

Inside AOCS

AOCS pioneer programs

Smalley, uniform methods, referee chemists programs retain importance

"In the early 1920s, methods of analysis were still somewhat primitive. I recall that in the cup refining of cottonseed oil, the amount and strength of lye to be used was left to the discretion of the chemist—paving the way to considerable guesswork. And in the analysis of cottonseed, five grams were weighed, wrapped in a filter paper, placed on a brick on the floor, and hit with a hammer until all seed coats had been broken in order that the oil could be extracted. At that time, we were on the second floor and there was a barbershop directly underneath. We had some rumble from down below that when a straightedge razor was being used and the hammer came down hard, some customers were nicked."

—AOCS member Paul Cretien,
reminiscing in 1978 about the 1920s

At the turn of the century, the larger companies trading in cottonseed meal and oil maintained laboratories to test the quality of products they bought and sold as well as to handle internal quality control. Smaller cottonseed mills, however, could not afford such facilities. This prompted the establishment of several independent laboratories devoted mainly to testing cottonseed products.

The Interstate Cottonseed Crushers' Association's (now the National Cottonseed Products Association) first rule book, published in 1898, did not include any analytical methods or standards for prime oil or meal. By 1903, Interstate perceived a need for standards of analysis and appointed David Wesson of Southern Cotton Oil Company, James Boyce of the American Cotton Oil Company and R. B. Hulme of the Kentucky Refining Company, as a committee to prepare a standard laboratory refining test and "give any arbitration chemists pointers on how to refine oil to get the best results." However, this was a com-

mittee of refining chemists only, with members very secretive about their individual methods.

Interstate appointed a similar committee each year until 1909 when it set up its first Chemists' Committee to recommend official methods of analysis to the Rules Committee for use by Interstate's official chemists. The first such methods were published in the Interstate's rule book after 1910.

C. B. Cluff, in a May 1945 *Oil & Soap* article, said the committee's formation probably was prompted in part by five talks given at the 1909 Interstate meeting. These were: Suggestions for Promoting Accuracy in the Sampling and Analysis of Cottonseed Products, by E. L. Johnson; Effect of Moisture in Cottonseed Meal as Affecting Settlement on Basis of Analysis, by George O. Haskell; The Uniform Moisture Basis for Reporting Analytical Results, by E. R. Barrow; The Application of Analytical Chemistry to the Valuation of Cottonseed Products, by Felix Paquin; and Estimates of Cottonseed Hulls in Cottonseed Meal, by G. S. Fraps.

Original members on the 1909 committee were Felix Paquin, chairman; E. R. Barrow, R. C. Warren, F. N. Smalley and E. L. Johnson. In fact, these five were among the nine men who agreed to start a cotton oil chemists' organization, the Society of Cotton Products Analysts (today known as AOCS).

The Society of Cotton Products Analysts set up its own Uniform Methods Committee. First committee members were F. N. Smalley, E. R. Barrow, R. C. Warren, Thomas C. Law and G. Worthen Agee. Methods approved by the Uniform Methods Committee were usually adopted by Interstate's Rules Committee and published in Interstate's proceedings. According to Cluff, such methods often originated with a request by the Chemists'

Committee that the society investigate a specific point. The Uniform Methods Committee, which contained members of the Chemists' Committee, would then study a proposed method. Some of the early topics included moisture determination, standard tintometer glasses, fatty acids in soap-stock and refining.

From this starting point, AOCS' Official Methods—statistically validated methods for analyzing fats, oils and meals—developed over the years.

A key person in this work was Frank N. Smalley, chief chemist of the Southern Cotton Oil Company, a member of the Interstate's Chemists' Committee and a founder of AOCS. For a number of years, Smalley had prepared cottonseed meal samples weekly at his laboratory in Savannah, Georgia, and sent them to the firm's district laboratories. Those laboratories then analyzed the samples for ammonia and oil content, using methods specified by Smalley, and mailed their results back to Smalley. In this way, Smalley checked the analytical proficiency of Southern Cotton Oil Company's laboratories.

Some time after 1912, other commercial chemists, including G. Worthen Agee and Thomas Law (both founding members of AOCS), asked Smalley if they could participate to check the accuracy of their laboratories. By 1915, this arrangement evolved into a cooperative analytical program handled by the society's Uniform Methods Committee headed by Smalley.

Smalley oversaw this work until his death in 1921. During those years, the committee sent out cottonseed meal samples (40 each year), crude cottonseed oil for refining tests, oils for free fatty acid determination, and fertilizers. Approximately 35 chemists participated in these first programs.

Initially, results were published monthly with analysts' names.

At the 1918 annual meeting in New Orleans, the Governing Committee voted to award two silver cups, one for the best average in ammonia and the other for the best average in oil and fats. Following a suggestion by Smalley, the society in 1919 awarded another cup for the best average for the combined ammonia and fat determination. It was decided that the cup must be won three times for permanent possession.

During Smalley's work with the check sample program, a folder "Cooperative Analytical Program of the American Oil Chemists' Society" was sent to all participants. This covered the information needed by the collaborators including the methods to use, explanation of sample preparation and directions for reporting results. It contained the following section:

Methods of Calculating Accepted Averages

"In order to determine the degree of accuracy of any given analysis a standard must be

established, and this is done by calculating the accepted average of all obviously reasonably accurate results received in the following manner: All results with the exception of those obviously incorrect are averaged. All results which then do not differ from the average thus obtained by more than 10% are reaveraged and the value obtained known as A. All the values used above are then tabulated in an ascending numerical series and it is then determined which group of 10% differences contains the greatest number of values. The average of all the values in this selected group is then known as B. The average of A and B is the accepted value. If the sum of A and B is an uneven number, the average is drawn in favor of the B value."

In 1920, when the society formally changed its name to the American Oil Chemists' Society, provision was made for a new membership classification, that of active referee member. This category was introduced to provide commodity buyers and sellers with a list of proficient analytical chemists. That same month, Interstate amended its trading rules to provide that a chemist analyzing samples had to be a referee member of AOCS, as well as a member in good standing in Interstate, to receive official recognition for arbitration. Active referee members were required to pass an examination before the society's new Referee Examination Board (now the Examination Board). By this action, AOCS became the first organization in the U.S. to certify referee chemists.

Upon Smalley's death in 1921, Herbert S. Bailey, also with Southern Cotton Oil Company's laboratory in Savannah, took over supervision of the check meal work. In June 1922, this cooperative work was renamed the Smalley Foundation in honor of its founder. The program was placed in the hands of H. C. Moore, chairman of the ammonia committee, who was then with Armour Fertilizer Works in Chicago. The Refining Committee was put in charge of the crude oil work and some of the other cooperative work was discontinued.

In 1925, the AOCS appointed C. B. Cluff as chairman of a committee to publish a book of official methods. This was accomplished within three years. A second committee was appointed to review these methods and issue additions and revisions as needed. This function was later assumed by the Uniform Methods Committee. In the 1940s, V. C. Mehlenbacher, in cooperation with J. J. Vollertsen, then chairman of the Uniform Methods Committee, completely revamped the methods book.

In 1928 at the New Orleans convention, the society dropped a requirement that official referees be Interstate members and instead required candidates to have a four-year college

course in chemistry and three years' practical experience to obtain full referee certificates.

Currently, the National Cottonseed Products Association and National Soybean Processors Association require that anyone applying as an official chemist under their trading rules first qualify as an AOCS official referee chemist. The National Institute of Oilseed Processors (NIOF) certifies its official chemists on the basis of how well the applicants perform in the Smalley program. The National Renderers Association uses the trading rules of the American Fats and Oils Association Inc. whose standard contracts for tallow and vegetable oil specify that arbitration analysis be in accord with methods and by chemists approved by AOCS.

Today, all referee chemists certified by AOCS must qualify through the Smalley Check Sample Program. Originally, the AOCS Examination Board issued its own samples to applicants. In the 1930s, the National Cottonseed Products Association sponsored an elaborate series of check samples of seed and oil. When the NCPA program was discontinued, the Examination Board once again issued its own samples, but this was later discontinued in favor of using the Smalley Check Sample Program. Independent chemists—those who don't work for buyers or sellers of oilseeds or oilseed products—who do well enough in the Smalley Program may be certified as AOCS Official Referee Chemists if the labs where they work are properly equipped to perform AOCS analytical methods. In 1983-84, there are 79 certified AOCS official referee chemists.

More than two-thirds of the approximately 375 Smalley participants, however, are not independent chemists. They enroll in order to check their analytical proficiency. The accuracy of their day-to-day work can mean tens of thousands of dollars to their employers during the course of a year, and

thus it is important that they maintain their skill. Some laboratories may view the program as a "contest" because of the prestige that a first place certificate may provide.

Each year the Smalley Program distributes more than 7,200 samples of materials ranging from cottonseed to fish oil. Each chemist uses AOCS-specified methods to analyze the series of samples he has ordered, then reports his analysis back to the committee. After all results have been tabulated and averages determined by computer, each chemist receives a report showing how accurate his content analysis was compared to that of other participants.

Currently there are 22 series in the Smalley Check Sample Program. In addition to oilseed meals, cottonseed, cottonseed oil and soybean oil series, the committee conducts check series of samples covering peanuts, fish meal, edible fats, tallow and grease, sunflower, NIOF fats and oils, fatty acid composition by gas chromatography, cellulose yield on cotton linters, aflatoxins in cottonseed meal, soybeans, vegetable oil for color, drying oils, condensed fish solubles, safflower and rape, fish oil, aflatoxin in peanut meal, aflatoxin in corn meal and aflatoxin in milk.

The development and promulgation of methods is the responsibility of the Uniform Methods Committee, and this has been true since its founding. But whereas the first methods covered only a few cottonseed-related products, the current scope includes soybean, flaxseed, peanut, coconut, safflower and other commercial seed oils, as well as fish oils, animal fats and petroleum-based detergents. There are also methods for industrial oils and derivatives and by-products of oil production. The physical appearance of the methods book has changed as well. Originally a small, loose-leaf volume, methods became a small bound volume by 1944, but once again is in loose-leaf form, this

Monitoring referees

How to monitor referee laboratories certified by AOCS has been a concern of the society's leaders over the years. According to A. W. Putland in his 1929 president's address, something was done about this during his term:

"One of the outstanding features of the work accomplished, in my opinion, was the result of that performed by your Referee Board through whose efforts there was inaugurated the practice of submitting samples to Referee Laboratories for analyses. This was made possible through the generosity of a member of the Referee Board in furnishing samples. This plan should unquestionably have been carried out in previous years, but a lack of finances prevented this. Such check samples are without question of great value to the industry by serving to immediately direct the

attention of the Board to such laboratories whose results are out of line. The standing of the Referee Laboratories is also further strengthened by the practice. I feel that some permanent arrangement for the continuance of this practice should be provided by the Society. To promote a higher standard of ethics is one of the announced purposes of the Referee Board and of this Society. How far we have succeeded in the accomplishment of this purpose is well known to all of us. We have done a great deal, but we must continue our efforts, not only to hold the ground we have gained, but to promote an even higher standard. It is of little use to promulgate a formal code of ethics having no power to punish breaches of such a code."

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time in a larger size designed for easier use in the lab. In 1982, AOCS hired its first "director of methods development," a full-time staff position. The director is to work with appropriate AOCS committees to make sure the methods book is as complete and modern as possible.

The methods book contains official and tentative methods. All proposed methods are published as "tentative" for at least a year to provide opportunity for suggestions and revisions. If a tentative method is not raised to "official" status within four years, it is removed from the book.

These three interrelated AOCS programs—Official Methods, Smalley Check Sample Program and Official Referee Chemists—don't operate auto-

matically. Like other AOCS activities, they are run by members who voluntarily put in long hours for the benefit of the entire industry. Some firms prepare samples for analysis, provide mailing services or computer services—often at no charge to the programs.

Standardization of analytical methods was one of the main purposes of the society when it first formed. It continues to be an important function. And from the work on methodology has come a worldwide program for certifying independent analysts and a check sample program that permits hundreds of chemists to maintain their analytical proficiency.

Smalley, Doughtie Cup Winners

The Smalley Program awards two trophies each year for outstanding analysis work. The Smalley Award is presented for the best analysis in determination of moisture, oil and nitrogen oilseed meals. The Doughtie Award, formerly known as the Barrow-Agee Cup, is awarded for best analysis of cottonseed. Frank Smalley was the originator of AOCS' check sample program. Richard T. Doughtie was a long-time chairman for the Smalley Program. Edward R. Barrow and G. Worthen Agee were the third and fifth presidents, respectively, of the society and owners of the firm that today bears their names.

Year	Smalley	Year	Smalley	Year	Doughtie
1919	G.C. Hulbert	1952	Paul D. Cretien	1961	W.J. Miller
1920	G.C. Hulbert	1953	Paul D. Cretien	1962	Paul D. Cretien
1921	C.H. Cox	1954	M.A. Clark	1963	A.H. Grimes
1922	Battle Labs	1955	E.R. Hahn	1964	Paul D. Cretien
1923	Battle Labs	1956	J.R. Simpson	1965	Edward R. Hahn
1924	L.B. Forbes		H.L. Hutton	1966	Thomas J. Moore
1925	E.H. Tenent	1957	Biffle Owen	1967	A.C. McConnell
1926	Battle Labs	1958	A.G. Thompson	1968	Edward R. Hahn
1927	W.F. Hand	1959	E.R. Hahn	1969	Ronnie M. Fox
1928	E.H. Tenent		D.B. McIsaac	1970	Ronnie M. Fox
1929	George W. Gooch	1960	H.L. Hutton	1971	Edward R. Hahn
1930	Southwestern Labs	1961	Biffle Owen	1972	Edward R. Hahn
1931	W.F. Hand	1962	H.L. Hutton	1973	Robert H. Beeler
1932	J.N. Pless	1963	Biffle Owen	1974	Edward R. Hahn
1933	D.B. McIsaac	1964	W.N. Kesler	1975	Ronnie M. Fox
1934	W.F. Hand	1965	Edward R. Hahn	1976	Vera Pierce
1935	W.F. Hand	1966	W.D. Simpson	1977	Edward R. Hahn
1936	N.C. Hamner	1967	A.C. McConnell	1978	Ronnie M. Fox
1937	N.C. Hamner	1968	W.J. Johnson	1979	Ronnie M. Fox
1938	W.F. Hand	1969	W.J. Johnson	1980	Ronnie M. Fox
1939	W.F. Hand	1970	W.D. Simpson	1981	Ronnie M. Fox
1940	A.G. Thompson	1971	J.E. Williams	1982	Melba Rodgers
1941	Russell Haire	1972	James P. Minyard	1983	Ronnie M. Fox
1942	T.L. Rettger	1973	James P. Minyard		
1943	Barrow-Agee Labs	1974	Ronnie M. Fox		
1944	D.B. McIsaac	1975	Biffle Owen		
1945	W.W. Wynn, Jr.	1976	Horace J. Keith		
1946	Russel Haire	1977	Horace J. Keith		
	L.B. Forbes	1978	Vera Pierce		
1947	Russell Haire	1979	Ronnie M. Fox		
1948	D.B. McIssac	1980	Horace J. Keith		
	M.A. Clark	1981	Horace J. Keith		
1949	A.G. Thompson	1982	Horace J. Keith		
1950	D.B. McIsaac	1983	Horace J. Keith		
1951	Paul D. Cretien				

CALL FOR NOMINATIONS

AOCS OFFICERS

Nominations for officers of the AOCS to serve from May 1984 to May 1985 are now being considered by your Nominating and Election Committee. The Committee needs the assistance of all active members and emeritus members in selecting candidates for these offices.

In accordance with the AOCS by-laws, the Vice-President will be proposed without opposition for the office of President. The officers to be elected, along with the four most recent Past Presidents, will form the AOCS Governing Board. For your information the present AOCS officers are:

President T.H. Smouse
 Vice-President N. Pelick
 Secretary J. Beare-Rogers
 Treasurer W.H. Tallent
 Member-at-Large R. Hastert
 Member-at-Large T. Mounts
 Member-at-Large A. Gavin

You will find recent editions of *JAACS* and the AOCS Membership Directory useful in indicating the names of members who have served in the past and other who would prove to be of advantage to the AOCS and to the sciences if elected.

NOMINATING AND ELECTION COMMITTEE

K.T. Zilch
 R.R. Allen
 T.H. Applewhite
 T.A. Foglia
 E.W. Lusas

American Oil Chemists' Society 1984 Nomination Suggestion Blank

Suggest ONE CANDIDATE (only) for each office.

Do NOT sign this blank.

Enclose blank in any envelope, AFFIX YOUR SIGNATURE to the OUTSIDE of the envelope and mail to:

Nominating and Election Committee
 American Oil Chemists' Society
 508 South Sixth Street
 Champaign, Illinois 61820

MY SUGGESTION FOR CANDIDATES ARE:

Vice-President:

Secretary:

Treasurer:

Board Members at Large: (3 to be elected):

1. _____

2. _____

3. _____

Thanking you in advance for your assistance, we hope that you will be pleased with the resulting ballot.

Nominating and Election Committee

**PLEASE RETURN BY
 December 1, 1983**

**DO NOT FORGET TO AFFIX YOUR
 SIGNATURE TO THE ENVELOPE IN
 WHICH THIS BLANK IS SENT!**

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Southwest Section meets

Changes in regulations affecting net content of packages was the topic for the Southwest Section's first meeting of the season, held Sept. 21, 1983, in Downey, California.

Chip Kloos, manager of statistics for Hunt Wesson Foods Inc., was the speaker.

The section tentatively has scheduled meetings for Dec. 1, 1983; Jan. 26, March 22, and May 24, 1984. All dates are Thursdays.

Surfactants to be topic

"New Developments in Surfactants" will be the topic for consultant Colin A. Houston at a Nov. 8 meeting of the Northeast Section of the AOCS. Time and place were not available as of the mid-September deadline for this issue of *JAACS*.

The section has scheduled three other meetings during the current program year. On Tuesday, Feb. 14, Robert Hastert of Harshaw Chemical Co. is scheduled to speak on "Hydrogenation—A Tool, Not an Epitaph." A one-day symposium will be held during March on analytical methods; specific date and place will be announced. The annual guest night will be held Tuesday, May 8. The program will include installation of new officers and presentation of awards to students by Dr. Chi Tang Ho of Rutgers University.

Northeast Section officers for the current year include

Andrew Menasian of A. Gross and Co., president; Stephen Greenberg of Lipo Chemical, vice-president; M. Deborah Meiner of Best Foods, secretary; Martin Freeman of Stokely Van Camp Inc., treasurer; and five board of directors members: Mark Bieber, and John Hasman, both of Best Foods; Chi Tang Ho, Rutgers; Ann Metzner, Hoffmann-La Roche; and August M. Rossetto, L.A. Salomon & Bro. Inc.

70 at North Central

More than 70 people attended the North Central Section's first meeting of the season held September 20 in Elmwood Park, Illinois, with the American Association of Candy Technologists.

Speaker Lon Wilson of Durkee Foods outlined vegetable fat and oil usage in compound and confectionery coatings. Explaining the different ways in which vegetable fats can replace, extend or substitute for cocoa butter, Wilson said the industry needs a common name for these ingredients to eliminate confusion, particularly for consumers.

At the meeting, the section's immediate past president, Neil Widlak of Kraft Inc., turned the gavel over to current president Timothy Mounts of USDA's Northern Regional Research Center. Other section officers are Robert Regutti of Interstate Foods, vice-president and program chairman; Cathryn Stroh of Sargent and Lundy, secretary-treasurer; Gerald Szajer of Armak Co., house chairman and member at large; Arthur Schmitz, membership chairman, and Kenneth Locher of Kraft Inc., both members at large.

ALTON E. BAILEY AWARD

The North Central Section of AOCS is requesting written nominations from Society members for the 1984 Alton E. Bailey Award. The purpose of the Bailey Award is to recognize research and/or service in the field of fats and oils. The nomination should contain at least five pertinent references or contributions in the field of oils, fats, waxes, etc. Some of the past Bailey Award winners are: V.C. Mehlenbacher, 1959; R.H. Potts, 1960; J.C. Cowan, 1961; A.R. Baldwin, 1963; T.P. Hilditch, 1965; D. Swern, 1966; W.O. Lundberg, 1967; H.J. Dutton, 1968; H.S. Olcott, 1969; H.E. Carter, 1970; J.F. Mead, 1971; R.T. Holman, 1972; C.M. Gooding, 1973; S.S. Chang, 1974; W.M.

Cochran, 1975; Raymond Reiser, 1976; L.A. Goldblatt, 1977; O.S. Privett, 1978; R.O. Feuge, 1979; Frank Norris, 1980; Hans Kautz, 1981; Thomas Applewhite, 1982; and Robert R. Allen, 1983. Please send nominations to:

Neil Widlak
Bailey Award Chairman
Kraft Inc. R&D
801 Waukegan Rd.
Glenview, IL 60025

The deadline for nominations is **November 15, 1983**, and notification of the selection will appear in this journal. The presentation of the Bailey Award is scheduled for early 1984.

CALL FOR
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