REFINING—Speakers gathered around the rostrum in the Walnut room of the Plaza hotel, San Antonio, Tex., on April 12, 1954 were as follows, in the usual order: E. B. Lancaster, F. G. Dollear, J. D. Lindsay (chairman), J. G. Hamilton, K. T. Zilch, and D. H. Saunders.

PROCESSING—Also on the April 12 program were these speakers: *(seated)* Frank E. Sullivan, W. D. Harris (chairman), J. W. Dunning; *(standing)* Robert M. Walsh, W. G. Juhl, J. P. Hughes, and W. A. Pons Jr.

PRODUCTION—With Chairman E. A. Gastrock at the podium, four speakers are ranged *(left to right)* for the photographer in the Roof Garden of the Plaza hotel: F. H. Thurber, F. E. Luddy, E. W. Sordelet, and R. R. Allen.

Reports on Technical Sessions at San Antonio Meeting

THE accent was on processing at the 45th Annual Meeting of the American Oil Chemists' Society at San Antonio, Texas, April 12, 13, and 14. Of the 38 papers presented at six technical sessions, 15 described modifications and improvements in methods for the extracting and refining of fats and oils.

The advantages of the new "Rotocel" method for extraction of cottonseed cake was explained by Earl T. Anderson from the Blaw-Knox Company. The system processes cake in a granular form, in contrast to the usual practice of flaking. Walter A. Pons Jr., reported on a study, at the U. S. Department of Agriculture's Southern Regional Research Laboratory, by Pons, Thurber, and Hoffpauir, of the relation between processing conditions and the chemical characteristics of cottonseed meals and oils. Twenty-six sets of mill samples, obtained by cooperation with 10 mills, were used in the investigation. Prepressed oils were superior to solvent extracted oils, showing lower refining losses, lower refined and bleached color, and less bleach-color reversion. A number of the meals exhibited the desirable characteristics of low free gossypol content and high nitrogen solubilities.

The necessity for almost complete removal of gossypol from cottonseed oil, to avoid color reversion, and from the meal to provide a nutritive feed for swine and poultry, establishes specific objectives in the ideal processing of cottonseed. In addition, the removal or inactivation of gossypol should be accomplished without lowering the nutritive value of the protein by excessive heating or by other means. Laboratory experiments to attain these objectives were described by F. H. Thurber, also from the Southern Regional Research Laboratory. To date best results have been obtained by rolling the meats, breaking the pigment glands by vigorous stirring of the meats with about 35% of water containing bases or acids, followed by drying at a maximum temperature of about 212°F. Lionel K. Arnold and W. G. Juhl from Iowa State college contributed a fourth paper dealing with solvent extraction of cottonseed, summarizing conditions for the solvent extraction with trichloroethylene.

Screw press operation was the subject of two papers. The conditions for good mill operation, with emphasis on low refining losses and good oil color, were explained by Allen Smith, Perkins Oil Company. W. B. Harris gave details of an experimental study of the screw-press method of extracting cottonseed oil conducted by the Cottonseed Products Research Laboratory of the Texas Experiment Station. Process variables were analyzed, and the importance of the preparation and cooking of the meats was stressed.

Recent developments in the filtration extraction process of the Southern Regional Research Laboratory were described in three papers. E. A. Gastrock presented work of his group at the Southern Laboratory on latest process refinements and a comparison of over-all pilot plant processing conditions with those of the first commercial test runs. James Ross, Lukens Steel Company, told about the translation of the filtration extraction process from pilot to commercial plant. High extraction efficiency can be obtained in direct solvent extraction of sesame seed by use of the filtration extraction process, according to A. V. Graci Jr., who reported bench-scale studies he has performed with H. L. E. Vix and M. L. Paredes on this oilseed at the Southern Regional Research Laboratory. J. W. Dunning, from the V. D. Anderson Company, also discussed the peculiarities of sesame seed as they affect recoveries of the oil. Expeller, continuous solvent-extraction, and prepress solvent-extraction methods were outlined.

E. W. SORDELET, W. G. Reece, and R. J. Vander Wal explained the production and processing of molecular-modified lard at Armour and Company. A rearrangement of the fatty acid groups by ester-interchange has made possible a shortening fat which was claimed to equal or surpass those from vegetable oils. Other research processing of animal fats was given by L. K. Arnold and H. C. Arvidson Jr., who described the solvent-extraction of meat offal as carried out at Iowa State College.

A new method for oilseed refining, the pressure system centrifugal refining, was illustrated by Frank E. Sullivan with the degumming of soybean oil at the DeLaval Separator Company. The effect of pressure within the centrifugal bowl resulted in greatly increasing the efficiency of separation and in lower refining losses. Soybean oil was also the subject of a paper by E. B. Lancaster from the Department of Agri-

culture's Northern Regional Research Laboratory. This paper, a continuation of refining studies on soybean oil, showed that no consistent correlation existed between iron, tocopherol, phosphorus, or ash content of the finished oil and the stability of the oil. The refining process should not be conducted so as to reduce objectionable iron or ash content to lowest values if this is accompanied by removal of too large amounts of the stabilizing phosphorus or tocopherol. A laboratory refining procedure for crude rice oil was described by F. G. Dollear. Experiments of Catherine H. Pominski, Josephine R. Loeb, and F. G. Dollear at the Southern Regional Research Laboratory showed that a modified refining loss method similar to the American Oil Chemists' Society official method Ca 9b-52, for determining refining loss of solvent-extracted soybean oil, will give satisfactory results for refining loss determinations of various rice oils.

The 45th Annual Meeting was opened with two papers on the economic status of the fat and oil industry. J. P. Hughes, Mrs. Tucker's Products, Division of Anderson, Clayton and Company, discussed the economic outlook for cottonseed oil. He pointed out that economic position is affected by technological and by political factors. A technological factor of considerable importance is the solvent-extraction of cottonseed with the resulting enhancement of oil yield. A political factor, even more dominating, is the federal farm-price support program and acreage allotment. A surplus was predicted as a continuing feature of our economy. The economic status of the entire fat and oil industry was reviewed by Robert W. Walsh, Market Development Branch, U. S. Department of Agriculture. A 25% increase in domestic production of fats since 1945-46 and a 40% increase since prewar have overcome world shortage and have created a domestic surplus. While food uses are increasing in line with population growth, industrial uses are losing to petroleum derivatives. The abundant supply of oils and fats is both an opportunity and a need for research on new uses for these materials. John M. Brewster, also from the Agricultural Marketing Branch, U.S.D.A., presented a study of the economies of different types of cottonseed oil mills and the effect of industry-wide shifts to more efficient mills on the supply and price of cottonseed oil and on the return to the grower.

SIX papers dealt with analytical procedures or compositional studies of various commodities. Francis E. Luddy reported on work completed at the Eastern Regional Research Laboratory on the composition and properties of rearranged lard. With no change in fatty acid content, the rearrangement produces considerable ester interchange and a lard of almost complete random composition. A. R. Baldwin, Corn Products Refining Company, described the fatty acid composition of 13 oils from corns having high, low, and medium oil contents. Increase in oil content was found to be accompanied by decrease in iodine value and linoleic acid content of the oil and by an increase in oleic and saturated acids. Raiford L. Holmes reported the results of a study of the composition of 74 samples of domestic tung oil conducted at the Southern Regional Research Laboratory with Frank C. Pack, Jacob C. Minor, and R. S. McKinney. W. J. Miller, from the Buckeye Cotton Oil Company, described a modification of the Pons and Guthrie p-anisidine method for the determination of free and bound gossypol in cottonseed materials containing dianilinogossypol. A method for the determination of chlorophyll in oils by measurement of the absorption band at 670 millimicrons, exhibited in the visible spectra of all chlorophyll containing oils, was outlined by R. C. Stillman, Procter and Gamble Company. Chlorophyll was also the pigment of concern to Duncan Macmillan and Eugene H. Melvin in their study of the color characteristics and chemical analyses of oil from frost- and weather-damaged soybeans. Refined bleached color of these oils remains so high that, under existing trading rules, they would carry a greater penalty than that from crude green grade. Weather damage seemed to destroy the porphyrins which absorb in the region of 670 millimicrons, but high "background" absorption is exhibited in this region, making estimations difficult.

Robert T. O'Connor, Elsie F. DuPré, and R. O. Feuge described the infrared spectra of various types of mono-, di-, and triglycerides. According to these workers, also from the Southern Regional Research Laboratory, absorption bands in the regions of 3 and 9 microns can be used to detect and determine these various glycerides in admixture and bands in the 10-micron region will permit the determination of *trans* isomers in mixtures of glycerides. Four other papers dealt with research on modified and synthetic glycerides. Miss Audrey Gros, also from the Southern Laboratory, presented

EFFECTS—Against a background of greenery and oriental wallpaper in the Plaza hotel on April 13 speakers from the B session are shown: *(seated)* James K. Weil, A. C. Wamble (chairman), and W. L. Kubie; *(standing)* R. L. Holmes, Duncan Macmillan, Peter T. Vitale, and J. M. Magner.

SCREW-PRESSING—Wednesday speakers, with the San Antonio sky-line behind them, were snapped by the photographer in a formal pose: *(seated)* Allen Smith, H. D. Fincher (chairman), and E. A. Gastrock; *(standing)* W. B. Harris, James D. Ross, A. V. Graci Jr., and John Brewster.

GENERAL—Another Wednesday speaker group is shown above: *(seated)* W. J. Miller, Audrey T. Gros, and F. G. Dollear (chairman); *(standing)* R. C. Stillman, Julius W. Dieckert, and R. T. O'Connor.

work of T. L. Ward and W. S. Singleton on the solubility of 1-monostearin in various solvents and her determinations with T. L. Ward and R. O. Feuge on the solubility of tristearin and hydrogenated cottonseed oil in certain aceto- and butyroglycerides. James G. Hamilton and Ralph T. Holman from the Hormel Institute, University of Minnesota, described a displacement chromatographic technique for the separation of mixtures of glycerides by adsorption on 1:2 mixtures of Darco G-60 and Hyflo Supercel columns. The influence of dietary fat on the glyceride structure of animal depot fat was the subject of a paper by Raymond Reiser and Julius W. Dieckert, from Texas A. & M. College.

Two papers each were devoted to oxidation and hydrogenation studies of fats and oils. D. H. Saunders described further work on the reactions of fatty materials with oxygen at the Eastern Regional Research Laboratory, showing the relation of hydroperoxide and chemical peroxide content to total oxygen absorbed in autoxidation of methyl oleate. K. T. Zilch reported on the continuance of the Northern Regional Research Laboratory's work on the analysis of fat acid oxidation products by countercurrent distribution methods. The low temperature decomposition of methyl linoleate hydroperoxide was studied by chemical and by infrared and ultraviolet spectral analyses of successive liquid-liquid extraction fractions.

NORTHERN Regional Research Laboratory's E. B. Lancaster also reported on the effect of agitation on the selectivity in the hydrogenation of soybean oil. Isomerization during hydrogenation was the subject of the second paper on hydrogenation. R. R. Allen and A. A. Kiess from Armour and Company found, in their experiments on the hydrogenation of oleic acid, that the amount of position isomers was proportional to the extent of hydrogenation until the ratio of the isomeric D^8 or D^{10} oleic acids to the D^9 oleic acid was almost one. The amount of geometrical isomers was found to be proportional to the amount of positional isomers, indicating that the two isomerization reactions are related.

A new approach to the old, but important problem of removal of gossypol and prevention of color reversion in cottonseed oils was presented by another group from the Southern Regional Research Laboratory. J. M. Dechary, R. P. Kupperman, F. H. Thurber, and R. T. O'Connor explained the use of p-aminobenzoic acid in removing gossypol as the insoluble di-p-carboxyanilinogossypol. Use of the chemical in laboratory experiments produced very light color oils and prevented color reversion. While probably not industrially feasible because of cost of the reagent, the use of p-amino-benzoic acid illustrated the chemical removal of gossypol early in the processing of the oil. J. M. Magner from Monsanto Chemical Company described the effect of insecticidal treatment with Schradan (Octamethylpyrophosphoramide) upon products produced from cottonseed. Residual insecticide was shown to be completely removed from the oil during refining. The effect of polyunsaturation in hot dip tinning oils was outlined by W. L. Kubie and E. E. Werle from Darling and Company.

Studies of synthetic detergents were reported by Peter V. Vitale, Colgate-Palmolive Company, and by J. K. Weil from the Eastern Regional Research Laboratory. Peter Vitale described the effect of electrolytes on soil redeposition in laboratory and laundry practice, and J. K. Weil explained the preparation of synthetic detergents from animal fats by the sulfation of tallow alcohols.

The technical papers were presented during one afternoon and two mornings, requiring concurrent meetings to accommodate the six sessions. This arrangement afforded time for business sessions, committee meetings, and golfing and other activities of the Society. Concurrent sessions meant however that interest had to be divided between two groups at all times. Despite this fact the excellent attendance at all technical sessions bears testimony to the general interest in the excellent technical program arranged by the San Antonio Committee. For the most part the sessions were unhurried, and full advantage was taken of the opportunity for technical discussions immediately following the presentation of individual papers. Most of the papers presented at the technical sessions will appear in full in future issues of the Journal.

R. T. O'CONNOR
assisted by
W. A. PONS JR., and
A. V. GRACI JR.

Eleven new organic chemicals, including the hydrocarbon, squalene, have just been added to the list of more than 3,500 Eastman organic chemicals offered by DISTILLATION PRODUCTS INDUSTRIES, Eastman organic chemicals department, Rochester 3, N. Y. Squalene is distilled by DPI from the liver oil of the basking shark, a plankton-eating species of which individuals more than 30 feet long have been taken.