INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS

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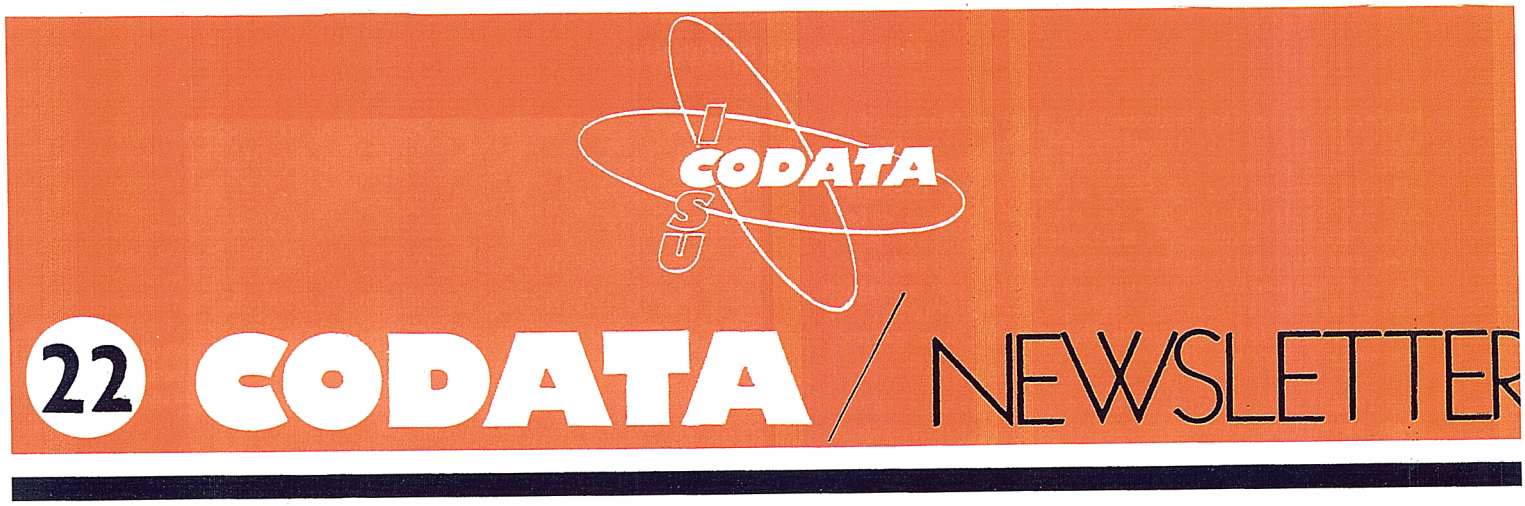
COMMITTEE ON DATA FOR SCIENCE AND TECHNOLOGY




# 22 CODATA NEWSLETTER

JUNE 1981

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*The Committee on Data for Science and Technology (CODATA) was established in 1966 by the International Council of Scientific Unions.*

*Working on an international, interdisciplinary basis, CODATA seeks to improve the quality, reliability and accessibility of data of importance to science and technology.*

# IN MEMORIAM

## TAKEHIKO SHIMANOUCHI

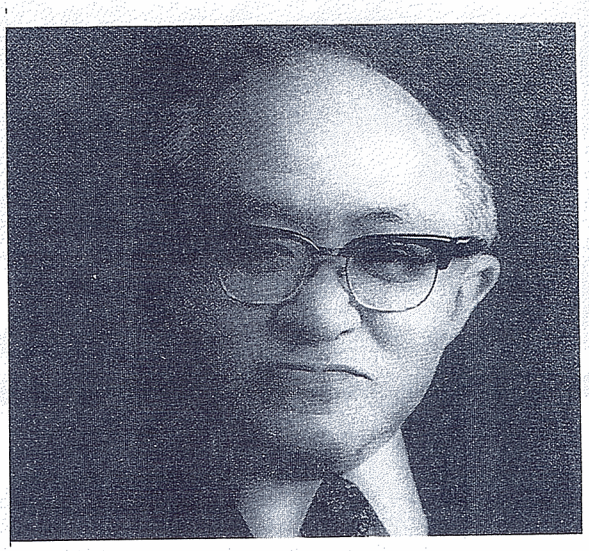
Professor Takehiko Shimanouchi died suddenly of a heart attack at his home in Tokyo on 19th May 1980. His passing is a great loss to the scientific community, not only in Japan but throughout the whole world. He is survived by his wife Reiko and two daughters Michiko and Yuriko. He died two days before his sixty-fourth birthday. Prof. Shimanouchi's diminutive figure and abundant energy are well known to all active in CODATA. His *joie de vivre* and cheerful personality gained him many friends.

His formal association with CODATA began in 1973 when he was appointed National Delegate for Japan a position he continued to hold until his death. He also served as Vice-President from 1976 to 1978. During the past year he devoted a great deal of his time to the planning of the Seventh International CODATA Conference of which he was a Co-Chairman of the Program Committee and Chairman of the Organizing Committee. He brought to these tasks his characteristic organizing abilities and infectious enthusiasm. Prof. Shimanouchi also partook very actively in the affairs of the Chemical Society of Japan and many other Japanese scientific organizations. He was also prominent in IUPAC in which he served as a Titular Member of the Commission on Molecular Structure and Spectroscopy and as Chairman of the Subcommittee on Storage and Retrieval of Spectroscopic Data.

Takehiko Shimanouchi was born in Tokyo in 1916. He took the B.Sc. degree at the University of Tokyo in 1941 and began graduate studies with Prof. San-ichiro Mizushima. He was appointed Associate Professor under Prof. Mizushima in 1946 and was awarded the doctorate degree of the University of Tokyo in 1949. Periods of study abroad followed during which he was a post-doctoral fellow at the University of Minnesota with Prof. Bryce Crawford and at the Thermodynamics Division of the U.S. National Bureau of Standards with Dr. David Mann. In 1959 he was appointed a full Professor at the University of Tokyo succeeding to that prestigious chair on the retirement of Prof. Mizushima.

Prof. Shimanouchi was among the earliest physical chemists to recognize the importance the electronic computer was to have on basic scientific research and scientific data management. In 1972 he was appointed Director of the Computing Center of the University of Tokyo. In this capacity he played a major role in developing a network of computerized chemical and spectroscopic data bases throughout Japan. On his retirement from the University of Tokyo he was appointed Dean of the College of Information Science at the new University of Tsukuba. Prof. Shimanouchi held this position until a few months before his death. Returning to Tokyo in March 1980 he joined Meisei University, an institution with which he had had a long association having attended the Meisei Highschool in his boyhood.

Prof. Shimanouchi during his long period at the University of Tokyo, first in association with



Prof. Mizushima, and later on his own accord, continued and developed the traditions of this active and imaginative school of molecular spectroscopy. He gathered around him many promising young scholars who now occupy senior positions in the academic and industrial life of Japan. This school has also attracted to Tokyo numerous molecular spectroscopists from all parts of the world.

In 1977 his students published a Memorial Volume of his 293 papers and monographs in commemoration of his sixtieth-birthday. In a preface to this volume Prof. Shimanouchi summarized his area of scientific activity as follows: *For the past 36 years I have been engaged in the study of molecular structures by means of vibrational spectroscopy. It has always given me much pleasure to examine the infrared and Raman spectra which I believe are the communications from the world of molecules. Decoding these messages provides the basis for practical utilization of the molecules for various purposes. With my colleagues I have tried to decode such messages from molecules of as many classes as possible.*

Those of us who have had the privilege of close association with Prof. Shimanouchi will see in this succinct summary of his many-sided research activities the broad philosophical approach he brought to the day-by-day problems of the laboratory. However, his interests ranged much wider. In informal technical conversations he was always ready to bring out pencil and paper to explain to foreign visitors some of the intricacies of Japanese language and history.

Prof. Shimanouchi leaves with us all a fond memory of an outstanding scholar. A man whom we all admire not only for his academic achievements but also for his fortitude in overcoming physical handicaps.

R. Norman Jones
June 1980

# IN MEMORIAM

## STIG ARNE SUNNER

The sudden death of Professor Stig Sunner on 3rd June 1980, at the age of 63, has robbed international science of one of its wisest counsellors. Born in Linköping, Sweden, Stig Sunner spent most of his professional life in the ancient cathedral and university city of Lund, in southernmost Sweden. He received his doctorate from the University of Lund in 1949, was appointed Docent (1949), became Head of the Thermochemistry Laboratory there (1956), was appointed Associate Professor (1958) and Professor (1966) under the Swedish Natural Science Research Council and finally University Professor (1977).

Stig Sunner was introduced to thermochemistry in the 1940's by Lennart Smith, then Professor of organic chemistry at Lund, and a specialist in combustion calorimetry. This subject had recently undergone a renaissance, with two distinct aspects: one, inspired by Frederick Rossini, involved very precise measurements on hydrocarbons, by attention to the details of calorimetry and the chemistry of combustion; the other, in which Smith was prominent, involved the extension of combustion calorimetry to organic compounds whose successful combustion required considerable artifice by the experimenter. Stig's great contribution to thermochemistry was to conjoin these two aspects, to produce precise thermochemical data on a variety of compounds, so providing information on the energetics of chemical binding. This he achieved by ingenuity in the design of his calorimeters and by insight into the highways and byways of chemical reactions. With the aid of many students and researchers who were attracted to the Lund school of thermochemistry, Stig developed and utilized a range of equipment for the measurement of reliable thermodynamic data. Some of the laboratory versions of this equipment were later developed into production models. Indeed, Sunner and his collaborators engaged in a number of technical developments by Swedish industry. One notable example, with only a tenuous connection with thermochemistry, was the development of "Tetrapac" sealed containers for the hygienic dispensing of drinks.

Stig's attendance as an observer at the 17th Conference of the International Union of Pure and Applied Chemistry (IUPAC) held in Stockholm in 1953, was the start of his involvement in international science. A visit shortly afterwards to Dr. Guy Waddington at the Bartlesville station of the U.S. Bureau of Mines led to the rapid emergence of the rotating-bomb calorimeter as the preferred instrument for measuring the energies of combustion of organic compounds containing sulphur and the halogens. Stig was appointed to IUPAC's Commission on Thermodynamics and Thermochemistry in 1957, serving as its Chairman from 1969 to 1973. He served on the Physical Chemistry Committee of IUPAC from 1969 to 1979, becoming successively the Secretary, Vice-President and President. Amongst the more tangible outcomes of the IUPAC Commission's work during Stig's long service may be mentioned the production of a series of definitive monographs on experimental thermodynamics and thermochemistry and the organizing of a series of international conferences on chemical thermodynamics.

His strong belief in international scientific cooperation took Stig to Arnoldshain, FRG, in 1968 for the First International CODATA Conference. He was there appointed Chairman of the Task Group on Key Values for Thermodynamics. By the time of his retirement from the Chairmanship in 1974, the Task Group had come to grips with its assignment and had produced its first data tables. Thereafter the Task Group continued to benefit from his advice, and indeed we held our 1977 meeting in Lund, with Stig as our local host. Within his own country, Stig acted as Chairman of the National CODATA Committee from 1971-77.

Amongst the honours which Stig received were the Gold Medal of the Royal Swedish Academy of Engineering Sciences and the Norblad-Ekstrand medal of the Svenska Kemistsamfundet. He received the 1970 Huffman Memorial Award of the (US) Calorimetry Conference and was to have delivered the keynote Rossini lecture at the forthcoming 6th International Conference on Chemical Thermodynamics, in Merseburg, GDR. But the honour which he probably prized most was the warm esteem in which he was held by chemists around the globe, esteem gained in his many travels (he was one of the first foreign scientists to visit the People's Republic of China) and during visits to Lund by thermodynamicists from East, West and the Third World: such a visitor was invariably accorded the most genuine hospitality by Stig and his wife, the chemist Gerd Olofsson.

Finally, how shall we remember Stig Sunner the man? Some will recall his thoughtfulness over little things, like the provision of his visitors with pocket-sized compendia of the fundamental constants and units for thermodynamics. Many will remember evening telephone calls from the Sunners' country cottage. All will recall his deep concern for the well-being of others.

J.D. Cox

# IN MEMORIAM

## SIR GORDON SUTHERLAND

Sir Gordon Sutherland who died on the 27th June 1980 at the age of 73 was a "founder" and the first Secretary-Treasurer of CODATA. He had a very special relationship with CODATA shared by very few others: he was from its earliest days continually associated with CODATA in one way or another.

When in 1965 the International Council of Scientific Unions (ICSU) set up an ad-hoc committee to examine how it might help in the field of scientific data generation, evaluation and dissemination, Sutherland was the United Kingdom's representative. When, a year later, CODATA was established by the 6 founding National Members, France, Federal Republic of Germany, Japan, U.K., U.S.A., and U.S.S.R., he became CODATA's first Secretary-Treasurer. He gave up this office in 1970 but remained U.K. delegate and Vice-President until 1972. During the next years he retained his contacts with CODATA as chairman of the British National Committee on Data for Science and Technology and in 1974 became U.K. delegate once again.

What were the special qualities, scientific and personal that led to Gordon Sutherland's assuming such an almost unique position in CODATA. A sketch of his life, his interests, his achievements and his personality may provide the answer.

Gordon Brims Black McIvor Sutherland was born on 8 April 1907 at Watten in Caithness, Scotland - a truly Highland Scot who to the end of his life retained his soft native accent. After undergraduate studies at the University of St. Andrews he went to Cambridge where, working in Professor (later Sir Eric) Rideal's group he acquired an expertise in infrared spectroscopy and developed his life-long interest in and fascination with the use of I.R. Spectroscopy for determining molecular structures. Having obtained his Ph.D. he spent 2 years (1931-33) as a Commonwealth Fund Fellow at the University of Michigan, Ann Arbor, an important centre for infrared studies and then returned to Cambridge. The next 6 fruitful years brought forth what was perhaps his most significant discovery, namely the elucidation of the structure of the hydrogen peroxide molecule. By applying quantum mechanics to the carefully measured infrared spectrum of $H_2O_2$, Sutherland, in collaboration with W.G. (later Lord) Penney was able to show that contrary to previous ideas the four atoms of hydrogen peroxide were not co-planar; the first example of determining a molecular structure in this way.

During the 1939-1945 war he was one of the pioneers in the use of infrared spectroscopy for chemical analysis, for instance of mixtures of hydrocarbons, a development of great national importance.

In 1949 Sutherland became Professor of Physics at the University of Michigan where during the next 7 years he built up a successful I.R. spectroscopy group with interests extending into biology.

Then, in 1956 he returned to England to become the Director of the National Physical Laboratory (NPL) where he stayed until 1964. He was the last Director of the NPL while it was still relatively free of direct governmental control and before, as a result of the reorganization of the Scientific Civil Service, it was placed under Government Departments, first the Ministry of Technology and, now, the Department of Industry. The 8 years of Sutherland's directorship thus marked the end of an era at the NPL and was a period worthy of its distinguished past. New research was started, the scientific staff was substantially increased and new facilities, some of them of great industrial importance, were established.

Sutherland's stewardship at the NPL reflected his whole philosophy about the desirable aims and functions of such an establishment - views he often and forcefully expressed at meetings of the British National Committee on Data. He passionately believed that a National Laboratory should help Government, Industry and the Academy World alike, especially in areas such as standards and data, where tradition, continuity and esprit de corps are prerequisites of success. He also believed that the morale of a scientific establishment depends to a great extent on its being involved in the advancement of science and that, therefore, basic research in areas relevant to the laboratory's work should be encouraged.

Perhaps towards the end of his Directorship Sutherland began to doubt whether his ideas will continue to be put into practice at the NPL. Be it as it may he was certainly happy to accept in 1964 the Mastership of Emmanuel College, Cambridge, which he held until his retirement in 1977.

The foregoing sketch of Sutherland's scientific career shows that in view of his involvement in the data and standards field, both in University and Government research, he was the obvious person to represent the U.K. on the ICSU Committee already mentioned. What were the other qualities which made Sutherland such a useful, respected and much-liked member of many scientific organizations, among them CODATA? He had the ability and the patience to dissect and to analyze knotty problems, he was meticulous in listening and weighing up arguments, he was fair and unbiased and as a result his decisions commanded respect: even those who may have disagreed with him were disarmed by his urbanity, his gentleness and his sense of humour.

Indeed, this sense of humour was one of Sutherland's most endearing qualities. Watching his quizzical smile as he was about to speak at some meeting or gathering one never knew what was coming - a humorous aside or an important statement. More often than not it was a combination of the two.

He also had the gift of self-mockery, of laughing at his own expense. It was after the conference dinner of the 3rd CODATA Conference in Le Creusot that Gordon was asked to say a few words. He did so reluctantly and expressed his concern that if the story he was going to tell became known in his native Scotland he would be shunned by his fellow countrymen. Earlier that year while crossing the Atlantic he was offered a head-set so that he may enjoy the film to be shown. The idea of spending $2.50 on what was likely to be a second-rate film did not appeal to him, but, purely out of politeness he asked what they were going to show. "City Lights with Charlie Chaplin" answered the stewardess and Gordon, being a Chaplin fan, paid for the head-set - only to realize a little later that "City Lights" was a silent film. He finished the story, chuckling merrily, with the remark that he was certainly the first and only Scotman to spend $2.50 on a head-set to watch a silent film.

He was a Scotman to the core and, as such, was enthusiastic about golf. There is a story - it may be apocryphal - that the choice of St. Andrews as the venue for the 2nd CODATA International Conference arose out of a conversation between Lewis Branscomb, U.S.A. Delegate to CODATA, a keen golfer and Sutherland. When Branscomb remarked that his great and as yet unfulfilled ambition was to play a round of golf on St. Andrews' famous "Royal and Ancient" course Sutherland replied "You will do so at the next CODATA Conference." Whatever the truth of this story, it is significant that at St. Andrews formal sessions were held only in the mornings and in the evenings after dinner, so that in the afternoons participants could engage, according to taste, in informal discussions or in a round of golf on one of St. Andrews' superb links.

Those who attended the 3rd CODATA Conference in Le Creusot may remember Gordon, notebook and pencil in hand, walking in the park surrounding Marie Antoinette's chateau accompanied by some of Le Creusot's city dignitaries advising them on the lay-out of a golf course.

Sutherland was elected a Fellow of the Royal Society in 1949, was a Vice-President in 1961-63, and Chairman of the Royal Society's Committee to study the causes and effects of the "Brain Drain" i.e. the loss of many able British scientists to the U.S.A. during the 1950's. The Sutherland Report is a shining example of what such a report should be. A compact, lucid exposé with just enough statistical data to give the reader confidence but not so much as to bore him.

He was a Vice-President of the International Union for Pure and Applied Physics, President of the Institute of Physics and Physical Society and a member of the Council for Scientific Policy in Britain and a Foreign Honorary Member of the American Academy of Arts and Sciences. But his interests and activities ranged far outside science, science policy and education. Probably through the influence of his Swedish-born wife née Gunborg Wahlström who had artistic leanings Gordon became quite a connaisseur of Chinese art; he was also a Trustee of the National Gallery.

He was a man of many achievements and considerable influence but wore his greatness with genuine modesty. When the sad news broke in the national press - The Times obituary ran to 1300 words, a rare occurrence - the little boy of the Sutherlands' next door neighbours rushed up to Lady Sutherland exclaiming "It's in the papers, you know! We did not know he was that important!" What better sentence to keep fresh the memory of Gordon, the renowned scientist, the loyal colleague, the dear and reliable friend, the man with the warm and unforgettable smile.

Nicholas Kurti

Left to right: D.G. Watson, M. Kotani, E.F. Westrum, Jr., V.V. Sytchev, J.E. Dubois

## CODATA ELECTIONS

Following the elections at the 12th CODATA General Assembly in Kyoto, Japan on 13-14 October 1980, the composition of the CODATA Executive Committee is as follows:

*President*:

Professor MASAO KOTANI
Science University of Tokyo, Kagurazaka 1-3, Shinjuku-ku, Tokyo 162, Japan

*Vice-Presidents*:

Professor JACQUES-EMILE DUBOIS
ITODYS, 1, rue Guy de la Brosse, 75005 Paris, France

Professor V. V. SYTCHEV
Soviet National CODATA Committee, Academy of Sciences of the U.S.S.R., 14 Leninsky Prospekt, 117901 Moscow B-71, U.S.S.R.

*Secretary General*:

Professor EDGAR F. WESTRUM, JR.
Department of Chemistry, University of Michigan, Ann Arbor, Michigan 48109, U.S.A.

*Treasurer*:

Dr. DAVID G. WATSON
University Chemical Laboratory, Lensfield Road, Cambridge CB2 1EW, U.K.

*Members*:

Professor A. BUSSARD
Chef du Service d'Immunologie Cellulaire
Institut Pasteur, 75015 Paris, France

Professor ANDRZEJ BYLICKI
Institute of Physical Chemistry
Polish Academy of Sciences, P.O. Box 49
ul. Kasprzaka 44/52, 01-224 Warsaw, Poland

Dr. DOROTHY L. DUNCAN
Oakfield, Horam, Heathfield, East Sussex TN21 OHA, U.K.

Dr. DAVID R. LIDE, JR.
Office of Standard Reference Data, National Bureau of Standards, A537 Administration Building, Washington, D.C. 20234, U.S.A.

Dr. MAURICE MENACHE
7, rue de Reims, 75013 Paris, France

Professor C. N. R. RAO
Solid State & Structural Chemistry Unit,
Indian Institute of Science,
Malleswaram, Bangalore 560012, India

Professor WOLFGANG SCHIRMER
Zentralinstitut für Physikalische Chemie
Rudower Chaussée 5, 1199 Berlin-Adlershof, G.D.R.

Complete CODATA membership can be found on page 15.

Other decisions at the General Assembly included approval for continuance of the Task Groups on
- Fundamental Constants
- Chemical Kinetics
- Accessibility and Dissemination of Data (ADD)
- Computer Use (hereafter: Computerized Data Handling)
- Data for the Chemical Industry
- Internationalization and Systematization of Thermodynamic Tables
- Thermophysical Properties of Solids
- Biothermodynamic Data
- Space and Time-Dependent Data

and the establishment of new Task Groups on
- Critical Interdisciplinary Survey of Property Data on High Pressure Phases (Professor B. VODAR, Chairman) and
- Standardization of Data Bases for NMR and Photoelectron Spectroscopy (Professor C.N.R. RAO, Chairman).

The General Assembly also decided to have the CODATA Bulletin published by Pergamon Press beginning with 1981 and accepted the invitation from Poland to hold the 1982 Conference and General Assembly in Poland and the invitation from Israel to hold the 1984 Conference in Jerusalem.

## CODATA NAMES IN THE NEWS

Professor Masao Kotani, President of CODATA, has received the prestigious "Order of Cultural Merit" from the Emperor of Japan.

Professor V.V. Sytchev, Vice-President of CODATA, has been named Deputy Chairman of the U.S.S.R. State Committee for Science and Technology.

Dr. W.W. Hutchison, former Member of the Executive Committee and IUGS Delegate to CODATA, named Director General of the Geological Survey of Canada.

Professor H. Gutfreund, U.K. Delegate to CODATA and former Member of the CODATA Executive Committee, elected Fellow of the Royal Society.

Professor C.N.R. Rao, Indian Delegate to CODATA and Member of the Executive Committee, named Foreign Member of the Yugoslav Academy of Sciences.

## 8TH INTERNATIONAL CODATA CONFERENCE - CALL FOR PAPERS

The 8th International CODATA Conference is scheduled for 3-7 October 1981 in Kozubnik, Poland (70 km from Cracow) at the invitation of the Polish Academy of Sciences.

### SCOPE OF THE CONFERENCE

DATA ON NATURAL RESOURCES - Their Use for the Development of Society.

The Conference is intended to touch some aspects of data on natural resources and their utilization for the benefit of society.

A prime focus of the Conference will be on the relevance of scientific data for:

- estimation of world raw material resources, especially those needed for the development of the chemical industry, metallurgy and energy production
- utilization of coal, oil, and petrochemicals and other raw materials for the chemical and metallurgical industries
- properties of materials, particularly thermodynamic
- environmental protection including biological problems.

The following will be covered:

- analysis of data needs in selected fields of science and technology
- compilation, generation and preprocessing of data
- data evaluation methodology
- critical evaluation and role of data accuracy
- computer use for storage, retrieval and networking of data; data compression
- technical and organizational aspects of data banks including demonstrations
- materials information systems
- data systems analysis
- correlation, extrapolation and estimation procedures
- mathematical modelling data requirements.

### CALL FOR PAPERS

Scientists involved in the methodology of data evaluation, estimation, generation, critical compilation, treatment, etc. - and also users of data - are invited to submit papers on the subject within the scope of the Conference.

Since poster sessions are planned at the Conference, the paper may be presented as a poster.

The title, together with a brief description of the contents of the paper should be submitted as soon as possible, but not later than *December 1, 1981, to the Chairman of the Program Committee, Professor A. Bylicki, Institute of Physical Chemistry, Polish Academy of Sciences, P.O. Box 49, ul. Kasprzaka 44/52, 01-224 Warsaw, Poland.*

Authors of papers will be notified before February 15, 1982 about the acceptance of their papers and will receive instructions on providing an abstract at that time.

### SCIENTIFIC PROGRAM COMMITTEE

Professor A. Bylicki, Chairman (Poland)
Professor R. Sinding-Larsen, Vice-Chairman (Norway)
Professor V.V. Sytchev, Vice-Chairman (U.S.S.R.)
Dr. J.H. Westbrook, Vice-Chairman (U.S.A.)

Professor Z. Dembowski (Poland)
Professor J.E. Dubois (France)
Professor A.S. Kertes (Israel)
Dr. David R. Lide, Jr. (U.S.A.)
Professor Y. Mashiko (Japan)
Professor C.N.R. Rao (India)
Professor W. Schirmer (G.D.R.)
Professor M. Szulczewski (Poland)

## ADD TASK GROUP MEETING

The CODATA Task Group on Accessibility and Dissemination of Data (ADD) met in Paris on 18-20 March 1981 under the chairmanship of Madame Antoinette David. Dr. Sherman Fivozinsky of the National Bureau of Standards (U.S.A.) was appointed Secretary of the group. Other members of the Task Group are Dr. C.F. Burk, Jr. (Canada), Prof. A.S. Kertes (Israel), Dr. A.D. Kozlov (U.S.S.R.), Prof. S.P. Spragg (U.K.), and Dr. I. Wesley-Tanaskovic (Yugoslavia).

The Task Group is concerned with trying to improve the access to and dissemination of evaluated scientific and technological data. Such improvements include the publication of recommended practices, educational activities for university students and information specialists, activities which promote and publicize existing data, and a variety of practical endeavors aimed at helping the user to find the required data. The aims of the Task Group are broad since it takes into consideration all the tools of accessibility to data in all the disciplines.

At its meeting the group evaluated the results of the training course in data dissemination given in Tsukuba, Japan in October 1980 and encouraged the continuance of such courses. It discussed its input into the CODATA/Unesco Preliminary Inventory of Data Referral Sources which is scheduled for completion during the summer of 1981. The group also decided to update CODATA Bulletin No. 16 "Study on the Problems of Accessibility and Dissemination of Data for Science and Technology."

## SOLUBILITY DATA PROJECT

The more than 150 editors, compilers and evaluators involved in this massive endeavor have now reached the 10+% mark in the production of the 80-100 volumes promised over the next 10-15 years of activity. This ambitious project of the Analytical Chemistry Division of IUPAC (Commission V.8) intends ultimately to provide a reliable basis for the rational prediction of solubilities in uncharted areas as well as the critically evaluated and clearly defined best values of gas/liquid, solid/liquid, liquid/liquid, gas/solid, and solid/solid equilibria as functions of both temperature and pressure. Each system consists of two essential parts:

- critically evaluated/recommended values with discussion on reliability
- data sheets with concise graphical presentation, adjuvant information on experimental procedures.

Fundamental to the philosophy of the project is the recognition that the basic element of strength is the active participation of career scientists. Consolidation of data from the primary literature and the production of a truly critically-evaluated set of numerical data are tasks worthy of the time of experienced scientists.

Reviews of the eight or so volumes already published by Pergamon Press in 1979-80 are still few, but those identified are listed below.

- K. Loening, Journal of the American Chemical Society 102 (1980), 3665.
- Fluid Phase Equilibria 4 (1980), 313-317
  Volume 1, M. J. Hiza
  Volume 2, R. F. Weiss
  Volume 3, U. N. Dash
- L. H. Gevantman, Bulletin of Chemical Thermodynamics 22 (1979), 496.
- M. L. McGlashan, J.C.S. Faraday I, 76 (1980), 1630.
- J. Rasiel, New Technical Books 65 (1980), 81.
- M. B. Ewing, Journal of Chemical Thermodynamics 12 (1980), 607-608.

The average price for the extant volumes approximates $100 each, although reduced prices are available upon subscription. Biennial cumulative indexes are contemplated. The succinct evaluative commentary is designed to be appropriate for scientific and technological fields as diverse as agriculture, biology, chemistry, engineering, geology, materials science, medicine, metallurgy, oceanography, and pharmacology.

## COMMISSION ON EQUILIBRIUM DATA - V.6

The IUPAC Analytical Chemistry Division's Commission on Equilibrium Data - V.6 announces the availability of the following publications: Equilibrium Constants of Liquid-Liquid Distribution Reactions - Introduction and Part I: Organophosphorous Extractants (Butterworths, 1974, xiv + 169); Equilibrium Constants of Liquid-Liquid Distribution Reactions - Part II: Alkylammonium Salt Extractants (Butterworths, 1974, vii + 85); Critical Evaluation of Some Equilibrium Constants Involving Organophosphorus Extractants (Butterworths, 1974, v + 93); Ion Exchange Equilibrium Constants (Butterworths, 1975, v + 41); Critical Evaluation of Equilibrium Constants in Solution: Stability Constants of Metal Complexes (Pure & Appl. Chem. 1977, 49 (1), 127-135); Critical Evaluation of Some Equilibrium Constants Involving Aklylammonium Extractants (Pergamon Press, 1977, v + 30); Critical Evaluation of Equilibrium Constants in Solution - Part A: Stability Constants of Metal Complexes: Critical Survey of Stability Constants of EDTA Complexes (Pergamon Press, 1977, v + 42); Equilibrium Constants of Liquid-Liquid Distribution Reactions - Part III: Compound Forming Extractants, Solvating Solvents, and Inert Solvents (Pergamon Press, 1977, v + 46); Proposed Symbols for Metal Complex Mixed Ligand Equilibria - Provisional (IUPAC Inf. Bull. 1978 (3), 229-232); Equilibrium Constants of Liquid-Liquid Distribution Reactions - Part IV: Chelating Extractants (Pergamon Press, 1978, xii + 228); Critical Evaluation of Equilibrium Constants in Solution - Part A: Stability Constants of Metal Complexes: A Critical Review of Equilibrium Data for Proton- and Metal Complexes of 1,10,Phenanthroline, 2,2'-Bipyridyl and Related Compounds (Pergamon Press, 1978, vi + 78); Ionisation Constants of Organic Acids in Aqueous Solution (Pergamon Press, 1979, xi + 989); Stability Constants of Metal-Ion Complexes - Part B: Organic Ligands (Pergamon Press, 1979, viii + 1263).

*For further information write to the Chairman of the Commission on Equilibrium Data, Professor G.H. Nancollas, Dept. of Chemistry, State University of New York, Acheson Hall, Buffalo, NY 14214, U.S.A.*

## SELECTED VALUES OF CHEMICAL THERMODYNAMIC PROPERTIES

Tables of the thermodynamic properties of inorganic substances and $C_1$ and $C_2$ organic compounds at 298.15K are prepared and published by the National Bureau of Standards. The properties covered are enthalpy of formation ($\Delta H_f$), Gibbs energy of formation ($\Delta G_f$), entropy (S), and heat capacity ($C_p$), all at 298.15K, $\Delta H_f$ (0), and H (298) - H (0).

Eight publications have been issued: NBS Technical Notes 270-1 through 270-8 which cover the compounds of all elements except those of the transuranics. The latest volume, issued in May 1981, by D.D. Wagman, W.H. Evans, V.B. Parker, R.H. Schumm, and R.L. Nuttall covers the compounds of uranium, protactinium, thorium, actinium, and the alkali metals. A later publication will contain data on compounds of the transuranic elements.

Information about the thermodynamic properties of specific inorganic compounds may be obtained from the NBS Chemical Thermodynamic Data Center. Inquiries should be addressed to Dr. David Garvin, Manager, Chemical Thermodynamics Data Center, Room A158, Chemistry Building, National Bureau of Standards, Washington, DC 20234. (Telephone (301) 921-2773).

## NEW GEODETIC REFERENCE SYSTEM

During the XVII General Assembly of the International Union of Geodesy and Geophysics in Canberra, the following Resolution was adopted:

Recognizing that the Geodetic Reference System 1967 adopted at the XIV General Assembly of IUGG, Lucerne, 1967 no longer represents the size, shape and gravity field of the Earth to an accuracy adequate for many geodetic, geophysical, astronomical and hydrographic applications and

Considering that more appropriate values are now available,

Recommends

a) that the Geodetic Reference System 1967 be replaced by a new Geodetic Reference System 1980, also based on the theory of the geocentric equipotential ellipsoid, defined by the following conventional constants:

equatorial radius of the Earth:
$a = 6378\ 137$ m

geocentric gravitational constant of the Earth (including the atmosphere):
$GM = 3986\ 005 \times 10^8 m^3 s^{-2}$

dynamical form factor of the Earth, excluding the permanent tidal deformation:
$J_2 = 108\ 263 \times 10^{-8}$

angular velocity of the Earth:
$\omega = 7292\ 115 \times 10^{-11}$ rad $s^{-1}$,

b) that the same computational formulas, adopted at the XV General Assembly of IUGG in Moscow 1971 and published by IAG, be used as for the Geodetic Reference System 1967, and

c) that the minor axis of the reference ellipsoid, defined above, be parallel to the direction defined by the Conventional International Origin, and that the primary meridian be parallel to the zero meridian of the BIH adopted longitudes.

## SEMINAR ON "GEOSCIENCE NUMERIC AND BIBLIOGRAPHIC DATA"

A seminar on "Geoscience Numeric and Bibliographic Data" was held 30 March-1 April 1981 under the auspices of the Australian Mineral Foundation.

The principal speaker at the seminar was Dr. C.F. Burk, Jr., of the Canada Centre for Geoscience Data. He presented a 20-page compilation comprising lists of databases, of database directories, of publications concerning standards for data, of newsletters and periodicals and of related publications. He groups the databases in two categories namely "reference" databases and "source" databases - a helpful distinction. The latter, referred to in the title as "numeric" databases, are structured compilations which give the questioner the required information directly - usually in numeric form. The former, described in the title of the seminar as "bibliographic" refers the questioner to likely sources of answers to his inquiry. The list of geoscience databases in which each is indicated as "reference" or "source" has 111 entries, of these 46 are in the "reference" category and 65 in the "source" category. The distribution among the various subdisciplines is as follows: General Geoscience-18, Minerals-24, Fuels-22, Geology-21, Geochemistry-14, Geophysics-12. The names of the following randomly selected databases give an idea character of the compilation:

MINING TECHNOLOGY (MINTEC) (Canada, Reference)
PETROLEUM DATA SYSTEM (USA, Source)
ROCK MECHANICS INFORMATION SERVICE (UK, Reference)
NATIONAL URANIUM RESOURCE EVALUATION PROGRAM (NURE) (USA, Reference)
EARTHQUAKE DATA FILE (USA, Source)
SEISMIC DATA ANALYSIS SYSTEM (SEDAS) (USA, Source).

Copies of the paper are available from Dr. C.F. Burk, Jr., Canada Centre for Geoscience Data, 580 Booth Street, Ottawa K1A 0E4, Canada.

## CODATA/UNESCO TRAINING COURSE ON DATA MANAGEMENT IN THE GEOSCIENCES

A training course covering the general aspects of data accessibility dissemination and utilization with emphasis on data in petrology and mineralogy is planned to be held at the Federal University of Ouro Preto in Brazil on 7-12 December 1981, under the auspices of Unesco and CODATA.

The objectives of the course are:

- to review the current and future role of numeric databanks in science and technology, with emphasis on those in geoscience and petrology and mineralogy
- to describe the availability of data resources and services currently available world-wide
- to analyze the particular problems of numerical data dissemination and how they differ from problems encountered in the dissemination of other kinds of information: formats, units of measurement, copyrights, costs
- to provide guidelines and references for the creation and utilization of data by means of database management systems and communication networks
- to encourage the formation of regional, topical, computer-based information and data centers, with particular emphasis on data generation and data exchange in petrology, mineralogy and geoscience
- to teach the use of databases for problem solving by computer.

Applications forms are available from:

CODATA/Unesco Training Course
c/o Geological Department
Federal University of Ouro Prêto
P.O. Box 50
35400 Ouro Prêto/MG
Brazil

# BOOKS OF SPECIAL INTEREST

## DATA NEEDS: MECHANICAL PROPERTIES FOR METALS AND ALLOYS[1] (1980, 38 pp, National Academy Press).

A U.S. National Research Council report has been published that assesses the status of data reporting, collecting, appraising, and disseminating of mechanical properties for metals and alloys. The report surveys comprehensively and documents concisely issues and problems that must be addressed if data needs are to be adequately met in the future.

The report explains the complexities of dealing with identification of materials and appraisal of their mechanical properties in contrast to evaluating physical and chemical properties of pure substances. It discusses: Data Uses and Dissemination; Data Sources, Collection, and Appraisal; Activities in Development of Test Methods for Measuring Mechanical Properties; Computerizing a Mechanical Properties Data System; International Aspects; and, in an appendix, Some Mechanical Properties Data Sources.

The study is the result of a request from the U.S. National Bureau of Standards' Office of Standard Reference Data to the Numerical Data Advisory Board of the National Research Council/ National Academy of Sciences. A panel was convened representing a broad range of interests from industry, professional societies, standards activities, energy technologies, and design of critical parts, and was chaired by Jim Graham from Deere & Co., and representing the Metals Properties Council.

One conclusion of the report is that a major prerequisite to data activities is not yet adequately in place, namely, that of standard test methods, standardized nomenclature, and uniform data reporting methods. Data in the literature or in reports cannot be adequately compared, assessed, and appraised ("evaluated") until such a measurement basis becomes further developed and utilized. This is particularly true when those data are to be applied to critical structures such as suspension bridges, nuclear reactor vessels, containers for hazardous materials, and aircraft. The panel identifies this problem as being international and identifies several organizations whose missions relate to this problem including NBS, CODATA, ISO, and ASTM.

A second identified shortcoming is the absence of uniform methods of property data appraisal. This again is a topic that should be addressed on an international level, the report notes.

Once these standard practices are adequately in place, compatible evaluated databases can be developed by any private or public concern. A method of computerizing such a database, including examples of data entry forms is described in the report.

A number of other issues and problems are identified and described in the report, several of which are relevant to CODATA.

C.G. Carter

## THE TECHNOLOGICAL IMPORTANCE OF ACCURATE THERMOPHYSICAL PROPERTY INFORMATION (NBS Special Publication 590).

There are doubts expressed nowadays in many quarters about the usefulness of generating and evaluating data unless there is an actual need. It is, therefore, a reassuring sign that the National Bureau of Standards should have published as an NBS Special Publication the papers concerned with the technological importance of data information given at a meeting of the American Society of Mechanical Engineers (ASME).

It is true that there is the usual disclaimer that the views expressed by the authors are not necessarily those of the NBS, but the fact that the proceedings have been published in this series indicates the NBS's interest in the subject and in the aims of ASME's Committee on Thermophysical Properties which organized the special session. It should also be noted that the introductory survey on the role of data accuracy in applications of thermophysics was written by a member of the NBS Thermophysics Division, Dr. Max Klein.

His splendid article may be likened to Hamlet: it's "full of quotations" - rather, full of passages worthy of becoming "quotations". How better to express the rationale of data gathering for industry than with the two well-worded antithetical sentences: "Thus with the exception of those very few substances whose utility is broad and long term, e.g. steam, the probability is quite small that a need will exist at any given time for some particular subset of thermodynamic properties for a particular substance or mixture chosen at random. On the other hand, at any particular time, the probability is quite large that a need exists for thermodynamic data of some kind for some substance and that this need was not previously predictable". Or, when referring to the transfer of ethylene near its critical point, he says: "Because of very large uncertainties in data correlation near the critical point, the resulting error estimate for the metering process as to quantity transferred approached total uncertainty". A delightfully diplomatic way of saying: "They hadn't a clue as to what they were doing".

[1] *Mechanical Properties Data for Metals and Alloys: Status of Data Reporting, Collecting, and Disseminating. Panel on Mechanical Properties Data for Metals and Alloys; Numerical Data Advisory Board Assembly of Mathematical and Physical Sciences.* Available from Numerical Data Advisory Board, National Research Council, 2101 Constitution Avenue, N.W., Washington, D.C. 20418.

Another good example of the consequences of insufficient data is the case of the firm which suspected that all was not well with their way of metering ethylene. So they decided to evacuate completely a salt dome, used for storage, and measure the amount of the ethylene removed. They found that "much more ethylene had been removed than had been stored", a clear indication of the inadequacy of the thermophysical data on which the conversion of flow parameters to quantity of material is based.

These are just a few telling examples culled from a wealth of similar material contained in this introductory article. The remaining five papers deal with specific subjects, as the abstract shows: "The areas covered included aerospace sciences, where such data have played a central role for a number of years; and geosciences, where first steps are being taken toward using accuracy in describing systems in terms of thermophysical properties. Also included were a discussion of the economic value of accuracy in the chemical process industry, a description of the role of data centers, and a description of several high-quality data compilations. An example of a specific problem in the design of heat exchanger for geothermal applications was also presented with the design uncertainties produced by data inacurracies illustrated".

The authors are R.C. Hendricks, H.E. Khalifa and J. Kestin, M. Klein, P.E. Liley, N.A. Olien, H.P. Stephens, and S. Sinnock.

All in all a good and timely publication which should be recommended reading matter for those who have the health and competitiveness of industry at heart.

N. Kurti

## CONCRETE AND CRYOGENICS - F.H. Turner

(Cement and Concrete Association 1979, 100 pp., £10.00, ISBN 0 7210 1124 1).

Cryogenics, i.e. the art, science and technology of producing, distributing and conserving at low temperatures - say below -150 °C (120 °K) - has developed rapidly in the last 5 or 6 decases. The main reasons for this upsurge were the widespread use of oxygen (obtained from the atmosphere by low temperature fractional distillation) in many industrial processes, the use of liquid hydrogen (and of liquid oxygen) in rocket propulsion, the advent of liquid natural gas, (LNG) and the possibilities of large scale use of liquid helium in the generation and transmission of electricity with the help of superconductors. The most commonly used constructional material in industry is steel in its various forms, but, for low temperature use, it has the great disadvantage of becoming brittle unless it has high nickel content. It is for this reason that prestressed concrete is finding more and more applications in cryogenics.

One would be justified in asking why a book addressed to specialists in concrete technology should be reviewed in a periodical serving the "Data Community". However it is felt that, even though large, comprehensive data-banks can answer the questions of specialists, there is also a need for well-chosen data collections designed to help the specialized engineer and technologist, and that such a collection should be an integral part of any textbook or manual.

The book under review performs this desirable function well. It contains, in the form of tables or graphs, the essential low temperature data likely to be needed by the designers of low temperature equipment made of concrete. They include the thermophysical properties of fluids ranging from water (boiling point 373 °K) to hydrogen (B.P. 20 °K), low temperature data of prestressed concrete, such as elastic modulus, strength, thermal conductivity, permeability and, also, on a more general level, data for safety assessment.

The author should be commended for giving data not only in "Imperial Units" so beloved by engineers, particularly in the U.S., but also in SI (Système International) and sometimes in CGS (called "metric" in this book) units. There are extensive tables of conversion and it seems that the designer of a container, e.g. LNG, will find all he needs in these handsomely produced glossy pages. But one can't help wondering whether the needs of the designer would not have been better served if this book had been published not only as a library tome but also as a modestly sized and modestly priced volume within the reach of the individual engineer.

The introduction describes the manifold applications of low temperatures, but it is a pity that the credibility of this otherwise good review might be endangered by the mention of: "centres for low-temperature storage of human bodies ..... opened in the U.S.A., in which corpses can be stored until medical technology had advanced sufficiently to be able to revive them". The recent discoveries of rotting corpses have exposed this particular area of cryotechnology as a cruel confidence trick which has probably lined some pockets and has certainly created misery through giving hope, followed by bitter disappointment.

N. Kurti

# NEW PUBLICATIONS

## CHEMICAL KINETICS

TABLE OF RECOMMENDED RATE CONSTANTS FOR CHEMICAL REACTIONS OCCURRING IN COMBUSTION National Standard Ref. Data Series, National Bureau of Standards 67, (1980, 110 pp., $4.25, U.S. Govt. Printing Office, Washington, DC 20402, SD Stock No. SN003-003-) by Francis Westley.

## CHEMISTRY

JOURNAL OF PHYSICAL AND CHEMICAL REFERENCE DATA VOL. 9 (1980, 1367 pp., $135 for U.S., Canada and Mexico, $141 other countries, special rates for members ACS or AIP, American Chemical Society, 2255 Sixteenth St., N.W., Washington, DC 20036) edited by David R. Lide, Jr. Contents: Energy Levels of Magnesium Mg I through Mg XII by W.C. Martin and Romuald Zalubas; Microwave Spectra of Molecules of Astrophysical Interest. XVIII. Formic Acid by Edmond Willemot, Didier Dangoisse, Nicole Monnanteuil, and Jean Bellet; Refractive Index of Alkaline Earth Halides and Its Wavelength and Temperature Derivatives by H.H. Li; Evaluated Kinetic and Photochemical Data for Atmospheric Chemistry by D.L. Baulch, R.A. Cox, R.F. Hampson, Jr., J.A. Kerr, J. Troe, and R.T. Watson; Energy Levels of Scandium, Sc I through Sc XXI by Jack Sugar and Charles Corliss; Comments: Revised Values of the Osmotic Coefficients and Mean Activity Coefficients of Sodium Nitrate in Water at 25 °C by Y.C. Wu and W.J. Hamer; Announcement of Second International Conference on Precision Measurement and Fundamental Constants; A Compilation of Kinetic Parameters for the Thermal Degradation of *n*-Alkane Molecules by D.L. Allara and Robert Shaw; Refractive Index of Silicon and Germanium and Its Wavelength and Temperature Derivatives by H.H. Li; Microwave Spectra of Molecules of Astrophysical Interest. XIX. Methyl Cyanide by D. Boucher, J. Burie, A. Bauer, A. Dubrulle, and J. Demaison; A Review, Evaluation and Correlation of the Phase Equilibria, Heat of Mixing, and Change in Volume on Mixing for Liquid Mixtures of Methane + Propane by R.C. Miller, A.J. Kidnay and M.J. Hiza; Saturation States of Heavy Water by P.G. Hill and R.D. Chris MacMillan; The Solubility of Some Sparingly Soluble Lead Salts: An Evaluation of the Solubility in Water and Aqueous Electrolyte Solution by H. Lawrence Clever and Francis J. Johnston; Molten Salts Data as Reference Standards for Density, Surface Tension, Viscosity, and Electrical Conductance: $KNO_3$ and NaCl by George J. Janz; Molten Salts: Volume 5, Part 1, Additional Single and Multi-Component Salt Systems. Electrical Conductance, Density, Viscosity, and Surface Tension Data by G.J. Janz and R.P.T. Tomkins; Pair, Triplet, and Total Atomic Cross Sections (and Mass Attenuation Coefficients) for 1 MeV-100 GeV Photons in Elements $Z = 1$ to 100 by J.H. Hubbell, H.A. Gimm and I. Øverbø; Tables of Molecular Vibrational Frequencies, Part 10 by Takehiko Shimanouchi, Hiroatsu Matsuura, Yoshiki Ogawa, and Issei Harada; An Improved Representative Equation for the Dynamic Viscosity of Water Substance by J.T.R. Watson, R.S. Basu and J.V. Sengers; Static Dielectric Constant of Water and Steam by M. Uematsu and E.U. Franck; Compilation and Evaluation of Solubility Data in the Mercury(I)Chloride-Water System by Y. Marcus; Recent Data Compilations; Property Index - Volumes 1-9 (1972-1980); Index to Selected Classes of Materials - Volumes 1-9 (1972-1980); Author Index - Volumes 1-9 (1972-1980).

## COMPUTER SCIENCE

DATA ABSTRACTION, DATABASES, AND CONCEPTUAL MODELLING: AN ANNOTATED BIBLIOGRAPHY, (1980, 86 pp., $3.75, U.S. Govt. Printing Office, Washington, DC 20402, SP 500-59) by Michael L. Brodie.

DATA BASE TECHNIQUES FOR PICTORIAL APPLICATIONS, (1980, 599 pp., $34.90, Springer-Verlag, Berlin-Heidelberg-New York) edited by A. Blaser. Proceedings of a Conference held in Florence, June 1979.

INTERACTIVE FORTRAN IV COMPUTER PROGRAMS FOR THE THERMODYNAMIC AND TRANSPORT PROPERTIES OF SELECTED CRYOGENS (FLUID PACK), NBS Technical Note 1025 (1980, 112 pp., $4.50, U.S. Govt. Printing Office, Washington, DC 20402) by R.D. McCarty.

## EARTH SCIENCES

CATALOGUE OF INSTRUMENTALLY-MEASURED WAVE DATA, Issue No. 1 (1979, 276 pp.) Marine Information and Advisory Service (MIAS) which is the U.K.'s Responsible National Oceanographic Data Centre (RNODC), designated by the IOC (International Oceanographic Commission) to act on instrumentally measured wave data. Address: MIAS, Institute of Oceanographic Sciences, Wormley, Godalming, Surrey GV8 5UB, U.K.). A world-wide list of about 350 measuring centres (coastal stations, lighthouses, etc.), with details about measuring techniques, types of data, extent of collections.

WATER DATA SOURCES DIRECTORY, (1980, about 900 pp., Price: Microfiche $2.25, Printed $40, Binder $4 extra, National Water Data Exchange (NAWDEX) of the U.S. Geological Survey, 421 National Center, Reston, Virginia 22092, U.S.A.). This is an exhaustive directory of some 800 entries

covering the U.S., its dependent territories, and certain parts of Canada and Mexico. In addition to the usual information such as addresses, etc., each entry gives full information about the categories of information available (e.g. surface water quantity/quality, ground water quality, etc.) and the number of sites from which data in each of the above categories are collected.

## HANDBOOKS

HANDBOOK SERIES IN INORGANIC ELECTRO-CHEMISTRY, VOLUME I, (1981, 512 pp., $64.95 in U.S.A., $74.95 outside U.S.A., CRC Press, Boca Raton, Florida 33431, U.S.A.) edited by L. Meites and P. Zuman.

HANDBOOK SERIES IN ORGANIC ELECTROCHEMISTRY, VOLUME IV, (1980, $59.95 in U.S.A., $68.95 outside U.S.A., CRC Press, Boca Raton, Florida 33431, U.S.A.) edited by L. Meites and P. Zuman.

## MECHANICAL AND ENGINEERING DATA

A CRITICAL COMMENTARY ON MEAN FLOW DATA FOR TWO-DIMENSIONAL COMPRESSIBLE TURBULENT BOUNDARY LAYERS, (1980, 230 pp., free of charge, AGARD, 7 rue Ancelle, 92200 Neuilly, France, Ref. AGARD-AG-253) by H.H. Fernholz and P.J. Finley.
Theoretical and critical commentary of data presented in AG-223 (see Newsletter No. 21).

DOCUMENTATION RHEOLOGY NO. 46, (1980, 848 pp., $100, Bundesanstalt für Materialprüfung, Unter den Eichen 87, D-1000 Berlin 45, F.R.G.) edited by E. Rudolph, H. Tischer, D. Mercks and J.G. Ilter.

DOCUMENTATION TRIBOLOGY-WEAR, FRICTION AND LUBRICATION NO. 14, (1980, 1415 pp., $84, Bundesanstalt für Materialprüfung, Unter den Eichen 87, D-1000 Berlin 45, F.R.G.) edited by H. Tischer, E. Rudolph, D. Mercks and M. Müller-Lorentz.

EXPERIMENTAL DATA BASE FOR COMPUTER PROGRAM ASSESSMENT, 1979, 642 pp., AGARD (Advisory Group for Aerospace Research and Development of NATO) Advisory Report No. 138, by the Fluid Dynamics Panel Working Group 104, edited by Dr. J. Barche. Obtainable from ONERA, 29, ave. de la Division Leclerc, 94 Châtillon-sous-Bagneux, France).
This report is concerned with the application transonic flow technology to aircraft design. To test and to improve the various computational methods an Experimental Data Base was established to cover the following cases: 2-dimensional (2-D) configurations (airfoils) 3-D configurations (wing and wing-body), body-alone configurations.

## THERMODYNAMIC PROPERTIES

THE VIRIAL COEFFICIENTS OF PURE GASES AND MIXTURES, A CRITICAL COMPILATION, (1980, 518 pp., £25.00, Oxford University Press, Oxford) by J.H. Dymond and E. Brian Smith.
A very extensive, thorough, and critically done evaluation for both individual substances and binary mixtures.

ELECTRONIC PROPERTIES RESEARCH LITERATURE RETRIEVAL GUIDE 1972-1976, (1979, 1596 pp. in four volumes, $275.00, $330.00 outside the U.S.A., IFI/Plenum, New York-London-Bombay) edited by J.F. Chaney and T.M. Putnam.
Contains 19 104 references on 15 electronic properties and seven property groups, including electron emission, luminescence, magnetoelectric, magnetomechanical, photoelectronic, piezoelectric and thermoelectric properties.

LIQUID-LIQUID EQUILIBRIUM DATA COLLECTION, VOL. V, PART 2: TERNARY SYSTEMS, (1980, 627 pp., 176 DM, DECHEMA, Frankfurt/Main, F.R.G.) by J.M. Sørensen and W. Arlt.
PART 3: TERNARY AND QUARTERNARY SYSTEMS, (1980, 605 pp., 173 DM, DECHEMA, Frankfurt/Main, F.R.G.) by J.M. Sørensen and W. Arlt.
The latest volumes in this excellent series of ternary and quarternary data on systems containing water, hydrocarbons, alcohols, ketones, ethers, esters, organic acids, amines, nitriles, halogenated and sulphur-containing hydrocarbons and other non-polymeric organic compounds. The data are correlated with the NRTL and UNIQUAC equations.

MOLYBDENUM: PHYSICO-CHEMICAL PROPERTIES OF ITS COMPOUNDS AND ALLOYS, (1980, 714 pp., 1000 Austrian Schillings, International Atomic Energy Agency, Vienna) edited by L. Brewer.
This is the seventh volume in an IAEA series dealing with some metals important in reactor techniques. The first six volumes treated plutonium, niobium, tantalum, beryllium, thorium and zirconium. The present volume is concerned with the critical evaluation and documentation of the following data on molybdenum: thermodynamic properties, densities, crystallographic structures, equilibrium diagrams and diffusion rates in the condensed state.

SUMMARY OF ON-LINE OR INTERACTIVE PHYSICO-CHEMICAL NUMERICAL DATA SYSTEMS, (1980, 24 pp., $1.75, National Bureau of Standards Technical Note 1122, Govt. Printing Office, Washington, D.C.) by Joseph Hilsenrath.
A brief description is given of 51 interactive physico-chemical numerical data systems, most of which are on-line on international computer networks. The systems are listed under five headings: those useful for identification of substances from spectroscopic data; those providing thermodynamic and transport properties of pure components and mixtures; those which perform metallurgical calculations and draw phase diagrams, systems producing complete tables of thermodynamic properties of individual substances; and those for chemical process simulation, optimization, and design. References to published descriptions of the systems, where they exist, are also given.

THERMODYNAMIC PROPERTIES OF METHANE (TERMODINAMICHESKIE SVOISTVA METANA), (in Russian, 1979, 349 pp., 2 rubles 70 Kopecks, available from "Znak Pocheta" Izdatelstvo Standartov, Novopresnenskiy per. 3, Moscow D-557) by V.V.

Sytchev, A.A. Vasserman, V.A. Zagoruchenko, A.D. Kozlov, G.A. Spiridonov, V.A. Tsymarny.

THERMOPHYSICAL PROPERTIES RESEARCH LITERATURE RETRIEVAL GUIDE, Supplement II 1971-1977, (1979, 1480 pp. in six volumes, $375.00 in U.S.A, $450.00 outside U.S.A.) IFI/Plenum, New York-London-Bombay) edited by J.K. Gerritsen, V. Ramdas and T.M. Putnam.
Contains 16 000 references on 14 thermophysical properties of 20 000 materials.

VOL XV - THERMOPHYSICAL PROPERTIES OF MATTER AND SUBSTANCES (TEPLOFIZICHESKIE SVOISTA VESHCHESTV I MATERIALOV), (in Russian, 1980, 165 pp., 85 kopecks, available from "Znak Pocheta" Izdatelstvo Standargov, Novopresnenskiy Per. 3, Moscow D-557) edited by A.D. Kozlov and V.A. Rabinovich.
This volume presents a collection of papers entitled: Critical Review and Correlation of Experimental Thermal Conductivity Data for Helium at Atmospheric Pressure by N. Kh. Zimina; Periodic-Heating Technique Measurements of the Thermal Conductivity of Gases at High Temperatures by N.B. Vargaftik, Yu. K. Vinogradov, A.V. Veryugin and N.A. Vanicheva; The Measurement and Analysis of Thermal Conductivity Data of Gaseous Freons by O.B. Tsvetkov, Yu. A. Laptev and N.A. Polyakova; Monotonic-Heating Technique Measurements of Thermal Conductivity of Freon Mixtures by O.B. Tsvetkov and Yu. S. Chilipenok; Some Results of the Correlation Treatment of Observed Thermal Conductivity and Viscosity Data on Alkali Metal Vapors by V.S. Yargin; The Gas Semitransparency Effect on the Measurement of Thermal Conductivity of Compressed Gases by A.A. Tarzimanov and R.S. Sal'manov; Experimental Studies on the Viscosity of Methane, Ethane and Propane Series Freons. Correlation of the Observed Data by V.Z. Geller; Experimental Investigation of Thermophysical Properties of the n-$C_5H_{12}$—n-$C_5F_{12}$ System over a Broad Range of Parameters Inclusive of Critical Ones by Yu. M. Aften'ev; Isobaric Heat Capacity of Ammonium Bromide at High Pressures Bordering Upon Order-Disorder Thase Transitions by G.A. Mil'ner and E.I. Ponomarenko; Correlation of Isobaric Heat Capacities of Copper Observed over 70-290 K by A.N. Kovryanov, Yu. R. Chashkin and V.A. Rabinovitch; The Range of Applicability of the Virial Equation of State for Calculation of $C_v$ by Yu. E. Shcheludyak and V.A. Rabinovitch; Applications of Molecular Thermodynamics to the Calculation of Thermodynamic Quantities by V. Yu. Bugaev and V.A. Rabinovitch; Estimation of Errors Involved in Some Methods Used for Measuring Thermophysical Property Data by A.A. Aleksashchenko.

VAPOR-LIQUID EQUILIBRIUM DATA COLLECTION, (DECHEMA, 6000 Frankfurt/Main, F.R.G.)
Vol. I, Part 6a - Aliphatic Hydrocarbons $C_4$-$C_6$ (1980, 687 pp., 168 DM) by J. Gmehling, U. Onken, W. Arlt.
Tables and diagrams of data for binary and multi-component mixtures up to moderate pressures. Systems with 1,3-Butadiene, Butane, i-Butene, 1-Butene, Cyclohexane, Cyclohexene, Cyclopentadiene, Cyclopentane, 2,2-Dimethylbutane, 2,3-Dimethylbutane, Hexane, 1-Hexene, Isoprene, 2-Methylbutane, 2-Methyl-1-butene, 2-Methyl-2-butene, Methylcyclopentane, 2-Methylpentane, 3-Methylpentane, 2-Methyl-1-pentene, 4-Methyl-1-pentene, Neopentane, trans-1,3-Pentadiene, Pentane, 1-Pentene, Vinylacetylene.
Part 6b - Aliphatic Hydrocarbons $C_7$-$C_{18}$, (1980, 506 pp., 148 DM) Systems with 1,5 Cyclooctadiene, Decahydronaphthalene, Decane, α-Dicyclopentadiene, 2,3-Dimethylpentane, 2,4-Dimethylpentane, Dodecane, Ethylcyclohexane, Heptadecane, Heptane, 1-Heptene, 2-Heptene, 3-Heptene, Hexadecane, 1-Hexadecene, Isopropylcyclohexane, Methylcyclohexane, 3-Methylheptane, 3-Methylhexane, Nonane, 1-Octadecene, Octane, 1-Octene, α-Pinene, Tetradecane, 2,2,3-Trimethylbutane, 1,3,5-Trimethylcyclohexane, 2,2,5-Trimethylhexane, 2,2,4-Trimethylpentane, Undecane, 2-Vinyl-(2,2,1)-bicycloheptane, 2-Vinyl-(2,2,1)-bicyclo-5-heptene.
Part 7 - Aromatic Hydrocarbons, (1980, 563 pp., 161 DM) Systems with Benzene, Toluene, Styrene, Ethylbenzene, m-Xylene, o-Xylene, p-Xylene, Isopropylbenzene, Propylbenzene, 1,2,3-Trimethylbenzene, 1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene, Butylbenzene, p-Cymene, 1-Methylnaphthalene, Anthracene.

VISCOSITY OF DENSE FLUIDS, (1979, 280 pp., $39.50, Plenum, New York, London, Bombay) by K. Stephan and K. Lucas.
Contents: Theory and Estimation, Numerical Data on Viscosity.

WZORMAT'S GUIDE-BOOK - PHYSICOCHEMICAL CERTIFIED REFERENCE MATERIALS, (1979, 57 pp., 23 zlotys, Wzormat, Warsaw) edited by Tomasz Plebanski.

## MISCELLANEOUS

ENCYCLOPEDIA OF INFORMATION SYSTEMS AND SERVICES, Fourth Edition (1981, 936 pp., $125.00, Gale Research Co., Detroit, Michigan 48226) edited by A.T. Kruzas and J. Schmittroth, Jr.
Updated version of this valuable reference book contains 2030 descriptions of organizations which produce, process, store and disseminate information products. Eighteen indexes for easy search.

USER EVALUATION OF CRYSTAL DATA PRODUCTS AND SERVICES: QUESTIONNAIRE, ANALYSIS AND IMPACT, (1980, 38 pp., $2.25, U.S. Govt. Printing Office, Washington, D.C. 20402, NBS TN 1112) by J.K. Stalick, A.D. Mighell and R.J. Boreni.
Results of a survey of the needs of users of Crystal Data Determinative Tables and related products and services of the NBS Crystal Data Center.

LES CHIFFRES CLES (KEY VALUES), Ministère de l'Industrie, 101, rue de Grenelle, 75700 Paris. Available from Dunod, 30, rue St. Sulpice, 75006 Paris.
Energie, 1981 (1981, 154 pp., 49 FF)
Matières Premières Minérales, 1981 (1981, 115 pp., 42 FF).

HANDBOOKS AND TABLES IN SCIENCE AND TECHNOLOGY, (1979, 184 pp., 32.50, Oryx Press, 2214 North Central at Encanto, Phoenix, Arizona 85004) edited by Russell H. Powell. An excellent compilation of some 2000 titles. A lucid 3-page introduction explains what is included and what is left out.

# CODATA MEMBERSHIP 1981-82

## OFFICERS AND EXECUTIVE COMMITTEE

| | | |
|---|---|---|
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## SECOND INTERNATIONAL CONFERENCE ON PRECISION MEASUREMENT AND FUNDAMENTAL CONSTANTS

The Second Precision Measurement and Fundamental Constants Conference was held on 8-12 June 1981 at the National Bureau of Standards in Gaithersburg, Maryland. Information may be obtained from: Dr. B. N. Taylor, National Bureau of Standards, Bulding 220, Room B258, Washington, D.C. 20234, U.S.A.

The following speakers presented review talks:
K.M. Baird (NRC, Canada), "Frequency Measurement of Optical Radiation"; S.J. Brodsky (SLAC, U.S.), "Fundamental Measurements and the Structure of Matter at Short Distances"; A. Colclough (NPL, U.K.), "Methods for the Determination of the Gas Constant"; H. de Boer (PTB, F.R.G.), "Experiments Relating to the Gravitational Constant"; R.D. Deslattes (NBS, U.S.), "Applications of X-ray Interferometry to Precision Measurements and Fundamental Constants"; J.L. Hall (NBS/JILA, U.S.), "Optical Frequency Standards: Prognosis and Applications"; T.W. Hänsch (Stanford, U.S.), "Precision Laser Spectroscopy"; H.W. Hellwig (FTS, U.S.), "Frequency Standards Based on Magnetic Hyperfine Resonances"; V.W. Hughes (Yale U., U.S.), "Exotic Atom Spectroscopy"; W.H. Johnson (U. Minnesota, U.S.), "The Measurement of Atomic Masses by Mass Spectroscopic Methods and the Role of Atomic Masses in the Determination of the Fundamental Constants"; B.P. Kibble (NPL, U.K.), "Realization of the Electrical SI Units"; K.v. Klitzing (U. München, F.R.G.), "The Quantized Hall Resistance in Two-Dimensional Systems"; M. Kochsiek (PTB, F.R.G.), "Mass Unit 'Kilogram', Precision Measurement of Mass, Attainable Uncertainties and Possibilities of a New Definition"; J. Müller (BIPM, France), "The Assignment of Uncertainty to Experimental Measurements"; A. Rich (U. Michigan, U.S.), "Experimental Determinations of the Anomalous Magnetic Moments of the Free Leptons"; W.R.C. Rowley (NPL, U.K.), "Laser Wavelength Measurements and Standards for the Determination of Length"; I.W. Roxburgh (U. London, U.K.), "Keynote Address. The Constants of Nature: What are They and Could They be Different?"; A. Sakuma (BIPM, France), "Present Status of the Absolute Measurement of Gravitational Acceleration"; R.C. Vessot (Smithsonian Astrophysical Observatory, U.S.), "Tests of Gravitation and Relativity"; E.R. Williams (NBS, U.S.), "The Proton Gyromagnetic Ratio in $H_2O$ - A Problem in Dimensional Metrology"; D.J. Wineland (NBS, U.S.), "Spectroscopy of Stored Ions"; D.R. Yennie (Cornell U., U.S.), "The Implications of QED Theory for the Fundamental Constants".

The CODATA Task Group on Fundamental Constants under the chairmanship of Dr. E. Richard Cohen met directly afterwards. A report of their meeting will appear in the next Newsletter.

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Proceedings of the 7th International CODATA Conference, Kyoto, Japan, 8-11 October 1980

Edited by P S Glaeser, CODATA Secretariat, Paris

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## CODATA PUBLICATIONS

Proceedings : Third International CODATA Conference : Le Creusot, France 26-30 June 1972, 100 pp, CODATA Secretariat, US $15.
Fourth International CODATA Conference : Tsakhcadzor, USSR, 24-27 June 1974, 171 pp, Pergamon Press. US $ 25.
Fifth International CODATA Conference : Boulder, USA, 28 June-1 July, 1976, 642 pp, Pergamon Press, US $ 70.
Sixth International CODATA Conference : Santa Flavia, Italy, 22-25 May 1978, 433 pp, Pergamon, US $ 95.

CODATA Newsletter - distributed free of charge on an irregular basis.

**CODATA Bulletin :**

No 1 (Oct. 1969), 12 pp, *Automated Information Handling in Data Centers, US $ 1.50, superseded by Bulletin No 4.*

Nos 2, 5, 6, 7, 10, 17 and 22, superseded by Bulletin No 28.

No 3 (Dec. 1971), 28 pp, *A Catalog of Compilation and Data Evaluation Activities in Chemical Kinetics, Photochemistry and Radiation Chemistry*, US $ 3.50.
(Report of the CODATA Task Group on Data for Chemical Kinetics).

No 4 (Dec. 1971), 12 pp. *Automated Information Handling in Data Centers*, US $ 1.50 2nd Edition.
(Report of the CODATA Task Group on Computer Use, Nov. 1971).

No 8 (Nov. 1972), 32 pp, *Geological Data Files : Survey of International Activity*, US $ 3.50.
(Report of COGEODATA, Committee on Storage, Automatic Processing and Retrieval of Geological Data of the International Union of Geological Sciences (IUGS).

No 9 (Dec. 1973), 6 pp, *Guide for the Presentation in the Primary Literature of Numerical Data Derived from Experiments*, US $ 1.50.
(Report of the CODATA Task Group on Presentation of Data in the Primary Literature, Sept. 1973).

No 11 (Dec. 1973), 8 pp, *Recommended Consistent Values of the Fundamental Physical Constants, 1973*
(Report of the CODATA Task Group on Fundamental Constants, August 1973).

No 12 (Sept. 1974), 12 pp, *Energy Data Accessing and/or Retrieval*, US $ 1.50.
(Report on Data Tagging, compiled by a Panel of Experts at the Energy R & D Data Workshop held at Gaithersburg, Md, May 6-7, 1974).

No 13 (Dec. 74), 8 pp, *The Presentation of Chemical Kinetics Data in the Primary Literature*, US $ 1.50.
(Report of the CODATA Task Group on Data for Chemical Kinetics).

No 14 (Feb. 1975), 180 pp, *Proceedings of the Fourth International CODATA Conference on the Generation, Compilation, Evaluation and Dissemination of Data for Science and Technology* (Tsakhcadzor, U.S.S.R., June 1974), US $ 17.00.

No 15 (March 1975), 32 pp, *Man-Machine Communication in Scientific Data Handling*, US $ 5.00.
(Proceedings of the Symposium sponsored by the CODATA Task Group on Computer Use, Freiburg im Breisgau, F.R.G., July 1973).

No 16 (October 1975), 32 pp, *Study on the Problems of Accessibility and Dissemination of Data for Science and Technology*
(Report of the CODATA Task Group on Accessibility and Dissemination of Data), US $ 5.00.

No 18 (April 1976), 44 pp, *Abstracts - Fifth International CODATA Conference*, US $ 5.00.

No 19 (June 1976), 22 pp, *Flagging and Tagging Data*, US $ 5.00.
(Report of the ICSU AB/CODATA Joint Working Group).

No 20 (Sept. 1976), 16 pp, *Recommendations for Measurement and Presentation of Biochemical Equilibrium Data*, US $ 5.00.
(Report of the ICSU Interunion Commission on Biothermodynamics).

No 21 (Oct. 1976), 122 pp, *Proceedings of the Plenary Sessions Fifth International CODATA Conference*, US $ 7.50.

No 23 (May 1977), 42 pp, *Selected Papers Relevant to Energy Presented at the 5 th International CODATA Conference*, US $ 5.

No 24 (June 1977), 42 pp, *CODATA Directory of Data Sources for Science and Technology, Chapter 1 : Crystallography*, US $ 10.

No 25 (Nov. 1977), 5pp, *Biologists' Guide for the Presentation of Numerical Data in the Primary Literature*, US $ 1.50.
(Report of the CODATA Task Group on the Presentation of Biological Data in the Primary Literature).

No 26 (Jan. 1978), 37 pp, *International Training Courses in the Handling of Experimental Data*, US $5.00.
(Report of the CODATA Task Group on International Training Courses in the Handling of Experimental Data).

No. 27 (March 1978), 40 pp, *Abstracts-6th International CODATA Conference*, US $5.00

No 28 (April 1978), 17 pp, *CODATA Recommended Key Values for Thermodynamics 1977*, US $5.00.
(Report of the CODATA Task Group on Key Values for Thermodynamics)

No 29 (Nov. 1978), 64 pp. *Selected Papers on Natural and Man-Made Hazards and Related Questions from the 6th International CODATA Conference*, US $10.00.

No 30 (Dec. 1978), 6 pp, *Guide for the presentation in the primary literature of physical property correlations and estimation procedures*, US $1.50.
(Report of the CODATA Task Group on Data for the Chemical Industry)

No 31 (Mar 1979) 30 pp, *Data Needs for Energy*, US $ 7.50.

No 32 (Aug. 1979), 6 pp, *Guide for the Presentation in the Primary Literature of Numerical Data Derived from Observations in the Geosciences*, US $ 1.50.

No 33 (Sep. 1979), 16 pp, *Evaluated Kinetic and Photochemical Data for Atmospheric Chemistry*, US $ 7.50.
(Report of the CODATA Task Group on Chemical Kinetics)

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(Report of the CODATA Task Group on Computer Use)

No 35 (Dec. 1979), 91 pp, *CODATA Directory of Data Sources for Science and Technology, Chapter 2 : Hydrology*, US $ 10.00.

No 36 (Jan. 1980), 56 pp, *CODATA Directory of Data Sources for Science and Technology. Chapter 3 : Astronomy*, US $ 10.00.

No 37 (July 1980), 67 pp, *Abstracts - 7 th International CODATA Conference*, US $ 6.00.

No 38 (Sep. 1980), 80 pp, *CODATA Directory of Data Sources for Science and Technology, Chapter 4 : Zoology*, US $ 10.00.

No 39 (Dec. 1980), 109 pp, *Problems in the Treatment of Numerical Data*, US $ 10.00
Proceedings of the Joint French-Israeli Interdisciplinary Symposium, Jerusalem, Israel, 5-6 March 1980)

# Data Handling for Science and Technology

## AN OVERVIEW AND SOURCEBOOK

*Sponsored by* CODATA *and* UNESCO

*edited by* **STEPHEN A. ROSSMASSLER (†),** *National Bureau of Standards, Washington, D. C., U.S.A. and* **DAVID G. WATSON,** *University Chemical Laboratory, Cambridge, England.*

1980. xvi + 184 pages. ISBN 0-444-86012-6
Price in the U.S.A./Canada: US $25.00. In all other countries: US $29.25/Dfl. 60.00

This book is intended to provide an introductory survey of the basic aspects of handling scientific and technical data, and to indicate to the reader, selected sources from which more details can be obtained. It is in this sense that the title carries the name "Sourcebook". The text is addressed to a varied body of users, including people who generate, publish, abstract, collect, evaluate, repackage, disseminate, and apply data, as well as to those who provide training courses in the handling of data, and those who administer the funding for all these activities.

Immediately following the Introduction, there is an examination of how and why data are generated, with a discussion of the differing degrees to which data have an "absolute" aspect (in the sense that they can be determined independently of any environmental conditions or measurement techniques) and a brief overview of systems for measuring and recording data. A two-part chapter is devoted to data-related aspects of the biosciences and geosciences.

There is also a survey of statistical analysis and interpretation of data. The following four chapters examine four important systematic aspects of data handling: presentation in the primary literature, means of finding data in the primary literature, the critical operations of compilation and evaluation of data, and the standards and guidelines which give structure to data handling. A chapter is devoted to a brief overview of how computers are used in laboratory science to handle data. The final chapter offers a cross-cut analysis of the formal and informal mechanisms by which data are disseminated, involving the interactions between suppliers and users of data.

The book therefore addresses itself to producers and users of data as well as to information specialists increasingly called upon to provide numerical data to scientific users. It should prove invaluable in scientific libraries and other information centres in both developed and developing countries. It is a book which by its very nature is timely and necessary, and yet will clearly require periodic revision since it is concerned with a rapidly developing field.



**In Memoriam**
This volume is dedicated to the memory of Stephen A. Rossmassler, whose scholarly approach to complex problems, his conscientious service to many organizations, and his urbane but gentle wit will be remembered by all.

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