250	3Y 0.3R

Flavor panel scores on these two stabilized oils are shown below:

Days at 60°C.	Sample 1	Sample 2
0	9	9
1	7.5	7
2	7.5	7
3	8	7
4	8	7

D. *Rate of Hydrogenation.* No significant differences in rate were observed during the partial hydrogenations described in section C. However, when samples 1, 2, and 3 were hydrogenated to nearly complete saturation, there were considerable differences. The data below demonstrates that peroxides are active catalyst poisons.

The three lard samples were hardened at 200°C. and 30 P.S.I. of hydrogen with 0.2% by weight of a commercial reduced nickel catalyst (containing about 25% Ni.). Then they were cooled under vacuum and filtered with a neutral bleaching clay and diatomaceous earth.

Sample	Hydrogenation Time (min.)	Iodine Value	Lovibond Color
1	115	6.5	2Y 0.5R
2	165	7.0	20Y 3.2R
3	330	6.3	9Y 1.5R

Summary

Storage of lard at 95°F. with the resultant development of peroxides had a detrimental effect on its flavor. Colors of the stored lards after deodorization were considerably darker than those of the fresh, and the flavor stabilities of the former were poorer. Partial hydrogenation did not stabilize the aged lards nearly as markedly as the fresh lards. The former had darker colors, lower A.O.M.'s, and poorer flavor stabilities.

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ABSTRACTS . . . . E. S. Lutton, Editor

• Oils and Fats

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Oxidation changes in lard in the process of production. N. S. Drozdov, N. P. Materanskaya, and N. Trofimova (Moscow Chem.-Technol. Inst. Meat Ind.). *Myasnaya Ind. S. S. S. R.* 24 (4), 82-5(1953). This is principally a review and discussion of past work. The course of the acid no., peroxide no., and epihydrinaldehyde, and oxy-acid contents of 2 lards during production are graphically presented. (*C. A.* 48, 901)

l-Lysine content of some oilseed cakes. V. S. Govindarajan and B. V. Ramachandran. *J. Sci. Ind. Research, India* **11B**, 477-9 (1952). The *l*-lysine content of some Indian oil seed cakes was determined by Gale's method (measuring the carbon dioxide liberated from lysine by the specific *l*-lysine decarboxylase of a strain of *Bacterium cadaveris*). Cottonseed and groundnut cakes proved to be useful sources of lysine. An exceptionally high content of lysine was found in the seed cake of papri *(Holoptelea integrifolia)*. (*Food Sci. Abs.* 25, 3392[1953])

Constitution of kamlolenic acid. S. C. Gupta, S. S. Gupta, and J. S. Aggarwal (Natl. Chem. Lab. of India, Poona). *J. Sci. Ind. Research* **12B**, 240(1953). Investigations on the constitution of kamlolenic acid obtained from kamala *(Mallotus phillippinensis)* oil reveal that the structure of the acid is ω-hydroxy-9,11,13-octadecatrienoic acid.

The determination of the fat content of cream (comparison of the modified butyrometer method with the Röse-Gottlieb method). H. Hostettler and W. Lehmann. *Proc. 13th Intern. Dairy Congr.* (The Hague) 3, 1216-21(1953). A description of a modified butyrometer method which compares well with the Röse-Gottlieb method. (*C. A.* 48, 297)

Chlorophyll for colouration of vanaspati. *Indian Forester* **72**, 635(1952); *J. Sci. Ind. Research* **12A**, 196(1953). A simple, inexpensive method has been developed for coloring vanaspati (hydrogenated peanut oil) with leaves of Indian plants without requiring the previous separation of chlorophyll extracts. The attractive green color is difficult to remove and can be detected even in traces spectroscopically or by a micro test for Mg.

The constitution of the polyenic acids occurring in the liver oils of cod and blue skate. E. Klenk and W. Bongard (Univ. Cologne, Germany). *Hoppe-Seyler's Z. Physiol. Chem.* **292**, 51-8(1953). In order to decide whether the polyunsaturated fatty acids of fish-liver oils belong to the divinylmethane ($CH{:}CHCH_2CH{:}CH$) or the divinylethane ($CH{:}CHCH_2CH_2$-$CH{:}CH$) type, liver oils from cod and blue skate were submitted directly to ozonization in order to avoid isomerization by previous alkaline hydrolysis. Under these conditions 18-28% malonic and a trace of succinic acid were formed, indicating that the fish-oil fatty acids are of the divinylmethane type. The monocarboxylic acids obtained during oxidation had the following mole % composition: propionic 14.6; caproic 9.8;

oenanthic 23.3; pelargonic 42.0; undecanoic, 10.3. (*C. A.* **48**, 387)

Structure of proteins and the vitamin A activity manifested by certain proteins in the presence of lard or lard distillate. Pierre Le Gallic (École hautes-études, Paris), *Compt. rend. soc. biol.* **147**, 302-6(1953). Material distilled from lard in high vacuum at 260° had no detectable vitamin A activity by itself, but had considerable such activity when fed together with purified casein (containing no vitamin A) to rats deprived of vitamin A. (*C. A.* **48**, 826-7)

The effect of moisture content of sunflower seeds on their keeping. M. I. Lishkevich. *Masloboino-Zhirovaya Prom.* **18** (9), 1-3 (1953). Data are presented to show that respiration rate of sunflower seeds (also of soybean, cottonseed, and flaxseed) is very low around the critical 16% moisture content of the hydrophilic part of the sunflower seeds. Seeds containing 38-40% oil on the basis of dry matter have shown the most intense respiration at a moisture level of 20.8-26.1%. The heat generated in the process was sufficient to raise the temperature of the seeds sufficiently to cause its spoilage. Accumulation of free fatty acids was observed. Drying to a maximum of 16% moisture before storage of sunflower seeds is recommended. (*C. A.* **48**, 820)

Enzymes of fatty acid metabolism. Feodor Lynen and Severo Ochoa (Chem. Univ.-Lab., Munich, Germany). *Biochem. et Biophys. Acta* **12**, 299-314(1953). A discussion. (*C. A.* **48**, 768)

Combination of vitamin A and thyroxine in milk production. B. Mainardi (Univ. Milan, Italy). *Boll. soc. ital. biol. sper.* **28**, 1681-2(1952). Milk production and percent of butterfat were higher for cows which received vitamin A and thyroxine.

The determination of vitamin E in milled products. A. Menger. *Getreide, Mehl u. Brot* **4**, 172-4(1950). Methods for the determination of tocopherol are described and discussed. Certain modifications of procedure are suggested. Treatment with acid is preferable to the use of alkali. Isopropanol may be used in place of ethanol. Suitable precautions should be taken during the colorimetric measurement to prevent exposure to light. (*Food Sci. Abs.* **25**, 3448[1953])

The determination of the butterfat content of milk by the hydrochloric (acid) test. H. Muldar and P. Meyers. *Proc. 13th Intern. Dairy Congr.* (The Hague) **3**, 1317-18(1953). Weigh 8 g. of milk accurately into a Mojonnier tube with globular bottom and add 6 ml. of 38% HCl. Add pumice stone and boil for 3 min. Cool to room temperature and add 8 ml. 96% EtOH. Extract with petroleum ether (b.p. 40-60°) 3 times with 40 ml., and twice with 25 ml. Pour the clear layer of the extracts into a weighed flask, evaporate, and weigh. The results are slightly lower than those with the Röse-Gottlieb test. (*C. A.* **48**, 299)

The digestibility of sunflower seeds, and sunflower seed extraction products in rabbits and ruminants. K. Nickisch (Humboldt Univ., Berlin). *Arch. Tiernähr.* **3**, 48-63(1953). The digestibility of sunflower seeds was tested in rabbits and ruminants. In the rabbit, sunflower seed extraction products were fed to test its effects as compared to the seeds. The influence of the crude fiber content was tested by feeding shelled seeds. The raw protein of sunflower seeds and its extraction products were well digested by both species with a slightly higher percentage in the rabbits than in the sheep. The digestion coefficient of the extraction products were only 1.6% lower than that of the seeds. Sheep showed a higher ability to digest the raw fiber than did the rabbit. Abilities to digest fats were the same in both. The shells tended to interfere with the absorption of needed nutrient materials. The results indicated that the shelled sunflower seed and its extraction products were worthwhile nutritional materials. (*C. A.* **48**, 824-5)

Some factors affecting the decomposition of frying fats. G. T. Carlin, R. P. Hopper, and B. N. Rockwood. *Food Technol*, **8**, 161-5(1954). Means are discussed for restricting oxidative decomposition through improved design of equipment and procedures for avoiding contamination of the fat.

Fat synthesis in higher plants. Antonio Montefredine. *Olivicoltura* **6** (10), 4-9(1951). A lecture. (*C. A.* **58**, 2186).

Oxidation changes in lard in the process of production. N. S. Drozdov, N. P. Materanskaya, and N. Trofimova. *Myasnaya Ind. S.S.S.R.* **24** (4), 82-5(1953). This is principally a review and discussion of past work. The course of the acid no., peroxide no., and epihydrinaldehyde, and oxy-acid contents of 2 lards during production are graphically presented. (*C. A.* **58**, 901).

Chemical and technological study of palm oil from Bahia. I. The chemical composition of the oil. Lucien Kehren. *Anais fac. farm. e odontol., Univ. São Paulo* **10**, 101-9(1952) (Pub. 1953) (in French). The oil of *Elaeis guineensis* (oléo de dendê) from Bahia had an acidity (as % palmitic acid) 22.5, saponification no. 201, iodine no. (Hanus) 55, unsaponifiable 0.42%. Vacuum distillation of the Me esters of the fatty acids and spectroscopy of the oil gave, as % composition: myristic acid 1.4, palmitic acid 29.5, stearic acid 4.0, oleic acid 46.9, linoleic acid 7.5, glycerol (by difference) 10.3, unsaponifiable (inclusive of carotene 0.12) 0.42. The composition of the oil resembles strongly that of African palm oil. Semimicro methods for the acid, sapon. and I nos., the average M. W. of the fatty acids and carotene are described. (*C. A.* **58**, 1708).

The determination of isoöleic acid in edible fats. G. Cerutti. *Ann. speri. agrar.* (Rome) **7**, 739-42(1953)(English summary). The method of Grossfeld and Peter (*Handbuch der Lebensmittel 1939*, vol. 4, p. 602) was used for the determination of isoöleic acid. A table is given containing the Wolny no., the Polenske no., the *n* at 35°, and the percent of isoöleic acid in 40 fats and oils of known origin. It is concluded that no one of these indexes can by itself serve as an indication of adulteration of butter or oleomargarine with hydrogenated fats. All should be taken into account as well as the interpretation of Tortelli-Jaffe and the unsaponifiable fraction, in deciding that there has been adulteration with fish oil of any degree of hydrogenation. (*C. A.* **58**, 1598-9).

Monoglycerides. P. B. F. Chinoy and N. R. Kamath. *Paintindia* **3** (5), 27-32; (6), 27-30(1953). Conversion of vegetable oils to monoglycerides by glycerolysis was studied. (*C. A.* **58**, 1707).

The application of the thiobarbituric acid test to the determination of oxidative rancidity in frozen herring. Sigren Fridriksdotter. *Student Rept. on Spec. Problem, Cornell Univ., Ithaca, N. Y., 1953*, 33 pp. Dunkley and Jennings (*C. A.* **46**, 2198) adapted the color reaction of thiobarbituric acid with oxidized oil to a spectrophotometric method for following the development of rancidity in milk. This adaptation when applied to fish was suitable only as a qualitative indication of rancidity. (*C. A.* **58**, 902).

The peroxidation of oleic acid in the presence of chlorophyll. Lucien Kehren. *Anais fac. farm. e odontol., Univ. São Paulo* **10**, 93-9(1952) (Pub. 1953) (in French). The autoxidation of pure oleic acid, as determined by Wheeler's peroxide value, was accelerated in the dark as well as in the light by a minimum of 1% chlorophyll. This effect was greater in the light than in the dark and at 70° than at 45°. The peroxides formed at 70° in the presence of chlorophyll decomposed more quickly. Conclusion: the concentration of chlorophyll in vegetable oils is too low to be of importance for its autoxidation. (*C. A.* **58**, 1706).

Detection of fish fats in butter with the Bellier's resorcin method. Franco De Francesco. *Boll. lab. chim. provinciali* (Bologna) **3**, 16-18(1952). The Bellier method gives good results for the detection of hydrogenated oils of fish and marine mammals. (*C. A.* **58**, 1706).

Detection of margarine in butter. J. Pien, J. M. Désirant, and B. Lefèbvre. *Ann. fals. et fraudes*, **46**, 350-8(1953). By French law margarine contains 0.2% potato or rice starch. Although butter is naturally free of starch it is often contaminated by traces of starch, usually from the feed material present in the dust of the stables. The official qualitative test for starch is not adequate. To 50 g. melted butter is added in the following sequence: 10 cc. EtOH (95%), 2 cc. NH_3 (22° Bé.), 20 cc. Et_2O, and 20 cc. petroleum ether. The mixture is shaken for 39 secs. and left to separate for 2 hrs. The aqueous layer is defatted by adding with shaking 5 cc. EtOH, 2 cc. NH_3, 20 cc. Et_2O, and 20 cc. petroleum ether. The aqueous layer is centrifuged, the sediment is washed twice with NH_3, diluted 1:10, centrifuged again each time, then washed with H_2O and finally with 0.1N HCl. The starch grains are counted. Butter containing 1% margarine contained 125,000 particles in the case of potato starch and 20,000,000 of rice starch per cc. As an alternative the colorimetric determination with iodine is suggested. (*C. A.* **58**, 1598).

Action of l-ascorbic acid on storage butter. Theodor Sabalitschka (Biol. Chem. Forschungsanstalt, Berlin). *Milchvissenschaft* **8**, 300-2(1953). Butter samples in which 0.05-0.20% ascorbic acid had been worked prior to storage in the dark at 5-12° were compared with control samples. A malt-like off-flavor peculiar to samples containing ascorbic acid was found objectionable; because of this ascorbic acid is not considered a suitable stabilizer. (*C. A.* **58**, 1597-8)

The characteristics of Argentine butter. G. Cerutti and P. L. Farfaletti. *Ann. speri. agrar.* (Rome) 7, 979-82 (1953) (English summary). The averages of about 100 samples of Argentine butter samples on arrival at Italian ports under refrigeration are reported for moisture, fat, *n*, Wollny no., Polenske no., and percent isoöleic acid. Individual values of the last 3 are given in a table for 80 samples. The figures are so similar to those for Italian butter that it is not possible to distinguish them by these tests. (*C. A.* **58**, 1597)

Improvements in refining olive oil. Enzo Sericano. *Olivicoltura* **6** (6), 6-8 (1951). A short review. (*C. A.* **58**, 1708)

The change in fat content of sorghum and maize germ during storage. E. Lindemann (Bundesanstalt Getreide-verarbeitung, Detmold, Germany). *Die Starke* **5**, 139-43 (1953). Air oxidation and polymerization of fats in stored dried sorghum germ gave dark-colored products with reduced I no., soluble in Et$_2$O but not extractable with petroleum ether, especially after high drying temperatures. With maize germ no changes in extractable fat were observed. (*C. A.* **58**, 1483)

The determination of vitamin A in milk and milk products. H. Moor. *Milchwissenschaft* **8**, 298-300 (1953). The extraction technique for the separation of the ether and water-soluble saponification products was modified to facilitate the separation. In addition the saponification operations usually performed in N atmosphere were carried out in air without loss by the use of the antioxidant, hydroquinone. Fat was extracted from 40 ml. milk by the addition, in turn, with shaking of 10 ml. 25% NH$_4$OH, 40 ml. pure absolute alcohol, 80 ml. H$_2$O$_2$-free ether, and 80 ml. petroleum ether. After having been held 15 min. in the dark an aliquot of the supernatant ether layer was removed and the ether was evaporated. To the residue, 1.5 ml. of a solution of hydroquinone in absolute alcohol and 15 ml. alcoholic NaOH were added, and to one of two duplicate samples pure vitamin A was added to match approx. in quantity that present in the sample. Saponification proceeded for 10 min. or more in a water bath at 70-80°. Al$_2$O$_3$, 8 ml. containing 12% water, was worked into the syrupy saponification products, and the mass was heated further until alcohol fumes were not detectable. The ether-soluble products were extracted with 25 ml. ether and washed free of soaps with a 5 ml. N$_2$O in separatory funnels. If interfering impurities were absent, the ether was evaporated and the residue was taken up in CHCl$_3$ to yield 2 ml. of a solution containing 15-30 units vitamin A. The CHCl$_3$ solution was added to a cuvette together with 10 ml. of the Carr-Price SbCl$_3$ reagent, and the color determination was made within 5 sec. The loss of vitamin A during saponification and chromatography should not exceed 7%. The method was found applicable to solutions containing as little as 1-3 International Units vitamin A. (*C. A.* **58**, 1595)

Composition and properties of hydrogenated oils (Vanaspati). P. T. Bhide. *Bombay Technologist* **2**, 81-2 (1952). Analysis of Vanaspati, a constituent of the Indian diet, showed the following percent acids: oleic 59-78; isoöleic 15-43; linoleic 0-12; saturated 20-32%. Ni and phosphatides (as lecithin) were present in 0.1-0.5 p.p.m. and 0.001-0.005%, resp. (*C. A.* **58**, 1030)

Spectrophotometric tests on buffalo fat. A. Di Girolamo (Zool. Sta., Naples). *Boll. soc. ital. biol. sper.* **28**, 443-5 (1952). The lipochrome pigment of buffalo fat differs from that of beef in that it has no particular absorption in the visible. In the ultraviolet there is a distinct change in the curve about 3000 Å. (*C. A.* **58**, 1027)

Detection of peroxides in fats. P. Braeckman and D. Deprez (Univ. Ghent) *Pharm. Tijdschr. Belg.* **29**, 139-42 (1952). (*C. A.* **58**, 1028)

Studies in fats and fatty acids. Chlorination and dehydrochlorination. D. B. Vidwans. *Bombay Technologist* **2**, 82-3 (1952). Chlorination of oleic acid with dry Cl$_2$ alone or in the presence of solvents such as C$_6$H$_6$, CHCl$_3$, hexane, or AcOH (with or without iodine catalyst) showed that the solvent has no beneficial effect and, in addition, is difficult to remove from the chlorinated product. Heating the product, either alone or in the presence of liquids which may or may not be HCl acceptors at various temperatures and times caused polymerization and little dehydrochlorination. The products obtained had poor film-forming properties. (*C. A.* **58**, 1027)

Influence of temperature on the hydrolysis of triricinolein by Ricinus lipase. Yvonne Moulé. *Bull. soc. chim. biol.* **35**, 759-70 (1953). To obtain a crude but potent *Ricinus lipase* preparation castor oil seeds are hulled and the kernels crushed and thoroughly defatted by extraction with boiling anhydrous acetone for 6-7 hrs. in a Kumagawa extraction apparatus. If moisture is excluded the enzyme is not injured by this treatment. The dry powder remaining after evaporation of the acetone from the tissue residue is stable and the lipase it contains is not readily inactivated by heat in the absence of moisture. Suspended in the castor oil and heated at 100° for 30 hrs. it loses about 40% of its activity. The oil exerts a protective action in the absence of water. When emulsified with water (or acetate buffer of pH 4.7) and castor oil it hydrolizes the oil readily at room temperature, but the enzyme is gradually inactivated at temperatures above 20°. Water appears to be the inactivating agent. (*C. A.* **58**, 2136)

Phase diagrams of acetic acid and olive oil. Emm. Voyatzakis. *Prakt. Akad. Athenon* **26**, 111-17 (1951) (pub. 1952). Phase diagrams of various solutions of AcOH and olive oil were studied. Presence of water greatly affects the temperature of the critical point and possibly could be used as a test for purity. (*C. A.* **58**, 1786)

The acquisition of fats from fungi. Marta Bline. *Kem. Zbornik* **1951**, 13-14. The fungi *Mucor mucedo* and *Stysanus* have been found to be particularly rich in fats. These microbes were prepared in cultures. The fungus *M. mucedo* was dried in warm air and its fat was extracted with petroleum ether. The fat thus obtained is light yellow and is almost solid at room temperature. The *Stysanus* culture has 2 differently colored modifications, red and brown, of which the brown contains more fat. The red mold gives 45.16% red oil and the brown mold gives 34.52% brown oil. The physical constants of the fats from both of the fungi are given in tabular form. (*C. A.* **58**, 2170)

Chemical examination of the seeds of Mallotus philippinensis. II. Unsaturated hydroxy acid isolated from the oil. S. C. Gupta, V. N. Sharma, and J. S. Aggarwal. *J. Sci. Ind. Research* (India) **11B**, 463-8 (1952). The 2 isomeric unsaturated hydroxy acids, α- and β-kamlolenic acids, have been further identified by hydrogenation, bromination, methylation, oxidation, and maleic anhydride addition reactions. The constants for the α- and β-acids are, resp.: neut. equiv. 293.3, 293.0; I no. (Wijs) 172.6, 195.4; I no. (Woburn B) 236.8, 248.3; partial I no. (Wijs, 2 min) 172.6, 173.4; diene no. (Ellis and Jones) 120.6, 120.6. (*C. A.* **58**, 1962)

Reprocessing of sesame seeds according to decoction-for-press. G. V. Krutchenskii. *Masloboino-Zhirovaya Prom.* **18** (7), 28-30 (1953). Cleaning and grinding of seeds, removal of oil from the decoction tank, drying of seed meats, and the final expression of oil by means of a screw-type press is described. (*C. A.* **58**, 388)

Detection of flours of soft wheat in semolinas and food pastes. M. Matweef. *Compt. rend. Acad. Agr. France* **38**, 658-63 (1952). Soft wheats contain sitosterol palmitate but hard wheats do not. A method is described for determining sitosterol palmitate by extracting ground material with acetone at 38° for 24 hrs. The extract is filtered and cooled to −5°, causing the sitosterol palmitate to settle out. A lower temperature must be avoided, since it causes crystallization of the sterols of hard wheat. An approximate quantitative determination can be made by weighing the precipitate, and a more accurate one by colorimetry using the Lieberman-Burchard reaction. (*Food Sci. Abs.* **25** [6], No. 3544 [1953])

Contact with Norway's problems (in pressing herring). *Meld. Sildolje-og Sildemelind. Forskningsinst. Damsgård, Bergen,* **1951** (7), 149-52. The processing of summer herring with full stomachs presents problems in cooking, pressing and meal manufacture.

Rapid determination of moisture in herring meal. *Meld. Sildolje-og Sildemelind. Forskningsinst. Damsgård, Bergen* **1952** (1), 13-16. A method and apparatus for drying herring meal by infrared radiation is described. After drying for 12-15 min. at 125, 145 or 168° the moisture content is read directly from a scale. (*Food Sci. Abs.* **25** [6], No. 3024 [1953])

The moisture content of herring meal changes with the weather. *Meld. Sildolje-og Sildemelind. Forskningsinst. Damsgård, Bergen,* **1952** (7), 134-8. English summary, p. 147. The hygroscopic properties of ordinary herring meal, whole meal, and intermediate blends are tabulated and shown in diagrams. Whole meal is the most hygroscopic and must be packed in vaporproof sacks. (*Food Sci. Abs.* **25**, No. 2988 [1953])

The cause of souring of herring oil. *Meld. Sildolje-og Sildemelind. Forskningsinst. Damsgård, Bergen* **1951** (8), 166-70 (1951). Storage of mixtures of press liquid and oil (about equal quantities of oil and water) at temperatures from 0° to 100° showed, after 9 days, that the greatest formation of fatty acids occurred at about 37°, indicating that souring was due either to enzymes or to micro-organisms. After heating for 20 min. at 120° the increase of fatty acids was slight, indicating that action of inorganic catalyst is negligible. After addition of only 5% of untreated press liquid to the sterilized sample, formation of fatty acids in the mixture was soon equal to that in the original press liquid, indicating that micro-organisms and not enzymes were responsible for the increase. Addition of formaldehyde, sodium nitrite, or boric acid arrested the increase in fatty acids. (*Food Sci. Abs.* **25**, 2998[1953])

Whole meal processing via vacuum evaporation. *Meld., Sildolje-og Sildemelind. Forskningsist. Damsgård, Bergen* **1952** (5), 90-7. English summary p. 106. A description of a commercial operation in which 1,000 tons of herring was processed in 5 days. The concentration of the stickwater to 40-2% solids and its addition to the press cake before drying increased the yield by 24%. (*Food Sci. Abs.* **25**, No. 2991[1953])

The processing of whole meal. *Meld. Sildolje-og Sildemelind. Forskningsinst. Damsgård, Bergen* **1952**(4), 71-7. English summary p. 87. Herring press cake was mixed with concentrated stickwater and dried in a flame drier.

The grinding of herring meal. *Meld. Sildolje-og Sildemelind. Forskningsinst.* **1952**(2), 28-34. (English summary p. 46.). A comparison of grinding mills.

The spectroscopic examination of pomegranate seed oil. N. H. E. Ahlers and N. G. McTaggart. *J. Sci. Food Agric.* **5**, 75-9 (1954). Quantitative ultraviolet and infrared spectra confirm the presence of a conjugated triene system and suggest a *cis-cis-trans* orientation for punicic acid. Spectra were determined between 220 and 300 mμ for solutions in cyclohexane, and between 2.5 and 15.0 μ for thin layers. Detailed examination in the 10 μ region was made on CS_2 solutions. Spectra are discussed in terms of those of β- and α-elaeostearic acids. Maxima were found at 274.5, 265 and 285.5 mμ and 10.11 (k 0.611), 10.36 (k 0.159), 10.67 (k 0.366) and 13.13 μ.

The role of glycerides in baking. I. Effect of adding glycerinated fats in bread and flour confectionery. M. A. Cookson and J. B. M. Coppock. *J. Sci. Food Agric.* **5**, 8-19 (1954). Glyceryl monostearates and monooleates of various purities were added to several types of doughs for bread, sponge and Madeira cakes. The effects on crumb softness, staling and volume were determined. The antistaling effect is discussed in terms of the action of the monoglycerides in controlling distribution of labile water between the coagulated gluten network and starch gel. The improving action of the monoglycerides is affected by the flour quality and the method of incorporation. Monostearates, in general, were more effective than monooleates. Suggested standards for monostearates for use in these baked goods are tabulated.

II. Influence of flour oils on the behavior of glycerinated fats in baking and the effect of natural monoglycerides present in flour oils and baking fats on the pharmacological desirability of using glycerinated fats in baked products. J. B. M. Coppock, M. A. Cookson, D. H. Laney, and (in part) D. W. E. Axford. *Ibid.*, 19-26. Oil was extracted from 81% extraction-flour by carbon tetrachloride and partially fractionated with acetone. Low levels of acetone-insoluble material improved both loaf volume and crumb softness. The effect was not given by commercial lecithin. Glyceryl monostearate exhibits improving effect only in the presence of flour oil. The magnitude of interference of various compounds on the analytical determination of monoglycerides is discussed. The presence and nature of monoglycerides in oils and fats used in baking or extracted from breads was determined by a combination of periodic acid oxidation, countercurrent extraction (hexane and methanol) and the preparation of 2,4-dinitrophenylhydrazones of the oxidation products. The pharmacological effects of monoglycerides are reviewed and their nontoxicity is reaffirmed.

Procedures for the extraction, separation and estimation of the major fat-soluble pigments of hay. J. Davidson. *J. Sci. Food Agric.* **5**, 1-7 (1954). Ground hay is mixed with water, and cells are ruptured by quick freezing and thawing. Pigments are extracted with 85 per cent acetone, transferred to ether and then to petroleum ether. Separation of chlorophylls from phaeophytins, carotene and xanthophyll is achieved by chromatography on a column of equal weights of sucrose and anhyd. sodium sulfate and developing with ether-petroleum ether. The green solutions contain chlorophylls *a* and *b* which are estimated by spectrophotometric measurements at 661 and 642.5 mμ. Phaeophytin-a and -b can be estimated in the yellow solutions by measurement at 667 and 655 mμ. The yellow solution also contains carotene and xanthophyll which are estimated after chromatography on magnesium oxide columns. Ranges of pigment contents in five samples of hay as mg./100 g. dry matter were: chlorophyll-a, 55-65; chlorophyll-b, 34-42; phaeophytin-a, 6-12; phaeophytin-b, 1-3; total tetrapyrroles, 96-119; carotene, 0.4-1.1; xanthophyll, 2.6-4.1.

The component fatty acids of the seed oils of Datura metel, D. stramonium and Capparis rothii. D. N. Grindley. *J. Sci. Food Agric.* **5**, 92-4 (1954). Yields, physical and chemical data on the oils are summarized. They resemble oils from other species of the same two families. Fatty acid compositions (as per cent) for oils from *D. metel*, *D. stramonium* and *C. rothii* were respectively: linoleic, 52.16, 60.75, 22.05; oleic, 31.84, 23.44, 37.95; palmitic, 13.05, 11.44, 15.50; stearic, 2.95, 4.37, 24.50. No linolenic acid was found.

Some physical properties of polymorphic forms of 1,2-diaceto-3-stearin and 1-aceto-3-stearin. E. J. Vicknair, W. S. Singleton and R. O. Feuge. *J. Phys. Chem.* **58**, 64-6 (1954). Monostearin was reacted with one and two equivalents of acetyl chloride in chloroform-pyridine. 1,2-Diaceto-3-stearin was recrystallized from acetone. 1-Aceto-3-stearin was purified by successively recrystallization from hexane and acetone. Expansibilities, melting dilations and points of polymorphic transitions were determined dilatometrically over the range −17 to 60°C. X-ray data and photomicrographs were obtained and crystal spacings calculated. Both products exist in three polymorphic forms. Crystals are long and narrow, forming on melting and resolidifying an unordered network of interlocking ribbons. Alpha forms exhibit stretchability of 200 to 300 times as much as an ordinary fat, although higher melting forms behave like the fat. Fatty products containing acetylated monostearin are nongreasy solids possessing considerable plasticity and stretchability. (See also *C. A.* **47**, 1456)

Analytical separation of the methyl esters of the C_{12}-C_{22} fatty acids by vapor-phase chromatography. F. R. Cropper and A. Heywood (Imperial Chemical Industries Ltd., Blackley, Manchester). *Nature* **172**, 1101 (1953). The technique of vapour-phase chromatography has been developed so that separation and measurement of the C_{12}-C_{22} fatty acid esters is now possible, at 230°C. The chromatographic column consists of a vertical spiral 1 inch in diameter with twelve turns, so that the over-all length of the column is about 3 feet; this packed with the dry mixture of 'Celite' and silicone grease. At the entrance to, and the exit from, the column are attached two platinum-wire catharometers which are connected in a Wheatstone bridge arrangement so that the difference in resistance can be recorded by a Cambridge high-speed recorder. The column and catharometers are wound with asbestos tape so as to form a single unit, which is then placed in an iron cylinder, wound and lagged so that temperatures up to 300°C. can be attained. The sample (about 0.02 ml.) is introduced from a hypodermic syringe, the needle of which is pushed through a rubber cap at the top of the column; a vacuum pump gives 2 cm. mercury pressure in the exit catharometer, and about 40 cm. mercury in the inlet catharometer, which is fed with nitrogen (8 ml./min.) from a ballast reservoir and gas cylinder. Under these conditions, the methyl esters of lauric, myristic, palmitic, stearic, arachidic and behenic acids are separated.

An unknown acid from brain extracts chromatographed on silica gel. F. Friedberg, L. M. Marshall, and L. H. Newman (Howard Univ. Med. School, Washington 1, D. C.). *Nature* **172**, 1191 (1953). The infrared absorption pattern of the tertiary amyl alcohol-chloroform (50 per cent v/v) extract of human brain indicated the presence of fumaric acid, succinic acid, lactic acid, and alpha ketoglutaric acid. There is a pronounced peak due to an unidentified acid. This acid contains 54.3 per cent carbon and 10.4 per cent hydrogen, and the absorption in the infrared shows the CH-stretching vibration (3.4 microns) and the carbonyl stretching (5.8 microns) vibration.

The structure of the glycerinositophosphatide of ground-nut. T. Malkin and A. G. Poole (Univ., Bristol). *J. Chem. Soc.* 3470 (1954). By means of paper-chromatographic checks during fractionation, the inositol-containing phosphatide of ground-nuts, which comprises some 38% of the phosphatides present, has been isolated in a high degree of purity. It differs from other known phosphatides in having a nitrogen-phosphorus ratio of 1:2, and its degradation products are not inconsistent with the N-glycosyl derivative of the ethanolamine ester of phosphatidylinositol phosphate. Each molecule of phosphatide contains two molecules of L-arabinose and one of D-galactose. Mild hydrolysis gives a disaccharide of arabinose and galactose, but the detailed arrangement of the three sugar molecules is not yet known.

Studies on the structure of sphingomyelin. III. Quantitative data on the peroxide and periodate uptake during the oxidation of sphingomyelin. G. Marinetti and E. Stotz. *J. Am. Chem. Soc.* **76**, 1345 (1954). Sphingomyelin was hydroxylated with performic acid and subsequently oxidatively cleaved with periodic acid. Quantitative measurements showed that one mole of peroxide and two moles of periodate were consumed for each mole of sphingomyelin which was oxidized. The postulated intermediates during the hydroxylation of sphingomyelin were substantiated by means of infrared spectroscopy.

Studies on the structure of sphingomyelin. IV. Configuration of the double bond in sphingomyelin and related lipids and a study of their infrared spectra. G. Marinetti and E. Stotz. *J. Am. Chem. Soc.* **76**, 1347(1954). The trans configuration of the double bond in sphingomyelin, N-lignocerylsphingosine and cerebroside has been established by means of infrared spectroscopy. The *trans* absorption band near 10.3 μ in the latter two non-phosphorus containing lipids was completely eliminated after hydrogenation whereas in the case of sphingomyelin this band was significantly diminished and altered. The spectrum of sphingomyelin was complicated by the finding that the band near 10.3 μ was due in part to the covalent phosphate group. It is proposed that infrared spectroscopy may be used for the qualitative and quantitative analysis of the two major classes of phospholipids, *i.e.*, the sphingolipids and the glycerophospholipids.

Fat separation in evaporated milk. II. Age-thinning of concentrated, sterilized milk. R. B. Maxcy and H. H. Sommer. *J. Dairy Sci.* **37**, 306-10(1954). Data are presented to characterize further the phenomenon of age-thinning of evaporated milk. The loss of viscosity is inversely related to the logarithm of the storage time, and the slope of the curve for age-thinning is directly related to the storage temperature. These relationships can be expressed in mathematical terms. A method is presented for the utilization of the above relationships in the calculation of the average viscosity during the early stage of quiescent storage. In addition, a method is described whereby it is possible to dissipate quickly the temporary viscosity formed during sterilization.

A simple chromatographic method for the determination of the C_{10}-C_{20} saturated straight-chain fatty acids. H. J. Nijkamp (The Netherlands). *Nature* **172**, 1102(1953). With specially prepared silica-gel, tinted with bromothymol blue, neutralized with methanolic ammonia solution, saturated with methanol and using isooctane (saturated with a distinct excess of 95% methanol) as the mobile phase, a column length of about 9 cm. is sufficient to obtain a quick and quantitative separation of the straight-chain even-numbered saturated fatty acids from C_{10} to C_{20}. Recoveries of single acids and of the acids in mixtures were between 95% and 105%. Even mixtures containing no more than about 0.5 mgm. of each acid could be analyzed with the same accuracy. Experiments indicate that the range of usefulness can be extended to C_{22} and perhaps to C_{24} acids. As compared to the reversed-phase chromatography of Boldingh and to the silica method of Ramsey and Patterson, this method has the advantage that the position of each acid is visible on the column, that each acid needs only one titration and that the analysis is quick and simple.

The direct chemical interrelation of the configuration of terpenes and hydroxy acids. Donald S. Noyce and Donald B. Denney. *J. Am. Chem. Soc.* **76**, 768-771(1954). By the successive degradation of (—)*cis*-3-hydroxycyclohexanecarboxylic acid to (+)3-methylcyclohexanone and to (—)α-methoxyadipic acid a direct chemical relationship between the configurations of the terpenes and of α-methoxyadipic acid has been established. This work tends to substantiate the relationships suggested by Fredga by the method of quasi-racemates, and the calculations of Kirkwood and of Eyring.

The role of lactones in flavor deterioration of milk fat. Stuart Patton, Philip G. Keeney, and Carl T. Herald. *Science* **119**, 218(1954). At an early stage in the storage deterioration of anhydrous milk fat a coconut-like flavor defect is evident. Evidence from this laboratory has indicated that the flavor and odor properties of δ decalactone appear to be identical with those of the compound responsible for the coconut-like off-flavor of milk fat. A logical origin of the lactone is Δ^9 decenoic acid, a component of milk fat glycerides. This acid and Δ^8 dodecenoic and Δ^9 tetradecenoic acids occur in milk fat but apparently are absent in most other fats. Of a number of fats studied, including milk fat, lard, coconut, cottonseed, and soybean and peanut oils, only milk fat developed the off-flavor in question.

Substituted long chain fatty acid hydrazones of 5-nitrofurfural. Norman Rabjohn and M. S. Cohen. *J. Am. Chem. Soc.* **76**, 1280(1954). Methods have been developed for a generalized procedure of preparation of derivatives of branched, long chain hydrazides which contain a substituted quaternary ammonium group.

In fats and oils the shift is from inedibles to edibles. *Chemical Engineering* **61**, No. 3, 200-202(1954). From the 31st Annual Review Issue, "The Challenge of '54." In 1953 the production of both edible and inedible fats slipped below the marks of the previous year, although large supplies were available. This abundant supply and the effects of the synthetic detergents on the soap field have produced two industry-wide trends: (1) greater use in foods, including animal foods, from these fats, and (2) increased activity to find more extensive non-food uses. Evidence of the first is seen in the increasing consumption of margarine, which is predicted to surpass that of butter this year, and the improvement of lard by eliminating certain undesirable properties not found in hydrogenated vegetable shortenings. The latter trend results from the sales of detergents soaring while sales of soaps dropped; as it is predicted that the synthetics will continue to dominate the market, it is recognized that production of grease and tallow products is necessary. Much attention was given to these problems at the fall A.O.C.S. meeting. One potential non-food outlet is the utilization of the long straight-chain structure of the tallows and greases to produce plastics, rubbers, synthetic fibers, surface-active agents, lubricants, and waxes; per-acetic oxidation of esterified cheap vegetable oils or animal fats yielded vinyl plasticizers, greases, etc. Development of a filtration-extraction process to obtain a 98% yield of seed oils and a high grade of meal, and a high-frequency modified hammermill set-up to render fats and oils is reported. In the food fields a margarine with spreading qualities from —4 to 110°F., and stable at the higher temperature, was developed; growth of consumption of synthetic frozen desserts using fat and oil products is another outlet mentioned. It was predicted that lard and edible oil production would probably drop; that cottonseed prices would be down from 1952, but would average near support; that soybean prices would be above support; that peanut prices would average support; and, that exports would increase slightly.

Chemical engineering from soaps to salads. E. A. Lawrence. *Chem. Eng. Prog.* **49**, No. 12, 627-634(1953). Discusses the chemical engineering used in the fat and oil industry and points out how the requirements of fat and oil products create new uses for basic engineering know-how.

A modified iodimetric determination of organic peroxides. B. Dudley Sully. *The Analyst,* **79**, No. 939, 86(1954). A modified iodimetric method for the estimation of organic peroxides, including those present in rancid fats, is described. The procedure is similar to the method of Lea, but the necessity for de-aerating the reagents and for working in a current of inert gas is avoided by mixing all the reactants in a boiling acetic acid-chloroform solution.

PATENTS

Agent for preventing loss of gloss in candy coatings. Sherwood Thomas Cross (Atlas Powder Co.). *U. S. 2,671,027.* Dulling of bon-bon coating in which the ratio of fat to sugar is 80/20 to 25/75 by weight is prevented by the addition of a mixture of a partial ester of a higher fatty acid and a polyoxyethylene derivative of the partial ester of higher fatty acids.

Process of hydrogenating vegetable oil. Harvey D. Royce and Langdon C. Haskell (Southern Cotton Oil Co.). *U. S. 2,671,097.* Soft, plastic fat of superior keeping quality is obtained by hydrogenating a liquid vegetable glyceride oil in the presence of a metallic catalyst and phosphatic ester. The phosphatic ester is the alcohol soluble reaction product of a polyhydric alcohol partial fatty acid ester with phosphoric anhydride and a primary alkylolamine and has the general formula $X[OP(=O)(OR)(OY)]_n$ in which *R* is hydrogen or a lower alkyl group, *Y* is alkylolamine, *X* is polyhydric alcohol partial ester, and *n* is a small, whole number.

Apparatus and method for rendering fat. Charles Pavia (Pavia Process, Inc.). *U. S. 2,671,098.* Description of apparatus comprising grinder, heated rolls, and a receptacle for the rendered fat.

Separation of tall oil acids. James Harwood, Charles W. Hoerr and Richard A. Reck (Armour & Co.). *U. S. 2,672,458.* Resin acids are separated from the fatty acids by mixing tall oil with aqueous acetonitrile (5-25% water) which precipitates the bulk of the resin acids while leaving the bulk of the fatty acids in solution.

Process for preserving the fresh natural flavor of butterfat. Grover D. Turnbow (International Dairy Engineering Co.). *U. S. 2,673,155.* Fat is separated from nonfat components of milk; sugar (lactose, sucrose or glucose) is added to the fat and the mixture is heated. The process may be used for the preparation of a cream concentrate or powdered cream.

Lubricating grease prepared from the esters of the dimer of linoleic acid. Arnold J. Morway, David W. Young and Delmer

L. Cottle (Standard Oil Development Co.). *U. S. 2,673,184.* The grease is prepared from C_1 to C_{18} alcohol diesters of the dimer of linoleic acid and thickened with the lithium soap of high molecular weight saturated fatty acid.

Separation of constituents of fatty oils or their derivatives by dialysis. Lever Brothers & Unilever N. V. (Jan Boldingh, inventor). *Dutch 72,285,* May 15, 1953. Components of fatty oils or their derivatives are separated by dialysis, preferably in the presence of a solvent, through a rubber membrane which swells in contact with oil. The dialysis of polar substances is accelerated by the use of polar rubbers and nonpolar solvents. Thus, from a mixture of mono-, di-, and trilaurin, a dialyzate rich in α-monoglyceride is obtained with a membrane of perbunan, and a 2-1 mixture of petroleum ether and EtOH as solvent. Other examples describe the freeing of arachide oil from mucous impurities, the separation of phosphatides from soybean oil, of polymeric stand oil from linseed oil, of vitamin A ester from fish-oil concentrates, the elimination of Ni catalyst from extracted fat obtained in the hardening of fatty oils, of free fatty acids and hydroxy acids from dark herring oil, and of coloring mixtures from fatty acids for the manufacture of soap. (*C. A.* 58, 1033)

Method and apparatus for milk sampling in dairy plants for determining the average fat content. Paul Funke & Co. G.m.b.H. (Herbert Grimm, inventor). *Ger. 820,817,* Nov. 12, 1951.

Theobromine-magnesium oleate. Nordmark-Werke G.m.b.H. (Julius Wolf, inventor). *Ger. 835,498,* Mar. 31, 1952. Theobromine-magnesium oleate of valuable chemotherapeutical properties is prepared from bromine or a bromine salt with Mg oleate or substances yielding these compounds, possibly in the pressence of diluents or finely dispersed silica, and at pH 3-10. (*C. A.* 58, 2092)

Vegetable-oil extraction from groundnuts. Council of Scientific and Industrial Research. *Indian 46,793,* Sept. 9, 1953. Dried decorticated groundnuts (peanuts) (4500 g.) are flaked by passing through a roller mill. The flakes thus obtained are put into a closed stainless-steel extractor provided with wire gauze at the bottom and top and an inlet and an outlet for solvent. An EtOH-gasoline mxiture is heated to 60-76° and pumped through the flakes for 5-10 min. Four l. of solvent are used in each of 4 successive extractions. The oil thus obtained is heated in a steam-jacketed vessel under low pressure to remove impurities by vaporization. It is then filtered to give 2100 g. of oil. The residual material may be powdered, sieved, and packed for use as an edible or industrial product. (*C. A.* 58, 1604)

• Biology and Nutrition

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

Detergents and chick growth. H. D. Branion and D. C. Hill. *Poultry Sci.* 33, 62-5(1954). The individual inclusion of each of six synthetic detergents and one soap, at an 0.5% level in the rations, failed to give an increased growth response over the control to 12 weeks of age. However procaine penicillin at a level of 10 parts per million also failed to give a response.

Biochemistry of the sphingolipides. VIII. Occurrence of a long chain base in plant phosphatides. Herbert E. Carter, Walter D. Celmer, William E. M. Lands, Katherine L. Mueller, and H. H. Tomizawa. *J. Biol. Chem.* 206, 613-23(1954). The purified inositol lipides from corn and soy bean phosphatide contain a nitrogenous component other than ethanolamine. This substance from corn is identical with the basic component of fungus cerebrin. The structure for cerebrin base previously proposed has been shown to be incorrect. Data are presented which show that cerebrin base is 1,3,4-trihydroxy-2-aminooctadecane, and that the amino carbon atom has the D configuration with respect to the terminal carbon atom. The term "phytosphingosine" is proposed as a more satisfactory designation for cerebrin base.

Effect of form of alfalfa when fed as the sole source of roughage to Guernsey cows on the carotenoid and vitamin A content of milk. H. M. Hansen, G. H. Porter, R. E. Johnson, H. D. Eaton, Goeffrey Beall, and L. A. Moore. *J. Dairy Sci.* 37, 311-15(1954). The effect of feeding artificially-dried and chopped, artificially-dried and pelleted, and field-cured and field-baled forms of alfalfa as the sole source of roughage on the carotenoid and vitamin A content of the milk was studied using 18 Guernsey cows in a double change-over design. During the feeding of the chopped form, carotenoid and vitamin A concentration of the milk and of the milk fat, as well as total amounts of these constituents secreted, were found to be significantly greater than those for the field-baled and pelleted forms of the alfalfa. The estimated vitamin A content of the butter as calculated from the carotenoid intakes during the feeding of each form of the alfalfa was approximately similar to the observed values for the chopped form, considerably lower for the pelleted form, and higher for the field-baled form.

The effect of hyperglycemic-glycogenolytic factor on fat metabolism of liver. Ella S. Haugaard and Niels Haugaard. *J. Biol. Chem.* 206, 641-5(1954). Further observations are reported on the action of hyperglycemic-glycogenolytic factor on the metabolism of fat by rat liver slices. In addition to acetate it was found that the utilization of radioactive glucose and fructose for fatty acid synthesis was inhibited by this substance. It was also shown that HGF increased the formation of ketone bodies by the rat liver slices, both in the absence of substrate and in the presence of acetate.

Metabolism of phospholipides by bacterial enzymes. Osamu Hayaishi and Arthur Kornberg. *J. Biol. Chem.* 206, 647-63 (1954). The metabolism of certain phospholipides has been studied with enzyme preparations from a strain of *Serratia plymuthicum.* This organism was isolated by enrichment culture on a medium containing glycerophosphorylcholine (GPC) and was routinely grown on a lecithin-yeast extract medium. These results suggest the following pathway for the bacterial metabolism of lecithin (or cephalin): Lecithin and lysolecithin are converted to GPC, which is then split into L-α-GP plus choline. Cephalin is metabolized to L-α-GP and ethanolamine by way of GPE.

Mechanism of increased hepatic cholesterolgenesis in diabetes: its relation to carbohydrate utilization. S. Hotta, R. Hill, and I. L. Chaikoff. *J. Biol. Chem.* 206, 835-44(1954). The rates of incorporation of the C^{14} of acetate-1-C^{14} into cholesterol by livers of two groups of alloxan-diabetic rats were compared. One group was fed a diet containing 60% glucose, the other a diet containing 60% fructose. The capacity of the liver of the glucose-fed, *diabetic* rat to incorporate the C^{14} into cholesterol was more than twice that observed with livers of *normal* fats fed either the high glucose or the high fructose diet. The rate of hepatic cholesterogenesis in diabetic rats was restored to normal by the feeding of the high fructose diet. The mechanism of increased hepatic cholesterogenesis in diabetes is discussed.

The influence of vitamin B_{12} on carbohydrate and lipide metabolism. Chiun T. Ling and Bacon F. Chow. *J. Biol. Chem.* 206, 797-805(1954). The effect of vitamin B_{12} on carbohydrate and lipide metabolism was studied by measurement of blood sugar levels, by glucose tolerance tests, and by estimation of the phospholipide content of blood and tissues. Its possible relationship to the changes in blood glutathione content was also investigated. Experimental results indicate that vitamin B_{12} deficiency entails a derangement in carbohydrate utilization and decreases the phospholipide content of blood and tissues. Administration of glutathione or vitamin B_{12} lowered the blood sugar levels of rats with hyperglycemia induced by a high carbohydrate-low fat diet and by glucose injections. It is concluded that vitamin B_{12} plays an important rôle in carbohydrate and lipide metabolism and that the effect of this vitamin on blood glutathione concentration may be of significance in its rôle in metabolism.

Oilseed processing, detoxification and toxicological studies of tung meal. G. W. Mann, W. H. Hoffman, and A. M. Ambrose (Albany, Calif.). *J. Agr. and Food Chem.* 2, 258-63(1954). Use of tung meal as an animal feed is not feasible because of its toxic nature; hence experiments were performed to resolve some of the apparent contradictory statements on the detoxification of this material. Employing rats as test animals it was found that a tung meal, prepared by hexane extraction of tung kernels, could not be detoxified completely by a combination of autoclaving and extraction with ethyl alcohol. Tung press cake (obtained by a commercial expeller process involving exposure to high temperatures) was detoxified almost completely by extraction with ethyl alcohol. The application of heat alone does not appear to effect complete detoxification of tung meal. The occurrence of a heat-stable toxic principle seems to require consideration in any proposed *commercial detoxification* process.

The absorption of C^{14}-labeled epicholesterol in the rat. H. H. Hernandez, I. L. Chaikoff, W. G. Dauben, and S. Abraham. *J. Biol. Chem.* 206, 757-65(1954). Cholesterol-4-C^{14} and epicholesterol-4-C^{14} were fed to rats that had cannulas inserted into their thoracic ducts. The rate of appearance of C^{14} in the lymph of each rat was measured, and the C^{14} containing compounds in lymph were characterized. Cholesterol was identified as the major C^{14}-containing compound in the lymph of rats fed cholesterol-C^{14}. Approximately 50% of the cholesterol recovered in lymph was esterified. Epicholesterol was identified as the only major C^{14}-containing compound in the lymph of rats fed epicholesterol-C^{14}. Practically none of this epicholesterol in lymph was in the esterified form. Cholesterol is more rapidly absorbed than is epicholesterol. The C^{14} recoveries observed in the rats fed the cholesterol were about twice those found in the rats fed the epicholesterol. The possible relation between the rate of absorption of cholesterol and its esterification is pointed out.

Enzymatic degradation and resynthesis of coenzyme A. G. David Novelli, Frank J. Schmetz, Jr., and Nathan O. Kaplan. *J. Biol. Chem.* 206, 533-45(1954). The splitting of CoA by phosphomonoesterase, phosphodiesterase, a specific CoA pyrophosphatase, and a type of peptidase, alone and in various combinations with each other, has been described. The products of the various enzymatic degradations have been identified and characterized. These data, together with other chemical data, have indicated the structure of CoA to be 3′,5′-diphosphoadenosine joined by a pyrophosphate bridge to 4′-phosphopantetheine. The resynthesis of CoA from certain enzymatic degradation products by extracts of pigeon liver in the presence of ATP has been described.

The acute fatty liver in man. *Nutrition Reviews* 12, 41(1954). The evidence afforded indicates the importance of early diagnosis of fatty liver, since the syndrome represents a deficiency disease which is reversible, but, if not treated promptly, it may lead to the development of fibrous changes and cirrhosis. In addition to proper diet, other efforts must be directed at rehabilitation of alcoholic patients. Moreover, it is important to plan for weight reduction in obese patients with acute fatty liver. That nutritional deficiency, particularly of protein, is of prime significance in the etiology of fatty liver is again demonstrated, as is the prompt and early response to treatment with a diet adequate in content of protein and substances with lipotropic activity.

Dietary atherosclerosis in monkeys. *Nutrition Reviews* 12, 25 (1954). Seventeen monkeys fed alpha protein of soybean meal supplemented with cholesterol and choline have been examined pathologically. These animals maintained a serum cholesterol over 300 mg. per cent during the experimental period. Of the 9 monkeys which were hypercholesterolemic for eighteen or more weeks, marked atheromata in the aortas of 4 were noted. Four monkeys had minimal lesions and one monkey was free of aortic disease. Lesions were less consistently found in monkeys fed the experimental diet for shorter periods.

The effect of choline on fatty acid oxidation. *Nutrition Reviews* 12, 88(1954). The lipotropic effect of choline has been generally ascribed to a stimulation of the rate of transfer of fatty acids from the liver to tissue fat depots. The transport form of fatty acids has been assumed to be choline-containing phospholipids. A considerable body of data indicates that this is not the correct explanation. The observation that choline added *in vitro* did not affect fatty acid oxidation suggests that not free choline but rather some choline derivative functions in fatty acid oxidation. Considerable circumstantial evidence suggests that this derivative is a phospholipid, but this remains to be proved. If one considers that the removal of fat from the liver requires not only an adequate supply of choline but also an adequate turnover rate of some choline-containing compound it may allow a different approach to the biochemistry of lipotropic factors.

Fat absorption in absence of bile and pancreatic juice. *Nutrition Reviews* 12, 28-30(1954). Neither the bile nor pancreatic juice appear to be necessary sources of the endogenous fecal fat, since the endogenous fecal fat excretion is greater than normal in the absence of either.

Fatty livers in amino acid deficiencies. *Nutrition Reviews* 12, 22(1954). There are two separate yet related phenomena in fatty liver production, first, a primary deficiency of methyl group or choline in which threonine is without effect and second, primary threonine or lysine deficiency in which choline is effective at high dietary levels. Massive fatty infiltration of the liver is the chief internal symptom of kwashiorkor and is observed frequently in African babies showing no visible sign of malignant malnutrition. Partial "subdeficiencies" of threonine and lysine may well be of importance in human nutrition as they are known to be present in limited amounts only in many staple vegetable proteins.

Fecal and plasma lipids on fat-free diets. *Nutrition Reviews* 12, 37(1954). These studies suggest that the amount of fat in the diet largely, but not completely, influences fecal lipid excretion in man. Thus, since lipids continue to be excreted during the ingestion of a lipid-free diet it is clear that there is a certain portion of the fecal lipid which is probably derived from such sources as secretion, desquamation, or bacterial synthesis.

In vitro studies of vitamin A formation. *Nutrition Reviews* 12, 23(1954). These studies provide further direct experimental evidence that the intestine, at least in the rat, is very important in the conversion of carotene to vitamin A. The rat differs from the human being in that carotene is not absorbed from the intestine. In man some carotene probably can be absorbed from the intestine. In the rat the intestine seems to be almost the exclusive organ for conversion of carotene. The degree to which the human liver may participate in vitamin A formation has not been established.

Prevention of hypercholesterolemia and atherosclerosis in chickens fed cholesterol. *Nutrition Reviews* 12, 54(1954). It has been shown that mixed soybean sterol or dihydrocholesterol had a marked effect in preventing hypercholesterolemia and atherosclerosis. However, it should be emphasized that there is as yet no evidence in man that a nominal intake of plant sterols is an important factor in preventing hypercholesterolemia. There is evidence in man that caloric balance affects the level of cholesterol in the blood.

Vitamin E deficiency and the heart. *Nutrition Reviews* 12, 57 (1954). One of the consequences of a vitamin E (tocopherol) deficiency in experimental animals is degeneration of the skeletal musculature. In some species, degeneration of the cardiac (heart) muscle is likewise encountered in this deficiency. Lambs that developed sudden electrocardiogram changes exhibited heart lesions in localized areas, whereas lambs exhibiting little or only slow changes in the patterns exhibited cardiac lesions which covered all of the ventricular wall. However, these results leave some doubt as to whether electrocardiographic changes bear my direct relation to progressive tissue changes that are microscopically detectable in vitamin E deficiency.

Studies on the microbiological degradation of cholesterol. Thressa C. Stadtman, Amelia Cherkes, and Christian B. Anfinsen. *J. Biol. Chem.* 206, 511-23(1954). The oxidative degradation of cholesterol by cell suspensions and enzyme preparations of a soil *Mycobacterium* has been studied. Methods are described for separation and detection of sterol oxidation products. Cell-free extracts contain a cholesterol dehydrogenase that catalyzes the conversion of cholesterol to Δ^4-cholestene-3-one. The oxidation of 4-C^{14}-cholestenone, 4-C^{14}-cholesterol, and 26-C^{14}-cholesterol to $C^{14}O_2$ by intact cells was studied. Carbon 4 of the steroid ring is oxidized to CO_2 about 4 times as rapidly as is carbon 26 of the side chain.

Relative utilization of glucose and acetate carbon for lipogenesis by mammary-gland slices studied with tritium, ^{13}C and ^{14}C. Judith H. Balmain, S. J. Folley, and R. F. Glascock. *Biochem. J.* 56, 234-239(1954). A study was made of the relative values of acetate and glucose as sources of carbon for fatty acid synthesis by mammary tissue, of the rat and the sheep, when both substrates are present in the incubation medium. A triple-labelling technique has been used in which the methyl carbon of acetate was labelled with tritium, the carboxyl carbon with ^{13}C, and all the carbon atoms of glucose with ^{14}C. A discussion of the results obtained is given.

Increasing the food value of whey by yeast fermentation. IV. Feeding trials with mice. G. M. Bell, V. E. Graham, D. L. Gibson, W. C. Lawton. *Can. J. Tech.* 32, No. 2, 55-59(1954). Nutritional studies with mice were conducted on powdered whey which had been fermented by *TORULA CREMORIS*. Yeast-whey was shown to possess more protein, fat, thiamine, riboflavin, calcium, and phosphorous than skim milk. When it was used in conjunction with a wheat-oats ration, its protein supplementary value was equal to that of dried skim milk even though its methionine content was apparently lower. Yeast-whey ranked with dried brewers' yeast as a vitamin source except in the case of thiamine.

A study of the onset of unsaturated fatty acid deficiency in subcellular particles of rat livers. Peter D. Klein and Ralph M. Johnson. *Arch. Biochem. & Biophysics*, 48, No. 2, 380-385 (1954). The results of this study suggest that the fundamental alterations in fat deficiency occur within a relatively short period of fat exclusion and affect the composition of the cytoplasmic particles to different degrees.

Effect of fatty acids on the growth, metabolism, and morphology of the anaerobic cocci. P. Wildy and R. Hare. *J. Gen. Microbiol.* 9, 216-25(1953). Addition of Na salts of lauric, capric, myristic, palmitic, stearic, or oleic acids to agar media used for the growth of anaerobic cocci had little effect on growth of representatives of groups I, II, V, and VI (*C. A.* 47, 1229), but did increase the metabolic activity of representatives of groups III and IV. In addition to increased growth, more rapid utilization of carbohydrate and pyruvate was noted. Cell size also increased. (*C. A.* 58, 2176)

Alimentation of rats with highly oxidized fats. Hans Kaunitz. *Naunyn-Schmiedebergs Arch. exptl. Pathol. Pharmakol.* 220, 16-25(1953). Highly oxidized hog fat in the diet caused in rats only insignificant changes provided all known vitamin factors were given separately in suspension. There was, however, a loss of weight that could not be explained by lack of unsaturated acids nor by reduced food intake, probably neither on the basis of disturbed absorption of fat. The degree of weight loss was parallel to the oxidation of the fats. Experiments with fat-free diet made it unlikely that unknown growth factors were deficient. Increased protein intake counteracted the weight loss. (*C. A.* 58, 1496)

Effects of feeding rape oil on some endocrine functions of the rat. K. K. Carroll and R. L. Noble. *Endocrinology* 51, 476-86 (1952). The functional activity of rat adrenal cortices enriched in cholesterol by feeding the animal rape oil was tested by subjecting the rat to these stresses: fasting, insulin injections, increase in water load, exposure to cold, unilateral adrenalectomy, etc. Rape oil diets caused an accumulation of ovarian cholesterol with no interference with ovarian function. (*C. A.* 58, 1494)

Modified course of Trypanosoma congolense infection in mice given diets with milk casein. Audrey A. M. Keppie. In mice fed a stock diet containing whole wheat 50, barley 25, whitefish meal 7, dried brewers' yeast 5, cod-liver oil 1, and NaCl 1% or in mice fed bread, milk, and oats, inoculation with *T. congolense* produced acute, and then chronic, parasitemia. Parasitemia was either delayed or prevented in inoculated mice on diets of margarine (containing vitamins, A and D) 3, cod-liver oil 0.5, McCollum's salt mixture (No. 185) 4, dried yeast 1.5, casein 10-30, and cornstarch 81-61%. The results are due to failure of the latter diets to nourish the parasite. (*C. A.* 58, 1494)

Variations in the manner of absorption of different fats and fat acids in the rat. P. Favarger and Juliette Gerlach. *Helv. Physiol. et Pharmacol. Acta* 11, 239-50(1953)(in French). Various mixtures of fats and free fat acids containing deuteriostearic, deuteriooöleic, and elaidic acids were fed to rats. Free fat acids, glycerides, and phospholipides were determined in 3 successive portions of the gut at appropriate time intervals. The distribution of the fat acids throughout the gut varied some with the nature of the acid, but more with the composition of the mixture. The differences were less marked with the phospholipides than with the glycerides. The results are discussed in relation to the mode of absorption of fat acids and the participation of phospholipides in this mechanism. (*C. A.* 58, 1507)

The quantitative biological determination of vitamin A and carotene in milk and fat products. K. H. Wagner. *Milchwissenschaft* 8, 291-8(1953). The following tests are discussed: (A) the "kolpokeratose" test of Hohlweg and Dohrn (*C. A.* 24, 5799) which is based on the appearance in deficiency cases of pathological symptoms in the mucous membrane of the vaginal tract; (B) the resistance test of Boynton and Bradford (*C. A.* 25, 5916) in which the saprophyte *Bacillus mucosus capsulatus* becomes pathogenic when injected into deficient rats; (C) the biological growth assay in which deprived rats having reached a stand-still in growth are used as assay animals; and (D) the curative test of W. (*C. A.* 32, 9186) resting on the appearance in deprived animals of a well-defined pathological eye condition. Results with the curative test are presented. Techniques for the chromatographic separation of vitamin A and carotenoids are described. (*C. A.* 58, 1595)

Failure of choline therapy to alter serum lipides in patients with coronary artery disease. Samuel U. Greenberg and Maurice Bruger. *Proc. Soc. Exptl. Biol. Med.* 84, 87-8(1953). Oral administration of the equivalent of 4.5 g. of choline base daily for 1.5-8.0 months to 11 patients with coronary insufficiency or myocardial infraction, or both, failed to alter the total serum cholesterol, the serum lipide P, and the phospholipide/total cholesterol ratio. (*C. A.* 58, 1571)

An experimental study of protein and fat assimilation after total gastrectomy. Tilden C. Everson and Everett Hoppe. *Surgery* 31, 511-16(1952). Thirty-nine individual 7-day metabolism periods were studied in 13 dogs subjected to total gastrectomy. Both fat and protein assimilation were impaired following total gastrectomy. On the av. 41.5% of ingested N and 27.6% of the ingested fat were excreted in the feces of the dogs with total gastrectomy; the corresponding values in normal animals were 12.8 and 2.8%, resp. (*C. A.* 58, 1528)

Hormonal effects on phosphorylation in the liver of the rat. W. E. Cornatzer, Duane G. Gallo, and John P. Davison. *Proc. Soc. Exptl. Biol. Med.* 84, 103-5(1953). Addition of 1% thiourea to the diet decreased synthesis of phospholipides and nucleoprotein in the liver. In normal rats the injection of 5 mg. of fat-mobilization factor of the pituitary (bovine thyrotropin) gave a 51% increase in total lipides in the liver in 6 hrs. Injections of pituitary growth hormones failed to affect the total lipide concentration in the liver but stimulated synthesis of both phospholipides and nucleoproteins. (*C. A.* 58, 1507)

Prevention of pancreatic fat necrosis by enzyme inhibitors. III. Quinine. Hans Popper and H. Necheles. *Surgery* 33, 896-7 (1953). The intraperitoneal administration of quinine had a marked effect in preventing pancreatic fat necrosis. A similar result was obtained with Na formaldehyde sulfoxylate. This effect was apparently due to inhibition of pancreatic lipase. The fact that trypsin inhibitors had practically no effect, while lipase inhibitors showed marked effects in preventing fatal pancreatic fat necrosis, seems to indicate that pancreatic lipase is of more importance in the development of acute pancreatitis than is generally assumed (*C. A.* 58, 1503-4)

Effect of emulsifiers on fat absorption in the normal young adult. Herbert C. Tidwell and Mary E. Nagler. *Gastroenterology* 23, 470-6(1953). No definite alterations in the chylomicron curves or the areas beneath them were produced in normal young men when the ingested fat was supplemented with an exogenous emulsifier or replaced with split fat. This indicated a similar rate of fat absorption in the subjects under these conditions. Neither Tween 80 nor glycerol monoöleate when fed to rats as a 6% supplement to a standard fat meal, appeared to influence the rate of fat absorption as measured by recovery of the unabsorbed fat. There was no demonstrable effect on fat splitting or gastric and intestinal motility. (*C. A.* 58, 1503)

Relationship of adiposity to serum cholesterol and lipoprotein levels and their modification by dietary means. Weldon J. Walker. *Ann. Internal. Med.* 39, 705-16(1953). Study of 29 cases of cardiovascular diseases indicated a general relationship between the state of nutrition and a definite though less marked correlation with serum cholesterol. The relationship is more marked in men than in women. Caloric intake may be a much more important factor in the genesis of arteriosclerosis than is dietary fat or cholesterol. 23 references. (*C. A.* 58, 1496)

Vitamin A tolerance curve as an index of fat absorption. Clarence W. Legerton, Jr., E. Clinton Texter, Jr., and Julian M. Ruffin. *Gastroenterology* 23, 477-81(1953). The absorption of vitamin A from an oily vehicle parallels the degree of fat absorption as measured by fecal fat balance studies. The height of the plasma vitamin A level at the end of 5 hrs. is a fairly reliable index of the ability of the body to absorb fat. (*C. A.* 58, 1493)

Absorption of fat and vitamin A in premature infants. III. Selma E. Snyderman, Saladin Mirales, A. W. Chung, J. M. Lewis, Angelina Messina and L. E. Holt, Jr. *Pediatrics* 12, 158-64(1953). Observations in premature infants show that fat assimilation can be increased by the use of either Tween 80 or Tween G 1205. The increase is a relatively small one and of questionable practical importance, inasmuch as increased fat absorption can be brought about to a considerably greater extent by other means such as substitution of more readily assimilated fats (corn oil for butter fat). Increased fat intake may also effect greater fat assimilation. (*C. A.* 58, 1494)

The stability of vitamin A in animal feeding stuffs. Alan W. Davies and Alastair N. Worden (Cromwell House, Huntingdon). *J. Sci. Food Agric.* 5, 107-12(1954). The stability of vitamin A in mixed feeds was studied under various storage conditions, differing in temperature, nature of container and exposure to light. Vitamin A (as cod liver oil) had greater stability in mash of medium particle size than in coarse feed. Cubing (pelletizing) provides some protection for vitamin A palmitate. Destructive action of mineral salts was confirmed and could be avoided by incorporating the salts in gelatin prior to addition to the feed. Stability of vitamin A in cod liver oil was greater in the presence of fish meal or liver meal and less in the presence of brewer's yeast than in the presence of cereal products such as barley meal or ground oats. Vitamin A palmitate was more stable than vitamin A in cod liver oil when added to mixed feeds.

Component fatty acids of the liver fat of albino rats receiving a high fat rice diet. S. M. Bose and V. Subrahmanyan. *Bull. Cent. Food Tech. Res. Inst.* (Mysore) **2**, 236-7(1953). Each fat (clarified butter) utilized contained about 20% of the lower fatty acids which were not in the liver of the rat, where oleic and palmitic acids especially are found. (*Oleagineux* **8**, 900, 1953)

• Drying Oils

Raymond Paschke, Abstractor

Abstract bibliography of the chemistry and technology of tung products, 1875-1950, Vol. III. Ralph W. Planck, Frank C. Pack, and Dorothy B. Skau. *U. S. Dept. Agr. Bur. Agr. and Ind. Chem. Mimeographed Circ.* **A1C-317**, 467-666(1952); **Vol. IV.** *Ibid.* 667-811(1952); cf. *C. A.* **46**, 9860. (*C. A.* **47**, 9627)

Silicone horizons. F. J. Quail (Canadian Gen. Elect. Co. Ltd., Toronto). *Can. Chem. Processing* **37**, No. 10, 62-8(1953). A discussion of chemistry, manufacture, and use of silicones.

How to keep fatty acids from darkening in storage. W. L. Riegler (Armour Chemical Division), J. V. Reilly (W. C. Hardesty), and R. A. Berhmann (Emery Industries, Inc.). *Paint Ind. Mag.* **68**, No. 9, 15-17(1953). Authors agree that contamination with iron should be avoided by storage in lined containers, that an inert gas blanket be used, and that the acids be stored at a temperature above their melting point.

Identification of resins and oils in paint vehicles. Odile Savy (Centre etudes et recherches Gaz France, Paris). *Peintures, pigments, vernis* **28**, 383-5(1952). A qual. analysis system for identification of unknown resins and oils in paint vehicles is outlined. The procedure is based on detn. of acid no., sapon. no., and acetyl no. Soly. studies, detection of chlorides, and gross observations of dried films are further aids in characterization. (*C. A.* **47**, 9627)

Paints. Francis Scofield (National Paint, Varnish, and Lacquer Assn. Inc., Washington, D. C.). *Ind. Eng. Chem.* **45**, 2233-6(1953). A discussion of developments of the past two years. Most important have been latex, fire-retardant, and anticorrosive paints.

Recent research on oxidation of monoethenoid fatty acids and esters. J. H. Skellon. *Chemistry and Industry* **1953**, No. 40, 1047-9. A discussion of recent work on catalytic oxidation with special reference to oleic, elaidic, petroselinic, petroselaidic, ricinoleic, erucic, and brassidic acids. 29 references.

Improved drying oils. Robert L. Terrill (Spencer-Kellogg and Sons, Inc.). *Off. Dig. Federation Paint and Varnish Production Clubs J.* **1953**, No. 344, 536-54. An extensive review covering thermal polymerization, oxidation, solvent segregation, fatty acids, isomerized oils, catalyzed oils, interesterified oils, dimerized fatty acids, dehydrated castor oil, dibasic acids, esters of higher alcohols, maleic modified oils, diene addition products, and styrenated oils. 11 references.

Optical properties of paints—the bases of instrumental measurements. D. L. Tilleard and T. R. Bullett (Paint Research Station, Teddington, England). *Oil and Colour Chemists' Assoc. J.* **36**, 545-67(1953). This paper is particularly concerned with the measurement of gloss, opacity, and color, indicating the types of method and instruments at present available, the principles on which they are based, and their scope and limitations in use. 28 references.

Metallic soaps in paints, varnishes, and lacquers. R. E. Wendt (Witco Chemical Co.). *Off. Dig. Federation of Paint and Varnish Production Clubs J.* **1953**, No. 344, 604-17

Recent developments in pigment technology. S. Werthan, W. B. Anderson, R. T. Urich, A. Permut, A. F. Knoll, P. Wheeler, W. G. Vannoy, C. J. Vander Valk, H. A. Wakefield, and S. S. Morris. *Paint Varnish Production* **43**, No. 10, 31-52(1953). A symposium covering zinc, titanium dioxide, white lead, carbon blacks, inorganic colors, organic colors, aluminum, extenders, red lead, zinc chromate, house paint, and industrial finish pigments.

Odorless paint problem reported solved with mono-oleate. Anon. *Chem. Processing* **17**, No. 3, 33(1954). Glyceryl mono-oleate is reported to keep alkyds stable and in soln. Required amount is from 5-15% by wt. based on vehicle solids.

The review report on progress in the paint industry. Anon. *Paint Oil Chem. Rev.* **117**, No. 3, 28(1954). Covers styrenated oils, latex paints, thixotropic vehicles, vinyl resins, epoxy resins, temperature-indicating paints, aerosol paints, fire retardant paints, silicone paints, water soluble industrial coatings ortho titanic acid esters, and lacquer emulsions.

Three-D paint. Anon. *Chem. Week* **74**, No. 6, 56(1954). Sherwin-Williams new Opal-Glo presents a new approach in use of aluminum powder and colored pigments to give an illusion of depth. The metal particles are said to stand on edge rather than to lie flat in the normal manner. A special application technique is necessary.

The determination of hydroxyl, ketone and ester groups in autoxidized fatty esters and related compounds by infra-red spectroscopy. N. H. E. Ahlers and N. G. McTaggert. *Analyst* **79**, 70(1954). Infra-red spectroscopic methods have been devised for quantitative determination of hydroxyl, ketone and ester groups in autoxidized or copolymerized fatty esters and related compounds.

Corrosion-protective paints for non-ferrous metals. H. Anders. *Metall Oberfläche* **B7**, No. 11, 172-4(1953). A Review with 11 references. (*C. A.* **48**, 3041)

A history of paints and varnishes in Great Britain. Part 3. Years of transition. F. Armitage. *Paint Manuf.* **24**, No. 2, 57(1954). This part described the rapid increase in paint raw material imports following overseas colonization between 1500 and 1700 and discusses the influence of the Statute of Monopolies on the technology of the industry. A review of the literature of this period is given.

Osmotic pressure, semipermeable membranes, and the blistering of paint. J. D. Babbitt (Washington, D. C.). *Can. J. Technol.* **32**, 49(1954). Although it has been known for several years that the blistering of paint on the outside of houses is caused by moisture, it has never been explained how the moisture gives rise to the large pressure required to separate a film of paint from wood. Recent experiments of Hopkins and Smart have shown that blistering occurs only when there is a temperature gradient. If the temperature of the paint film is below the condensation point so that the migrating moisture accumulates as liquid water in the pores of the wood, it is possible to suggest a mechanism, analogous to osmosis, which will give rise to large hydrostatic pressures.

TME (trimethylolethane)—a new polyol for the coatings industry. E. Balgley. *Am. Paint J.* **38**, No. 24, 65(1954). Typical alkyd formulations are given and processing conditions and film properties are discussed. Advantages in alkyds are light color, hardness, fast dry, excellent alkali resistance, good durability, heat stability, compatibility with amino resins, fast alcoholysis, and low volatility.

Microstructure of paint films. E. G. Bobalek, L. R. Lebras, A. S. Powell, and Waron Fischer. *Ind. Eng. Chem.* **46**, 572 (1954). By use of the electron microscope it appears that the luster and color of paint films are affected by both binder structure and the flocculation and sedimentation properties of the pigment in the film. There seems to be some correlation between microstructure of films and sedimentation properties of liquid paints. The surface roughness of films is least for films formed from paints that tend to settle rapidly to a dense pigment packing. This sedimentation behavior of pigments in films or liquid paints is influenced greatly by vehicle-pigment interactions, and cannot be predicted solely from data regarding particle size or extent of flocculation of the pigments.

The effect of surface active agents on pigment-vehicle systems. R. Denning and F. K. Daniel. *Off. Dig. Federation Paint & Varnish Production Clubs* **26**, No. 348, 37(1954). Flow Point determinations with three vehicles, six pigments and five surface active agents (SSA) show that dispersability does not depend on the pigment, the vehicle, or the surface active agent alone, but on the combination of all three components. Therefore, it is futile to expect any single agent to be effective in all pigment-vehicle systems. The best that can be hoped for is to find a compromise addition agent beneficial in a large percentage of pigment-vehicle combinations and innocuous in the remaining cases. A large group of SSA's must be tested to find the agent producing maximum dispersing efficacy in a given pigment-vehicle system. The Flow Point method is a convenient tool for finding the best agent.

The application of the polarograph to the paint industry. W P. Geogans. *Oil & Colour Chemists' Assoc. J.* **37**, 84(1954) Details are given of conditions found suitable for a number of polarographic estimations, including maleic anhydride in phthalic anhydride, lead and cobalt metals in driers, copper in copper naphthenate, zinc and titanium in pigments, and aluminum in "metallic finishes." The construction of a simple, inexpensive polarograph is described together with the elementary theory behind its operation. 42 references.

Recent developments in silicone vehicles for maintenance paints. R. C. Hedlund. *Org. Finishing* **15**, No. 2, 16(1954). In a few years silicone resins have won wide recognition as vehicles for heat-stable and corrosion-resistant paints. Usually pigmented with aluminum and applied with brush or spray, silicone-base baked-on finishes maintain their film integrity at temperatures ranging from 500° to 100°F. from 10 to 50 times as long as the best organic coatings. Silicone vehicles, silicone-alkyd copolymers, and modified silicone-alkyd resins are discussed.

Ester gum by esterification of rosin with glycerol. J. D. Hind, T. T. Kanno, and C. S. Miner, Jr. *Ind. Eng. Chem.* **46**, 441 (1954). Under the normally used reaction conditions, the glycerol triester is the major product, even when a large excess of glycerol is used. Only in the presence of certain alkaline catalysts are appreciable amounts of "rosin monoglyceride" formed. In the usual procedure, about 5% of the glycerol undergoes esterification to polyglycerol. Only after prolonged heating does the product contain substantial amounts of polyglycerol esters.

By combining use of SO_2, ZnO catalyst and a steam-blowing step to remove rosin oil, it is possible to produce a higher melting, light colored gum in much shorter time than by previous processes.

Protective coatings for high-melting metals. R. Kieffer and E. Nachtigall. *Congr. Materiaux Resistant A Chaud A.E.R.A.* **1951**, 301-6. A review with 34 references. (*C. A.* **48**, 3041)

Observations on optical properties of pigmented films. R. H. Kienle and C. Maresh. *Off. Digest Federation Paint & Varnish Production Clubs* **26**, No. 348, 5(1954). The use of optical and electron microscopy in the study of optical propreties. 29 photomicrographs and 10 references.

Analytical control of processes for dehydrating castor oil. W. J. Kissel, G. W. Blum, and E. G. Bobolek. *Off. Dig. Federation Paint and Varnish Production Clubs* **26**, 59(1954). A study of processes and catalysts for the purpose of improving manufacturing methods used for dehydrating castor oil. Infrared and ultraviolet spectroscopy and chemical methods were used for analytical control.

The alkyd reduction technique. E. C. Larson and H. Low. *Off. Dig. Paint & Varnish Production Clubs* **26**, No. 348, 45 (1954). The major problem obstructing the wider application of the odorless principle by the paint industry is the extremely poor compatibility features of odorless thinners. This study was directed toward achievement of (1) miscibility of alkyds in odorless thinners and (2) reduction in viscosity of such systems without sacrifice in vehicle content.

Mechanism of drier action. Proposal. E. R. Mueller, W. O. Lundberg, F. Scofield, F. M. Greenawald, E. B. Fitzgerald. *Ind. Eng. Chem.*, **46**, 570(1954). Panel Discussion. A brief review of peroxidation and polymerization mechanisms for drying oils and air-drying finishes, including the probable role of the drier metals in these mechanisms, is given.

Experimental work on several air-drying varnishes is presented. The maximum infrared absorption in the 2.9-micron band (which measures—OH) is greatest up to the "set" time. Moreover, if this is correlated with the ultraviolet and peroxide-development data of other workers, there appears to be good agreement between peroxide development, induced conjugation, and peroxide decay. When two "optimum" driers are used which differ considerably in composition but produce the same over-all drying times at 30°C., the infrared data almost exactly superimpose each other.

It is postulated that an important role of the driers is to initiate peroxidation so that autoxidation can proceed. It is theorized that certain active drier metals—e.g., cobalt—may initiate reaction chains in addition to promoting peroxide decomposition and free-radical chain formation. The concentration of driers is significant until a level is reached to obtain maximum speed of peroxide development. Several mechanisms by which driers may help produce free radicals are presented.

A discussion of this proposal points up the fact that there may be no single, simple mechanism of drier action. Observations on the action of cobalt as a destroyer of peroxides and hydroperoxides are made. The physical effects of driers—observed phenomena that can be explained only by consideration of physical processes—are discussed.

Esters of distilled and acid-refined tall oil as varnish vehicles. P. D. Patrick, Jr., M. G. Bestul and R. W. Gressang. *TAPPI* **36**, 561-4(1953). Glycerol esters of 3 acid-refined (I) and 4 distd. tall oils (II) were prepd. by heating 400 g. oil with glycerol (III) (2% in excess of that calcd. to give a 0 acid no.) in an inert atm. 1 hr. at 230° and then 8-12 hrs. at 280°, made into varnishes, and evaluated for film properties. None of the tall oils gave ester varnishes that dried tack-free in 18 hrs. The I esters gave harder films because of their higher rosin acid content. Both types had moderate to poor H_2O and alkali resistance. Alkyd resins with 24% phthalic content were prepd. by heating 400 g. II with the required amts. of III and phthalic anhydride 1 hr. at 230° and 8-12 hrs. at 275°. Alkyd varnish films dried tack-free in 17-18 hrs., had good hardness and flexibility, but moderate to poor H_2O and alkali resistance. Film evaluation showed that up to 50% glycerol ester of either type I or II can be blended with the com. 20-gal. tung oil-modified phenolic resin varnish to obtain a vehicle which dries tack-free overnight, has good flexibility, and which is suitable for use where H_2O and alkali exposure are not critical. (*C. A.* **48**, 2372)

Glycerine in industrial finishes. E. S. Pattison. *Org. Finishing* **15**, No. 2, 19(1954). A review with 14 references.

The composition of dimer acids of industrial origin, produced from drying oils. J. Petit and J. Cazes. *Peintures, Pigments, Vernis* **29**, 636-40(1953). This paper reports evidence of an unsuspected complexity in the compn. of dimer acids of drying oils. By use of chromatography of the ethyl esters in a systematic manner, the presence of the following was established: C_{18} monoacids, high monoacids (C_{19-99}), diacids of less than C_{36}, C_{36} diacids, and polymerized oxyacids. This mixt., which differs appreciably from that expected (only monomers, dimers, and trimers) is explained easily as a result of multiple cracking reactions in the course of the prepn., and a single decarboxylation is incapable of explaining the results. Linseed, soya, and rapeseed oils were the principal starting materials, and they were heated to 360-80° to produce the dimer acids. After sepg. out unsaponifiable matter, the acids were converted to the Et esters and sepd. by chromatography and the several fractions were characterized. (*C. A.* **48**, 3041)

The use of safflower oil in paint vehicles. J. W. Prane. *Paint Oil Chem. Rev.* **117**, No. 4, 18(1954). A discussion of typical properties of safflower oil, its drying, its thermal polymerization, the dispersion of soft gels, viscosity reduction, and uses in varnishes, alkyd resins, and copolymers.

Manufacture and properties of dehydrated castor oil. P. Slansky. *Paint Manuf.* **24**, No. 2, 45 (1954). A discussion of various methods for dehydrating castor oil in the laboratory and on a commercial scale.

A modified iodimetric determination of organic peroxides. B. D. Sully. *Analyst* **79**, 86 (1954). The procedure is similar to the method of Lea, but the necessity for de-aerating the reagents and for working in a current of inert gas is avoided by mixing all the reactants in a boiling acetic acid—chloroform solution.

How inks dry. Part 2. F. A. Varron. *Paint Manuf.* **24**, No. 2, 49(1954). This concluding part is concerned with precipitation of the resin, solidification, filtration, gelation, polymerization by oxidation, and thermal polymerization.

Electro-osmotic examination of paint films. J. K. Wirth and W. Machu. *Paint Oil Chem. Rev.* **117**, No. 4, 12(1954). (Reprinted from *Korrosion & Werkstoffe* 3, 444-460 [1952].) The first of two parts. An apparatus is described for the detn. of the sign of the elec. charge on pigments and for electro-osmotic studies. It permits detn. of size and number of pours, total cross-sectional area of pores, and the distance between the pores. 13 references.

PATENTS

Esters of α-hydroxy acids and their estolides. O. D. Cunningham and O. L. Polly (to Union Oil Co. of Calif.). *U. S. 2,652,410.* Products are useful for linoleum-cementing compns. and drying oil compns. (*C. A.* **48**, 3043)

Corrosion-resistant paint. A. Arent (to A. Arent Labs., Inc). *U. S. 2,657,145.* Anhyd. $SbCl_3$ is caused to react with an equal wt. of turpentine. The reaction product is then mixed with H_2O to convert all the Sb to H_2O-insol. $SbOCl_3$. An extremely uniform and stable dispersion of $SbOCl_3$, a corrosion-resistant salt, in polymerized pinene, and adherent film forming oil is thus obtained, to which a small amt. of dryer should be added. (*C. A.* **48**, 3043)

Abrasion-resistant wire enamels. F. J. Emig and M. J. Muth (to E. I. du Pont de Nemours & Co.). *U. S. 2,668,157.* An electrical insulating liquid organic coating composition consisting essentially of an organic film-forming material of the group which consists of (1) a combination of heat-hardenable phenol-formaldehyde resin and polyvinyl formal resin, (2) a linear polyamide, and (3) an oleoresinous varnish and colloidal polytetrafluoroethylene dispersed uniformly throughout said coating composition, in a concentration between about 0.1% and about 1% by weight based on said film-forming material, to increase the scrape abrasion resistance.

Resinous copolymers of 3,4 and 3,5 dichloro-alpha-methylstyrene. C. H. Swart and T. A. De Grotenhuis (to the General Tire and Rubber Co., Akron, Ohio). *U. S. 2,668,164.* 1. A solid interpolymerization product of at least two different substituted alpha methyl styrene liquids consisting essentially of (1) at least one alpha-methystyrene which has at least one nuclear substituent selected from the group consisting of halogen, trifluoromethyl, methyl and hydrogen on the 3,4 or 5 positions and (2) at least one member of the group consisting of the 3,4 and 3,5 dihalo-alpha-methylstyrenes, all of the alpha-methylstyrenes being characterized by absence of substituents on the 2 and 6 positions on the nucleus.

Condensation products of higher fatty acids, polyalkylene polyamines, and organic halides. J. E. Carpenter (to American Cyanamide Co., N. Y.). *U. S. 2,668,165.* Claim I. A composition of matter comprising the condensation product from the simultaneous reaction at a temperature of about 120°C. to about 300°C. of a higher fatty acid material, a polyalkylene polyamine and an organic halide containing the radical CH_2X, X being halogen, the ratio of higher fatty radicals to nitrogen in said product being from about 0.02 to about 0.50 the number of equivalents of the fatty acid material.

Claim 5. A composition of matter as in claim 1 wherein the higher fatty acid material is tall oil.

Epoxide compositions. S. O. Greenlee (to Devoe & Raynolds Co., Louisville, Ky.). *U. S. 2,668,807.* 1. The two-step process of making high melting point resins and final infusible products which comprises first reacting a dihydricphenol free from reactive groups other than phenolic hydroxyl groups with an excess of an aliphatic polyepoxide free from reactive groups other than epoxide and alcoholic hydroxyl groups to form a reaction product having terminal epoxide groups and further reacting this product with a further amount of such a dihydricphenol.

Bodying catalysts for drying oils. E. E. Parker (Pittsburgh Plate Glass Co.). *U. S. 2,669,573.* 1. A process of treating a drying glyceride oil which comprises heating the oil to bodying temperature in the presence of .05 to 3% of a catalyst consisting essentially of 9-anthrone until a desired increase of viscosity is attained.

Drying oil from semi-drying oil. K. Morii, *et al.* (to Nitto Chem. Ind. Co.). *Japan 993('53).* Cuttlefish oil is interesterified with MeOH to obtain the Me ester (I) of the oil. I (100 parts) is chilled at —3° to sep. it into 25 parts solid acid esters and 75 parts of liquid acid esters. The latter in MeOH in the filtrate removed to give 60 parts of the Me ester of a highly unsatd. oil. This ester (I no. 250) and 6 parts mannitol are heated at 200-50° in the presence of ZnO for 6 hrs. to give 66 parts of the mannitol ester of highly unsatd. acids. (*C. A.* **48**, 2390)

Rapid drying oil from drying or semidrying oils. S. Shibayama and S. Tomioka (to Maeda Oil Manufg. Co.). *Japan 1287('53).* Cuttlefish oil (5.0 kg.) having an acid no. of 2.7 and I no. of 188.7 is sapond. with 1 l. 30° Bé. NaOH (enough to saponify satd. and low mol. unsatd. glycerides) at 90-100°. The oil is sepd. by centrifuging to give 2.73 kg. of oil with an I no. of 200.5 and a cloud point of —2°. (*C. A.* **48**, 2391)

• Waxes

R. L. Broadhead, Abstractor

Sugar-cane wax. IVa. The effect of burning cane, of cane variety, and of mud storage on wax yields. B. K. Davison, A. F. Thomson, L. F. Wiggins, and R. D. E. Yearwood. *J. Agr. Soc., Trinidad & Tobago* **53**, 173-5, 177-9, 181, 183-4 (1953); (*C. A.* **46**, 8400h). The crude-wax yield from various dry muds by Soxhlet extn. was: St. Kitts, St. Lucia, Barbados, Antigua 17.6; Jamaica 15.8; Trinidad 11.68; Brit. Guiana 8.67%. Burning of the cane reduced the yield of both hard wax (I) and soft fatty matter (II). I varied in 6 cane varieties examd. from 0.31 to 2.13, II from 0.47 to 2.49 lb. per ton cane. Storage of the dry mud for 59-486 days diminished the yield of I and II. I is prepd. by mixing molten crude wax with fine bagasse, bentonite, and activated C and extg. with iso-PrOH or füsel oil. I crystallizes upon cooling of the exts. and is freed of solvent residues by melting; m. 77-8°, d. 0.98, acid no. 15, sapon. no. 65, I no. 8. II is prepd. by evapn. of the ext. The local differences of the wax yield are probably caused by differences in the varieties cultivated. (*C. A.* **48**, 2398)

Telomeric reactions of ethylene and alcohols. E. R. Gilliland and R. J. Kallal. *Chem. Eng. Progr.* **49**, 647-52 (1953). A continuous high-pressure system was constructed for studying solvent polymerization of $CH_2:CH_2$. The $CH_2:CH_2$ was continuously recycled at 400g./hr. through a 360-cc. reactor. The solvents, methyl, ethyl, isopropyl, and tertiary butyl alc., contg. ditertiary butyl peroxide as initiator, were fed at rates up to 1,000 g./hr. The study covered the range 1,000 to 8,000 lb./sq. in. and 120-190°. Analysis of products, ranging from oils to waxes, indicated that the primary and secondary alcs. telomerize to form long-chain alcs. whereas the tertiary alc. was inert. The polymerization rates increased with temp., pressure, $CH_2:CH_2$ purity and peroxide concn. (*C. A.* **48**, 1081)

Wool wax. Part V. The constitution of the 2-hydroxy-acids derived therefrom. D. H. S. Horn, F. W. Hougen, E. Von Rudloff and D. A. Sutton. *J. Chem. Soc.* 177-180 (1954). Reduction of the wool wax acids to the alcohols by means of lithium aluminum hydride and subsequent treatment with periodic acid indicated the presence of about 30% 2-hydroxyacids in the original acid mixture. The mixture of acids was separated, by solvent distribution, into three broad groups: A resinous polar group of acids (11%) of high molecular weight, 2-hydroxy acids (27%) and unhydroxylated acids (62%). The hydroxy acids were converted to methyl esters which were distilled at 1 mm. pressure in a micro-spinning band column and the pure components separated from the appropriate distillates by crystallization, together when necessary with solvent distribution. Three pure 2-hydroxy-acids obtained were identified by oxidation with lead tetra acetate in a current of air to the corresponding fatty acids containing one carbon atom less as two-hydroxy—n-dodecanoic,—n-tetradecanoic and n-hexadecanoic acid. The total wool wax acids were reduced with lithium aluminum hydride and the 1:2 diols were separated in 22% yield from the other components by chromatography on active alumina. Distillation of the acetates, hydrolysis and crystallization of appropriate fractions yielded pure n-tetradecane,—n-hexadecane,—n-octadecane—and 16-methylheptadecane—1:2 diol. The saponifiable fraction of wool wax from Merino wool thus yields nearly 30% of a mixture of optically active 2-hydroxy,—n-dodecanoic,—n-tetradecanoic, n-hexadecanoic,—n-octadecanoic, and 16-methylheptadecanoic acid.

Some developments in petroleum derivatives. W. S. Kumblad. *Paper Mill News* **79**, No. 49, 110, 112(1953). Descriptive article dealing with new waxes used in paper manuf., an emulsified aromatic solvent used in sulfite pulping, a new defoamant, and Na_2S (a by-product in petroleum purification). (*C. A.* **48**, 1679)

Wool wax alcohols. E. S. Lower. *Seifen-Ole-Fette-Wachse* **79**, 687; **80**, 36, 59. Composition of wool wax alcohols and their utilization in cosmetics, ointments and pharmaceutical products are discussed.

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Last slip for removing shoes from lasts. John C. Eldridge and Francis A. Flaherty (to United Shoe Machinery Corp.). *U. S. 2,658,004,* Nov. 3, 1953. A last slip which, after application, dries to a pulpy coating that has a low shear resistance and prevents adhesive penetration, is prepd. by dispersing 35-40% of 200-mesh mica in water with 2.0-3.5% synthetic detergent, or an amine soap. A molten, water-insol. wax (3-8 parts), m. 45-70°, is combined with 1 part of an emulsifying agent in sufficient water to form a 35-50% solids emulsion. The mica dispersion and wax emulsion are mixed to form a 30-50% solids brushable fluid contg. 4.5-7 parts mica to 2 parts wax. (*C. A.* **48**, 2402)

Organic salts from cation-active and anion-active compounds. Deutsche Hydrierwerke Akt.-Ges. (Ernst Gotte, inventor). *Ger. 859,468,* Dec. 15, 1952 (Cl. 12o, 27). Cation-active compds. with at least 2 higher mol. aliphatic hydrocarbon radicals of preferably waxlike structure which may contain hetero atoms or hetero atom groups are caused to react with anion-active compds. contg. at least one lipophile radical of at least 6 C atoms to give salts which contain at least 3 higher mol. radicals and find use as wax substitutes or in the manuf. of wax emulsions. An aq. soln. of 70 parts of the condensation product from octadecyl dimethylaminoacetate and octadecyl chloroacetate is heated with 37 parts Na octadecyl sulfate almost at the b.p. The pptd. oily product is sepd. from the aq. layer, washed with hot water and recrystd. from EtOH to give a waxlike product, m. 50-3°, is similarly prepd. from bis(octadecyloxcarbonylmethyl) dimethylammonium chloride (I) and Na oleate. Treatment of I with NH_4 montanate gives a wax product, m. 63-5°. A product, m. 64-6°, is obtained from Na octadecylsulfonate and dihexadecyldimethylammonium chloride. The salt from Na stearate and trimethyl-sec-pentatriacontylammonium chloride m. 63-4° with softening. (*C. A.* **48**, 1714).

Sulfur compounds. Deutsche Vakuum Oil Akt.-Ges. (Rudolf Urlass and Rolf Lotthammer, inventors). *Ger. 871,894*, Mar. 26, 1953 (Cl. 12o, 24). Crude montan wax (I) or its refined or sapond. products are treated with S at 115-50° to give S compds. with a high-S content. Higher temps. (above 150°) yield S products with a low-S content. I (1 kg.) is triturated with 150 g. S for 3 hrs. at 145°. The product contains about 14% S. Other samples describe the prepn. of I products with S content of 5.45%, 15%, and 50%. They are useful as factice substitutes and gear-cutting and gun-oil additives. (*C. A.* **48**, 2395)

Determination of the fatty matter in wool by extraction with diethyl ether. F. F. Elsworth and J. Barritt. *J. Textile Inst.* **44**, P754-9(1953). The effect of sample size in relation to the Soxhlet barrel was investigated for the draft method of determining the amount of fatty matter in worsted tops proposed by the Technical Committee of the International Wool Textile Organization. It was found that it was unnecessary to specify a particular sample weight, only the maximum weight permissible for a particular size of barrel. A minimum ratio of 10:1 for solvent to wool was recommended. The extraction of fatty matter from dry combed tops by ether was found to be slow and incomplete but no difficulty was observed with oil-combed tops. (*C. A.* **58**, 1693)

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• Detergents

Lenore Petchaft, Abstractor

A new deodorant-bactericide. Anon. *Soap, Perfumery, Cosmetics* **27**, 165-6(1954). A new deodorant-bactericide, Anobial, a chlorinated salicylanilide of the molecular formula $C_{13}H_8O_2NCl_3$ is described. Physical properties, biological properties, toxicity, hand wash tests and applications are listed. Anobial, may be used to advantage in toilet soaps and cosmetic products as an effective deodorant-bactericide.

The observation of foam drainage transitions. Morton B. Epstein, John Ross, and Conrad W. Jakob. *J. Colloid Sci.* **9**, 50-9(1954). Apparatus and methods for observing foam drainage transition temperatures are described. Sharp and reversible transitions are observed in Duponol ME (long-chain sodium alcohol sulfates) systems containing unsulfated alcohol, and in Duponol ME systems in which the unsulfated alcohols are replaced with lauryl alcohol. The foam drainage transition temperatures agreed with the corresponding film drainage transition temperatures.

The role of the substrate in the detergency process. Manuel N. Fineman and Phyllis J. Kline. *J. Colloid Sci.* **8**, 288-99(1953). Experiments are described which demonstrate in a striking fashion the influence of the substrate on the process of removal of soil by a detergent. When metallic and non-metallic substrates are coated with an oily-carbon soil, and immersed in solutions of a non-ionic surfactant of the alkylaryl polyether alcohol type, the metals promote rapid removal of the soil in finely dispersed form, whereas the same soil comes off the non-metallic substrates very slowly and in fairly large clumps. For metals, fineness of soil dispersion depends upon the electrical character of the substrates, and is roughly proportional to their position in the electromotive series.

Fatty alcohols. K. B. Kulkarni. *Bombay Technologist* **2**, 37-43 (1952). A review of the high-pressure, Na and $LiAlH_4$ reduction, "Oxo," "Synol" and electrolytic oxidation processes for preparation of fatty alcohols and of their use in the detergent industry. (*C. A.* **48**, 1029)

Investigations to determine the effects of the washing temperature and time and the concentration of the washing agents when washing by machine. Sigurd Kohler. *Textile Research J.* **24**, 173-96(1954). Some 3,000 washing tests were carried out in connection with the practical work in a Stockholm hospital laundry to determine the effects of the maximum temperature, the time, and the concentration of washing agents on detergent action, and on the reduction of tensile strength and weight of bleached cotton and linen fabric. Soap made of fatty acids with a titer of about 40°C. was used in the tests, except in special cases where low-titer soap made of fatty acids with low and high iodine values were used respectively. Test methods and procedures are detailed and results tabulated and discussed.

The flow properties and mesomorphic behavior of anhydrous soaps at elevated temperatures. I. Sodium stearate above 200°. B. D. Powell and I. E. Puddington. *Can. J. Chem.* **31**, 828-36 (1953). A viscosity method is useful in studying transition temperature of anhydrous Na stearate (I). The transition subneat to neat occurs at 262° and the true m.p. at 290°, in agreement with earlier workers. A transition within the subneat phase is found at 225°. I exhibits thixotropy over the range 211° to 298°. Above 305° the flow is that of a Newtonian liquid. The viscosity of I in the range 285-336° was determined with a Pyrex glass viscosity apparatus, the construction of which is described. A steel extrusion viscometer was used below 280°. Viscosities are calculated from the viscometer constants, slopes of pressure *vs.* rate-of-flow curves, and the Poiseuille equation. (*C. A.* **48**, 1772)

Toxicity studies on actamer. Herman A. Shelanski and Morris V. Shelanski. *J. Soc. Cosmetic Chemists* **4**, 277-82(1953). Actamer [2,2′-thiobis (4,6-dichlorophenol)] 2% in soap is shown to be no more toxic than the soap base itself, by the acute oral toxicity method. Actamer (2% in soap and 5% in Corn Oil) was shown to be nonirritating in rabbit eye studies. Actamer (1% in dimethyl phthalate) applied daily to the skin for five days per week for ninety days in dosages of 1, 2, and 4 cc./kg. produced no evidence of histopathology. A 10% aqueous solution of soap containing 2% Actamer, when compared with a 10% solution of the base soap containing no Actamer showed no difference in its effect on the skin. A 1% solution of Actamer in dimethyl phthalate showed no evidence of deleterious effect on human skin.

Synthetic detergents: types and applications. A. Taylor. *J. Soc. Cosmetic Chemists* **4**, 201-16(1953). The various types of European synthetic detergents are discussed. Chemistry, structure, properties, applications of anionic, cationic, and nonionic types are described in detail with specific examples of all types.

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Detergents containing imidazoline lactates. Hyman W. Zussman and Robert L. Bernstein (Alrose Chemical Co.). *U. S. 2,669,546.* A liquid detergent useful in drycleaning and metal cleaning, consists of a volatile organic liquid solvent selected from the group of hydrocarbons and polychlorinated hydrocarbons and containing a lactate salt of an imidazoline which is substituted in the 2-position by an alkyl group of seventeen carbon atoms but whose 4 and 5 positions are unsubstituted.

Substituted gluconamides. Charles L. Mehltretter, Russell L. Mellies, and John C. Rankin (Secretary of Agriculture). *U. S. 2,670,345.* Substituted gluconamides prepared by reacting D-gluconolactone and aliphatic or rosin amines, are transformed to sulfuric acid derivatives by reaction with a sulfating agent resulting in a new class of wetting agents capable of reducing the surface tension of water and other aqueous solutions.

Soap compositions. Celanese Corporation. *Brit. 697,510.* Soap compositions that will form highly concentrated aqueous solutions having a low viscosity are prepared by adding to a soap, a small proportion of an alkyl oleate of which the alkyl group contains 3-10 carbon atoms.

Detergent compositions. General Aniline & Film Corp. *Brit. 703,091.* An improved germicidal detergent composition consists of a solution of a germicidally effective amount of free iodine in a water soluble, nonionic surface active agent containing a polyglycol ether of an alkyl phenol containing 6 to 18 alkyl carbon atoms.

Detergent and bactericidal compositions. Imperial Industries Ltd. *Brit. 703,256.* A bactericidal and detergent composition useful in cleansing and sterilizing food-handling equipment consists of an admixture of a linear polymeric substance such as polymer hexamethylene biguanide in the form of its salts and a surface-active agent of a cationic (quaternary) or nonionic (ethylene oxide condensation) type.