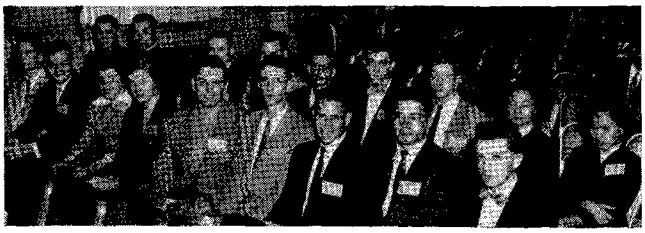
DETERGENTS—Speakers *(left to right)* are F. J. Gozlow, L. O. Leenerts, R. G. Bistline Jr., J. Fred Gerecht, chairman, W. C. White, and Foster Dee Snell.

Summarize Highlights of Philadelphia Papers

TECHNICAL SESSIONS were held on general fat chemistry, analytical aspects, detergents, technology, chemical modification, shortenings, nutrition, oxidation, and polymerization at the 29th Fall Meeting of the American Oil Chemists' Society in Philadelphia on October 10–12, 1955. J. B. Brown of Ohio State University presided over the general session and a student session on opportunities in lipid chemistry, chemical engineering in fat technology, and the advantages of specialized training in fat and oil chemistry. A number of excellent papers were presented by speakers from Canada, New Zealand, and South Africa.

In the detergent session, at which J. Fred Gerecht presided, a polymerizable ester from α-sulfonated saturated fatty acids was mentioned, methods for evaluating dishwashing detergents were discussed, a preliminary report on a rapid method of evaluating detergency by means of an ultrasonic transducer was presented, and a commercial process for the manufacture of surface-active sucrose esters of fatty acids was described. In the method discussed by Foster D. Snell, of Foster D. Snell Inc., sucrose in 3:1 molar ratio may be transesterified with methyl stearate, with K_2CO_3 catalyst, in 9–12 hrs at 90–95°C., at a reduced pressure of 80–100 mm., with a yield of 95%. The product containing 54% sugar, 1–2% catalyst, and 45% active ingredient is suitable for many uses and may be purified with removal of sucrose by solution in water and precipitation as a curd from a 5% salt solution.

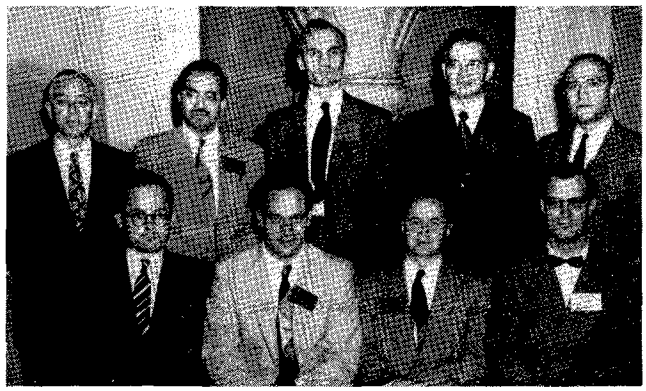
The general session revealed countercurrent distribution as a powerful tool of high resolution in the separation of individual triglycerides, showing linseed oil to be randomly distributed and cocoa butter to have a directed organization of its glycerides. Improvements in glyceride syntheses involving monotrityl glycerol were described. Edwin M. Meade of the University of Toronto showed that ricinoleic acid could be easily purified *via* its crystalline orthoborate, and methyl ricinoleate by molecular distillation of the orthoborate.



STUDENTS—Delegations from Drexel Institute of Technology, Philadelphia, and Pennsylvania Military College, Chester, Pa., are shown above, together with two visitors from Thailand, Mrs. Nidnoi Sucharitakul and Mrs. Boonlom Teovayanonda.

SPEAKERS AT STUDENT SESSION—These authorities are *(left to right)* W. O. Lundberg, J. B. Brown, chairman, F. A. Kummerow, and C. E. McMichael.

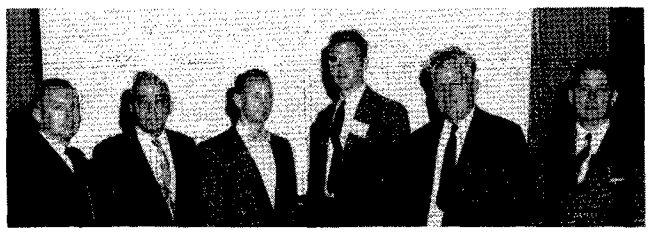
PAPERS IN THE analytical session, with Thomas H. McGuine presiding, described the adaptation of some official methods to the semi-micro scale, the determination of unsaponifiables,



ANALYTICAL SESSION—Seated are E. M. von Rudloff, Constantine Ricciuti, R. P. A. Sims, and T. H. McGuine, chairman; standing are C. Y. Hopkins, N. A. Khan, E. M. Meade, R. O. Swisher, and A. J. Derbetaki.

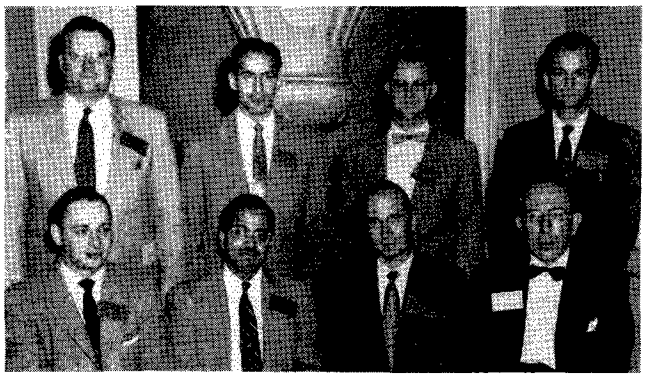
the composition of asparagus seed oil (over 80% C_{18} consisting of linoleic, oleic, and stearic but no linolenic), the use of the polarograph in the kinetics of epoxidation, the direct potentiometric titration of oxirane oxygen, the separation of hydroxy acids by solvent partition, the use of nuclear magnetic resonance spectroscopy to elucidate the structure of long chain alkylbenzenes, and the determination of position of double bonds by permanganate-periodate oxidation. In this last paper von Rudloff of the Prairie Regional Research Laboratory, Saskatchewan, showed that the position of double bonds could be determined by the use of only catalytic amounts of potassium permanganate, provided that sufficient periodate was present to reoxidize the tetravalent manganese back to the heptavalent state and also to cleave the α-glycol formed. Epoxidation of internal double bonds was reported by Ricciuti to proceed about 20–25 times as fast as that of external double bonds.

The technology session, at which Frederick W. Keith Jr. presided,, included papers on solubility data in the alcoholic extraction of vegetable oils, extraction rates of corn oil by three petroleum solvents, exhaustive solvent extraction of cottonseed, solvent cooking of cottonseed meats, filtration-extraction of peanuts and flaxseed, liquid-liquid extraction to separate mono-, di-, and triglycerides, a dielectric method for determination of oil content of safflower and sunflower seed, and purification of crude glycerine by ion exclusion.



TECHNOLOGY—These speakers are G. E. Prielipp, L. K. Arnold, J. A. Monick, F. W. Keith Jr., chairman, E. A. Gastrock, and H. L. E. Vix.

The chemical modification session, with John T. Scanlan presiding, included papers on the preparation of conjugated acids by dehydration, the kinetics of the Diels-Alder reaction, vinyl ethers of unsaturated fatty alcohols, *in situ* epoxidation with resin catalysts, epoxidation of polyesters of tetrahydrophthalic acid and unsaturated alkyd resins, epoxidized esters as internal and external plasticizers, stearolic acid and related substances, and a survey of derivatives prepared from α-bromo higher fatty acids. Danzig of the Northern Regional Research Laboratory reported that high conversions to conjugated acids could be obtained by pyrolysis of the borate esters of ricin-



CHEMICAL MODIFICATION—In the front row are M. J. Danzig, N. A. Khan, L. E. Gast, J. T. Scanlan, chairman; in the back are J. W. Pearce, L. S. Silbert, R. J. Gall, and R. R. Estes.

elaidic and dihydroxystearic acids. Vinyl ethers of unsaturated alcohols were shown to be readily prepared from the alcohol acid acetylene and also to be polymerizable by Lewis acids. Gall of Becco Division, Food Machinery and Chemical Corporation, described a new expendable resin technique for high conversion of unsaturated fatty esters to epoxides.

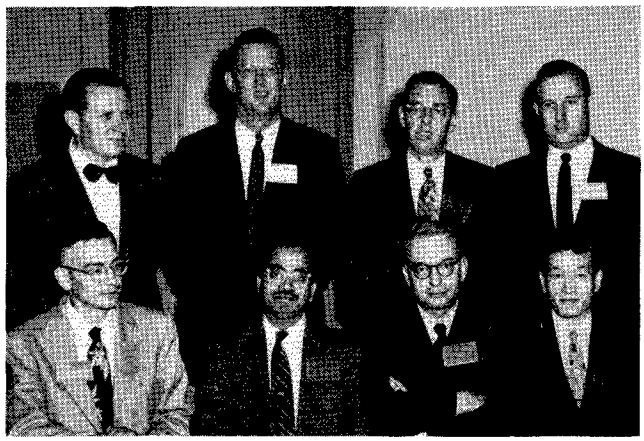
THE SESSION on shortenings, at which R. W. Riemenschneider presided, included papers on dilatometric methods, the dilatometric properties of butyro and acetopalmitins and stearins, plasticizing fats in the laboratory, and the microscopy of lard and rearranged lard. A paper by H. K. Hawley and G. W. Holman of the Procter and Gamble Company described a continuous directed interesterification of lard, using a liquid NaK catalyst with removal of trisaturated glycerides. This process has been successfully started commercially to upgrade lard to premium shortening quality. L. Hartman, Department of Scientific and Industrial Research, Wellington, New Zealand, revealed that *trans* unsaturated acids, iso acids with odd and even numbers of C atoms, and odd-numbered ante-iso and straight chain acids have been found in the depot and milk fat of ruminants.

SHORTENINGS — This octet comprises *(seated)* S. F. Herb, R. W. Riemenschneider, chairman, L. Hartman, and S. G. Morris; *(standing)* G. W. Holman, A. H. Steffen, B. M. Craig, and R. O. Feuge.

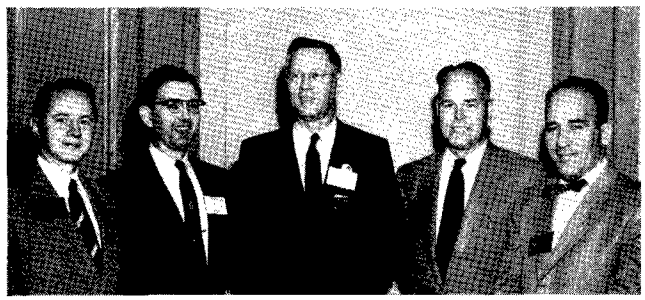
Papers in the nutrition session, with W. O. Lundberg presiding, discussed the biological effects of autoxidized fats, the action of plant sterols in cholesterol absorption, the relation of unsaturation in dietary fat to atherosclerosis, and the stability of vitamin E in laboratory diets. Biologically active fat-soluble and heat-stable fatty acid esters of pyridoxine (vitamin B_6) were described by Taketami Sakuragi and F. A. Kummerow of the University of Illinois. Pyridoxine tripalmitate was almost insoluble in fat; pyridoxine 5-monopalmitate was more readily soluble.

Kaunitz of Columbia University showed that polymers isolated by molecular distillation from drastically autoxidized lard and cottonseed oil exert a growth-depressant effect on rats.

Papers in the oxidation and polymerization session, with Waldo C. Ault in the chair, discussed thermally polymerized oils and theoretical aspects of the autoxidation of methyl oleate and linoleate. Recent work on autoxidation of methyl oleate was reviewed. L. R. Dugan Jr. and Paul W. Landis, of the American Meat Institute Foundation, reported that gamma radiation from Co^{60} catalyzed the oxidation of oleic acid and



NUTRITION—From left to right *(seated)* are F. A. Kummerow, N. A. Khan, D. A. Sutton, Taketami Sakuragi; *(standing)* Hans Kaunitz, W. O. Lundberg, chairman (substituting for B. F. Daubert), A. F. Wells, and O. C. Johnson.



OXIDATION AND POLYMERIZATION—W. C. Ault, program chairman for the Philadelphia fall meeting, has at his right R. P. A. Sims and L. R. Dugan Jr., at his left O. S. Privett and Daniel Swern.

methyl oleate to high peroxide values at 20° and 55°C. Hugo H. Sephton and Donald A. Sutton of the National Chemical Research Laboratory, Pretoria, South Africa, reported that the autoxidation of methyl linoleate appears to proceed with formation of hydroperoxides at the 9 and 13 positions and that conjugated dienes are predominant.

ALEXANDER J. STIRTON and DANIEL SWERN
Eastern Regional Research Laboratory
Philadelphia, Pa.

Fatty Acids Rise

Production of fatty acids in August 1955 totalled 37.5 million lbs., approximately 11.6 million lbs. above the seasonally low level recorded in July. August production was 18.7% more than the August 1954 figure of 31.6 million lbs.

Total disposition was 39.7 million lbs., approximately 8.6 million lbs. above the July figures and some 7.5 million lbs. above the August 1954 level. This included some 3 million sales within the industry so that actual disposition outside the industry is overstated to this extent. Stocks, including work in process, remained at somewhat the same level of 39.7 million lbs.

Production of fatty acids in September 1955 totalled 36.8 million lbs., approximately the same as that recorded in August. September production was 22.3% more than the September 1954 figure of 30.1 million lbs.

Total disposition was 36.9 million lbs., approximately 2.8 million lbs. below the August figures, but some 3.8 million lbs. above the September 1945 level. This included some 2.0 million sales within the industry so that actual disposition outside the industry is overstated to this extent. Stocks, including increased work in process, rose over that of last month to a level of 42.6 million lbs.