JOURNAL STAFF AT THE FALL MEETING

Among the new Journal groups are the book reviewers, some of whom may be seen above: H. T. Spannuth, Wilson and Company, Chicago; Fred A. Kummerow, Kansas State College, Manhattan; R. J. Vander Wal, Armour and Company, Chicago; with the Journal editor, H. L. Roschen. Other reviewers are M. H. Gwynn, Mountain Lakes, N. J.; R. P. Hutchins, French Oil Mill Machinery Company, Piqua, O.; Morris Mattikow, Refining uninc., New York City; F. A. Norris, Swift and Company, Chicago; Daniel Swern, Eastern Regional Research Laboratory, Philadelphia; and H. M. Teeter, Northern Regional Research Laboratory, Peoria.

Among the leading spirits of the Advertising Committee are (left to right, seated) W. Doss Lumpkin, Filtrol Corporation, Los Angeles; R. H. Potts, Armour and Company, Chicago; Norman L. Ruston, Emery Industries inc., Cincinnati, chairman; and Henry Odeen, Bennett-Clark Company inc., Nacogdoches, Tex., and H. Odeen Company, Memphis. Backing them up literally and figuratively are J. J. Vollertsen, Society treasurer; C. P. Long, first vice president; and H. L. Roschen, secretary. Other members of the Advertising Committee are Harvey C. Bennett, Los Angeles Soap Company; E. H. Chapin, Foster Wheeler Corporation, New York City; H. C. Dormitzer, Wilson and Company, Chicago; A. G. Hovey, General Mills inc., Minneapolis; H. H. Mueller, Lever Brothers Company, Cambridge, Mass.; and Procter Thomson, Procter and Gamble Company, Cincinnati.

In addition to the Journal committees pictured on these pages there are two other groups: Editorial Advisory Board, comprised of members of the American Oil Chemists' Society who are available as manuscript reviewers, and the Journal Committee, which is responsible for all matters pertaining to the publication of the magazine. Chairman of the latter since 1937 is H. L. Roschen, Swift and Company, Chicago.

Processing Problems, Drying Oils Receive Emphasis at Fall Meeting

MANY practical and theoretical points of interest discussed in the 36 papers presented at the 21st fall meeting of the American Oil Chemists Society drew unusually large attendance at the technical sessions. The presence of nickel in hydrogenated soaps used for synthetic rubber manufacture was shown to decrease significantly the extent of polymerization. The biological synthesis of arachidonic acid from isooleic acid containing deuterium was described. Heptenal, a possible oxidation product of conjugated octadecatrienoic acid, has been isolated from reverted soybean oil; this compound had the odor and flavor characteristic of the reverted oil. An entire session devoted to processing problems revealed that partially hydrogenated linseed oil has greatly decreased yellowing properties when formulated into alkyds; hydrogen from dissociated ammonia is economical and practical for catalytic hydrogenations; solvent extraction of cottonseed was reported to be efficient and here to stay; and continuous fat splitting has many advantages over the older batch procedures.

Processing Problems

B. A. Brice (1) has found that nickel in the soap used for synthetic rubber manufacture will decrease polymerization by 1% for each 12 parts per million of nickel. Quantitative colorimetric analyses of soaps collected under the Soap Development Program of the Rubber Reserve Company established a range of 0.0 to 104 parts per million of nickel. A. Van de Erve (2) described a hydrogenation method which uses dissociated ammonia as the hydrogenation gas. The process consists of (1) conversion of liquid ammonia to gaseous ammonia, (2) cracking the gas at high temperature and low pressure in the presence of a nickel catalyst, (3) removal of the 0.05% residual ammonia, (4) compression of the mixed gases, and (5) hydrogenation of the fatty material. There was no poisoning of the nickel catalyst and hydrogenation rates and gas consumption were very close to those of steam-iron hydrogen. A. C. Brown (3) showed that the Colgate-Emery continuous countercurrent fat-splitting process has a material saving of steam and catalyst over the old Twitchell method. Fat and water react countercurrently in a vertical tower at 725 psi and 500° F. to give a splitting efficiency of 98%.

Following this paper, H. H. Mueller (4) described how, during the Twitchell splitting of coconut oil, mono- and diglycerides rose rapidly to 7 and 19%, respectively, and then gradually decreased to zero. Confirmation was given for possible advantages of the continuous process. Partial hydrogenation of linseed oil by a continuous process using a series of Votators was described by J. S. Long (5). Very little selectivity was shown between linolenic and linoleic acid radicals, but significant selectivity was observed between oleic and the more unsaturated acid radicals. All the hydrogenated linseed oils tested in both clear and pigmented alkyds displayed superior non-yellowing characteristics over the original oil and in many cases over those of soybean oil.

The effects of processing on the flavor stability of soybean oil was reviewed by J. C. Cowan (6). No significant difference was noted between pressed and extracted oils; steam stripping to remove solvent from extracted oils often decreased quality. Once-degummed oil has a greater stability than oil which has been water washed more often. Laboratory deodorized oils are more stable than commercial oils. Since the effects of addition of citric acid and sorbitol during deodorization vary with the equipment, these materials may act as metal scavengers. M. Mattikow (7) described the Ewing process of refining crude oils. When crude oils are mixed with liquid propane at 140° to 158° F. at about 350 psi, two layers are formed. The upper layer is light; most of the color bodies and phospholipids are concentrated in the lower phase. For example, crude corn oil containing 1.25% phospholipids was degummed with water to 0.18% phospholipids and by propane refining to 0.10% phospholipids.

C. W. Bilbe (8) said that solvent extraction of cottonseed has been put on a practical basis and is here to stay. There are six extraction plants now in operation, and conclusions reached thus far are that the oil is of prime grade with refining losses averaging about 7% and that there is a slightly better yield by cooking the meats prior to extraction. Fines and lint prob-

lems were the most troublesome, but he felt that they definitely can be overcome by using the proper equipment and practices.

Drying Oils

An interesting review of the wartime developments in this field was given by A. Schwarcman (9). When chinawood oil imports fell nearly to zero, replacements were necessary. Castor oil was dehydrated on a large scale. Methods for conjugating semidrying oils were developed. Substitution of higher alcohols such as pentaerythritol for the glycerine in drying oils was practiced. "Reinforced oils" in which the triglycerides are partially alcoholized with a polyhydric alcohol and the resulting mono-diglycerides are esterified with dibasic acids were produced. Catalysts, such as anthroquinone, were added to reduce drying times. Finally, a new type of oil which forms very hard films with improved water and alkali resistance, namely the dicyclopentadiene copolymers, is now on the market.

F. A. Kummerow (10) has shown that linoleic and alkali-conjugated linoleic acids do not oxidize in the same manner. These two acids were treated with oxygen at 90° C. During the initial stages of oxidation both absorbed oxygen rapidly, but in the nonconjugated system the oxygen was absorbed as a peroxide which was lost on prolonged oxidation. The conjugated system kept adding oxygen into the molecule with simultaneous loss of double bonds. The active methylene group seemed to be involved in the formation of peroxide oxygen. J. C. Cowan (11) described a polymer which is believed to be responsible for rapid gelation in polyamide formation. The adduct of methyl linoleate and maleic anhydride when reacted with ethylene diamine produces a gelling polymer having a molecular weight of about 950. The use and peculiarities of vegetable oils in the floor-covering industry were described by G. A. Hare (12).

Analytical Methods

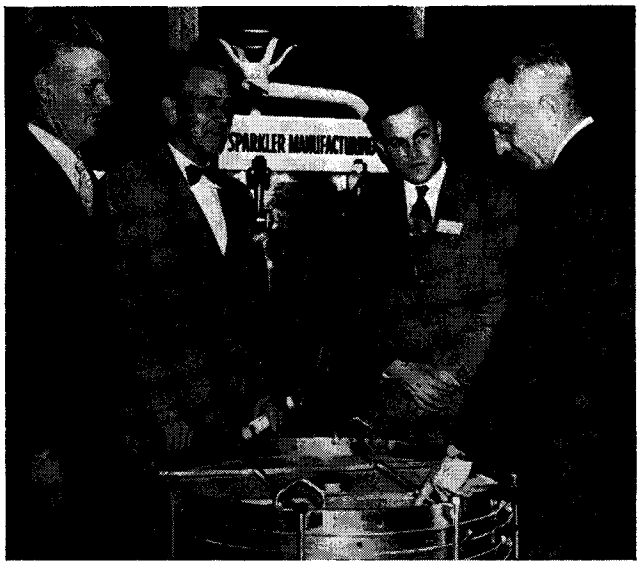
Several analytical studies reported at this meeting continue to enrich our fundamental knowledge of lipid chemistry. Methods of determining refining losses on crude cottonseed and soybean oils were compared by one of our past presidents, R. R. King (13). The Wesson procedures gave more reproducible results than did the cup method, and the Wesson losses were found to be closely indicative of the total neutral oil contents of crude oils. H. J. Dutton in two papers (14, 15) described the use of chromatographic adsorption analyses of soybean oil and ethyl esters. The oil was separated on an aluminum oxide column into fractions with iodine values ranging from 104 to 173. Still better fractionation was obtained on soybean oil ethyl esters. Synthetic mixtures of pure C_{18} ethyl esters could be separated quite readily by adsorption analysis. Even the oleate-linoleate mixture was separable. LeRoy Dugan, Jr. (16) made chromatographic separations of oxidized methyl linoleate on a special sodium aluminum silicate column. The most highly oxygenated substances were most strongly adsorbed. Primary oxidation products with exceedingly high peroxide values were isolated.

C. A. Snell (17) pointed out that the potentiometric method of titration given in A.S.T.M. specification D803-44T can be used for tall oil titrations. A pH value of 11 is taken as the end point for acid and saponification values while for rosin acid numbers there are end points at pH 6 and 11. R. L. Holmes (18) discussed studies on the refractive index and spectral dispersions (using the sodium D line and the mercury g line) of tung oil. Mixtures of tung and other oils can be analyzed accurately provided the refractive indices of the unmixed oils are known. Tung oil has the highest refractive index of any commercial vegetable oil. Heating lowers both the refractive index and the dispersion. Refractive indices were more closely related to diene numbers than to iodine values. W. R. Lewis (19) applied polarographic techniques to the investigation of fat peroxides. He found that oxidized lard had at least three different types of peroxides as indicated by three separate waves in the current-voltage curves. Also the curves for lard autoxidized at 40° C. and at 100° C. were very different, indicating the great complexity of the fat oxidation picture.

Fatty acids of the C-18 series were shown by I. M. Bernstein (20) to exist as dimers, probably through hydrogen bonding, when cryoscopic determinations of molecular weights were made in benzene or in cyclohexane. However, as the freezing point of the solvent was increased to that of d-camphor and borneol the fatty acids became monomeric. A mixture of monomers and dimers existed in solvents with freezing points at intermediate temperatures. H. A. Schuette (21) described solidification point diagrams of ternary systems in the saturated fatty acid series. The diagrams may find application in the analysis of unknown mixtures of fatty acids provided their identities are known beforehand. Francis Scofield (22) illustrated the use of a tristimulus system for the measurement of transmitted colors. Preliminary results indicate that the system shows promise but might be difficult to handle. He suggested ways of developing the method for recording colors of oils, varnishes, and resins.

E. Handschumacher (23) described a technique for testing the reversion properties of soybean oils. Unknown samples of fat were compared with controls which consisted of graded amounts of reverted hydrogenated soybean oil in cottonseed oil. R. P. Cox (24) discussed the application of ultraviolet spectrophotometric techniques to a study of drying oil films. Films at different ages were dissolved in a 10% solution of potassium hydroxide in methanol, and their spectral curves were determined. The rate of conjugation of double bonds in the oil was greater than destruction of conjugation during the first five hours of drying. The reverse was true in subsequent aging. Weather resistance of films and the amount of light absorbed between 320 and 400 mμ were closely correlated.

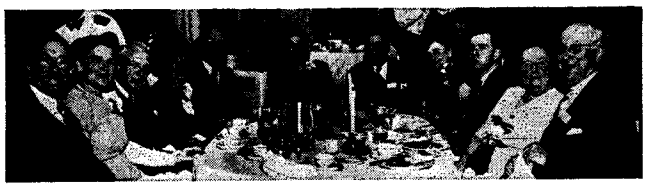
This shot was intended to be taken of the abstracts staff for the Journal, but since M. M. Piskur of Swift and Company, Chicago, was the only one on hand (center), he was flanked by A. R. Baldwin (left), Corn Products Refining Company, Argo, Ill., and B. W. Beadle (right), American Meat Institute, of the Journal Committee. The missing two are Miss Lenore M. Petchaft and the Armour Soap Works, Chicago, and H. M. Teeter, Northern Regional Research Laboratory, Peoria, Ill.



Visitors at the Sparkler Manufacturing Company booth are (left to right) A. B. Mills and Harley L. Ward of the Journal advertising staff and R. E. Shields and W. J. Kracklauer of the Sparkler staff.

IN THE MARINE DINING ROOM

Several first ladies are to be seen at this table: Mrs. R. T. Milner, wife of the 1947 president of the American Oil Chemists' Society; Mrs. R. H. Fash, wife of the 1926 president; and Mrs. Lamar M. Kishlar, wife of the 1943 president. Left to right, the guests are Mrs. and Dr. Milner, Peoria; Mrs. and Mr. W. H. Goss, Minneapolis; Mr. and Mrs. Fash, Fort Worth; and Mr. and Mrs. Kishlar, St. Louis.



One of the familiar groupings at Society affairs is found at this table: (left to right) Mr. and Mrs. J. J. Ganucheau, New Orleans; J. J. Vollertsen, Chicago; Mrs. H. S. Mitchell and Mr. Mitchell, Chicago; Mrs. Vollertsen; G. W. Agee, Memphis; Mrs. J. P. Harris and James Harris, Chicago; Mrs. Agee; and Mr. Harris.

Among the intimate dinner parties in the famous dining room of the Edgewater Beach hotel is this group: (left to right) J. H. Kirby, Memphis; Mrs. and Mr. A. A. Robinson, Chicago; Mrs. Kirby; B. L. Sternberg, Chicago; Henry Odeen, Nacogdoches, Tex., and Memphis; Mrs. Sternberg; and Mrs. Odeen.

Relaxing from the heavy cares of convention are Mr. and Mrs. C. E. Morris, hotel and ladies' chairmen, respectively, and with them are a number of friends: (left to right) Mrs. Morris, Chicago; K. H. Bedell, Chicago; Mrs. Ralph Potts, Chicago; E. H. Chapin, New York City; Mrs. W. R. Prosch, Chicago; Mr. Morris; Mrs. Chapin; Mr. Potts; and Mrs. Bedell.

General

The biological synthesis of arachidonic acid by white rats was reported by Henry Sherman (25). The rats, which were fed casein, starch, salt mixture, triolein, and tri-dideuterioisoolein, deposited in the tissues arachidonic acid which contained deuterium. L. J. Filer, Jr. (26) has found that when part of the milk fat in normal infant feeding is replaced by meat fat there is no appreciable lowering of fat digestibility. The meat fat (3 to 25% of the fat ingested by the infant) was supplied in the form of a commercially prepared strained meat consisting of beef, veal, pork, and lamb.

B. F. Daubert (27) reported the isolation of compounds contributing to the reversion flavor of soybean oil. These "reversion compounds" were recovered from the oil by high vacuum steam distillation. About 30% of the distillate consisted of carbonyl compounds which, when added to freshly deodorized oil, made it taste strongly reverted. One of the products was characterized as being heptenal. It is possible that this could be formed by oxidative rupture of conjugated octadecatrienoic (conjugated linoleic) acid. A. W. Schwab (28) described an all-glass laboratory deodorizer which permits simultaneous deodorization of four samples under nearly identical conditions. It was pointed out that much shorter deodorization times than are now used commercially for soybean oil may be possible as far as flavor stability is concerned.

Cottonseed is continuing to yield possible products of commercial application. L. E. Castillon (29) told how purified gossypol can be prepared by extraction of pigment glands (obtained by the gland flotation process) with acetone followed by precipitation of gossypol-acetic acid from the extract. J. C. Arthur, Jr. (30) discussed the preparation of concentrated cottonseed protein dispersions. These, when extruded into an acid-salt bath, coagulate into filaments which can be stretched 300% in the wet state.

Certain forms of sodium carboxymethyl cellulose were shown by T. H. Vaughn (31) to be highly effective as synthetic detergent promoters. They act in some degree as water softeners by protecting the detergents against hard water cations. For example, a sodium alkyl aryl sulfonate detergent combined with the proper proportions of sodium carboxymethyl cellulose in as high as 15 gr. water exhibits detergent properties superior to those of the synthetic detergent alone in distilled water.

K. S. Murti (32) reported on the compositions of several rice bran oils grown in Arkansas and Texas. The results showed 0.8 to 1.6% linolenic acid, 30 to 33% linoleic acid, 45 to 54% oleic acid, 10 to 17% saturated acids, and 3 to 6% unsaponifiable matter.

A study of the mechanism of synergistic action of ascorbic and phosphoric acids with α-tocopherol in lard was made by O. S. Privett (33). Phosphoric acid reduced the preformed peroxides of lard and formed a lipid-soluble complex. Alpha tocopherol exhibited a protective action on ascorbic acid and tended to prolong the period of effectiveness of phosphoric acid. The evidence indicates that α-tocopherol is oxidized primarily by a highly unstable peroxide and the function of the synergist is to impede this oxidation through a competitive reaction.

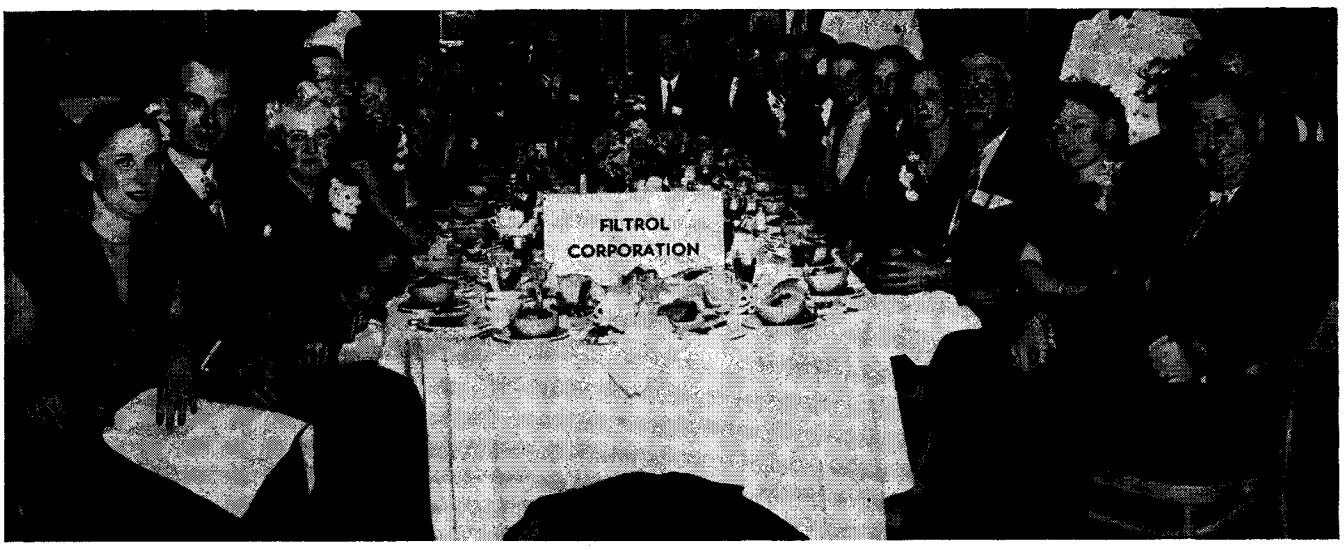
Two more review-type of papers were presented. W. K. Hilty (34) described the technical application of soybean lecithin. Its unique surface active and antioxidant properties make it a valuable component of many food and industrial products. Daniel Swern (35) gave an excellent review of recent advances in the mechanism of oxidation of fatty materials.

Foster Dee Snell (36) reported on the recent meeting of the Fat and Oil Commission of the International Union of Chemistry in Paris. This commission which adopts analytical methods of international standing resumed its activities this year after a break of nine years. Four sessions were held to discuss collaborative work on determinations of moisture, free alkali and carbonate in soaps, rosin soaps, soluble and insoluble fatty acids, sterols, thiocyanate index, and peroxides. Although language and other barriers hampered the work, definite progress was made. A United States Fat and Oil Commission has been established to cooperate with the Commission of the International Union in which the United States now has three full representatives instead of the one alternate which it had in Paris. The next meeting of the Union will be held in Amsterdam in 1948.

REFERENCES

1. B. A. Brice, Margaret L. Swain, L. O. Willits, and W. C. Ault. Relationship between Nickel Content of Soap and Conversion to Polymer in GR-S Manufacture.

2. A. Van de Erve, W. A. Jacob, and R. W. Bates. Use of Dissociated Ammonia for Hydrogenation.



Largest among the special dinner parties at the October 21, 1947, banquet of the American Oil Chemists' Society was the one arranged by Mr. and Mrs. W. Doss Lumpkin of Okmulgee, Okla. Left to right, beginning on the left hand side of the table, with Mrs. Lumpkin, their guests are R. T. Doughtie, Jr., Memphis; Mrs. and Mr. M. M. Durkee and their daughter, Miss Jean Durkee, Decatur, Ill.; Forrest Hunter, Chicago; Mrs. S. O. Sorensen, Minneapolis; R. B. Muller, Chicago; Harry E. Corman, Toronto; Mr. Sorensen; M. A. Partridge and R. A. Burt, Toronto; R. R. King, Sherman, Tex.; Dr. and Mrs. H. C. Black, Chicago; N. W. Ziels, Edgewater, N. J.; Mrs. Muller; Mr. and Mrs. E. W. Colt, Chicago; E. M. James, Cambridge, Mass.; and Mrs. A. D. Rich, Altadena, Calif. Mr. Lumpkin is in the right foreground.

3. H. L. Barneby and A. C. Brown. Continuous Fat Splitting Plants Using the Colgate-Emery Process.
4. H. H. Mueller and E. K. Holt. Changes in Composition of the Fatty Phase During the Twitchell Splitting of Coconut Oil.
5. J. S. Long, F. G. Smith. Partial Hydrogenation of Linseed Oil by a Continuous Process.
6. J. C. Cowan. The Flavor Problem of Soybean Oil. IV. Some Observations on the Effect of Processing and Refining Variables on Flavor Stability.
7. Morris Mattikow. Refining Fatty Oils in Solvents.
8. C. W. Bilbe. Solvent Extraction of Cottonseed. Six Months Later.
9. Alexander Schwarcman. The American Chemists' Wartime Contribution to Drying Oils.
10. F. A. Kummerow, M. Houston, and A. Jackson. Factors Which Affect the Stability of Highly Unsaturated Fatty Acids. I. Differences in the Oxidation of Linoleic and Alkali-Conjugated Linoleic Acid.
11. J. C. Cowan, H. M. Teeter, and M. J. Geerts. Polymerization of Drying Oils. III. Some Observations on the Reaction of Maleic Anhydride With Methyl Oleate and Monomeric Distillate.
12. G. A. O'Hare, Vegetable Drying Oils in the Floor Covering Industry.
13. R. R. King and F. W. Wharton. Comparison of Wesson Loss and Cup Refining Loss Analyses on Crude Cottonseed and Soybean Oils.
14. H. J. Dutton and Catherine L. Reinbold. Adsorption Analysis of Lipids. II. The Fractionation of Soybean Oil and Derived Ethyl Esters.
15. H. J. Dutton and Catherine L. Reinbold. Adsorption Analysis of Lipids. III. Synthetic Mixtures of Ethyl Stearate, Oleate, Linoleate, and Linolenate.
16. LeRoy Dugan, Jr., A. S. Henick, and B. W. Beadle. A Chromatographic Study of Autoxidized Methyl Linoleate.
17. C. A. Snell. Potentiometric Method for Determination of Acid, Saponification, and Rosin Acid Values of Tall Oil.
18. R. L. Holmes and F. C. Pack. Studies on the Refractive Index of American Tung Oil.
19. W. R. Lewis and F. W. Quackenbush. Polarographic Investigation of Fat Peroxides.
20. I. M. Bernstein. Comparative Cryoscopic Molecular Determinations of the C_{18} Fatty Acids in Various Solvents.
21. H. A. Schuette and J. G. Kane. Solidification Point Curves of Ternary Systems in Saturated Fatty Acid Series.
22. Francis Scofield. The Representation of the Color of Liquids in a Tristimulus System.
23. E. Handschumaker. A Technique for Testing the Reversion Properties of Hydrogenated Soybean Oil Shortenings.
24. R. P. Cox, M. J. Hendrickson, and J. C. Konen. Some Applications of Ultra-violet Spectrophotometry in Drying Oil Research.
25. Henry Sherman, Mary K. Nutter, W. J. Paterson, and R. S. Harris. Studies on Fatty Acid Metabolism by the Deuterium Technique. II. The Biological Synthesis of Arachidonic Acid.
26. L. J. Filer, Jr. The Digestibility of Fats by the Infant.
27. B. F. Daubert, C. J. Martin, and A. I. Schepartz. Isolation of Reversion Compounds From Soybean Oil.
28. A. W. Schwab and H. J. Dutton. The Flavor Problem of Soybean Oil. III. A Four-Sample, All-Glass Laboratory Deodorizer.
29. L. E. Castillon, C. M. Hall, and C. H. Boatner. Preparation of Purified Gossypol From Cottonseed Pigment Glands.
30. J. C. Arthur, Jr. and M. L. Karon. Preparation and Properties of Cottonseed Protein Dispersions.
31. T. H. Vaughn and C. E. Smith. The Effect of Sodium Carboxy Methyl Cellulose of Detergent Systems.
32. K. S. Murti and F. G. Dollear. Rice-Bran Oil. II. Composition of Oil Obtained by Solvent Extraction.
33. O. S. Privett and F. W. Quackenbush. Studies on the Mechanism of Synergistic Action.
34. W. K. Hilty. A Review of the Technical Applications of Soybean Lecithin.
35. Daniel Swern, J. T. Scanlan, and H. B. Knight. Mechanism of the Reactions of Oxygen With Fatty Materials. Advances From 1941 Through 1946.
36. F. D. Snell. Report of an American Representative on the Fat and Oil Commission of the International Union of Chemistry.

A. R. BALDWIN.

Research to improve the quality of peanut products and find new and wider uses for them, also research to enhance the flavor of soybean oil and to retain good flavor in such oil has been approved under the Research and Marketing Act of 1946, according to the United States Department of Agriculture. The former will be conducted at the Southern Regional Research Laboratory, New Orleans, and the latter at the Northern Regional Research Laboratory, Peoria, Ill.

Benjamin H. Thurman, vegetable oil consultant, addressed a recent meeting of the SHARPLES CORPORATION at the Sky-Top lodge in the Poconos on the "Theory, Practice and Advantages of Refining the Clayton Process," according to word from W. D. Lindsey, who reports that Mr. Thurman developed the soda ash process when he was with Refining Unincorporated.

In view of the increasing need in science and industry for accurate determinations of acidity the NATIONAL BUREAU OF STANDARDS, Washington, D. C., is recommending the universal adoption of a single standard pH scale analogous to the International Temperature Scale. It is proposed that the pH assigned to solutions of buffer substances distributed by the bureau as standard samples be taken as the fixed points on this standard scale.

The AMERICAN DAIRY SCIENCE ASSOCIATION will hold its 43rd annual convention at the University of Georgia on June 14-16, 1948. This is the first time that the association has met south of the University of Kentucky.

The newest process for the refining of fats and oils, the Solexol process announced in November, 1946, will be operated for the first time commercially by the Baltimore plant of Lever Brothers Company, It will be a tallow fractionating plant.

Plans have been completed for the second annual FOOD INDUSTRY EXPOSITION on the Atlantic City steel pier, January 18-21, 1948.