using liquid paraffin on kieselguhr as the stationary phase and acetic acid as the liquid phase (Anker and Sonanini, *Pharm. Acta Helv. 37*(5-8), 360). Two thin-layer chromatographic methods for determining the glycerides of seed oils were described. In the first method the adsorbed spots were extracted, mixed with a known amount of methyl heptadecanoate and converted to methyl esters for gas chromatographic analysis. In the second method three fractions obtained from the oil by low temperature crystallization were further separated chromatographically (Gunstone et al., *Chem. Ind. (London) 1964*, 483). The glyceride structures of a number of oils, including linseed and soybean, were determined by oxidation with permanganate-periodate, esterification of the oxidized glycerides and gas chromatographic analysis of the oxidation products (Youngs and Subbaram, *JAOCS 41*, 218, 595).

A gas chromatographic method for determining the polymer content of fatty esters using the internal standard technique was described (Zielinski, *Ibid.*, 249). Polyglycerols were determined quantitatively by paper chromatography (Zajic, *Papers Inst. Chem. Tech. Prague 6*, 179). Film-forming polymers and copolymers were analyzed by subjecting them to controlled pyrolysis and separating the products gas chromatographically (Hippe, *Polimery 8*(11), 414). The applications of various instruments in paint research included studies of bronzing, paint film yellowing, resin identification, pigment identification, polymer and oil analysis, study of wash primers, measurement of corrosion resistance and determination of pigment size (Valentine, *Peint. Pig. Vernis 39*(4), 211; (5), 295). A method was described for determining the rate of chalking of a paint by measuring the weight loss at intervals during natural or accelerated weathering (Boers, *Deutsche Farben-Z. 17*(4), 155).

Plasticizers were separated from mixtures by column chromatography and then analyzed by infrared spectroscopy (Criddle, *Brit. Plast. 36*(5), 242). Plasticizers in nitrocellulose, vinyl and acrylic lacquers were identified and quantitatively determined by programmed temperature gas chromatography (Esposito, *Anal. Chem. 35*, 1439).

### Paint Technology

Results of an extensive 3-year exposure test conducted by the National Flaxseed Processors' Association showed that conventional linseed oil house paints compared favorably to latex paints (Morris, *Am. Paint J. 47*(55), 93). Studies were made of the water absorption, extensibility, breaking strength and permeability of free paint films in an effort to correlate these properties with paint failures due to blistering, weathering and cracking (Harris, *Can. Paint Var. 37*(2), 22; (3), 42, 73). A coating composition was described in which the vehicle was a coconut oil-phthalic alkyd resin (Langstroth, *U.S. 3,128,260*). Improvement of oil-modified alkyds by heating with a bivalent metal hydroxide was described (Friedsam, *U.S. 3,110,690*). A summary of new developments in lacquers referred to lacquers for various purposes made from polyurethanes, vinyl resins and acrylate resins, hydroxyethylcellulose as a protective colloid in acid- and alkali-resistant latex paints, and plasticized poly(vinyl acetate) latex paints (*Chem Progress Union Carbide, Internat. Ed. 14*(4), 1).

Nyasaland (Montana) and Fordii tung oils gave comparable results in corrosion resistant zinc chromate primers under salt spray conditions (Chatfield, *Paint Oil Colour J. 146*, 228). A corrosion-resistant paint consisted of a drying oil, alkyd resin, epoxy resin, or poly(vinyl acetate) vehicle containing 0.5–1.0% of a barium salt of cyanuric, (2-ethylhexyl)phosphate, capric, caprylic or phytic acids (Bryan and Tidridge, *U.S. 3,137,583*). Exhaustively chlorinated oleic and stearic acids were used in the manufacture of fire-retardant paints (Cheng, *Thesis, Karlsruhe, 1962*, 47 pp; *List of Accessions, Roy. Inst. Technology Library, Stockholm, 1963*(147), 11). The formulation and testing of water-resistant, intumescing fire-retardant paints was described. The three major components were the vehicle, a spumific melamine phosphate and a carbonific polyurethane (Verburg et al., *JAOCS 41*, 670). An introduction to the field of electro-deposition of paint was presented (Berry, *Paint Technol. 27*, 13). An improvement in the preparation of drying oil-impregnated porous carbon electrodes consisted of subjecting the impregnated electrode to 300 psi steam pressure and then quickly releasing the pressure (Bailey and Best, *U.S. 3,120,454*).

In corrosion-resistant primers the critical pigment volume concentration varied with the specific surface of the red iron oxide pigment. While ion permeabiltiy of such a paint gave an indication of its porosity, it was not an absolute measure of the effectiveness of the paint (Kresse, *Farbe Lack 69*(4), 255). The use of heavy metal soaps as dispersing, bodying, drying, flatting and antifouling agents in paints was summarized (Pilpel, *Paint Technol. 27*, 16), as were the uses of thickening agents in solvent- and water-thinned paints (Rabate, *Peint. Pig. Vernis 39*(6), 347).

### Plasticizers

Butyl stearate, butyl oleate, butyl ricinoleate and methyl linoleate were evaluated as plasticizers in poly(vinyl chloride). As sole plasticizers, these esters had limited compatibility with the resin. In combination with dioctyl phthalate they gave improved properties over resins containing only DOP (Riser et al., *JAOCS 41*, 172). Twenty diesters of brassylic (tridecandioic) acid were evaluated as poly(vinyl chloride) plasticizers. Several had excellent low-temperature properties and light resistance (Nieschlag et al., *Ind. Eng. Chem. Prod. Res. Develop. 3*, 146). N,N-bis(2-alkoxyethyl) amides of terpenic acids, naphthenic acids, a variety of fatty acids, and the acids of animal fats, rapeseed, *Limnanthes douglassii* seed, parsley seed and hydrogenated cottonseed oils were evaluated as plasticizers in poly(vinyl chloride-vinyl acetate). Some showed good low-temperature properties but most had poor thermal stability (Mod et al., *JAOCS 41*, 781). Forty-six N-acyl derivatives of cyclic imines (containing essentially the same acyl groups as the amides described immediately above) were also evaluated in poly(vinyl chloride-vinyl acetate). These amides of 5-, 6-, and 7-membered cyclic imines showed exceptionally high plasticizing efficiencies and good compatibilities. Several of them had good low-temperature properties and antifungal activity (Mod et al., *Ibid.*, 237).

### Miscellaneous Products

Nitrocellulose particles were coated with 0.02–0.5% of their weight of sorbitan trioleate (Coffee, *U.S. 3,118,797*). A valve-packing composition consisted of polymerized castor oil, 30–60%; triethanolamine, 3–7%; stiffener (carnauba wax, N,N'-ethylenebisstearamide, aluminum ricinoleate or dimethyldioctadecylammonium bentonite), 5–20%; and filler, 30–60% (Puttroff, *U.S. 3,109,744*). A composition consisting of at least 99.5% of maleic anhydride and at least 0.07% of a 10–25 carbon fatty acid was described (Gans and Russell, *U.S. 3,140,300*). The effect of temperature on the formation of polyglycerol by heating glycerol was studied. Polyglycerol did not form at 180C but formed slowly at 200 C. Sodium oxide accelerated the reaction (Zajic, *J. Inst. Chem. Tech. Prague 7-1*, 179, 191).

*The Annual Review of Literature will be continued in September*

## • *Obituary*

C. L. Manning, Fort Worth-Southwestern Laboratories, Fort Worth, Texas, died suddenly on Saturday, July 3, 1965, following a heart attack.

Mr. Manning had been with the Fort Worth-Southwestern Laboratories since 1927 and was well known in the cottonseed and related industries.