The livers continue to increase abnormally in size at a constant rate and in this experiment were double the normal weight at the termination of the study.

Preventive and curative studies on the "cholesterol fatty liver" of rats. *Ibid.* **58**, 301(1954). Crystalline cholesterol was added at different concentrations. The livers of rats fed these rations and of other rats fed similar rations containing various lipotropic supplements were analyzed for lipid content. At moderate intakes of cholesterol (0.2%) sufficient dietary choline or betaine were able to prevent the excessive deposition of both glycerides and cholesteryl esters. Vitamin B_{12} exerted a considerable curative lipotropic action on the glycerides but much less on the cholesteryl ester fraction of liver lipids. Inositol was found to be without any appreciable lipotropic effect.

Effects of lipotropic substances on the cholesterol content of the serum of rats. *Ibid.* **58**, 306(1954). Free and total cholesterol have been determined in the blood sera of young adult rats maintained on natural and on purified diets. The rats fed the stock ration showed 70 mg./100 ml. of which 12 mg./100 ml. are in the free form. The rats fed purified hypolipotropic diets showed a progressive drop in bound serum cholesterol as the experiment continued. In preventive studies choline and betaine maintained the serum cholesterol within the normal range but inositol was not effective. In curative studies choline, betain and vitamin B_{12} were effective but inositol was not effective.

Fatty acid and cholesterol synthesis rates in the intact rat. T. T. Hutchens, J. T. Van Bruggen and E. S. West(Dept. Biochem., Univ. of Oregon Med. School, Portland, Oregon.). *Arch. Biochem. Biophys.* **52**, 261(1954). An approach to the determination of lipide synthesis rates in the individual intact rat using single tracer injection, short-term experiments is described. Use is made of respiratory $C^{14}O_2$ data to evaluate the carbon flux through the precursor stages. Fatty acid and cholesterol synthesis rates determined in this manner are reported as mg. lipide synthesized/hr./100 g. animal weight for total animal, liver, and carcass of normal, chow-fed Sprague-Dawley rats in the postprandial, postabsorptive, and 18-hr. fasted states.

Intracellular distribution of vitamin A esterase activity in rat liver. J. Ganguly(Dept. Biochem. and Nutrition, Univ. of Southern California, L. A., Calif.). *Arch. Biochem. Biophys.* **52**, 186(1954). Various cell fractions from livers of vitamin A-depleted rats were obtained by using the differential centrifugation technique. Their relative ability to hydrolyze vitamin A acetate was also studied. The activity was quantitatively localized in the microsomal fraction, whereas the nuclear, mitochondrial, and supernatant fractions were inactive.

Isolation of pentachloronaphthalene from cottonseed feed pellets. R. T. Blickenstaff and J. E. Callen(Miami Valley Labs., Procter & Gamble Co., Cincinnati, Ohio). *Anal. Chem.* **26**, 1586 (1954). A method was needed to enable the determination of a possible contaminant, pentachloronaphthalene, in cottonseed feed pellets. The isolation was carried out by ether extraction of the pellets, saponification of the ether extract, chromatography on alumina of the unsaponified portion, liquid-liquid extractions of the chromatographic fraction containing chlorine, and crystallization of the main fraction from ethanol. The material obtained agreed with that of pentachloronaphthalene in its ultraviolet, infrared, x-ray diffraction patterns, chemical analyses, and melting behavior. As little as 8 p.p.m. of pentachloronaphthalene can be determined in cottonseed feed pellets.

• Drying Oils

Raymond Paschke, Abstractor

Copolymers of vinyl compounds, polyphenylether alcohols and unsaturated fatty acids. J. W. McNabb(American Can Company). *U. S. 2,689,834.* This describes an interpolymer of styrene and a polyester of dehydrated castor oil acids and an esterifiable glyceryl polyether of 2,2-bis(4-hydroxyphenyl) propane. The molecular weight is from 1400 to 1600.

Resins from cyclopentadiene glyceride oil styrene and alpha methyl styrene. W. K. Hoya(Pittsburgh Plate Glass Company). *U. S. 2,689,233.* A process using an organic peroxide catalyst.

Copolymers of conjugate and non-conjugate drying oils, cyclopentadiene and styrene. J. F. McKenna(Pittsburgh Plate Glass Company). *U. S. 2,689,231.* A new coating material is described. This consists of 5 to 30% of cyclopentadiene, 10 to 45% of styrene or similar compounds, of 15% to 50% of tung oil, and of the remainder which is a non-conjugated drying oil.

Catalysis by complexes—drying of linseed oil. A. C. Zettlemoyer and R. R. Myers (Lehigh Univ.). *Ind. Eng. Chem.* **46**, 2220(1954). In studying the use of metal complexes as drying catalysts for oleoresinous vehicles, cobalt was replaced by manganese and iron in conjunction with a suitable amine additive. In some cases manganese catalysis was improved to the point at which it was superior to cobalt catalysis; in general, the greatest improvement occurred with diamines or other difunctional amines possessing resonant structures and by certain amines of large steric requirements. Iron was susceptible to improvement by the same types of amines and to a greater extent in proportion to its original activity than was manganese. The finding that catalysis by manganese can be enhanced by relatively inexpensive compounds may constitute an important step in the development of a new drier technology.

Method of production of drying oils from kerosine hydroxy acids (acid esters). P. V. Serb-Serbin. *Byull. Obmenu Opyt. v Lakokrasoch. Prom.* **1953**(4), 18-22; *Referat. Zhur., Khim.* **1953**, No. 7720. A synthetic drying oil was produced from ethylene glycol ethers and kerosine acid esters by first preheating them at 100-110° to remove moisture and volatile matter, followed by internal esterification at 150-225°. The process was accelerated by vacuum and also by blowing air or CO_2. Additional esterification of kerosine acid esters was carried out by adding 12-15% of ethylene glycol ethers or diethylene glycol at 150-80°. This addition was made in 2 or 3 steps while gradually raising the temperature to 225, 250, and 270°. The reaction was considered completed when the acid no. of the ester was 10-15. The degree of condensation of the ester was determined from the viscosity of its solution in a 1:1 mixture of solvent naphtha-xylene. Preliminary tests of the film-forming properties of this synthetic drying oil showed it to be suitable for inside and outside work. (*C. A.* **48**, 11079)

Cooking of tung oil. H. Schroeder. *Ing. Chim.* **32**, 198(1950). *Chem. Zentr.* **1951**, **I**, 3569. Rapid heating to 280° and rapid cooling are recommended. Tung oil high in acid polymerizes more slowly than that low in acid. Alkyl phenol resins are especially suitable for cooking with oil. (*C. A.* **48**, 11079)

Aluminum alcoholates—a new group of paint additives. J. Rinsl(Chemical Research Associates, Bernardsville, New Jersey). *Paint Varnish Production* **44**(11), 70(1954). The preparation, the chemical properties, the application in paints, and the drying principle are discussed.

Epoxy resin esters in stoving finishes. A. G. North. *Paint Oil Colour J.* **126**, 576(1954). The completely saturated esters based on lauric and hydrogenated castor fulfil color and non-gas-check requirements, but show reduced chemical resistance and toughness to the stage where they are not appreciably superior to normal alkyd resins, better adhesion being their only main advantage over alkyds. The semi-saturated types, represented by castor esters, have to some extent the faults of both saturated and unsaturated esters in that films are not very water and chemical resistant and also discolor to a certain extent. They can, however, sometimes provide a useful compromise. The unsaturated esters based on soya and sunflower acids provide the best alternative to D.C.O. esters in terms of economy and a greatly reduced gas-checking tendency without noticeable sacrifice in general film performance. They do not provide superior color retention, and at present the best answer for non-yellowing epoxy finishes is the pure epoxy resin, non-drying alkyd, melamine system.

Electronic explanation of catalysis of linseed oil drying. R. R. Myers and A. C. Zettlemoyer(National Printing Ink Res. Inst., Lehigh Univ., Bethlehem, Pa.). *Ind. Eng. Chem.* **46**, 2223-25 (1954). A difference of opinion existed as to whether the rate determining step was the abstraction of hydrogen or the subsequent polymerization, presumably via free radicals. Regardless of which view was taken, the proposed electronic explanation of catalysis will apply. The reversible formation of covalent bonds could be pictured as taking place between a 3d electron of the metal and the free radical just as it has been depicted for molecular oxygen.

Condensation of resorcinol and m-cresol with tung oil. T. N. Mehta, C. V. N. Rao, D. B. Rishi and N. H. Mulik(Nagpur Univ.). *Paintindia* **4**(5), 29(1954). Tung oil, the phenol and phosphoric acid catalyst were heated for four hours on the steam bath. The phenol added either at the ethylenic linkage or at the ester group. Resorcinol is less reactive than m-cresol.

Linseed oil at the surface of titanium dioxide pigment. W. R. Lasko and L. S. White(National Lead Company, Sayreville, N. J.). *Anal. Chem.* **26**, 1631(1954). Electron micrographs of particulate materials often give a very fuzzy appearance which cannot be completely associated with the intrinsic surface of the material. By means of a high magnification technique it has been found that such surface characteristics may be due to the presence of adsorbed dispersant. A study has been made of the surface roughness of titanium dioxide pigment particles, as well as the fuzziness developed upon the addition of various amounts of unpolymerized and polymerized linseed oils, used as dispersants. In some instances the nonuniform adsorption of these oils indicates the heterogeneous nature of the particle surface. The need for the use of controlled amounts of dispersant when studying the intrinsic surface characteristics of particulate materials is indicated.

Vinyls. W. H. McKnight(Mellon Institute). *Paint Varnish Production* **44**(11) 64(1954). These resins offer a combination of properties for formulating primers and finishes having good toughness and adhesion, moisture-, salt spray-, chemical-, and solvent-resistance.

Rapid identification of glycols in alkyd resins. C. B. Jordan (Aberdeen Proving Ground, Md.). *Anal. Chem.* **26**, 1657(1954). A rapid method, which utilizes only standard laboratory equipment, has been developed for qualitatively detecting vicinal glycols of low molecular weight in alkyd resins. It is based on reflux distillation, making use of a ternary azeotropic mixture formed by xylene, the glycols, and water, xylene being the refluxing medium.

Production technology of shale drying oil. A. A. Ivanova and A. I. Bespalko. *Byull. Obmenu Opyt. v Lakokrasoch. Prom.* **1953**(4), 22-6; *Referat. Zhur., Khim.* **1953**, No. 7721. Shale drying oil was prepared by oxidation of shale oil with air at 140-150° in the presence of 3% of catalyst "MK" to a viscosity of 10-12 min. in a funnel NIILK (Nauchno-Issled. Inst. Lasokrasochnoi Prom.) at 18-20°. Dehydration was carried out at 240-250° in the presence of an additional 3% "MK" to a viscosity of 17-18 sec. in funnel VZ-4 after diluting with xylene in 1:1 ratio. Paint prepared from iron ocher with this drying-oil base lasted for 1½ years and powdered Al paint with this base for 2 years. Analyses are given of raw, oxidized, and dehydrated shale oils. (*C. A.* **48**, 11079)

The oxidation of monoethenoid fatty acids and esters. Catalytic oxidation of n-propyl oleate. The oxidation products. A. J. Feuell and J. H. Skellon(Acton Technical College, London). *J. Chem. Soc.* **1954**, 3414. The products of catalytic oxidation at 55°, 85°, and 120° of *n*-propyl oleate by gaseous oxygen have been resolved. The main products resulting from transformation or decomposition of the initially formed hydroperoxides are 9:10-epoxy- and 9:10-dihydroxy-stearic acids, unsaturated keto-esters, and the scission fragments nonanoic, decanoic, suberic, and azelaic acid. With increasing temperature and duration of oxidation, the unsaturated keto-esters tend to dimerize and form oils and resins that still retain their ketonic character. The observed rapid loss of unsaturation at the higher temperatures, and the formation of appreciable quantities of epoxy- and dihydroxy-stearic acid derivatives are compatible with a mechanism involving direct attack on ethenoid linkages by free hydroxyl radicals generated by thermal homolytic fission of the initially formed hydroperoxides.

Mould growth on painted surfaces. L. D. Galloway. *Paint Oil Colour J.* **126**, 81-8(1954). A lecture covering the principal factors involved, the methods of attack, tests and preservatives.

Studies on oxidized films of trilinolein and trilinolenin. J. R. Chipault and Evelyn McMeans (Hormel Institute). *Off. Dig. Federation Paint Varnish Production Clubs* **26**(354), 548 (1954). Trilinolein and trilinolenin films were collected at two levels of oxidation, and after the peroxides had been determined the remainder of the films were reduced and saponified. The hydroxyl, *alpha* glycollic, and carbonyl content, and the unsaturation of the free acids were then measured. In addition, the neutralization equivalent, molecular weight, and ultraviolet and infrared spectral characteristics of the acids were determined.

Vehicle problems. H. Burrell(Interchemical Corporation). *Paint Varnish Production* **44**(11), 68(1954). There is need for custom alkyds in small volume, low-cost epoxides, and heat stable vinyls.

High polymer theory of the wrinkle phenomenon. H. Burrell (Interchemical Corporation). *Ind. Eng. Chem.* **46**, 2233(1954). Wrinkling occurs when a drying oil composition forms a surface skin lying on top of a liquid underlayer of monomer. This polymeric skin is swollen by the liquid layer. The strains set up by the swelling are relieved by wrinkling when the modulus of elasticity of the swollen gel is low enough. By use of this theory, it is possible to formulate improved industrial wrinkle finishes that are more nearly foolproof in their tendency to give the same pattern time after time.

Tall oil—its function in the paint industry. Part III—Tall oil in the protective coatings industry. W. Brushwell. *Am. Paint J.* **39**(6), 80(1954). Discussed in this part are (1) the chemistry of tall oil in relation to its uses, (2) esterification, (3) decarboxylation, (4) sulfonation, (5) sulfurization, (6) polymerization, (7) reaction with styrene, etc., (8) tall oil soaps, and (9) rosin ester varnishes.

Tall oil—its functions in the paint industry. Part II—Properties of commercial tall oil products. W. Brushwell. *Am. Paint J.* **38**(51), 60(1954). The chemistry of available tall oil products is discussed.

Hydrogen transfer. Part VI. — Metal-catalyzed transfer-hydrogenation of ethylenic compounds. E. A. Braude, R. P. Linstead and P. W. D. Mitchell(Imperial College, London). *J. Chem. Soc.* **1954**, 3578. Cyclohexene, and similar hydroaromatic compounds which disproportionate at moderate temperatures in the presence of metal catalysts, can be used as hydrogen donors for the reduction of ethylenic and acetylenic bonds in hydrocarbons and carboxylic acids. The disproportionation of the donors is suppressed by the acceptors to varying extents; in favorable cases, transfer occurs exclusively although it usually proceeds more slowly than does disproportionation in the absence of acceptor. The results can be interpreted in terms of co-adsorption of the donor and acceptor on the catalyst surface.

Polymers. I. Synthesis of an all-cis diene polymer. W. J. Bailey and H. R. Golden (Wayne University). *J. Am. Chem. Soc.* **76**, 5418(1954). The cyclic diene, 1,2-dimethylenecyclohexane, was polymerized to a high molecular weight, all-1,4- all-*cis* diene polymer. This polymer was a white crystalline solid, melting at 165° and possessing no rubber-like properties, even though it is very similar in structure to natural rubber.

Carilla-seed oil gel. J. W. Airan(Wilson Coll., Bombay), *Oils & Oilseeds J.*(India) **4**(9/10), 43-4(1952). Carilla seeds (*Momordica charantia*) yield 35% oil containing stearic (17%), oleic, and linoleic acids, in addition to an unidentified unsaturated (possibly conjugated) acid. The oil, on standing, polymerizes to a yellowish white solid and finally to a highly viscous red liquid. The addition of C_6H_6 or an alcohol extraction of the seed kernels delays polymerization. The Wijs method does not give the complete oil number of the oil. The oil probably contains a resin that induces polymerization in other oils. (*C. A.* **48**, 10355)

The structure of oils and resins: spectroscopy. N. H. E. Ahlers (Unicam Instruments Ltd., Cambridge) and L. A. O'Neill. *Oil and Colour Chemists' Assoc. J.* **37**, 533(1954). The present state of knowledge regarding the structure of oils and resins, including some treated oils and synthetic resins, is reviewed. Problems still outstanding and their technical significance are indicated, and the possibility of solving them by newly developed techniques is discussed. The most important newer technique—absorption spectroscopy—is considered in detail.

The spectroscopic examination of alpha and beta kamlolenic acid. N. H. E. Ahlers and F. D. Gunstone(Unicarn Instruments Ltd., Cambridge, England). *Chemistry and Industry* **1954**, 1291. The infrared and ultraviolet absorption spectra of these acids are similar to those of the eleostearic acids. It is concluded that the alpha isomer has the *cis, trans, trans*, or *trans, trans, cis* configuration. The beta acid is said to be the all *trans* isomer.

• Detergents

Lenore Petchaft Africk, Abstractor

Optical whitening agents for detergents. D. A. W. Adams (Hickson & Welch Ltd., Castleford, Yorks, Eng.). *Perfumery, Essent. Oil Record* **45**, 303-7(1954). To be effective as whitening agents, compounds should show intense blue fluorescence, they must be soluble in aqueous solutions, have affinity to cellulosic or other fibers, be essentially colorless, be reasonably fast to washing and light, and be stable to various agents. The chemical constitution of whitening agents is discussed. They should possess a series of conjugated double bonds to give fluorescence, contain one or more solubilizing groups such as sul-