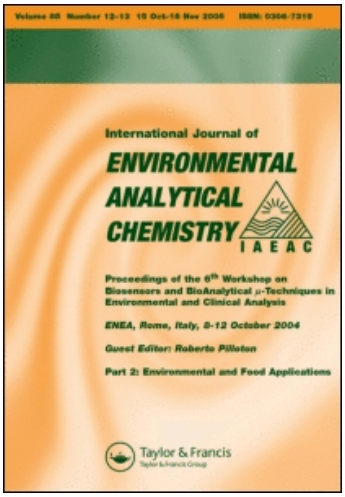

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Book Reviews

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Book Reviews

BIOCHEMICAL BASIS OF CHEMICAL CARCINOGENESIS, by Prof. Helmut Greim, GSF Neuherberg, Dr. Reinhard Jung, Hoechst AG, Prof. Martin Kramer, Hoechst AG, Prof. Hans Marquardt, Eppendorf-Hamburg, and Prof. Franz Oesch, Mainz, 307 pages (including a summary of 5 pages, 78 figures, 57 tables, up-to-date literature references after each chapter, and a subject index of 9 pages), linen, format 242 × 164 mm, ISBN 0-89004-961-0, Raven Press, New York (1984), US$ 68.50.

The proceedings present the results of the 13th Workshop Conference Hoechst organized 1982 (the 14th Workshop 1983 was related to Selectivity; a Goal for Synthetic Efficiency) in Grainau, Federal Republic of Germany, with the intention to get a better understanding of the biochemical processes that lead to carcinogenesis. The first part of the volume is related to specific carcinogens, the second half to promotion, enzymatic and hormone systems, interactions with DNA and with specific organs, and repair. Twelve papers from the U.S.A., 11 papers from the Federal Republic of Germany, 1 from Sweden and 1 from Switzerland inform about newest experimental facts about the behaviour of organic environmental chemicals, such as benzo(a)pyrene and its derivatives, nitroarenes (e.g. nitro-pyrene), aromatic amines (incl. acetylaminofluorene), stilbens (incl. diethylstilbestrol), N-nitrosamines, and aflatoxins. The various stages of chemical carcinogenesis are discussed. The first chapters begin with the the activation of chemicals to toxic electrophyllic metabolites (depending on the chemical structure of the compounds). The extent and the quality of activation, inactivation and sequestration depend on the phase I and phase II enzyme patterns (also interactions with P-450 protein systems, hormones, etc. are discussed), and may therefore vary according to systems (including humans), and even individuals. These differences have to be considered when experimenting with inbred strains.

It is shown, that initiation (binding of metabolites to DNA and other critical targets within cells) alone is probably not carcinogenic. Different metabolites generated from procarcinogens may influence different stages of carcinogenesis. Phenols may be metabolized by two enzyme systems. If one is saturated, non-linear dose-effect correlation (with decrease in tumour incidence) is possible. Persistence of lesions and status of cell proliferation may affect the inition process as well. Further progression of the process needs promotion. Tumour promoting agents have probably a threshold concentration or dose. They may for instance disturb membrane function or have other indirect effects. DNA bound to a carcinogen or an alkyl moiety may also undergo repair, but enzymatic activities may limit repair capacities. The findings are of major importance to all cancer researchers, toxicologists, molecular geneticists, environmental researchers, biochemists, and industrial hygienists.

To define the status of information on the mechanisms involved in chemical carcinogenesis three main topics are illustrated and discussed more in detail:

—The metabolic control of ultimate carcinogens with regard to activation, inactivation and sequestration
—The mechanisms of action of chemical carcinogenesis, and
—Adduct formation of ultimate carcinogens with DNA and repair.

It is shown that there is no commonly valid approach to evaluate the risk of chemical carcinogens. Because all the compounds discussed induce different, individual responses (in a few cases concentrations may be thresholded) as much information as possible on each chemical is required to provide a sound basis for extrapolation. This includes mechanisms in different organs (incl. the target organ), and transforming capabilities in different species. The proceedings thus illustrate what is needed for rational extrapolation of the high doses frquently used in animal experiments (feeding of rats with high concentrations of chemical compounds may become obsolete) to low doses of human exposure. It is also determined whether a linear dose-effect curve is to be anticipated or if a deviation from linearity can be suggested.

METAL CARCINOGENESIS TESTING, by Max Costa, Department of Pharmacology and Toxicology, University of Texas, Houston,

167 pages (including 29 tables, 38 figures, references added to each chapter, and a subject index of 3 pages referring to arsenic, beryllium, cadmium, chromium, cobalt, iron, lead, manganese, mercury, molybdenum, nickel, silver, selenium, tellurium, vanadium and zinc compounds), linen format 233 × 160 mm, ISBN 0-89603-017-2, The Humana Press Inc. Clifton, N. J. (1980), US$ 39.50 (in the U.S.A.), US$ 49.50 (outside U.S.A)

The useful volume consists of three parts:

I. Epidemiological studies, exposures, carcinogenesis in experimental animals (especially with arsenic, cadmium (less conclusive), chromium and nickel)
II. Mechanisms of metal carcinogenesis
III. Principles and methods of *in vitro* metal carcinogenesis testing,

Structured into 8 chapters. The author has tried to write an understandable laboratory handbook giving emphasis to the use of *in vitro* biochemical, bacterial, and tissue culture methods—particularly the latter—that have proved to be rapid, relatively inexpensive, and reproducible. Since understanding is needed of certain unique principles, and methodologies that differ from those applied to organic materials, the molecular mechanisms of metal-induced cancer are considered at each of the levels of human exposure, of animal studies, and of research *in vitro*. Because we are exposed both in the industrial work place and through environmental pollution, anyone who has interest in how, and which metals cause cancer—such as pharmacologists, toxicologists, epidemiologists, pathologists, industrial hygienists, biologists, and environmental scientists—finds useful information in this review. This is true especially for the area of detection of potentially carcinogenic metals and their compounds.

The author mentions that speciation, dose, exposure time, particle size of material, solubility properties, predisposition of individuals, anticarcinogenicity, etc. are critical parameters. Various exposure possibilities (atmospheric content, tobacco, water and food, medical exposure, etc. with valuable data in 15 tables) are discussed. Of further general interest are cellular uptake and localisation of metals (effects on nuclear DNA and RNA synthesis, most of the literature references are however relatively old). In studies in cell culture systems toxic and mutagenic effects, and morphological transformations (incl. phagocytosis) are considered. For *in vitro* testing

(including metabolic activation) advantages and disadvantages of biochemical assays, bacterial assays, and tissue culture assays are compared.

About 32 pages are devoted to techniques (including description of laboratory systems, and analysis of data). Another 16 pages deal with industrial metal carcinogenesis testing (incl. sampling and protocols, which should be followed). The author is however somewhat too optimistic when he says that using the data obtained from *in vitro* transformation studies—and taking into account possible accumulation in lung tissue—it is possible to predict safe levels of substances in the atmosphere of an industrial plant. In a new edition data should perhaps also be presented and critically compared in tables of effect levels e.g. LC_{50} values) observed in humans, in animals, and *in vitro* experiments of the not so many specific metal compounds under discussion, since M. Costa concludes with the sentence "Eventually the monitoring of carcinogenic hazards in industry by *in vitro* test systems and improvement of safety by controlling carcinogens produced will probably lead to a dramatic decrease in occupationally related cancer".

MAXIMUM CONCENTRATIONS AT TNE WORKPLACE AND BIOLOGICAL TOLERANCE VALUES FOR WORKING MATERIALS 1983, Report No. XIX of the DFG-Commission for the Investigation of Health Hazards of Chemical Compounds (Chairman: Prof. Dr. Dietrich Henschler, D-8700 Würzburg), 88 pages (incl. various tables, 3 pages with a list of changes as compared to Report No. XVIII (1982), and 8 pages of a list with the possible changes under discussion (with reasons, incl. literature references) for the Report No. XX (1984)), paperback, format 240 × 170 mm, ISBN 3-527-27330-1, Verlag Chemie, D-6940 Weinheim (1983), DM 20.00, US$ approx. 10.00.

For health protection it is necessary to be aware of the annually revised MAK values, which represent the maximum allowable concentrations of about 500 chemicals as gases, vapors, or particles in the air. According to the present knowledge, concentrations during a daily period of eight hours constituting an average work week of 40 hours) below these MAK values do not constitute health

hazards to healthy adults. The up-to-date information is structured into two chapters and seven subchapters:

—Maximum Concentrations at Workplace
—Significance and usage of MAK values
—List of compounds (incl. a list of substances for which MAK values must still be established)
—Carcinogenic working materials (incl. TRK List)
—Dusts
—Special working materials (organic peroxides, gasoline, pyrolysis products)
—Biological Tolerance Values for Working Materials
—Significance and usage of BAT values
—List of compounds.

The following far reaching changes and additions in the newest list may be mentioned: For the first time upper limits for short-time exposure are given in addition to the 8-hour average values. The chapter "dusts" has been completely revised and the MAK value for "inert dust" replaced by a newly defined "general dust limiting value". Also, CAS registry numbers are given for the first time for all compounds listed. Among the specific changes the much lower values for triethylamine and xylene should be noted. Antimony trioxide is now rated as "unmistakably carcinogenic in animal experimentation". Aniline, monochlorodifluormethane, trimethylphosphate and others are "justifiably suspected of having carcinogenic potential". For instance cadmium and organic mercury are now also included into the BAT List. One can also learn that for some metals and their compounds bioavailability and solubility are examined to extrapolate dependence on them to carcinogenic effectiveness (is there a limitation?).

ATMOSPHERE AND ENVIRONMENT (in German), By Dr. Peter Fabian, Max-Planck. Institut für Aeronomie, D-3411 Katlenburg–Lindau 3, 115 pages (incl. 30 figures, 99 literature references, and a subject index of 3 pages), paperback, format 205 × 155 mm, ISBN 3-540-12863-8, Springer–Verlag Berlin (1984), DM 24.00, US $9.40.

The author describes in a clear way, how the atmosphere was

generated, which chemical processes take place, and how men interfere to initiate disturbances, such as the smog-problem, acid rain, changes in the ozone layer, and consequences of the increasing carbon dioxide concentrations. Students and scientists find a lot of crucial information about local, regional and global phenomena in the stratosphere and in the troposphere, including newest knowledge on photochemistry, working with models, influence of agriculture, and forest damages.

ERNEST MERIAN

MICROCOLUMN HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY, Edited by P. Kucera, Journal of Chromatography Library 28, 1984, XVI+302 pages, Price: US $63.50/DFl 165, ISBN 0-444-42290-0.

This is the first attempt to compile a book on the state-of-art of microcolumn HPLC.

The first chapter gives a lucid and easily readable introduction into the fundamental aspects of the field and ends with some practical conclusions and advice on how to approach miniaturized HPLC, pitfalls and advantages, and important points to keep in mind when constructing an instrument. Solvent saving (adsorbent saving could also be added) is still one of the least controversial arguments. The problems of injection and detection are clearly pointed out. It is one of the strongest chapters in the book.

The next chapter discusses design of apparatus and starts again with theoretical concepts which is pretty much a duplication of the first chapter. The applied section gives some valuable hints to the practitioner showing the wide experience of the author. However, the discussion of commercially available apparatus is already hopelessly out of date. This is probably unavoidable since from the date of writing the manuscript at least a dozen additional companies have started providing microbore (low dispersion) chromatography equipment. Chapter 3 introduces the concept of high speed microbore HPLC and is quite informative except for the theoretical discussion which involves again much duplication with the previous chapters. A critical comparison with conventional high speed HPLC techniques might also be useful.

Chapters 4 and 5 deal with special techniques in microcolumn systems. Nobody doubts the importance of on-column trace enrichment partly to overcome the problem of injection in microcolumn techniques. However, the section on trace enrichment discussing frontal analysis and mass overload is rather confusing. Trace enrichment from diluted solutions can also be made without overloading and some of the pioneer work by Huber *et al.* on frontal analysis has not been introduced in the theoretical discussion. The chapter on chemical derivatization is somewhat superfluous. Problems with off-line pre-column derivatization are not different from conventional HPLC from a reaction point of view and other problems are the same as discussed in previous sections. On post-column reactors the meagre amount of data available at the time of writing the manuscript led the author to draw some erroneous conclusions. Bed reactors, which have not been mentioned, are particularly suitable for microbore systems also for slower kinetic reactions of up to a few minutes. This can easily be shown from theory and has also been verified experimentally in the meantime. Even segmented systems can be miniaturized. In brief chapters 4 and particularly 5 are a bit premature.

Chapter 6 on applications could have been left out entirely. The introduction is poor and the few applications could have been incorporated in the other chapters of the same authors.

Chapter 7 on LC with columns of capillary dimensions is an authoritative account on the state-of-art of this still somewhat futuristic area of miniaturization in HPLC. It makes for interesting reading and gives useful impulses particulary to the research oriented scientist in the LC field.

The last chapter on microbore LC/MS is a well written and very informative account of the current state of development of LC/MS coupling with the use of microcolumn systems.

To summarize, in spite of the obvious weaknesses of this book, it can be recommended for purchase to the person who wants to enter this field. If only since it is the first somewhat comprehensive source in this very important field.

Amsterdam, June 1984 R. W. FREI

CHROMATOGRAPHY AND MASS SPECTROMETRY IN BIOMEDICAL SCIENCES, edited by Alberto Frigerio, Mario Negri Institute of Pharmacological Research, Milan (Italy).

Volume 1 (Analytical Chemistry Symposia Series, Volume 13), 278 pages (including 128 figures, 46 tables, and a two side author index), linen, format 248 × 171 mm, ISBN 0-444-42016-9, Elsevier Scientific Publishing Company, Amsterdam, 1983, US$ 72.25, dfl. 170.

Volume 2 (Analytical Chemistry Symposia Series, Volume 14), 506 pages (including 252 figures, 67 tables, and a two side author index), linen, format 248 × 171 mm, ISBN 0-444-42154-8, Elsevier Scientific Publishing Company, Amsterdam, 1983, US$ 106.50, dfl. 250.

The two volumes include 6 plenary lectures, 55 studies, and 14 poster presentations in the areas of latest applications of chromatography, mass spectrometry and chromatography mass spectrometry in biochemistry, medicine, toxicology, drug research, forensic science, clinical chemistry, and environmental sciences (identification of metabolists and pollutants). The papers were presented at the 1st and at the 2nd International Conferences in the fields at Venice (June, 1981) and at Bordighera (June, 1982). The 3rd Symposium in the series—which will be devoted more to applications in nutrition science—is to take place at Montreux (June, 1983). Although main emphasis is given to drug and clinical studies, endogenous compounds, and biomedical studies (with valuable information on newest techniques), about one fourth of the volumes is related to developments in methodology and to environmental studies.

The environmental studies include applications to municipal waste water and sludge, to atrazine metabolite isolation, to detection of alkyl disulphides, to the separation of plutonium from americum-241, to aliphatic aldehydes in biological samples, to polychlorinated naphthalenes in soil samples, to metabolism of omethoate (a phosphororganic compound) in soil and sugar beet, to separation of some polymers from compost, humic substances and enzymatic oxidation produced from phenols, to GC-separation of polycyclic aromatic hydrocarbons in airborne particulate matter with nematic liquid crystals as liquid phase, to quantitative analysis of HCH-isomers in environmental samples, and to clean up techniques for quantitative determinations of PCB's in fish. In this latter study

procedures for extraction, clean up with Florisil cartridges and GC determination are described.

Some newer developments in methodology involve for instance comparisons of different methods, combinations of chromatography and electrophoresis, application of liquid chromatography to chrono-biological problems, automated head-space gas chromatography, preparation of biological samples for the gas chromatographic determination of organo-chlorine insecticides, combined gas chromatography–Fourier transform infrared spectroscopy, quantitative ion-exchange thin layer chromatography, scouting on thin-layer plates, enrichment and transmission factors in GC-MS, application of mass fragmentography, and tandem mass spectrometry.

The two volumes give valuable ideas and details on recent studies to specialists in the fields of analytical chemistry. One misses however an introduction and some comments. It is also a certain draw-back that no subject indices are included to find relevant matters of interest in the somewhat arbitrary collection, and that not all the papers in these proceedings have an abstract or a summary. It would at least help in future volumes, if some structuring in chapters could be foreseen.

ERNEST MERIAN

PCB's: HUMAN AND ENVIRONMENTAL HAZARDS, by Prof. Frank M. D'Itri and Prof. Michael A. Kamrin, Michigan State University, East Lansing, 443 pages (including an introduction, 44 figures, 91 tables, an index of 9 pages, and literature references added to each chapter, linen, format 236 × 157 mm, ISBN 0-250-40598-9, Ann Arbor Science, Butterworth Publishers, Woburn, Mass. (1983), £50.00.

The editors and 41 co-authors from the U.S.A., Canada, Japan and the Netherlands evaluated material presented at an International Symposium on PCB's in the Great Lakes held at Michigan State University, March 17–19, 1982. Although polychlorinated biphenyls have been used for industrial purposes for over 50 years (occupational exposure was first reported in the early 1940's), concern about the ecological and human health impact did not become an environmental issue until 1966 (S. Jensen, *New Scientist* **32,** 612). The book presents viewpoints and research findings from 1966 to

1982, as well as an overview of the steps that are being taken to solve PCB-problems, particularly in the Great Lake region.

The volume is thus divided into five parts:

— Chapters 1 through 8 present background, scientific, social, and political information that is important to understand the PCB contamination problem,

— Chapters 9 through 12 describe the current state of the art with respect to chemical analysis and monitoring,

— Chapters 13 through 19 summarize the information on the metabolism, biotransformation, toxicology and persistence of PCB's,

— Chapters 20 through 22 present data on the effects of PCB's on human health,

— Chapters 23 through 30 address the roles of federal and state agencies in the regulation of PCB's (including results of a panel discussion).

The book can be recommended to all who look for data on PCB mass balances, and for other information about bioavailability and effects of this substance group. Although many chapters deal especially with observations around the Great Lakes, the presentation is of more general interest. For instance Michael D. Mullin and Stephen H. Safe discuss analysis of PCB's using specific isomer high resolution capillary gas chromatography, while other scientists are dealing with fish sampling for monitoring and with photochemistry of PCB's. About 40% of the volume are devoted to biotransformation of PCB's in fish, to metabolism in mammals, to effects in mammals (including inhibition reactions, embryo toxicity, and cancer promotion), and to epidemiological studies (mainly of Michigan residents). One misses however the subject "incineration" in the index, and not too much is said about dibenzofurans (as possible consequences of PCB existence).

ERNEST MERIAN

RECENT DEVELOPMENTS IN MASS SPECTROMETRY IN BIOCHEMISTRY, MEDICINE AND ENVIRONMENTAL RESEARCH 8, edited by Alberto Frigerio, Mario Negri Institute of Pharmacological Research, Milan (Italy), Analytical Chemistry Symposia Series, Volume 12, 345 pages (including 190 figures, 47

tables, and a one side author index), linen, format 248 × 171 mm, ISBN 0-444-42055-X, Elsevier Scientific Publishing Company, Amsterdam (1983), US$ 80.75 (in USA and Canada), Dfl. 190.

Two similar volumes (Analytical Chemistry Symposia Series, Volumes 13 and 14) have already been reviewed. The present book is another addition to the series, and covers the proceedings of the 8th International Symposium on Mass Spectrometry in Biochemistry, Medicine and Environmental Research in Venice, June 1981. Thirty-three papers by analytical chemists from USA, Canada, Japan, India, Great Britain and ten continental European countries give a variety of examples to illustrate the potential application of mass spectrometry for identification of compounds to be measured. Those interested in methodologies and in specific information find a lot of details, although detecting facts looked for is somewhat difficult, because one misses an introduction, comments and a subject index. Emphasis is directed to drug studies (including metabolisation), to nutrition, to microbiology, to respiratory functions, to endogenous compounds, and to diagnostic tools, but a few papers deal also with environmental problems: For instance G. Lhoest, Brussels identified new metabolites of benzo(a)pyrene, R. Massot *et al.*, Grenoble studied atmospheric interactions between chlorine and hydrocarbons, and A. Buchs *et al.*, Geneva identified significant differences of methylcyclohexanol and cyclic terpene alcohol isomers with isobutane and ammonia chemical ionization (CI) mass spectras.

ERNEST MERIAN

METHODS OF SEAWATER ANALYSIS (second, revised and extended edition), by Prof. K. Grasshoff, Dr. Manfred Ehrhardt and Dr. Klaus Kremling, University of Kiel, 419 pages (including 108 figures, 26 tables, an appendix, and a valuable index of 17 pages; literature references are added to each chapter), linen, format 246 × 177 mm, ISBN 3-527-25998-8, Verlag Chemie GmbH, D-6940 Weinheim (1983), DM 140, approximately US$ 70.

According to the editors analysts, seawater chemists, seawater biologists and local authorities for water protection should be interested in this volume on general marine chemistry and its analytical branch. Several co-authors helped to write the 13 chapters:

— Sampling and sampling techniques
— Filtration and storage
— Determination of salinity
— Determination of oxygen
— Determination of hydrogen sulphide
— Determination of thiosulphate
— Determination of pH
— Determination of alkalinity and total carbonate
— Determination of nutrients (phosphorus and nitrogen compounds)
— Determination of trace elements (this chapter is rather incomplete: One solvent extraction procedure based on a dithiocarbamate-freon system is described, manganese, chromium, arsenic, antimony and germanium are analysed with AAS, mercury with cold vapour AAS, zinc with ASV (anoding stripping voltametry), and iron, manganese and aluminium with spectrophotometry only; results are not discussed adequately and compared with sampling and measuring data of other authors (and with other methods) as for instance those of U. Förstner, H. W. Nürnberg and K. H. Wedepohl; some concentrations found in off-shore oceans are probably much too high, and not enough indications are found about depth dependence of measurements or about interactions with other contaminants of sea-water)
— Determination of major constituents (such as calcium, magnesium, bromide)
— Determination of organic constituents (also this chapter is presented rather arbitrarily, incidentally and incompletely; one subchapter deals with separation and detection of selected organochlorines (PCB's) with gas chromatography, another of amino acids with liquid chromatography)
— Automated chemical analysis.

Although the book is restricted to selected techniques (which are presented rather in the form of laboratory recipes), one misses the background of some environmental chemistry to get a better understanding, why the methods have been selected (including goals in relation to concentrations to be expected). Also mistakes which may occur should be discussed better, and in the index one does not even find for instance the term "speciation".

ERNEST MERIAN

RESIDUE REVIEWS (RESIDUES OF PESTICIDES AND OTHER CONTAMINANTS IN THE ENVIRONMENT, VOLUME 89), edited by Francis A. Gunther and Jane Davies Gunther, Dept. of Entomology, University of California, Riverside, U.S.A., 213 pages (including a foreword, 3 tables, and a subject index of 5 pages), linen, format 236 × 159 mm, ISBN 0-387-90884-6, Springer-Verlag, New York, Berlin, Heidelberg, Tokyo (1983), DM 72, approx. US$ 28.

The worldwide concern in scientific, industrial, and governmental communities over traces of toxic chemicals in foodstuffs and in both abiotic and biotic environments has justified to combine comprehensive reviews, rapidly published progress reports, and archival documentations. The original "Residue Reviews" have thus been extended somewhat in their philosophy to include those many residue matters requiring further attention and to collate for variously trained readers present knowledge in specific important areas of residue and related endeavors involved with other chemical contaminants in the total environment. This new publication in the series is thus of special interest to all interested in environmental research, since it covers three subjects:

— *Chemical Contaminants in Human Milk*, by Allan A. Jensen, DK-2900 Hellerup; the excellent, rather complete survey, is a useful addition to the ZEBS/FAO/WHO work (see for instance "Health Evaluation of Heavy Metals in Infant Formula and Junior Food," edited by E. H. F. Schmidt and A. G. Hildebrandt, 1983). In one subchapter one finds typical mean contents of several trace elements and molecules and information about monitoring and analytical chemistry (including practical detection limits). Another subchapter is especially devoted to organohalogens in human milk, but some details about nonorganohalogens and heavy metals are also described, however with less emphasis.

— *Mutagenicity in Procaryotes of Insecticides, Acaricides, and Nematocides*, by Christa Wildemauwe *et al.*, Pasteur Instituut van Brabant, B-1040 Brussels; results of short-term tests are presented and compared (about 52% of the pages are devoted to organophosphorus compounds; besides other chemical groups also some arsenic compounds are discussed for mutagenicity testing).

— *Analysis of Established Pyrethroid Insecticides*, by Euphemia Papadopoulou-Mourkidou, Aristotelian University, Thessaloniki,

Greece; GC-FID and GC-ECD systems are mainly used, to some extent also HPLC systems. Adequate work has been done for formulated materials, but residue analytical methodologies and validation studies need further developments, as can be taken from the text.

ERNEST MERIAN

N-NITROSO COMPOUNDS (ACS SYMPOSIUM SERIES 174), edited by Richard A. Scanlon, Oregon State University, Corvallis, OR 97331, and by Steven R. Tannenbaum, Massachusetts Institute of Technology, Cambridge, MA 02139, 400 pages (including 71 figures, 76 tables, many formulae, and a subject index of 8 pages), linen, format 236 × 158 mm, ISBN 0-8412-0667-8, American Chemical Society, Washington, D.C. 20036 (1981), US$ 39.95 (in U.S.A. and Canada, US$ 47.95 for export).

Twenty-six papers of a representative symposium—having taken place March 31 to April 1, 1981 in Atlanta, Georgia—are presented mainly by U.S. scientists, but also a limited number by Canadian, English and German authors. They are structured into three parts.

— Chemistry and Metabolism (giving information about transformation, activation, and structure-activity relationships of nitrosamines).
— Chemistry of Formation and Blocking (e.g. in the gas phase, in soils, in microorganisms, in plants, in mammals, in food (including beer) and in pesticides); *in-vivo* reactions are particularly discussed.
— Analysis and Occurrence (several techniques for analysing, monitoring and reduction of contamination are presented, and additionally studies about environmental fate, studies about relation between nitrosamines and gastric cancer (including discussion of preventing the latter), and regulatory aspects.

The valuable book covers some needs for better and more specific analytical methods for a better understanding of the omnipresent mutagens and carcinogens, and their fate and effects. Detection in foods, air, water, and industrial and agricultural products, transformation, and reduction or elimination of volatile nitrosamines in contaminated products are studied intensively. New information on

precursors and on endogenous formation is also an important field.

ERNEST MERIAN

RIVER POLLUTION CONTROL, edited by Michael J. Stiff, Water Res. Centre, Stevenage, Hertfordsh. SG1 1TH, U.K., 423 pages (including 124 figures, 37 tables, discussion contributions, a summary, a list of delegates, and a 5 page subject index), linen, format 237 × 160 mm, ISBN 0-85312-183-4, Ellis Horwood Limited, Chichester, West Sussex PO19 1EB, U.K. (1980), £32.50.

The book evolved from the Water Research Centre Conference "River Pollution Control' in April 1979, and thus includes 26 papers (more than half from the U.K., minor numbers from the U.S.A., the European Continent, and Japan). The subject is structured into 6 parts:

— Approaches to River Pollution Control
— The Problems of International Rivers (e.g. of the Rivers Danube and Rhine)
— River Pollution Control Practice
— Data Requirements for Pollution Control (including information on sampling, flow measurement, data collection, and modelling techniques)
— Water Quality Assessment (ecological value scales for small streams; water quality assessment using the theory of entropy)
— Water Quality Modelling (with practical examples from the River Ouse, the River Thames, and wastewater management).

The valuable volume brings together otherwise independent sources of experience which exist in this complex field of study. Steps are taken so that the different uses to which these rivers are put—transport, effluent disposal, water abstraction and maintenance of fish stocks—can be accommodated with political and environmental aspirations and documented as models of experience. This appraisal includes discussion of the part played by agencies such as the World Health Organisation in stimulating and co-ordinating national and international strategies. The scientific reader finds for instance information and data on biological conditions, on data handling, on fish monitoring, on interlaboratory comparisons, on mathematical

models, on monitoring in general, on pollution aspects, on risk assessment, on salt discharges, on sampling, on water demand, and on water quality standards, but most of the text is related to the needs of river authorites, and to concrete case studies with European river systems (including administrative aspects of river pollution control). Specific objectives should be set at a local level, but information must be exchanged.

ERNEST MERIAN