REVIEWS ON ANALYTICAL CHEMISTRY

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The volume is a collection of invited lectures presented at Euroanalysis IV, Helsinki/Espoo, 23–28 August, 1982.

It contains 16 chapters, beginning with H. A. Laitinens' survey, "The Development of Analytical Chemistry as a Scientific Discipline". His aim was to define the emergence of analytical chemistry as a science and he dates this to the year 1894, when W. Ostwald's book, "Die wissenschaftlichen Grundlagen der analytischen Chemie" was published. According to the author, the first revolution was brought into analytical chemistry by the introduction of scientific theories and physical-chemical principles, not by the development of instruments.

Today, analytical chemistry can be considered as the science of chemical characterization and of measurements giving information on materials over and above their traditional chemical composition.

In Chapter 2 the biography and scientific work of the famous Finnish chemist, Johan Gadolin, best known for his discovery of rare earths in the mineral gadolinite, are outlined and his mineral analyses are discussed by O. Mäkitie.

H. Egan ("Analytical Chemistry, the Analyst and Society") surveys the increasing role of analysis in modern life, e.g. commerce and trade, health and environment, crime detection and prevention. He characterizes the five basic types of analyst employed in industry in the United Kingdom: chemical analysts, special analysts, instrumental technologists, production analysts and instructors. The discussion that began in 1883 on "the desirability of uniform bases of analysis and the practicability of establishing an international agreement concerning them" is still a topical matter of debate today.

W. Pfannhauser ("The Responsibility of the Analytical Chemist amid the Conflicting Interest of Government, Industry and Consumer") outlines the difficult position of analysts who work in the cross-fire between different interest groups. He discusses the situation from the point of view of a food chemist, and illustrates the problems with selected examples, such as the mercury and selenium contents of food, polycyclic aromatic hydrocarbons and food flavouring,

Chapters 5, 6, 7, 14 and 15 deal with the current trends and developments relating to five instrumental techniques: Spark Source Mass Spectrometry (G. I. Ramendik), Secondary Ion Mass Spectrometry (SIMS) (A. Lodding), Inorganic Mass Spectrometry for Trace Analysis (I. Cornides), Minicomputer Coupled Infrared Spectroscopy (D. Hadzi) and Raman and Resonance Raman Spectroscopy (Pham V. Huong).

In Spark Source Mass Spectrometry, the need for more reliable quantitative data and the design of simple and cheap instrumentation is emphasized.

As concerns SIMS, the lowering of the elemental detection limit, the imaging of the element distribution on sample surfaces and the clarification of several artifacts of in-depth profiling are mentioned as recent advances.

In Inorganic Mass Spectrometry for Trace Analysis, an overview is presented of the traditional field of the method.

In Minicomputer Coupled Infrared Spectroscopy, a short survey is given of the ways in which the computer is used to improve the sensitivity of infrared spectroscopy.

Raman and Resonance Raman Spectroscopy is presented as a non-destructive analytical method suitable for the study of molecules and materials in any physical state. Besides the principles of the method, a wide range of applications in chemistry, physics, pharmacology, biology and materials science are discussed.

In Chapter 8 the authors (V. Simeonov and H. Malissa) discuss some ideas for the development of an ideographic information system for the description of analytical procedure. The authors regard the symbolic system as a mediator between the detailed description and sufficient preliminary information.

Future perspectives of the application of polarography and voltametry in process control – at present of very limited use – are outlined by Z. Kowalski – who emphasizes the conditions to be fulfilled for this purpose.

Problems of environmental analysis are dealt with in Chapters 10, 11, 12 and 16.

High-resolution Gas Chromatography (K. Ballschmiter) and Ion Chromatography (IC) (J. Slanina) are useful methods in different situations involving environmental analysis. With high-resolutions gas chromatography, the chemical inertness of the GC system is a strict requirement for trace analyses. With IC, the high-speed automated or computerized instrument seems to be an excellent tool for the analysis of large series of samples.

Trace Analysis and the Contamination Problem is the subject of E. Wäminen's paper, the problem arising in determinations of very low concentrations. The main factors affecting the accuracy turned out to be the purity of the reagents and the contamination from the laboratory and laboratory personnel.

Environmental Asbestos Analysis (P. G. Byrue) is a paper reviewing the current analytical techniques for the detection and monitoring of asbestos in ambient environments. The need to establish a standardized method with a comfortable threshold limit is demonstrated.

The subject of Chapter 9 (Arctic Automatic Analysis – by D. Dryssen) is based on the experiences of chemical analysis performed on board the Swedish icebreaker YMER. The aim was to obtain depth profiles for salinity and temperature, total alkalinity, carbonate and calcium, as well as the determination of very low concentrations of amino acids and halocarbons. The author hopes that the development of know-how in analytical chemistry will have an impact on the design of chemical measurements on icebreakers and ice camps.

The value of the contributions is enhanced by the numerous figures, tables and references.

The careful work of editing was undertaken by Prof. L. Niinistö.

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