The Association of Official Analytical Chemists (AOAC)

FRED J. BAUR, The Procter and Gamble Company, Winton Hill Technical Center, Cincinnati, Ohio 45224, and **LUTHER G. ENSMINGER,** AOAC, Box 540 Benjamin Franklin Station, Washington, D.C. 20044

ABSTRACT AND SUMMARY

The analytical methods adopted by the AOAC (Association of Official Analytical Chemists) are used by government agencies concerned with the analysis of fertilizers, foods, feeds, pesticides, drugs, cosmetics, hazardous substances, and other materials related to agriculture, health and welfare, and the environment. AOAC methods are also used by industry to check compliance of their products. The AOCS and AOAC have cooperated in the past in achieving common methodology for fatty acids, hydrocarbons and mineral oils, and monoglycerides. Present cooperative effort centers primarily in the mycotoxins area. The various methods adopted by the AOAC appear in the book, *Official Methods of Analysis,* which is published every five years with annual supplements. The 12th edition was published in January 1975. Industrial scientists cannot be full or active members but they can serve as associate members of the AOAC. Active membership is limited to government scientists. Industry can and should, however, participate in the activities of the AOAC—particularly in the key task of developing, testing, and validating methods of analysis. Uniform methodology should be the goal of all societies. The purpose of this paper is twofold: (a) to explain the structure, functions, and goals of the AOAC; and (b) to inform potential industrial representatives how they may participate in the Association's activities.

INTRODUCTION

The Association of Official Analytical Chemists, well known as the AOAC, is a professional organization of government scientists devoted to developing, testing, approving, and publishing methods for (a) the forensic sciences, and (b) the analysis of foods, fertilizers, feeds, pesticides, drugs, cosmetics, hazardous substances, colors, and other materials related to agricultural, environmental, and public health and welfare pursuits.

It is organized and operated exclusively for scientific and educational purposes with the primary aim being that of providing government agencies and other interested parties, including regulated industries, with reliable analytical methods. It does this via: (a) methods development, (b) methods testing and evaluation, (c) various publications, (d) sponsorship of technical meethings, (e) liaison with various societies such as the AOCS, and (f) maintenance of cooperative arrangements with other national and international associations and governmental bodies.

The methods adopted by the Association are the "official" methods for the food and drug industries. They are usually the methods of choice for regulatory agencies—federal, state and local; they are the ones with the greatest stature in legal situations; they are the most proven methods from a performance standpoint; and they are and should be used by the regulated industries.

Historically, the Association received its greatest support from the USDA prior to 1940 and since then from the Food and Drug Administration. The ultimate goal of the Association is to draw upon the entire scientific community interested in analytical methods for the needed funds, leadership, and technical contributions.

GOALS OF THE ASSOCIATION

The goals of the Association—all methods oriented—are to:

(a) secure, devise, test, and adopt uniform, precise, and accurate methods;
(b) promote uniformity and reliability of analytical results;
(c) encourage research related to agriculture and public health and to the regulatory control in these areas;
(d) provide opportunities for scientists to discuss matters of common interest;
(e) publish official and technical information related to methods development, adoption, and use;
(f) promote uniformity of analytical methods.

MEMBERSHIP OF THE ASSOCIATION

There are presently three classes of membership in the Association: active, associate, and honorary members. Active membership, at this time, is limited to government scientists engaged in analytical work in the fields of concern. A proposed constitutional change will permit ex-officio membership to be granted to individuals elected or appointed to an official position, such as a liaison officer, associate or general referee, or committee member, whereby no membership fee (if one is adopted in the future) will be required. Presently members of industry are associate members if they are serving the AOAC in an official capacity as noted above, and under the proposed change they will be associate members ex-officio without payment of dues. A proposed fourth new category is sustaining membership open to agencies of local, state, provincial, or national governments.

ORGANIZATIONAL STRUCTURE

The officers of the Association consist of a president, vice-president, executive director, executive secretary, and treasurer. The executive director has the responsibility for the general management of the Association and works closely with the Executive Committee which establishes the general policies of the Association and acts as the managing group for the corporation. The Executive Committee is comprised of the elected officers, the immediate past president, and three other active members elected at the annual meeting which is held in October in Washington, DC.

The president, with the concurrence of the Executive Committee, appoints the various liaison officers to other organizations and the various standing committees including the Committee on Recommendations for Official Methods.

The Committee on Recommendations for Official Methods is divided into seven subcommittees, each having the responsibility of reviewing the reports and subjects within their assigned technical areas and making appropriate recommendations to the Association. The seven subcommittees are Agriculture (A); Human Drugs (B); Foods I (C); Foods II (D); Pesticide Residues (E); Extraneous Materials and Microbiology (F); and Animal Drugs, Colors, and Forensic Sciences (G). Each subcommittee has general

referees assigned to it to handle the more clearly defined general technical areas. For example, Oils and Fats is a general referee assignment in Subcommittee C, Foods I.

The executive secretary, with concurrence of the president, appoints the general referees and the associate referees and coordinates their assignments and responsibilities. General referees and subcommittee members can be drawn only from active membership of the Association, i.e., from the ranks of government scientists. The general referees' main assignments are to (a) keep abreast of methodology in their assigned areas, (b) recruit and supervise associate referees, and (c) report on their activities to the subcommittee. Associate referees' main responsibilities are to select and test methods, including the running and reporting of collaborative studies to general referees. Associate referees can be drawn from nonmembers as well as eligible members–hence, from industry.

The associate referee topics now under the Oils and Fats area include Antioxidants; Chlorinated Aromatics in Fats, Oils, and Fatty Acids; Cyclopropene Fatty Acids; Determination of Lard-Beef Fat Mixtures; Emulsifiers; Fats and Fatty Acids; Gas Chromatography; Fish Oils in Other Oils and Fats; Lower Fatty Acids; Olive Oil and Other Oils in Olive Oil; Oxidized Fats; Spectrophotometric Methods; and Sterols and Tocopherols. Of these assignments, Cyclopropene Fatty Acids, Determination of Lard-Beef Fat Mixtures, and Olive Oil and Other Oils in Olive Oil are vacant.

Collaborators do the actual methods testing, including the running of samples furnished by the associate referees. At least six laboratories and 30 determinations must be involved in each collaborative study. This long-established system of validating a method is indeed second to none and is responsible for the worldwide acceptance, recognition, and use of the methods approved by the Association.

ADOPTION OF METHODS

The Association adopts methods at its annual October meeting by voting on recommendations in the subcommittee reports. The initial action on a new method is to adopt it as "official first action"; then after a period of satisfactory use and upon recommendation of the appropriate referee, the method may be adopted "official final action." Methods achieving either status are published in *Official Methods of Analysis* and must have undergone collaborative study. In special situations, a method may be accepted as "interim official first action"; an example from 1975 is "A Gas Chromatographic Method for Volatiles and Denaturants in Ethanol Solutions." Procedures which do not lend themselves to a collaborative study may be approved as procedures. An example is sampling.

The Association is considering a fifth category, that of "official proprietary methods" which are automated versions, usually of official methods. Adoption will be only after collaborative study.

ACCOMPLISHMENTS OF THE ASSOCIATION

The productivity of the Association is best measured by the number of methods adopted. This usually runs 50-60 per year with 47 adopted in 1975.

These methods are published in the well known *Official Methods of Analysis* which normally is published every five years. The last issue, the 12th edition, was issued in January 1975. It has 51 chapters and 1094 pages, including about 2000 methods. The Oils and Fats methods are presented in Chapter 28 which has 33 pages and a total of 49 methods. Methodology includes refractive index, melting point, iodine value, saponification number, peroxide value, fatty acid analyses, and chick edema factor. Consideration is being given to publishing portions of the book more frequently in order to keep pace with rapidly changing methodology. The initial successful action in this regard was the updating of Chapter 26 dealing with Mycotoxins.

The next best known publication of the AOAC is the *Journal of the Association of Official Analytical Chemists* (JAOAC). This journal is published bimonthly starting in January. The March issue is a key issue since it contains the reports from the annual meeting and the up-to-date listing of general and associate referee assignments. Analytical technical papers from any source, if suitable for publication, are considered contributed papers.

The third primary Association publication is the "Statistical Manual of the AOAC." Additional publications include "Handbook of the AOAC," "Style Manual of the AOAC," "Micro-Analytical Entomology for Food Sanitation Control," "FDA Bacteriological Analytical Manual (BAM)," "EPA Manual of Chemical Methods for Pesticides and Devices," "Principles of Regulatory Drug Analysis," "IR and UV Spectra of Some Compounds of Pharmaceutical Interest," "A Chemist's Guide to Regulatory Drug Analysis," "Natural Poisons," and "A Manual of Cosmetic Analysis."

Members of industry are encouraged to present papers at the annual meeting. In addition to this annual meeting in October, the Association has just recently inaugurated workshops and training conferences which, hopefully, will be held annually in locations throughout the country. The recently completed one in Denver in May 1976 drew 325 attendees who participated in work sessions on such subjects as Mycotoxins, High Pressure Liquid Chromatography, Filth Analyses, Electrochemistry, and others. The second spring workshop will be held in Cincinnati on May 4-6, 1977. For details about this program, contact John Feldman, Director, Laboratory Branch of the Cincinnati FDA District or Howard Moore of the Ohio Department of Agriculture, Consumer Analytical Laboratory, 9000 E. Main Street, Reynoldsburg, OH 43068. All meetings are open to the entire scientific community.

Some of the awards granted by the Association include the prestigious Harvey W. Wiley Award, student scholarships, and the Fellow awards (granted to active or associate members giving ten years of meritorious service).

AOCS PARTICIPATION

The cooperation between the AOAC and the AOCS suffered a setback with the untimely loss of Dr. R.T. O'Connor a few years ago. He was the official liaison representative from the AOCS to the AOAC, and he has not been replaced. Of the nine associate referees currently active in the fats and oils area, seven are AOCS members. Cooperation between the Associations in the past centered in the fatty acids, hydrocarbons, mineral oils, and monoglycerides areas. Present cooperation is largely in the mycotoxins area and is best represented by the Joint AOAC-AOCS-AACC Committee for these substances and their methodology. Cooperation should be greater! One does not need to be the member of any given society to be able to participate as an associate referee or a collaborator.

Present needs, in addition to associate referees for Cyclopropene Fatty Acids, Determination of Lard-Beef Fat Mixtures, and Olive Oil and Other Oils in Olive Oil areas, are for participants in collaborative studies on 9, 12 Di-cis Linoleic Acid (contact A.J. Sheppard, FDA, 200 C St., S.W., Washington, DC 20204) and Fatty Acid Analysis by Gas Chromatography, an international study (contact D. Firestone, FDA, WAshington, DC).

[Received April 24, 1976]