

SESSION A, MONDAY—Shown above are (seated) Hermann Birnbaum (left) and M. M. Renfrew; (standing, left to right) C. W. Hoerr, H. C. Black, presiding, and L. L. Linteris.

Three Symposia Mark New Orleans Program

THE TECHNICAL PROGRAM for the 48th annual meeting of the American Oil Chemists' Society was organized by Robert T. O'Connor, Southern Utilization Research and Development Division, and consisted of 60 papers presented at eight sessions. Presiding at the technical sessions were H. C. Black, H. L. E. Vix, A. E. MacGee, A. M. Altschul, J. J. Ganucheau, F. G. Dollear, J. J. Spadaro, and L. A. Goldblatt.

Three symposia highlighted the program. Record attendance at the symposium on "Fats in Nutrition and Health" marked the keen interest in this subject. C. G. King, professor of chemistry, Columbia University, and scientific director of the Nutrition Foundation, struck the keynote in stating that although there is wide interest in a possible relationship between fat intake and heart disease, as yet the specific cause-effect relationship is a matter of pure speculation and there is a tendency among laymen to attribute more blame to fats than the facts actually justify. Dr. King said that insurance statistics showed a greater incidence in heart disease among heavy smokers and persons with a history of heart disease in their families. All speakers in the symposium stressed the need for more basic research on metabolism of various nutrients, of which fat is only one. Dr. King noted that, as rapidly as reliable information becomes available to serve as a practical guide, industry can be relied upon to adjust to the new evidence. That industry is seeking this information is indicated by the fact that the food industries have already this year contributed \$750,000 to the Nutrition Foundation for research in nutrition.

The symposium on "Unit Processes and Operations" featured new developments in extraction processes for oilseeds, the refining and processing of vegetable oils, and the distillation of tall oil. R. H. Potts of Armour and Company stated that 10 stills, now built or being built, have a capacity of 300,000 tons of tall oil per year and will annually produce 200 million pounds of high purity fatty acids, chiefly oleic and linoleic. The rosin produced will be able to supply the demand resulting from the dwindling supply of wood rosin due to the depletion of aged stumps required for the production of wood rosin.

A symposium on "Safety," headed by A. Ernest MacGee of the Skelly Oil Company, stressed the need for maximum safety measures not only to reduce danger of fire but also to reduce accidents which kill or injure personnel.

DURING Technical Session A on Monday afternoon, at which nine papers were presented, Leonard Smith of the National Cotton Council pointed out that the consumption of soybean oil has increased since 1947 whereas that of cottonseed oil has decreased. He said that use of margarine has doubled in the past 10 years, from 746 million pounds in 1947 to 1.4 billion pounds in 1956. Malcolm M. Renfrew of Spencer Kellogg and Sons painted a bright picture for the future of drying oils. A most interesting development is modification with di-isocyanate to produce urethane oils with outstanding properties. R. E. Beal of USDA's Northern Utilization Research and Development Division reported on the pilot-plant production of edible safflower oils having A.O.M. peroxide values of the same

order as good commercial soybean salad oils. In his paper on "Crystalline Forms of Commercial Fats and Oils" C. W. Hoerr of Armour and Company pointed out that the crystalline forms of commercial fats and oils cannot be classified so categorically as can those of purified triglycerides. L. L. Linteris, Lever Brothers Company, reported that some stearines dissolved in liquid oil have been found effective as fluid shortening agents. S. A. Kaloyereas, Louisiana State University, stated that it is possible to determine the drought resistance of plants by analyzing for changes in chlorophyll, bound-water, or pentose contents. He also reported that the viability of plant seeds can be determined by analyzing for rancidity. Hermann Birnbaum of Hachmeister Inc. pointed out that although more than 1,000 emulsifiers are on the market today, only three are permitted by federal law to be ingredients of baking products. These are lecithin, monoglycerides, and a diacetyltartaric acid ester of monoglyceride. He suggested that emulsifiers produce softer baking products by changing moisture distribution in the dough so that more water complexes with the gluten, leaving less for starch complexing or crystallization.

During Session B nine papers were presented on new developments in oilseed extraction and crude oil degumming and refining. Five were concerned with cottonseed oil processing. A. M. Gavin, of W. J. Podbielniak Inc., discussed the theory of operation of the multistage, centrifugal contactor and its application in soy oil degumming and refining, and miscella refining. The economics of degumming of directly extracted cottonseed oil was presented by James K. Sikes of the Plains Cooperative Oil Mill. Inherent advantages of continuous miscella refining were emphasized. L. J. Molaison, Southern Utilization Research and Development Division, reported that slightly less crude oil and total neutral oil was obtained when alkali cooking was used in the preparation of cottonseed flakes for extraction as compared to water cooking and direct extraction. G. C. Cavanagh of Ranchers Cotton Oil reported on the use of soda ash in preparing cottonseed meats for extraction and emphasized the importance of low-temperature processing. Two papers from the Southern Utilization Research and Development Division on gossypol in cottonseed oil followed. Leah C. Berardi demonstrated that gossypol was probably the principal pigment responsible for the development of highly colored cottonseed oils. Vernon L. Frampton proposed a quinone-like structure for gossypol reaction products and reported the use of polyfunctional aliphatic amines to decolorize these oils. The evaluation of some amino hexose reductones used in aqueous media and in oil media was reported by C. D. Evans of the Northern Utilization Research and Development Division. L. K. Arnold presented two papers on alcoholic extraction of cottonseed on a pilot-plant scale. He reported that low-moisture, high-temperature, and high-alcohol concentration and a relatively long extraction period were required for satisfactory extraction. The value of ethyl alcohol as a solvent for oil seeds, particularly with regard to its use in countries such as India where petroleum solvents are expensive and difficult to obtain in quantity, was discussed.

In Session C, the symposium on safety, H. D. Fincher of Anderson Clayton, F. P. Parkin of Borden's Soya Processing, and Norm Witte of Central Soya, members of the Technical Safety Committee, reported on the activities of their subcommittees. Considerable progress was reported in the study of the new proposed standards for safe operation of solvent-extraction plants. Laboratory safety was reviewed by Harold Shultz, who presented slides showing the new and unusual laboratory of S. C. Johnson and Sons Inc. E. B. Rumble of the "Automatic" Sprinkler Corporation of America discussed the use of mechanically produced airfoams for control of sol-



SESSION B, MONDAY—Seated from left to right are H. L. E. Vix, presiding, Leah Castillon Berardi, L. J. Molaison; standing are L. K. Arnold, A. M. Gavin, V. L. Frampton, and C. D. Evans.



SAFETY SYMPOSIUM—Speakers in the front row are D. F. Starr (*left*), A. E. MacGee, presiding, and J. H. Brawner; in the second row are H. H. Schultz, J. F. Miller Jr., E. B. Rumble, Henry James, and J. E. (Ed) Miller.

vent fires. Henry James of Ralston Purina spoke on solvent-extraction-plant operating safety, and James H. Brawner of Southern Cotton Oil followed with comments on the increasing complexity of fire and health protection problems in vegetable-oil-processing plants. Dr. MacGee demonstrated by means of fire loss statistics that recent fire losses in solvent-extraction plants are slightly lower than fire losses in nonsolvent-extraction plants. James F. Miller of Esso Standard Oil Company talked on safety aspects of the unloading of extraction solvents. D. F. Starr of the V. D. Anderson Company presented the paper "Safety in the Solvent Pilot-Plant" by L. E. Matthews and J. W. Dunning, in the absence of both authors.

THE RECORD attendance at Session A on Tuesday morning, on the "Symposium on Fats in Nutrition and Health," attested to the wide interest in this subject. Dr. King stressed the importance of fats in the diet of the average individual and the need for basic research in many fields but recommended no dietary changes for the general public. Research suggested by Dr. King included the following: relation of fat intake to linoleic acid intake; amount of unsaturated fat required to lower cholesterol level and the relation of the amount of fat to protein intake necessary to maintain a normal cholesterol level; levels of vitamin B₆, choline, and amino acids necessary to prevent coronary diseases; fatty acid isomers and the position of the double bond in relation to cholesterol level; and effect of fats on the blood-clotting process.

Edward H. Ahrens, Rockefeller Institute Hospital, reported that the relationship between total cholesterol levels and fatty acid composition of dietary fats of patients fed certain rigidly controlled diets consisting of 15% protein, 40% fat, and 45% carbohydrate, can be expressed by a simple mathematical formula. He recommended that only in the case of coronary patients or patients with atherosclerosis should special diets be prescribed and recommended no dietary changes for the general public at present. The paper, "Progress in the Metabolism of Lipides," by Raymond Reiser, Texas Agricultural Experiment Station, given by J. W. Dieckert Jr., of the Southern Utilization



SYMPOSIUM ON FATS—Ladies first: Roslyn B. Alfin-Slater (*left*) and Grace Goldsmith, then A. M. Altschul, presiding, and R. L. Holman; back row: Daniel Melnick, E. H. Ahrens Jr., C. G. King, and J. K. Sikes, who spoke at another session.

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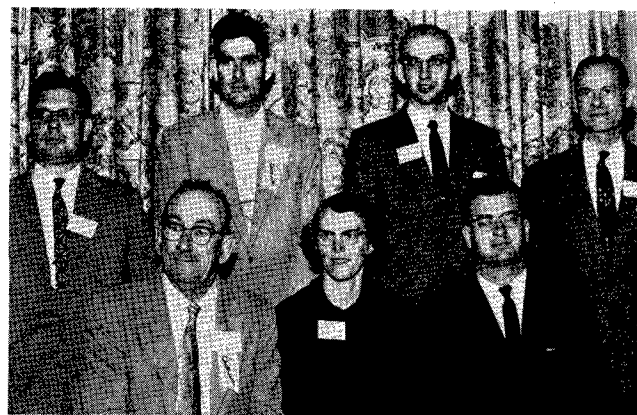
JOURNAL REPORTERS—Covering the technical sessions of the New Orleans spring meeting are (seated) L. A. Goldblatt, in charge, Ruth R. Benerito; (standing) C. L. Hoffpauir, D. A. Yeadon, and H. P. Dupuy. All are with the Southern Utilization Research and Development Division, U.S.D.A.

Research and Development Division, in the absence of the author, emphasized that advances along many lines are being made in our knowledge of the metabolism of lipides despite occasional apparent discrepancies. Roslyn B. Alfin-Slater, University of Southern California, in her paper, "Newer Concepts of the Role of Essential Fatty Acids," noted that abnormally high amounts of cholesterol and lipides were observed in the livers and adrenal cortex of rats deficient in essential fatty acids. Experimental evidence also indicated sex differences. Daniel Melnick of Best Foods Inc. spoke on the "Nutritional Quality of the Fats Absorbed by Commercially Fried Foods" and presented a summary of the results of a recently completed survey of the potato chip industry. This shows that the frying oils in use on a continuing commercial basis are free of polymers. Russell Holman, head of the Pathology Department, Louisiana State University Medical School, in his paper "Prevalence of Atheroma" in individuals from one to 40 years of age, reported the following conclusions: atheroma starts in childhood and progresses through many stages; heart attacks precipitated decades later may be of an entirely different origin; and atherosclerosis is built up over a long period of time. In her summary Grace Goldsmith of the Tulane University Medical School did a splendid job of bringing together the sometimes divergent views expressed by the various participants in the symposium. She noted that more questions have been raised than have been answered and that all speakers have stressed the need for additional research. Interest in the role of fats in human nutrition is widespread and reaches into many fields. Much research has yet to be performed to answer the many unsolved problems concerned with the relationship of dietary fat to changes in serum lipids, cholesterol contents, and blood coagulation times and the interrelation of other nutrients to the types and percentages of fats in the diet. At present there are many hypotheses, few facts, and much too much publicity in the lay press calling attention to the alarming danger of fats in the diet, she said. While medical advice advocates moderation in caloric and fat intake, it must be emphasized that a certain amount of fat is not only normally safe but is physiologically essential. Therefore no drastic changes in the reduction of percentages of fats in the normal diet are recommended now.

Ten papers were presented at Session B on Tuesday. D. F. Kuemmel of the Procter and Gamble Company reported they have devised a direct and quantitative procedure for the determination of the saturated, long-chain fatty acids having 16 carbon atoms or more. This method was stated to be applicable not only to natural fats and oils but also to partially hydrogenated products. According to Patricia Quinlin, also of Procter

and Gamble, they have devised a simple and straightforward procedure for the separation of mono-, di- and triglyceride components from monoglyceride concentrates. The glycerides are absorbed in a silica gel column and selectively eluted with benzene, ether-benzene mixture, and ether. The glycerine and free fatty acids are not eluted from the column. Endre Sipos of Central Soya Company Inc., in his paper on the "Correlation of Chromatographic Refining Loss Determinations with A.O.C.S. Cup Loss Method in Soybean Oil," pointed out that a good correlation exists between the Chromatographic Loss Method and the A.O.C.S. Cup Loss Method for degummed soybean oil samples analyzing above 1% chromatographic loss, but below 1% chromatographic loss this correlation is less accurate. He called for more collaborative work, including a review of the industry's present method for the determination of refining losses in soybean oil for trading purposes. C. E. Ireland of the A. E. Staley Manufacturing Company discussed spectrophotometric evaluation of the bleaching of soybean oil and noted that spectrophotometric evaluation is intrinsically well suited to this problem. E. N. Frankel of the Northern Utilization Research and Development Division described a modified method for the determination of tocopherol in oxidized fats. He suggested that the accepted view that tocopherol is completely destroyed in fats oxidized beyond the induction period needs reevaluation for vegetable oils. M. F. Stansbury, Southern Utilization Research and Development Division, reported results obtained from analysis of 99 acidulated cottonseed soapstocks. Most of the compositional characteristics of the soapstocks were quite variable and greatly dependent upon the processing history. A mechanically stirred and electrically heated apparatus for determination of the Wiley Melting Point and a disc rheometer applicable to measuring shortening flow-properties were described in two papers from the laboratories of Pillsbury Mills Inc. The advantages of a slurry storage system and the laboratory and pilot-plant work performed in designing a workable slurry storage system for light soda ash were described by J. H. McCracken of the Diamond Alkali Company. S. T. Bauer of Crosby Chemicals Inc. discussed factors contributing to the formation of unsaponifiable constituents in tall oil and their identification and determination.

NINE PAPERS were presented at Session A on Wednesday morning. Several of the papers dealt with problems associated with the elucidation of the role of fats in human nutrition. Joseph McLaughlin Jr. of the Walter Reed Army Institute of Research reported on the hemolytic activity of several unsaturated fatty acids and noted that, with the exception of linolenic acid, the hemolytic activity increased with increasing unsaturation. Linolenic acid was less hemolytic than oleic. Hans Kaunitz of Columbia University reported on the "Influence of Certain Vegetable Fractions on Growth and Weight Maintenance Requirements." Since short-chain, fatty acid triglycerides are known to have little tendency to enter body depot fats, the possibility of feeding such fats as a caloric source was investigated. The results indicated that the degree of unsaturation of the triglycerides as well as the chain length were important. A related paper entitled "Composition of Fecal Lipides of Rats Fed Diets Containing Polymers from Autoxidized Fats" was presented by D. H. Saunders of the Eastern Utilization Research and Development Division. Autoxidized fats were found to cause loss of weight and death in rats. When polymers isolated from autoxidized fats were fed to rats, there was an increase in the quantity of fecal lipides over those of rats on a comparable diet containing fresh lard. O. C. John-



TUESDAY'S TECHNICAL SESSION—In this group are J. J. Ganucheau (left), presiding, Patricia Quinlin, Endre Sipos; (second row) S. T. Bauer, M. F. Stansbury, D. F. Kuemmel, and C. E. Ireland.



SESSION A, WEDNESDAY—Speakers ranged round the rostrum, from left to right, are Hans Kaunitz, R. Reddy, J. M. Dechary, Ogden Johnson, Joseph McLaughlin Jr., F. G. Dollear, presiding, D. H. Saunders, and G. C. Potter.

son, University of Illinois, also reported on studies of the nutritional and physiological effects of thermally oxidized oils. He found that the nutritional loss of edible oils which had been thermally oxidized at 200° C. was more related to their linoleic acid content than to their total unsaturation. In another paper on the effect of methyl oleate or linoleate on the oxidation of methyl stearate at 180° C. Dr. Johnson reported that the presence of unsaturated esters increased the rate of breakdown of the stearate. Margaret G. Morehouse, University of Southern California, using palmitic acid -1-C₁₆ and stearic acid -1-C₁₈ found that the limiting factor in the digestion of fat was the ability of the mucosa to discharge the fat into the intestinal and thoracic lymph and not the rate of entrance of the labelled fat into the mucosa. J. M. Dechary, Southern Utilization Research and Development Division, reporting on the "Incorporation of Gossypol into the Eggs of Laying Hens Fed Gossypol Schiff Bases," found that gossypol anils derived from normal aliphatic amines produced eggs having little or no available gossypol. Eggs from birds fed a 0.5% level of bis (n-octadecyl-imino) gossypol were indistinguishable from normal ones. George C. Potter, Quaker Oats Company, in a study on the lipide changes during early stages of germination of oats, reported a tentative conclusion that carbohydrate-containing lipides are a possible metabolite for the oat seedling in the early stages of germination. R. Reddy, Texas Agricultural Experiment Station, in a study of the glyceride structure of swine depot fat, found that unsaturated acids predominate in the 1- and 3- positions and the saturated in the 2- position.



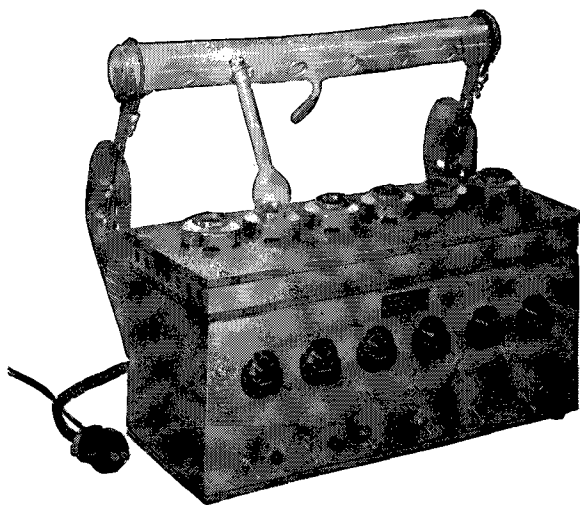
SESSION B, WEDNESDAY—J. J. Spadaro (left) presided at the session on unit processes and operations. At his left are R. H. Potts, E. M. James, and E. A. Gastrock.

Session B offered a small but powerful symposium on unit processes and operations. E. A. Gastrock, Southern Utilization Research and Development Division, reviewed present processing methods to show the more recent developments and changes that have occurred in the United States in the extraction of soybeans, cottonseed, flaxseed, peanuts, and minor oilseeds and stressed the need to improve, upgrade, and make more uniform the products of oil milling. These needs may impose upon the industry new requirements, such as the lowering of processing temperatures which have a profound effect upon all extraction processes.

A report of the purpose, methods, reactions, and equipment involved in the refining and bleaching of the principal vegetable oils processed for edible and industrial purposes was given by Edward M. James, past president of the Society. Possible future developments in refining were outlined. Brief descriptions of refining in miscella, which appears to have some promise for cottonseed oil, refining, and decolorization by liquid-liquid extraction with propane were given. Both of the above methods have the potential of eliminating bleaching clays entirely. R. H. Potts of Armour and Company pointed out that the separation of tall oil into rosin and fatty acids by fractional distillation is rapidly becoming the largest unit process of the fatty acid industry. Within a comparatively short time the amount of tall oil separated by distillation has reached an amount approximately equal to the total amount of fatty acid distilled from all other sources. He discussed problems com-

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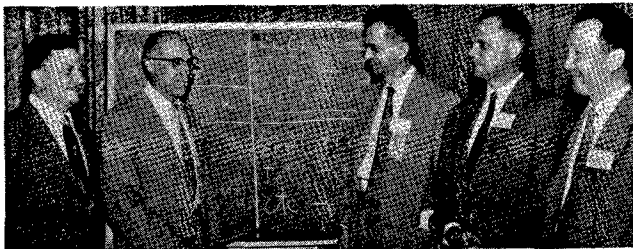


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SESSION C, WEDNESDAY—Against the blackboard are (left to right) R. G. Bistline Jr., D. H. Wheeler, L. A. Goldblatt, presiding, R. O. Feuge, and Huo-Ping Pan.

mon to all types of fatty acid distillations, with the major comments devoted to a comprehensive description of a tall oil still recently placed "on stream." The talk was illustrated with slides showing flow sheets, operating data, etc., as well as Kodachromes of the installation.

Five papers were presented at the concluding session, C. R. G. Bistline, Eastern Utilization Research and Development Division, described the properties of some sulfated, ethenoxylated tallow alcohols. The sulfated, tallow alcohol nonionics were more soluble than corresponding tallow, alcohol sulfates, with good metal ion stability and excellent lime soap dispersion. R. O. Feuge, Southern Utilization Research and Development Division, discussed the positional isomers formed during the hydrogenation of cottonseed oil under selective, normal, and nonselective conditions. He reported that changing the conditions of hydrogenation did not have a marked effect on the position of the residual double bonds though there was some influence. A spectrophotometric study of the *cis-trans* equilibrium of the eleostearate isomers was reported by D. H. Wheeler of the General Mills Research Laboratories. He found the equilibrium composition to be 66% beta eleostearate, 30% alpha eleostearate, and 3.2% punicate, with other isomers probably absent. He suggested the *cis-9-trans-11-cis-13-trienoic* structure for punicic acid instead of the *cis,cis,trans*-structure previously proposed. Huo-Ping Pan, Massachusetts Institute of Technology, reported on *trans* isomerization of oleic acid

and potassium oleate irradiated with cathode rays. *Trans*-isomerization was found to occur in samples irradiated at a high dose at a high level. The last paper, "The Effect of X-Radiation on the Unsaturated Fatty Acids of Liver Phosphatides and Erythrocytes" by Anthony Lamanna and Olive E. McElroy, Walter Reed Army Institute of Research, was given by Joseph McLaughlin Jr. in the absence of the authors. He reported that following radiation there was a slight decrease in the phosphatide content of liver and erythrocytes and an increase in whole blood. There was no significant change in the polyunsaturated fatty acids in liver phosphatides, but erythrocytes from irradiated rats showed a decrease in dienoic acids and a rise in tetraenoic and hexaenoic acids.

LEO A. GOLDBLATT

Report of the Membership Committee—1956

The following table indicates the growth in membership in the American Oil Chemists' Society during the fiscal year ending December 31, 1956.

	Hon.	Emer.	Active	Ind. Asso.	Corp. Asso.	Total
Membership 1/1/56	4	6	2,191	118	122	2,441
New Members			241	34	12	287
Renewals			5			5
Changes in classification		+4	-4			
			+2	-2		
Losses						
Resignations			69	7	4	80
Deaths			8			8
Nonpayment			82	11	5	98
Lack of address			1			1
Membership 12/31/56	4	10	2,275	132	125	2,546

Membership passed the 2,500 mark during the year. A fair number of new members came from the synthetic detergent industry.

The disheartening figures here are the losses caused by resignations and drops for nonpayment of dues. Many of these are due to members changing positions and feeling it is no longer an advantage to maintain membership.

Between January 1 and April 1 of this year 111 new members were added and 124 dropped for nonpayment of dues, leaving a net membership of 2,533 as of April 1. With reinstatements and applications since April 1, approved and in process, the total now is about 2,580.

Each year we have substantial losses by resignations and drops for nonpayment of dues. If these could be reduced, our growth would be much more substantial. Perhaps the rendition of better service to members by the Society would reduce losses of membership. We must carry out programs that result in demonstrable benefits to our industries, sciences, and members. The basic idea should be one of "what we do" rather than "what we are."

A growing membership indicates a thriving and progressing organization. There are limits to our growth, but we feel safe in predicting that we are not approaching them and that we will continue to show satisfactory growth.

The Society benefits from every new member. New thoughts and fresh approaches to old problems are helpful. This keeps us from going stale. At the same time each new member is a challenge to us to convince him that he belongs to a worthwhile group.

The committee appreciates the assistance from many members and the local sections. Your chairman thanks members of the committee and Mrs. Hawkins and her staff, who helped far beyond the routine handling of the many details of processing applications. We extend best wishes to our successors for better results.

J. T. R. ANDREWS	F. B. WHITE
R. T. DOUGHTIE JR.	R. W. BATES, <i>ex officio</i>
E. B. KESTER	H. C. BLACK, chairman
J. C. KONEN	

Ladies' Night

MISS MARYE DAHNKE, director, consumer service department, Kraft Foods Company, Chicago, Ill., was the speaker May 22, 1957 at the Builders club, Chicago, when the North Central Section of the American Oil Chemists' Society scheduled their annual Ladies' Night. Her topic was "Keys to Consumer Appeal in Merchandising New Food Items." Program chairman was L. R. Dugan, American Meat Institute Foundation.

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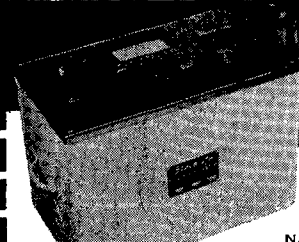
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