cate that shape changes were more than sufficient to compensate for size changes.

It would be desirable to control recrystallizations which apparently occurred in these spreads during the course of tempering. Kolthoff observed that dyes which were absorbed on the surface of crystalline precipitates prevented recrystallization. As reported by Lancaster *et al.* (7), phosphatides added to global spread formulations retarded hardening on prolonged storage and enhanced softening under mild tempering treatments. Phosphatides may function by hindering one type of recrystallization and assisting the other.

Although these studies were conducted to clarify changes associated with improvement in palatability of spread, they have a strong bearing also on storage properties of spreads. Global spread is designed for use under diverse climatic conditions. Shipping to tropical regions could possibly involve prolonged storage at temperatures in the neighborhood of 112°F. (44°C.). Need for stabilizers to prevent spreads from becoming hard is quite apparent.

Summary

Global edible spreads became firmer in consistency subsequent to their manufacture probably because slow deposition of monoglyceride in the supercooled mixture cemented existing aggregates together. Tempering global edible spread at 95°F.(35°C.) or above caused softening initially, followed by hardening on prolonged tempering. The higher the temperature in the range, 95°-130°F.(35°-54°C.), the more rapid was the rate at which consistency changes occurred. Physical studies of spreads led to the conclusion that consistency changes were a consequence of recrystallization of solid components. Softening occurring in initial stages of tempering resulted from a) weakening of aggregate structure present in untempered spread and b) recrystallization of solids into more perfectly ordered and sharply defined crystals. Hardening after prolonged tempering resulted from further recrystallization of solids into needlelike and platelike forms.

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

• Oils and Fats

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

Processing fatty oils. A. D. Rich(Filtrol Corp., Los Angeles 17, Calif.). *Ind. Eng. Chem.* 46, 2272-77(1954). Work was undertaken in the pilot plant to substantiate the laboratory findings. Lots of vacuum, dry rendered fancy and special tallow were dried and clarified by mixing 0.5% diatomaceous earth with the fat in the bleacher at 160°F. under 7 mm. of mercury pressure for 30 minutes and filtering. The two fats were bleached with activated and natural clay adsorbents. Each run was repeated except that 1% of water was added with the adsorbent. The tests confirmed that the bleached color of the fat was markedly lower when the water was used and the activated clay adsorbent was employed.

Positional asymmetry of fatty acids on lecithin. D. J. Hanahan(Dept. of Biochem., Univ. of Washington, Seattle). *J. Biol. Chem.* 211, 313-19(1954). A positional asymmetry for the fatty acids of some of the naturally occurring lecithins from liver has been established. It has been shown that the lecithins of beef, rabbit, dog, guinea pig, and rat livers have only unsaturated fatty acids on the α'-ester position and only saturated fatty acids on the β-ester position.

A convenient route to (distearoyl)-L-α- and β-monostearoyllecithin. Position of fatty acids on the lecithins of egg. D. J. Hanahan(Dept. of Biochem., Univ. of Washington, Seattle). *J. Biol. Chem.* 211, 321-25(1954). (Distearoyl)-L-α-lecithin may be conveniently prepared in good yields by hydrogenation of the chromatographically purified lecithins of chicken egg. An individual lysolecithin, β-monostearoylglycerylphosphorylcholine (β-monostearoyllecithin), may be obtained by the action of lecithinase A on the purified lecithins. The fatty acids of the lecithins of egg have been found to be "asymmetrically" located; i.e., only unsaturated fatty acids on the α'-ester position and saturated fatty acids on the β-ester position.

Oil extraction and drying process. R. W. Barns(French Oil Mill Machinery Co.). *U. S. 2,695,304.* An oil, containing water, is dried by sparging with hot vapors of a dry, water-immiscible solvent which forms an azeotrope with water. The process is continuous.

Process for recovery of resins, waxes, and oils from peat. E. J. Schabelitz(Schabelitz Biochemical Corp.). *U. S. 2,695,838.* Pulverized peat is leached with ethylene dichloride at atmospheric temperature and pressure for 2 to 3 hrs. to remove soluble oil, wax, and resinous constituents. The extract is drawn off, and these constituents are recovered by removal of the solvent. The dried peat is compressed into briquette form.

Stabilization of fats and oils with tetraoxy derivatives of biphenyl. A. Bell and M. B. Knowles(Eastman Kodak Co.). *U. S. 2,697,111.* Fats and fatty oils are stabilized by the addition of 0.001 to 1.0% by wt. of 2,2',5,5'-tetrahydroxy-4,4'-di-*tert*-butyl biphenyl.

Rendering fat. A. J. Kramer. *U. S. 2,697,112.* Fatty tissue is comminuted to a particle size of 0.25 to 1 inch and heated to a temperature between 140° and 212°F. The hot tissue is pulped mechanically to a non-cellular fibrous state and the fat is immediately separated.

Method of removing protein from fatty tissue. A. J. Kramer. *U. S. 2,697,113.* Fatty tissue is comminuted, heated to 140° to 212°F., and pulped to a non-cellular fibrous state. Hot water is added. The pulp is allowed to separate and the fat is skimmed off.

The determination of percentage fat and water in milk powder. W. Mohr and D. Merten(Anstalt Milchwirtschaft, Kiel, Germany). *Milchwissenschaft* 9, 153-8(1954). Six methods, each considered a standard in one country or another, were compared in the determination of moisture in milk powder and

3 methods were compared in the determination of fat. Samples of spray and roller-dried skim and whole milk powder were tested. The Karl Fisher reagent method is the most suitable if the water of crystallization of lactose is considered free water. If otherwise, the lower oven temperatures (75°) are favored. Three methods were compared in fat determinations: (1) the Gottlieb-Roese, (2) the gravimetric, HCl digestion, and fat filtration method, and (3) English method which, in principle, resembles the others, but which varies in details. Variations within 0.06%, 0.04%, and 0.02%, resp., were obtained with the three methods. Agreement between the first two methods was within 0.06%. The English method yielded results 0.3-0.4% higher. (*C. A.* **48**, 13114)

Detection of horse fat in beef fat as well as in lard. Cl. Franzke (Humboldt.-Univ., Berlin). *Z. Lebensm.-Untersuch. u. Forsch.* **99**, 27-33(1954). Methods based on determination of polyunsaturated acids for detection of horse fat in beef fat and lard are reviewed. Analyses of 40 horse-fat samples show: linoleic acid 11.1-24.8 and linolenic acid 2.5-8.3%; whereas beef fat and lard contain, resp., 1.5-2.9 and 1.7-7.6 linoleic acid, and there is less than 1% linolenic acid in either. In testing the polybromide precipitation method, data were developed for the 3 fats on precipitation (crystallization) from petroleum ether at −20, −10, −4, and +5°, and the effect of washing the bromides with petroleum ether alone and with ethers saturated with tetrabromides and hexabromides, resp. On the basis of these data a method is developed in which the Br addition products of both linoleic and linolenic acids are precipitated from petroleum ether at −4°, and the tetrabromostearic acid-saturated petroleum ether cooled to −4° is used to wash the precipitate. Under these conditions the two samples of each fat gave the following results: horse fat 104.8, 96.6; beef fat 4.0, 3.7; lard 5.7, 2.6 mg. of polybromides per g. of fat. (*C. A.* **48**, 13120)

Comparison of the Schain and Babcock tests for the determination of butterfat in milk. R. W. Henningson(Cornell Univ., Ithaca, N. Y.). *Milk Dealer* **43**(9), 56, 91-6(1954). By varying the conditions of the Schain test (*C. A.* **43**, 8067; **46**, 5739) it was possible to obtain results from 0.2% higher to 1.5% lower than the Schain and Babcock control tests. Data on samples from individual cows were evaluated graphically. It was concluded that the Schain detergent method in its present form is not suitable for determinations of butterfat in milk. (*C. A.* **48**, 13117)

The conjugated acid content of milk fat. Andreas Lembke and Werner Kaufmann(Forschungsanstalt Milch., Kiel, Germany). *Milchwissenschaft* **9**, 113-14(1954). Milk samples (150 ml.) from individual cows were creamed, and the fat was extracted from the cream with 80 ml. ether. The ether layer was separated by centrifuging, and the ether removed by evaporation at 40° followed by evaporating 30 min. *in vacuo* in a desiccator. After cooling and hardening, a 0.165-g. sample of the fat was dissolved in 50 ml. of the pure hexane. Because of the invalidity of Beers' law, dienes were measured in a fat concentration of 0.0825 g. per 100 ml. hexane, and trienes in a concentration of 0.11 g. per 100 ml. The ultraviolet maximum at 2280-300 A. is ascribable to dienes, that at 2680-700 to trienes. The values of $E^{1\%}_{1cm.}$ for dienes and trienes, were taken as 1190 and 1930, resp. This method was applied to the determination of dienes and trienes in milk from individual cows, and in mixed milk in a study of the effect of changes from stall to pasture feeding and vice-versa. The results showed that in the change from stall to pasture feeding during the summer months, the diene and triene content doubled and tripled, resp. Mean triene values for milk from pasture and stall-fed cows were 0.07% and 0.035%, resp. Corresponding diene values were approximately 2.1% and 0.65%. (*C. A.* **48**, 13114)

Structure and stability of sweet-cream butter manufactured by Meleshin's process. A. Titov. *Molochnaya Prom.* **15**(5), 15-20 (1954). The storage stability of butter manufactured by Meleshin-continuous and ordinary batch methods, as influenced by the size distribution of the water-phase droplets and completeness of the phase inversion from oil in water to water in oil, is discussed. The data show that the microorganism-caused spoilage of butter during its storage at sub-zero temperatures was appreciably reduced with decrease in size of the water droplets and the magnitude of the phase inversion, especially when butter is held at 0° for a period of time prior to storage at sub-zero temperature. The keeping quality of butter made by the Meleshin process was superior to that of butter made by batch process, when held at −10° for 12 months. (*C. A.* **48**, 13117)

Yield and composition of milk of New Zealand Berkshire sows. D. M. Smith. *New Zealand J. Sci. Technol.* **34A**, 65-75(1953). The daily mean yield of milk per sow, over the first 3 lactations, was 14.4 lb. with a peak yield in the 5th week of lactation. The average composition of milk in the 3rd lactation was 7.7% of fats, 6.2% of protein, and 5.0% of lactose. (*C. A.* **48**, 12959)

The reaction of adsorbed stearic acid with copper and copper oxide. A. Dobry(Westinghouse Research Labs., East Pittsburgh, Pa.). *Lubrication Eng.* **10**, 210-15(1954). The adsorption of stearic acid from C_6H_6 solution on Cu foil was studied by means of a microbalance. Extraction of the adsorbed stearic acid resulted in solution of Cu in proportions indicating the formation of cuprous stearate. In the presence of H a carefully reduced sample of Cu did not react with stearic acid. A thermodynamic study indicates that oxygen is a reactant. It is concluded that fatty acids act as boundary lubricants for Cu and its alloys only in the presence of oxygen (*C. A.* **48**, 12506)

Fractionation of castor oil. Rathindra Chandra Basu, Rou Choudhury, Sushil Kumar Das, and A. M. Saha(Univ. Coll. Sci., Calcutta). *J. Indian Chem. Soc., Ind. News Ed.* **61**, 24-6 (1953). Constituents other than triricinolein in castor oil cause "after-tack" in dehydrated castor oil. Extraction in a separatory funnel with petroleum ether (b. 40-60°) removed the undesirables. (*C. A.* **48**, 4861)

The modified Bellier method. Modification of the technique. A. Ibarra. *Rev. asoc. bioquim, argentina* **18**, 290-3(1953). Reflux 1 ml. of oil with 5 ml. of 8% KOH in alcohol for 10-15 min. on an air bath, neutralize with dilute AcOH (1:2) against phenolphthalein, add 50 ml. of 70% EtOH and 3 drops of HCl (d. 1.06) and cool until the solution becomes turbid. This temperature is 19.5° for olive oil, 22° for sunflower oil, 39.5° for peanut oil, 26° for rapeseed oil, 27° for cottonseed oil, and 15° for grapeseed oil. Additions of other oils to olive oil can be estimated from increased Bellier values. (*C. A.* **48**, 4861)

Extraction of palm oil. Ch. Depiesse. *Belg. 480,722.* The palm nuts are boiled, allowed to stand for 24 hrs., malaxed, washed with water, and again boiled; the oil is then decanted. (*C. A.* **48**, 4866)

Viscosity of cottonseed miscella. I. V. Gavrilenko and V. V. Beloborodov. *Masloboĭno-Zhirovaya Prom.* **18**(11), 13-16(1953). Two diagrams relating viscosities (kinematic and dynamic) of benzene miscella mixtures, their concentrations, and temperature have been prepared. (*C. A.* **48**, 4862)

Experimental work at the Ust-Labinsk oil mill on the production of light-colored cottonseed oil. E. Z. Plyushkina(Central Lab. of Trust "Krasnodarzhirmaslo," Krasnodar). *Masloboĭno-Zhirovaya Prom.* **18**(10), 7-8(1953). Data are presented to show that the color of oil expressed by the hot process is determined largely by the moisture content of the meal prior to cooking. With an increase in moisture from 9.56% to 14.5%, the color intensity of oil diminished from 95 red to 18.5. (*C. A.* **48**, 4862)

Testing of cacao butter and its substitutes. I. Invernizzi and C. Sampietro. *Boll. lab. chim. provinciali*(Bologna) **4**, 44-7 (1953). Definite distinction between cacao butter and its substitutes can be based on the difference between solidification and fusion points of the butter and its fatty acids. This difference for cacao butter is large and constant (35°-30°). For substitutes the difference varies from 0 to 8°. (*C. A.* **48**, 4861)

Investigations of the unsaturated acids of the liver oil of Galeocedro tigrinus. R. Sen Gupta(Univ. Coll. Sci. Technol., Calcutta), A. Grollman, and S. C. Niyogy. *Proc. Natl. Inst. Sci. India* **19**, 527-39(1953). With the purpose of determining the nature of the hypotensive constituents, liver oil of the Indian shark *(Galeocedro tigrinus)* was hydrolyzed with EtOK, the freed fatty acids were treated with $Pb(OAc)_2$, and the unsaturated acids from the filtrate converted to ethyl esters and fractionally distilled at 0.05-0.5 mm. Only the fractions $b_{0.06}$ 130-5° and $b_{0.3}$ 162-8° on redistillation contained substances that were biologically active, the higher boiling fraction being the more active. The first fraction was shown by conversion to the *p*-phenyl-phenacyl ester, hydrolysis, and oxidation with $KMnO_4$ to be principally ethyl palmitoleate The higher-boiling fraction was shown to be 12,16-tetracosadienoate. In other fractions were found oleic, linoleic, linolenic, and gadoleic acids. (*C. A.* **48**, 4860)

Synthesis of unsaturated long-chain fatty acids. R. Sen Gupta (Univ. Coll. Sci. Technol., Calcutta), A. Grollman, and S. C. Niyogy. *Proc. Natl. Inst. Sci. India* **19**, 519-25(1953). As a further confirmation of the identity of the unsaturated acids

obtained from the liver of *Galeocedro tigrinus*, palmitoleic, gadoleic, and 12,16-tetracosadienoic acids were synthesized by the method of Ahmad and Strong (*C. A.* **48**, 4859).

Component fatty acids in hydrogenated fats. N. G. Magar (Inst. Sci., Bombay). *J. Indian Chem. Soc., Ind. News Ed.* **16**, 39-46(1953). The component acids of 2 commercial hydrogenated fats were determined by low-temperature crystallization, alkali isomerization, spectrophotometry, and fractional distillation of the Me esters. The linoleic acid content was 0.06% and 4.8% and the combined oleic, isoöleic, and linoleic acids was 61-63%. (*C. A.* **48**, 4859)

Determination of moisture of fat. A. Efimova(S. M. Kirov Meat Combine, Leningrad). *Myasnaya Ind. S.S.S.R.* **24**(5), 54-6(1953). The method comprises drying the fat at 70° in a desiccator which is continuously evacuated and flushed with CO_2. (*C. A.* **48**, 4859)

Analytical examination of natural and refined fats. G. Wolff. *Mises au point chim. anal. pure et appl. et anal. bromatol.*, Ser I, 159-70(1953). General information is given on analytical methods for examination of fats. Pork fat contains much α-palmitodistearin, which can be recrystallized from 20% solution in acetone and identified by melting point. Cacao butter is identified by its ability to supercool (time-temperature curve). (*C. A.* **48**, 4859)

The activity of complex catalysts used for the hydrogenation of fats and on the specificity of their action. B. N. Tyutunnikov and B. Fraĭer(Polytech. Inst., Kharkov). *Maslobo͡ino-Zhirovaya Prom.* **18**(10), 12-13(1953). The activity of Ni catalyst was increased when charcoal, TiO_2, and diatomaceous earth were used as supports, whereas Cr_2O_3 and $Ca_3(PO_4)_2$ reduced the activity. Among the metals studied, only Cu (5 and 25%) appreciably increased the activity. A large amount of Co (25%) suppressed the activity, and a small amount (5%) increased it slightly. The negative effect of Fe diminished somewhat with its content, while Mn lowered the activity abruptly. No direct relationship exists between the changes in activity of Ni and the selectivity of its action. As the activity of supported and mixed catalysts increased, lesser amounts of isoöleic acids formed during the hydrogenation process. (*C. A.* **48**, 4859)

Prolonged storage of compound fat at low temperatures. E. Berezina and V. Komarova. *Myasnaya Ind. S.S.S.R.* **24**(5), 53-4(1953). Storage tests indicated that a fat made of good grade cottonseed oil 70% and beef fat 30% will keep for 16 months at −5 to −12°. (*C. A.* **48**, 4859)

The selectivity of the fat-hydrogenation process. A. A. Zinov'ev. *Maslobo͡ino-Zhirovaya Prom.* **18**(10), 14-19(1953). A review and discussion of physical chemical factors involved in hydrogenation. (*C. A.* **48**, 4859)

Continuous rendering of fat. S. Liberman. *Myasnaya Ind. S.S.S.R.* **24**(6), 14-19(1953). Several continuous rendering processes are described. (*C. A.* **48**, 4859)

Application of the Gerber galacto-butyrometer for the determination of fat in solid and semisolid substances at ordinary temperatures. P. Armandola and F. Cacciatore. *Bol. lab. chim. provinciali (Bologna)* **4**, 40-2(1953). Comparative analysis by the Soxhlet, Granville and Desmet, and butyrometer methods of testing fat showed close agreement in results. The last method is recommended for routine tests. (*C. A.* **48**, 4859)

Experiments on the use of unshelled, coarsely ground cottonseed as a feed for livestock. M. E. Prakhin. *Maslobo͡ino-Zhirovaya Prom.* **18**(11), 9-11(1953). An investigation is reported of the effect of supplementation of cow's ration with unshelled, coarsely ground cottonseed containing 0.04-0.05% of free gossypol, on milk production and the toxic effect of gossypol on farm animals. Feeding of 3-4 kg. of cottonseed per day per cow, during 6 months' trial, produced no detrimental effect on milk production. Clinico-hematological studies and the analysis of urine failed to detect any pathological changes in the animals. (*C. A.* **48**, 4724)

Quality and keeping quality of nonwashed butter. F. H. McDowell, J. A. Singleton, and J. J. O'Dea (Dairy Research Inst., Palmerston, North). *New Zealand J. Sci. Technol.* **35A**, 175-88(1953). Nonwashed butter was compared with washed butter from similar cream and both were found to be of similar quality. (*C. A.* **48**, 4719)

Problem of the acid number and of the peroxide number as indexes of lard freshness. Antoni Rutkowski(Univ. Poznań, Poland). *Roczniki Państwowego Zakladu Hig.* **3**, 89-104(1952). The conditions were investigated in which the peroxide no. (Lea no.: ml. of 0.002N Na thiosulfate/g. of fat) can serve as an indication of the freshness of lard, and the obtained values were compared with the results given by the acid-no. determination, the Kreis assay, and the neutral red assay. For the experiments a freshly melted lard was used; it was stored in darkness in an open container at 60°. Conclusions: (1) The acid no. is not an indication of the freshness of lard, and particularly of changes taking place during its storage. (2) The peroxide no. is the true indication of the lard freshness. (3) The peroxide no. is not sufficient to determine the quality of a lard which suffered biochemical decomposition. (4) The quality determination of lard with neutral red solution (Laskowskaja method) gives a good indication of its freshness and the assay is rapid and simple. (*C. A.* **48**, 4721)

The influence of copper on the suitability of butter for cold storage. E. Piraux and P. Jamotte(Sta. laitiere état, Gembloux, Belgium). *Conserva*(The Hague) **2**, 137-40(1953). Although Cu catalyzes the oxidation processes in butter during storage, the behavior of butter cannot be predicted from the Cu content. Butter made from fresh cream with a low Cu content may have a fishy flavor, while butter made from old cream with high Cu content may not always have this defect (*C. A.* **48**, 4719)

The determination of copper in oils and fats by means of dibenzyldithiocarbamic acid and its salts. D. C. Abbott and R. D. A. Polhill(Dept. Government Chemist, Government Lab., Strand, London, W. C. 2). *The Analyst* **79**, 547-550(1954). A method has been developed for the rapid absorptiometric determination of copper in oils and fats over the range 0.02 to 2 p.p.m. Most of the fatty matter is removed from the sample by vaporization and the remainder is destroyed by digestion with nitric acid and sulfuric acid. The copper in the resulting acid solution is then determined after dilution, by the extraction of its dibenzyldithiocarbamate with carbontetrachloride and measurement of the optical density of this solution at 435 mμ in a suitable spectrophotometer. The method is shown to be free from interference by some other commonly occurring metals and to give a good recovery of added copper. A determination can be completed in two hours. The preparation of the dibenzylammoniuum, potassium and zinc salts of dibenzyldithiocarbamic acid is also described.

The branched-chain fatty acids of butterfat. 5. The isolation of 12-methyltridecanoic acid. R. P. Hansen, F. B. Shorland and N. June Cooke(Fats Res. Lab., Dept. of Scientific and Industrial Research, Wellington, New Zealand). *Biochem. J.* **58**, 358-359(1954). 12-methyltridecanoic acid has been isolated in trace amounts from butterfat by methods which included hydrogenation, fractional distillation, and low-temperature crystallization.

A new concept of the mechanism of autooxidation of methyl oleate, linoleate, and linolenate. N. A. Khan(Dept. of Physiology, Univ. of Minn., Minn.). *Can. J. of Chem.* **32**, 1149-1154 (1954). This article discusses, as the title implies, a new concept of the mechanism of autooxidation of methyl oleate, linoleate and linolenate. The author gives his concept as a possible explanation of the mechanism in the formation of peroxides during the initial stages of autooxidation.

Viscosimetry of vegetable oils. I. Behavior of olive oil when mixed with certain organic solvents. P. Klantschnigg. *Olearia*, **8**, 203-211(1954). The viscosities of olive oil mixtures with *n*-butyl alcohol, isoamyl alcohol, cyclohexane, toluene, pyridine and cyclohexanol were determined at 20° for different solvent concentrations. The viscosity of the oil was greatly reduced by small additions of each of the solvents except for cyclohexanol where the phenomenon of *negative viscosity* was encountered. Walther's equation for mineral oils was modified to give an approximate mathematical relationship between the viscosity and the concentration of the mixtures at 20°.

Hydroxylation of methyl oleate by ammonium persulfate in the presence of acetic acid. M. Naudet and F. Carrera. *Revue Francaise des Corps Gras* **1**, 478-482(1954). A mixture of methyl oleate, acetic acid and water was stirred vigorously under reflux while sulfuric acid was added dropwise. The temperature of the mixture was adjusted to 95° and the ammonium persulfate added in small portions with the temperature not being allowed to exceed 100°. After about 90 minutes all the persulfate had been added, the charge was diluted with a large excess of water, allowed to cool and extracted with diethyl ether. The ether solution was carefully washed until neutral, the solvent evaporated and the residue dried under vacuum. A number of runs were made in which the concentrations of each of the reactants were varied systematically using this general procedure. A portion of each reaction product was saponified in order to recover the substituted fatty acid mixtures and analytical tests were run

on these and the mixed esters. Three compounds, methyl dihydroxystearate, methyl acetoxyhydroxystearate and methyl ketostearate were found in all the reaction products. There was little if any evidence of chain breaking and epoxides were not detected. The concentration of acetic acid had to be at least 15-20% in order for the reaction to proceed and as the concentration of acid was increased above this value the percentage of methyldihydroxystearate decreased while that of the methyl acetoxyhydroxystearate increased. When 130 parts of ammonium persulfate to 100 parts of methyl oleate were used only traces of unsaturation were found in the products. As the persulfate concentration was increased above this ratio, the formation of methyl ketostearate increased. The absence of sulfuric acid also favored the formation of the ketostearate. The urea adduct technique was found to be suitable for separating the hydroxy and ketostearate from the acetoxystearate since the latter compound did not complex while the other two did.

Practical applications and industrial possibilities of urea addition compounds with fatty materials. R. Rigamonti. *Olii-Minerali-Grassi e Saponi-Colori e Vernici* 31, 157-169(1954). The constitution, theory of formation, preparation, physical and chemical properties and analytical uses of urea adducts are reviewed. The possibilities of the industrial application of the urea adduct technique to vegetable oil fractionation are discussed.

• Biology and Nutrition

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

Studies on the aerobic oxidation of fatty acids by bacteria. IV. The effect of 2,4,6-trichlorophenol on the oxidation of caprate and its derivatives by Serratia marcescens. J. M. Waltman and S. C. Rittenberg(Dept. of Bacteriology, Univ. S. Calif., Los Angeles, Calif.). *J. Bacteriology* 68, 585-8(1954). Thirteen metabolic inhibitors were tested for their effects on the oxidation of capric acid and α,β-unsaturated-, β-hydroxy-, and β-keto-capric acids by resting cells of *Serratia marcescens*. Sodium fluoride and arsenate had no effect. Terramycin, malonate, and fluoroacetate inhibited the rate of oxidation. Iodoacetate, arsenite, azide, cyanide, 2,4-dinitrophenol and hydroxylamine decreased both the rate and the extent of oxidation. All these compounds affected the oxidation of caprate and its derivatives to the same degree. However, at a concentration of 0.00067 *M*, 2,4,6-trichlorophenol prevented the oxidation of caprate derivatives and shorter chain length fatty acids but did not inhibit the oxidation of capric and longer chain length fatty acids. The results are discussed in terms of enzyme systems.

A liproprotein as a growth factor for certain pleuropneumonia-like organisms. P. F. Smith, J. G. Lecce, and R. J. Lynn(Dept. of Microbiology, School of Medicine, Univ. Penna., Philadelphia). *J. Bacteriology* 68, 627-33(1954). Two strains of pleuropneumonia-like organisms obtained from human sera were grown on basal media to which were added protein factors from bovine blood serum. Physical properties of the protein growth factor were found to be strikingly similar to those of *alpha*-1 lipoprotein. Bound cholesterol and phospholipid were contained in the growth factor. When a lipid-free basal medium was used, the lipoprotein growth factor could be replaced with the lipid-free protein, cholesteryl laurate and lecithin of animal origin. Large amounts of bovine serum albumin and β-lactoglobulin from milk also supported optimal growth.

The effect of fat level of the diet on general nutrition. XII. The requirement of essential fatty acids for pregnancy and lactation. H. J. Deuel, Jr., Charlotte R. Martin and Roslyn B. Alfin-Slater(Dept. of Biochem. and Nutrition, School of Medicine, Univ. of Southern Calif., Los Angeles). *J. Nutrition* 54, 193-99(1954). In studies designed to determine whether or not fats are necessary for successful pregnancy and lactation and, if so, in what amounts, the following conclusions were reached: Dietary fat was not required by the female rat for conception or for the completion of pregnancy when the diets were otherwise complete. However, fat was required in the diet of the mother to insure the survival of the pups after birth. The constituents of the fat responsible for the survival of the young and for satisfactory lactation appeared to be the essential fatty acids.

The effect of fat level of the diet on general nutrition. XIII. The effect of increasing dosages of x-irradiation on the protective action of fat on radiation injury. Amber L. S. Cheng, Roslyn G. Alfin-Slater, and H. J. Deuel, Jr.(Dept. of Biochem. and Nutrition, School of Medicine, Univ. of Southern Calif., Los Angeles). *J. Nutrition* 54, 201-207(1954). The present test confirmed the earlier experiments in demonstrating the protective effects of dietary fat against x-irradiation in a variety of doses and given at several time intervals. The rats on the test diets for only three weeks after weaning exhibited the protective effects of fat against x-irradiation as satisfactorily as did rats which had received the test diets for as long as 8 weeks after weaning. A simple procedure for studying the effect of diet on protection from x-irradiation involves feeding the weanling rats for three weeks on the test diets, followed by exposure of the animals to two 400 r doses of x-rays at intervals of 4 days.

Studies on lipide anticoagulants. II. Isolation procedures. D. P. J. Goldsmith, and C. W. Mushett(Merck Institute for Therapeutic Research, Rahway, N. J.). *J. Biol. Chem.* 211, 169-81(1954). Lipide anticoagulants from various materials in particular fresh beef brain and BSC lipides, have been partially purified and characterized. They were water-soluble, colloidal, acidic substances associated with the cephalin fraction of phosphatides, and contained about 2.5 to 3.5 per cent of the activity of heparin *in vitro* and *in vivo*.

Studies on the action of rat liver on 2-acetylaminofluorene. H. R. Gutmann and J. H. Peters(Radioisotope Unit, Veterans Admin. Hospital, Minneapolis, Minn.). *J. Biol. Chem.* 211, 63-74(1954). Rat liver slices and homogenates deacetylated the carcinogen 2-acetylaminofluorene to 2-aminofluorene. The data indicated that homogenates also yielded other, as yet unidentified, metabolites having a free diazotizable amino group. Deacetylation did not take place in the absence of oxygen. 2-Benzoylaminofluorene yielded no free diazotiable amine. Slices, but not homogenates, hydroxylated 2-acetylaminofluorene to 2-hydroxy-7-acetylaminofluorene. When rat liver slices were incubated with 2-acetylaminofluorene-9-C^{14}, the proteins in slices, as well as the proteins precipitable from the supernatant liquid by trichloroacetic acid, bound a small fraction of the radioactivity. Comparable binding of the radioactivity could not be demonstrated with homogenates.

Phosphorus metabolism in unsaturated fatty acid-deficient rats. P. D. Klein and R. M. Johnson(Detroit Inst. of Cancer Res., Detroit, Mich.). *J. Biol. Chem.* 211, 103-110(1954). Measurements of P^{32} uptake in livers of rats fed control and fat-deficient diets revealed that there was a decreased uptake of P^{32} by the acid-soluble organic P fraction in fat deficiency. This appeared to be related to a dissociation of oxidation from phosphorylation accompanying the oxidation of intermediates of the Krebs cycles by the DPN-linked dehydrogenases. No differences were found between the normal and fat-deficient groups with respect to their anaerobic glycolytic ability, suggesting that the defect was restricted to oxidative phosphorylation. On the basis of studies described it was suggested that the uncoupling of oxidative phosphorylation found in unsaturated fatty acid deficiency was of a restricted type, concerned with a particular member of the electron transport system, at or near the level of DPN reduction and oxidation.

Studies on lipide anticoagulants. I. Assays in vitro. C. W. Mushett, D. P. J. Goldsmith, and K. L. Kelley(Merck Inst. for Therapeutic Res., Rahway, N. J.). *J. Biol. Chem.* 211, 163-68 (1954). Assays *in vitro* for lipide type anticoagulants were outlined and some of the variables involved were discussed. The precise assay of emulsified samples was somewhat difficult, but reproducible results can be obtained with soluble samples under standardized conditions.

Susceptibility to experimental atherosclerosis and the methylation of ethanolamine-1,2-C^{14} to phosphatidyl choline. L. O. Pilgeram and D. M. Greenberg(Dept. of Physiological Chemistry, Univ. of California, Berkeley). *Science* 120, 760-61(1954). Part of the metabolic block in the metabolism of the lipids that occurred in the atherosclerotic was a lack of formation of lecithin (phosphatidyl choline) or an increased abnormal degradation thereof. The possibility exists that it may be necessary for the ethanolamine base to be methylated and to form lecithin before clearing action becomes evident.

The transformation of cholesterol to coprostanol. R. S. Rosenfeld, D. K. Fukushima, L. Hellman, T. F. Gallagher(Sloan-Kettering Inst. for Cancer Res., New York, New York). *J. Biol. Chem.* 211, 301-11(1954). The transformation of cholesterol to coprostanol has been studied in human subjects and in incubation experiments with the aid of cholestrol-3d, 4-C^{14}. The data suggested that coprostanol was produced from cholesterol principally by a process not involving the hydroxyl group at C-3, but by direct saturation of the 5,6 double bond of cholesterol. In the incubation studies, appreciable amounts of

deuterium were introduced into coprostanol at positions other than at C-2, C-3, and C-4; this isotope was presumably at C-5 or C-6.

Studies of the New Hampshire chicken embryo. III. Nitrogen and lipide analyses of ultracentrifugal fractions of plasma. O. A. Schjeide(Atomic Energy Project, School of Medicine, Univ. of California at Los Angeles). *J. Biol. Chem.* 211, 355-61(1954). Total lipide and total nitrogen determinations were made on whole plasma and lipoprotein fractions of the plasma of chicken embryos, chicks, roosters, and laying hens. The nitrogen and the lipide of whole plasma both increased during the incubation period, the nitrogen increasing at a more rapid rate, especially during the last 3 days of incubation. After hatching, the nitrogen of the plasma continued to increase, whereas the lipide had decreased markedly by the time the chick was 7 weeks old.

The biosynthesis of sphingosine. II. The utilization of methyl-labeled acetate, formate, and ethanolamine. I. Zabin and J. F. Mead(Dept. of Physiological Chemistry, Univ. of Calif. School of Medicine, Los Angeles). *J. Biol. Chem.* 211, 87-93(1954). Acetate-2-C^{14}, formate-C^{14}, and ethanolamine-1,2-C^{14} were adminstered to groups of weanling rats. The distribution of the label in sphingosine derived from each label compound was determined by degradation of the pure dihydrosphingosine derivative. The relative amounts of the tracer in dihydrosphingosine derived from acetate showed a pattern to be expected if palmityl or 2-hexadecenyl coenzyme A was a precursor. Formate was found to label carbon atom 1 of dihydrosphingosine almost exclusively. Ethanolamine was not a specific precursor. These results lead to the conclusion that sphingosine carbon originated from a 16-carbon fatty acid-like intermediate and the α- and β-carbon atoms of serine.

Carotene and vitamin A in human fat. A. W. Pierce(Univ. Adelaide). *Med. J. Australia* **1954**, I, 589. Analysis of 2 samples of highly colored human fat showed 5.1 and 6.1 γ/g. of carotene and 2.0 and 2.2 γ/g. of vitamin A. (*C. A.* **48**, 12971)

Digestibility of stearic acid and its glycerol esters in the rat. P. Scribante and P. Favarger(Univ. Geneva, Switzerland). *Helv. Physiol. et Pharmacol. Acta* 12, 74-89(1954)(in French). Methods of estimating apparent and true digestion and absorption of fats as described. When fed as 15% of the ration, stearic acid, tristearin, and tripalmitin were digested to a small extent. Oleodistearin was 3 times as digestible as stearic acid. Trimystrin was nearliy all digested. Glycerol monostearate was about 76% digested, but rats found the ration containing it distasteful and often refused to eat it. The coefficients of digestibility found show that elevation of the m.p. does not necessarily decrease the digestibilty. The endogenous excretion of fat into the intestine is not constant. It increases when digestibility of the dietary fat decreases. (*C. A.* **48**, 12967)

Synthesis of fat in the adipose tissue of rats. P. Favarger and Juliette Gerlach(Univ. Geneva, Switzerland). *Helv. Physiol. et Pharmacol. Acta* 12, C15-17(1954)(in French). In a suitable medium containing phosphate, coarsely chopped liver, mesenteric adipose tissue, and interscapular brown fat tissue, $CH_3C^{14}O_2H$ was incorporated into new fat. Rat liver was less active than mouse liver and less active than rat adipose tissue. Glucose is indispensable for the synthesis although it can be partially replaced by succinate or pyruvate. Finely homogenized adipose tissue did not synthesize fat. (*C. A.* **48**, 12968)

Glycerophosphatides of bovine cardiac muscle and the occurrence of choline-containing acetalphosphatides. E. Klenk and G. Gehrmann(Univ. Cologne, Germany). *Hoppe-Seyler's Z. physiol. Chem.* 292, 110-17(1953). The acetalphosphatide content of the lecithin was 11-20%. Cephalin contained less than 5% acetalphosphatide and small amounts were found in serine- and colamine-cephalin fractions. The fatty acids of lecithin in percent of total fatty acids were: saturated C_{16} 25.7, C_{18} 5.5; unsaturated C_{16} 2.1, C_{18} 55.0, C_{20} 10.6, C_{22} 1.1. (*C. A.* **48**, 12965-6)

Fat-tolerance tests in infants. L. Barta and E. Németh(Univ. Med. School, Budapest). *Acta Med. Acad. Sci. Hung.* 5, 231-40 (1954). A significant increase in plasma fatty acid is produced in eutrophic, dystrophic, and atrophic infants 4 to 6 hrs. following ingestion of 2 g. butter per kg. body weight. Atrophic infants exhibit less ketogenesis than do eutrophic and dystrophic infants; this deficiency can be correlated with the "vita minima" and pituitary hypofunction. (*C. A.* **48**, 12963)

The interaction of chyle and plasma in the rat. D. S. Robinson, G. H. Jeffries, and J. E. French(Sir William Dunn School Pathol., Oxford, England). *Quart. J. Exptl. Physiol.* 39, 165-76 (1954). During the absorption of olive oil in the rat there is an increase in the ability of the animal's plasma to clear chyle *in vitro*. Clearing of chyle by a post-absorption plasma and by a plasma withdrawn 15 min. after the injection of 5 units of heparin/kg. of body weight are similar processes with regard to temperature, pH, and inhibitors such as Triton derivatives, Na tauroglycocholate, and protamine. In both systems, as clearing of the chyle proceeds, fatty acid is released with the subsequent formation of a soluble fatty acid-albumin complex in the plasma. In normal plasma a 0.85% NaCl extract of rat pancreas clears added chyle slowly. This clearing is accelerated by Na tauroglycocholate. The post-absorption clearing reaction may represent the physiological mechanism for the solution of chylomicrons in the blood in which plasma albumin plays only a transient role as an acceptor of the dissolved lipide. (*C. A.* **48**, 12961-2)

Biosynthesis of carbon^{14}-labeled linoleic acid and its fate in the normal and the fat deficient rat. Lars Reinius. *Ann. Acad. Sci. Fennicae* Ser. **A**, 11, No. 49, 7-66(1953)(in English). The biosynthetic incorporation of C^{14} from CO_2 into linoleic acid was accomplished in 2 steps, the 1st being the photosynthesis of C^{14}-labeled sugars by *Canna indica* leaves and the 2nd the microbial synthesis of C^{14}-labeled linoleic acid from these sugars by means of *Trichosporon pullalans*. The linoleic acid was fed as ethyl linoleate to 2 female rats, one of which had been maintained on a complete stock diet and the other on a fat-deficient diet until it had plateaued in weight. The fat-deficient rat took up linoleic acid more rapidly than did the normal rat and collected a greater part of it in the more active organs (liver, kidneys, heart, and possibly muscles). The metabolic rate of the fat-deficient rat was 1.5 times greater than that of the normal rat. (*C. A.* **48**, 12954)

Steatosis due to endocrine disturbances. G. Giraud. A. Levy, and H. Latour(School Med., Montpellier, France). *Ann. nutrition et aliment.* 7, C163-C195(1953). Deficiency in somatotropin or in thyroxine, which controls phosphorylation and biosynthesis of phosphatides, may result in deposition of excess fat in the liver. 135 references. (*C. A.* **48**, 4678)

The discharge of detoxicated cottonseed cake and grist by the oil mills. F. A. Pusep. *Masloboĭno-Zhirovaya Prom.* 18(11), 11-13(1953). To approximate the gossypol in cottonseed cake and grist, a ground, sifted (mesh 16), and thoroughly mixed 50-mg. sample of cottonseed cake or grist is subdivided into 5-6 mg. portions which are placed on slides. These portions, moistened with 5-6 drops of H_2SO_4, are examined under low-power lens for the number of black spots secreting reddish liquid. The total number of spots is then divided by the weight of the sample and multiplied by a factor 0.076 to obtain the gossypol content of the sample. (*C. A.* **48**, 4862)

Anaerobic nutrition of Saccharomyces cerevisiae. II. Unsaturated fatty acid requirement for growth in a defined medium. A. A. Andreasen and T. J. B. Stier(Indiana Univ., Bloomington). *J. Cellular Comp. Physiol.* 43, 271-81(1954). In a medium containing trace elements, salts, $(NH_4)_2SO_4$, B vitamins, glucose, and Na succinate buffer, *S. cerevisiae* required oleic, linoleic, or linolenic acid for anaerobic growth as well as ergosterol. Linolenic acid was less active than oleic or linoleic acids. The amount of oleic acid required to produce stationary populations for $180\text{-}250 \times 10^6$ cells/ml. was 0.2-0.4 micromole/ml. When only oleic acid limited growth, the minimum requirement was 1 γ/ml. to produce 10^4 cells/ml. or 355 micromoles/10^6 cells. Aerobic growth was depressed at optimal anaerobic concentrations of oleic acid. (*C. A.* **48**, 12889)

Nutritional inducement of fatty liver. M. Beauvallet(Sorbonne, Paris). *Ann. nutrition et aliment.* 7, C15-C39(1953). Enrichment of liver tissues in lipides may be caused by diets low in protein and relatively rich in saturated C_{14}, C_{16}, or C_{18} fatty acids; however, fatty livers may be observed in young growing animals deprived of the essential, unsaturated, linoleic or arachidonic acids, or fed an excess of cholesterol, thiamine, biotin, folic acid, or of certain acids (cystine, ethionine, etc.). (*C. A.* **48**, 4678)

The action of fat acids on Trichomonas baginalis. H. G. Frank and L. Reiner (Wallace Tiernan Co., Belleville, N. J.). *J. Immunol.* 72, 191-3(1954). Saturated, unsaturated, branched, and hydroxy unsaturated fat acids containing 3-18 C atoms were studied. Of 19 acids tested those having a chain length of 7-12 C atoms were trichomonacidal. The activity increased with the chain length with this range and was greater at lower pH values. (*C. A.* **48**, 4678)

Studies of fatty acid oxidation. 1. The oxidation of the alkylthio fatty acids. W. T. Brown and P. G. Scholefield(Montreal General Hosp. Res. Inst., Montreal, Canada). *Biochem. J.* 58, 368-374(1954). The addition of alkylthio fatty acids to slices of mouse kidney, mouse liver and rat kidney depressed the

respiratory activity of these tissues but when added to slices of rat liver, guinea pig kidney and guinea pig liver they produce a marked increase in $-Q_{O_2}$ values. Evidence is presented to prove that alkylthio fatty acids are not only oxidized by mammalian systems but that they may also influence the metabolism of mammalian tissues.

Studies of fatty acid oxidation. 2. The effect of alkylthio fatty acids on acetylation reactions. J. Avigan and P. G. Scholefield (Montreal General Hosp. Res. Inst., Montreal, Canada). *Biochem. J.* **58**, 374-379(1954). Alkylthio fatty acids form coenzyme A derivatives and evidence has been obtained which supports the suggestion that both alkylthio fatty acids and benzoic acid produce their inhibitory effects on acetoacetate synthesis only after formation of a coenzyme A derivative. The simple and alkylthio fatty acids inhibit sulphanilamide acetylation with pyruvate as acetyl donor. Acetate increases the rate of acetylation. The effect of alkylthio fatty acids on acetoacetate formation is similar to that of benzoate.

Corticosteroid metabolism in liver. III. Isolation of additional cortisone metabolites. E. Caspi and O. Hechter(Worcester Foundation for Experimental Biology, Shrewsbury, Mass.). *Arch. Biochem. and Biophys.* **52**, 478-483(1954). The isolation of allopregnan-3β, 17α, 20β, 21-tetrol-11-one, Δ^4-pregnan-11β, 17α, 20β, 21-tetrol-3-one and androstan-3 -ol-11, 17-dione from perfusates of cortisone through isolated rat livers is reported.

The absorption and metabolism of cholesterol and its main companions in the rabbit—with observations on the atherogenic nature of the sterols. R. P. Cook, A. Kliman and L. F. Fieser (Converse Memorial Lab., Harvard Univ., Cambridge, Mass.). *Arch. Biochem. Biophys.* **52**, 439-450(1954). Rabbits were fed for 23-25 days diets containing 16.6% olive oil to which was added 1% pure cholesterol (Δ^5-cholestenol), lathosterol (Δ^7-cholestenol), 7-dehydrocholesterol, and cholestanol. The unsaturated sterols were absorbed to the extent of 90% corresponding to 0.25 g./kg. body wt./day. Cholestanol was absorbed at about 0.2 g./kg. body wt./day. The marked increases in the concentration of sterol in the sera and livers of the unsaturated sterol-fed animals were shown to consist of Δ^5-cholestenol, indicating interconversion. On autopsy, abnormal features were noted. All the sterols produced atheroma of the aorta to a greater or lesser degree.

The determination of total tocopherol. J. R. Edisbury, Jean Gillow and R. J. Taylor(Unilever Ltd., Port Sunlight, Cheshire). *Analyst* **79**, 617(1954). A modified Emmerie and Engel test has been evolved to avoid non-linearity, high or variable blanks and the use of corrosive solvents. A solution of the saponified material in petroleum ether is purified by chromatography, the tocopherol being absorbed on mildly alkaline alumina, washed with diethyl ether-light petroleum solvent and then eluted with chloroform. The eluate is concentrated by evaporation and treated with chloroform solutions of ferric chloride and 2:2′-dipyridyl. After the solution has stood for 5 min., a measured volume of water is added and the optical density of the aqueous extract determined at 520 mμ or, the depth of color, which is stable for some hours, may be assessed visually, as by comparison with a standard cobalt sulfate solution. The only interference encountered has been from highly oxidized carotenoids for which correction is possible. Sensitivity found is five times that of the original Emmerie and Engel test.

Fat composition and in vitro oxygen consumption of marrow from fed and fasted rabbits. J. D. Evans, R. W. Riemenschneider and S. F. Herb(Temple Univ. School of Medicine, Philadelphia, Penn.). *Arch. Biochem. and Biophys.* **53**, 157-166 (1954). Spectrophotometric analyses of the marrow fat of six fed and six fasted rabbits have been compared with their respective *in vitro* oxygen consumptions. Unsaturated fatty acids constitute 62% by weight of the total marrow fat. The per cent of linoleic and linolenic acids decreases during fasting, whereas that of arachidonic, pentaenoic, and oleic acids increases. In terms of per cent, total saturated fatty acid in marrow fat is essentially unaffected by starvation. Rate of oxygen consumption *in vitro* is not related to the concentration of any fatty acid component of marrow fat. It is concluded from *in vitro* evidence that polyunsaturated fatty acids of marrow are not oxidized *in situ* but are transported elsewhere for utilization or discard.

Differential fractionation of hydrogen isotopes in liver and mammary gland. R. F. Glascock and W. G. Duncombe(National Inst. for Res. in Dairying, Univ. of Reading). *Biochem. J.* **58**, 440-447(1954). A theory is presented in which it is predicted that biological fractionation of hydrogen isotopes during the reversible incorporation of water hydrogen into any metabolite will be observed only under conditions of net synthesis and not under conditions of turnover. There is reason to believe that in the fatty acid metabolism of mammary gland and liver net synthesis and turnover are, respectively, the predominant processes. The incorporation of hydrogen from water doubly labelled with tritium and deuterium into the fatty acids of these and other organs has therefore been studied. The results are also discussed in relation to the contribution of drinking water to blood water, and the relative utilization of various tissues of water hydrogen for fatty acid synthesis.

Clinical moving-boundary electrophoresis: nonplanar difficulties due to the presence of lipoproteins in normal and pathological serum. R. Trautman(Univ. of Cal. Radiation Lab., Donner Lab., Berkeley, Calif.). *Arch. Biochem. and Biophys.* **53**, 85-93 (1954). The lipides and lipoproteins present in whole serum lead to boundary artifacts in the free electrophoresis technique. In particular, the artifacts considered are the β-anomaly and nonplanarity of boundaries. The β-anomaly and associated nonplanarity are removed if the low-density group of lipoproteins is removed from serum. The nonplanarity of the α-region is removed if the high-density group of lipoproteins is removed. The significance of these findings is discussed in relation to a proposed procedure for the clinical study of serum.

Chromogenic values of 17-hydroxy corticosteroids in a modified Porter-Silber reaction. Hildegard Wilson and R. Fairbanks (Dept. Chem., New York Univ. College of Medicine, N. Y., N. Y.). *Arch. Biochem. and Biophys.* **53**, 71-76(1954). A convenient semimicro modification of the original Porter-Silber assay has been described. Among 15 of the 17,21-dihydroxyl-20-ketosteroids tested in this procedure, cortisone, dihydrocortisone, and tetrahydrocortisone were strongly chromogenic. Hydrocortisone and Reichstein's substance S gave about one-third the color of cortisone, while the four corresponding dihydro compounds were about one-tenth as chromogenic as cortisone. Two tetrahydro analogs of hydrocortisone and two of Reichstein's substance S were practically nonchromogenic.

• Drying Oils

Raymond Paschke, Abstractor

Research related to protective coatings at the Utilization Research Branches. J. C. Cowan (Northern Utilization Res. Branch, Peoria). *Am. Paint J.* **39**(13), 100(1954). A discussion of epoxidation, acetoglycerides, and fatty acid distribution in linseed oil.

Water permeability of paint films. W. C. G. Wheeler(Royal Navy Scientific Service, Portsmouth). *Chemistry & Industry* **1954**, 1441. This note describes a simple method of comparing the rate of transmission of water through paint films. It is based upon the color change of cobalt chloride in gum arabic between the paint film and a clear glass plate as water penetrates the paint.

Nomograph for alkyd resin formulation. I. Wangsness(Glidden Co., Minneapolis). *Off. Dig. Federation Paint Varnish Production Clubs* **26**, 1062(1954). This paper extends the calculations of Burrell to include not only alkyds made from fatty acids but also alkyds based on oils or mixtures of oils and various types of acids. The calculations also take into consideration the use of excess amounts of polyhydric alcohol. Finally, a nomograph is presented that simplifies, and in many cases eliminates, calculations.

Oils for house paints. S. O. Sorenson(Archer-Daniels-Midland Co., Minneapolis). *Paint Ind. Mag.* **69**(11), 29(1954). A review is given of the oils used and the reasons for their use.

The significance of the tack-free test. S. H. Richardson(The Bakelite Co.). *Off. Dig. Federation Paint Varnish Production Clubs* **26**, 1067(1954). The following specific conclusions are offered:

(1) The test methods studied show poor reproducibility. This is illustrated by the broad range of values obtained.

(2) From the results, there is no justification for preferring one method over another.

(3) In general, the agreement among the laboratories was within the precision of the test methods.

(4) The committee feels it inadvisable to suggest a method for the determination of tack-free at this time but suggest careful use and interpretation of existing methods.

(5) In view of the variations experienced in attempting to make duplicate readings, it appears necessary to allow a large margin of safety when specifying a definite tack-free time.

• Waxes

R. L. Broadhead, Abstractor

Quebec peat. IV. Composition of peat bog at Lanotaie. V. Extraction of peat wax. C. E. Brunette, D. Spence, H. Girard (Ministere mines, Quebec), and J. Risi. *Ann. ACFAS* **18**, 96-100(1952). The average analysis was bitumins 5.82, water soluble 4.73, hemicelluloses 7.19, other materials soluble in 2% HCl 9.85, cellulose 4.58, other materials soluble in 80% sulfuric acid 6.42, humic materials, lignin 7.01, ash soluble in 80% sulfuric acid 5.89, and total ash 9.54%. A crude extract is recovered by using 90:10 benzene-EtOH extracted with boiling alcohol to leave behind the polymeric waxes, and cooled to precipitate the waxes; the waxes are oxidized with chromic acid to yield a promising wax which may compete with carnauba wax. (*C. A.* **48**, 13199)

Sugar cane wax. V. V. Mhaskar and A. B. Kulkarni(Natl. Chem. Lab., Poona). *Current Sci.* (India) **23**, 156(1954). A $K_2Cr_2O_7$ and H_2SO_4 mixture was found to be the best bleach for cane wax, removing ash, and color as well as unsaturation. The esters present are hydrolyzed and the alcohols are oxidized to the corresponding acids. Characteristics of the wax are given. (*C. A.* **48**, 13245)

Improving the quality of wax emulsions. R. A. Metlitskaya and A.L. Azides. *Legkaya Prom.* **14**(8), 21-5(1954). Bituminous admixtures in montan wax hinder the preparation of uniform, high-quality emulsions. Admixtures should be removed and emulsion should be homogenized. Carnauba wax containing a small amount of bituminous admixtures formed a uniform emulsion. (*C. A.* **48**, 14160)

Modified sugar cane wax. E. A. Wilder and E. Spurgat(S. C. Johnson & Son, Inc.). *U. S. 2,682,516.* A wax suitable for use in the carbon-paper industry is made from deoiled, nonderesinated sugar-cane wax. The wax is melted, heated to 80-150° and air bubbled through it until the acid no. is 22-8. Then 2-20% (usually 10%) by weight of *p*-phenylphenol-HCHO resin is added and air bubbling continued until the mixture has an oil-retention-penetration value of 55 or less. With the wax at 120°, 5-11.5% succinic, maleic, or glutaric anhydride is added to esterify 40-85% of the free wax hydroxyl groups. The resulting wax has a good oil-retention-penetration value and good oil-bleed and dye-bleed resistance. The method permits use of up to 60% more of the crude sugar-cane wax than usual. (*C. A.* **48**, 14259)

Modified sugar cane wax. D. E. Whyte and E. A. Wilder(S. C. Johnson & Son, Inc.). *U. S. 2,683,092.* Purified sugar cane wax (97% solution in boiling isopropanol) is mixed with 3-20% of a material such as rosin acids, rosin-maleic anhydride addition products, or rosin esters, melted, and air bubbled through at 110° until an acid number 25-38 (30 preferred) is reached. The material thus treated has improved odor and color and has strong gel-forming and oil-retention properties. It is useful in the polish and carbon-paper industries. (*C. A.* **48**, 14259)

Lubricant for cutting and grinding surfaces. E. A. Fiser. *U. S. 2,687,357.* A solid composition for application to cutting and abrading surfaces to prevent "loading" and increase the grinding action is made of tallow 65, paraffin 29, beeswax 1 lb., citric acid 1.3, oxalic acid 1.3, K citrate 1.3, urea 6.6 oz., and sufficient Vienna Red to produce the desired color. (*C. A.* **48**, 14183)

Powdered degreasing and polishing wax. Alessandrina Elli (nee Saibene). *Ital. 476,597.* The mixture of beeswax 45, ceresin 25, talc 15, $NaHCO_3$ 10, turpentine oil 3, yellow (edible) oil 2%, after drying and grinding, can be used to polish marbles, glasses, metals, enameled wares, and floors. (*C. A.* **48**, 13344)

• Detergents

Lenore Petschaft Africk, Abstractor

Improvements in washing and fulling agents. "Tepha" Gesellschaft fur Pharmazeutisch und Chemisch-Technische Erzeugnisse M.B.H. *Brit. 715,017.* A washing and fulling agent is made from a condensation product of water or alkali soluble protein or protein degradation products with soap forming acids and an alkali metal salt of an alkyl benzene sulfonic acid.

Improvement in or relating to detergent materials. Rohm & Haas Co. *Brit. 716,517.* A dry, friable, solid, water soluble detergent composition is prepared by mixing 20 to 40 parts by weight of an alkylphenoxypolyethoxyethanol with an aqueous slurry containing 80-60 parts by weight of sodium tripolyphosphate and drying the resulting mixture by heating to a temperature of 75° or more.

Antiseptic soap composition. E. W. Elliott and R. S. Shumard (Monsanto Chem. Co.). *U. S. 2,695,881.* An antiseptic detergent composition contains a detergent soap and 1 to 3% by weight based upon the detergent soap of a synergistic mixture of equal parts of tetra-methyl thiuram disulfide and a halogenated 8-hydroxy quinaldine.

The germicidal action on human skin of soap containing tetramethylthiuram disulfide. R. L. Baer and S. A. Rosenthal(New York Univ., N. Y.). *J. Investigative Dermatol.* **23**, 193-211 (1954). The germicidal action of a soap containing 1% tetramethylthiuram disulfide (TMTD) has been tested by a modification of Price's multiple basin hand washing procedure. One week's use of TMTD soap resulted in a very substantial reduction in the transient and resident bacterial population of the hands. This germicidal activity persisted for at least two days after the soap had been discontinued. The germicidal activity of 1% TMTD soap appeared to be greater and persisted longer than that of 2% hexachlorophene soap. Skin micrococci did not develop increased resistance to TMTD soap after the soap had been used daily for one or more weeks. It is concluded that 1% TMTD soap is a highly effective germicidal agent for use on human skin. TMTD soap, even when tested deliberately on 309 dermatologic patients under clinical conditions which are highly conducive to the production of allergic eczematous sensitizations, caused allergic sensitization to TMTD in only 1 subject.

Determination of dichlorophene, hexachlorophene, and 2,2'-thiobis(4,6-dichlorophenol) in soap and cosmetic preparations. J. E. Clements and S. H. Newburger(Food & Drug Admin., Washington, D. C.). *J. Assoc. Offic. Agr. Chemists* **37**, 190-7(1954). These compounds are isolated and purified by a series of extractions. They are identified by their ultraviolet absorption curves and determined through calculations made by the use of formulas which employ the absorbancy values obtained at specified wave lengths. Data showing recoveries from soaps, a deodorant cream base, and an antiperspirant cream are presented. (*C. A.* **48**, 14122)

Characteristics and effects of synthetic detergents. Task Group Report. P. D. Haney, et al(Black & Veatch, Kansas City, Mo.). *J. Am. Water Works Assoc.* **46**, 751-74(1954). The various items discussed are carefully defined. The compositions of the various detergents are given, also a summary of the so-called builders. Structural formulas are included of the principally used compounds. Micelle formation is diagrammed and analytical methods are considered. Effects on surface water, water treatment, and sewage waste are discussed. A short section considers toxicity to humans. Many operating experiences are briefly illustrated. (*C. A.* **48**, 14051)

Physicochemical investigations of soap micelles. II. Sodium dodecyl sulfate. potassium oleate, and hexadecyltrimethylammonium bromide. Kirsti Granath(Univ. Uppsala, Sweden), *Acta Chem. Scand.* **7**, 297-305(1953). The weights and the shapes of the micelles of these compounds were investigated by sedimentation, diffusion, and viscosity measurements, in the presence of electrolytes in varying amounts. The degree of association increases strongly with the amount of salt present and with the length of hydrocarbon chain of the respective soaps. The lengths of the shorter half axis of a prolate ellipsoid of revolution, calculated from the frictional ratio, become independent of the medium and are of the same magnitude as the length of the soap molecules. This supports Debye's view that the micelles are rod-shaped. The length of the rod depends on the degree of association, whereas the diameter is fixed to double the length of the soap molecule. (*C. A.* **48**, 13350)

Hygroscopicity, hardening, and agglomeration of synthetic detergents. H. Stupel(Seifenfabric. Hochdorf, Switz.). *Seifen-Ole-Fette-Wachse* **80**, 170-2, 225-7, 245-7(1954). Hardening and agglomeration of synthetic detergents are disadvantageous. Without added crystalline builders, detergents tend to absorb H_2O and agglomerate without hardening; inorganic builders regulate H_2O absorption. H_2O absorption is determined by storing 50-g. samples (surface 60 sq. cm.) over H_2O in a desiccator at room temperature (15-20°) for 7 days with daily weighings. Agglomeration is tested by shaking 70-g. samples through 60 horizontal motions in 30 sec. (*C. A.* **48**, 12429)