



23 CODATA / NEWSLETTER

APRIL 1982

SITE OF 8TH INTERNATIONAL CODATA CONFERENCE CHANGED FROM KOZUBNIK TO JACHRANKA/ZEGRZYNEK

The Polish National Committee for CODATA has changed the site of the 8th International CODATA Conference to Jachranka/Zegrzynek, a suburb of Warsaw, approximately 30 kilometers east of the capital.

The scientific program for the Conference which is scheduled for 4-7 October 1982 is in the final stage of being formalized. Plenary sessions are planned for the Geosciences and Natural Resources, Chemistry and Chemical Industry, Materials Science, Data Banks and Computer Sciences. Proposed topical sessions include "Geosciences - Data Banks, Data Handling, Modelling, Environmental Monitoring," "Systems, Data Banks and Services," "Processed Data for Computer-Aided Design," "Computer Data Analysis," "Phase Equilibria and Phase Stability including Solubility Data," "Thermodynamic Data," "Materials Data," "Physics Data," and "Biosciences Data". Poster sessions are planned throughout the Conference. Approximately 95 submitted papers have been received by the Program Committee and participation of about 200 scientists is expected.

The second circular for the Conference with further details is available from:

Prof. Andrzej Bylicki
 Institute of Physical Chemistry
 Polish Academy of Sciences
 P.O. Box 49
 ul. Kasprzaka 44/52
 01-224 Warsaw
 POLAND

or
 CODATA Secretariat
 51 Boulevard de Montmorency
 75016 Paris
 FRANCE

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.

CODATA MEETINGS 1982

9-10 February
 15-16 February
 17-19 February

 22 March
 22-23 March

 23-24 March

 25-27 March
 31 May-2 June
 14-15 June
 28 June-1 July
 25-26 September

 4-7 October
 7-9 October

Geoscience Committee, Paris
 Working Group on a Hybridoma Data Bank, Geneva
 Task Group on Internationalization and Systematization of Thermodynamic Tables, Paris
 Committee on Data for Industry, Paris
 Task Group on Accessibility and Dissemination of Data, Paris
 Scientific Program Committees of 8th and 9th International CODATA Conferences, Paris
 CODATA Executive Committee, Paris
 Task Group on Chemical Kinetics, Paris
 Task Group on Data for the Chemical Industry, Paris
 Task Group on Fundamental Constants, Boulder
 Task Group on Thermophysical Properties of Solids, Baden-Baden
 8th International CODATA Conference, Jachranka/Zegrzynek
 14th CODATA General Assembly

IN MEMORIAM YERAM S. TOULOUKIAN

Thermophysics has suffered a heavy loss, a loss of a giant leader whose impact will be felt throughout the scientific and technological communities. With the unexpected death of Professor Yeram S. Touloukian on 12 June 1981 while attending a meeting of the CODATA Task Group on Thermophysical Properties of Solids of which he had been the chairman from 1972-1976, the thermophysics family is left without its main pillar of support, its source of strength and its guiding light. No single individual has done as much for the advancement of the thermophysics field as has Professor Touloukian. His name has become synonymous with thermophysical properties, which he molded into a highly respected field of study in its own right.

Touloukian was a great engineer with a broad scientific knowledge and a deep perception of the needs of reliable properties data by the technical and scientific communities. His lifelong ambition was to make available properly documented and carefully evaluated data on thermophysical and related properties of materials. With exceptional personal dedication and effort, he singlehandedly established the Thermophysical Properties Research Center (now known as CINDAS) at Purdue University in 1957. In addition, Touloukian's intense belief in the importance of high-quality research influenced and motivated numerous investigators and led to the establishment of some of the best research facilities in thermophysical measurements.

Touloukian never hesitated to start something new once he was convinced of its usefulness and needs. His role and effectiveness in starting new conferences, forming committees and task groups, and numerous other activities in the thermophysical properties field are very well known. One of the most recent examples is his vital role in the establishment of the "International Journal of Thermophysics." The journal, in its second year of publication, owes its existence to Touloukian's foresight, determined efforts, and constant support.

Touloukian's monumental and extremely valuable contributions were recognized and appreciated by people and organizations in engineering as well as in scientific fields. Throughout his career, he received numerous awards and honors from both national and international organizations. The most recent of all is the award by the International Thermophysics Congress. Although planned several months before his death, the award was presented posthumously during the International Joint Conferences on Thermophysical Properties on 16 June 1981. The award recognized his outstanding leadership in the international thermophysics community, his unique perceptions and guidance in thermophysics research, and his pioneering and major contributions to the thermophysical properties literature.

Those of us who have had the opportunity of knowing Touloukian personally will miss his dynamic personality, his youthful enthusiasm, and his warmth. His faith in humanity and his optimism for the future have given us self-confidence and strength. He had a genuine concern for people and never hesitated to extend his helping hand. He has left behind many strong and enduring



friendships. We will miss him very much, yet we are very thankful for being fortunate enough to have known him in our limited lifetimes. We will cherish, for the rest of our lives, the pleasant and valuable memories we have had with him.

Let our resolve to support the continuation of his ideals and projects be a humble indication of our gratitude and appreciation for all the things he has done. There can be no better tribute to Professor Touloukian than our continued work in thermophysics with the enthusiasm, vigor, dedication, and the sense of perfection that he had and always wanted us to share.

Ared Cézairliyan
Chairman, International Thermophysics Congress
(Printed with permission from the *Thermophysics and Electronics Newsletter*, May/June 1981.)

PROFESSOR YERAM S. TOULOUKIAN MEMORIAL FUND

The Touloukian family has established the "Professor Yeram S. Touloukian Memorial Fund" at Purdue University. Contributions in memory of Professor Touloukian may be earmarked for the Fund and sent to:

Professor Yeram S. Touloukian Memorial Fund
c/o Office of the Dean of Engineering
Purdue University
West Lafayette, Indiana 47907
U.S.A.

CODATA Secretariat
51 Boulevard de Montmorency
75016 Paris, France
TEL.: 525.04.96 - TELEX: 630553 F ICSU

Editor: Phyllis Glaeser, Executive Secretary
Associate Editors: David R. Lide, Jr. and Edgar F. Westrum, Jr.

Le directeur de la publication: Phyllis Glaeser

IN MEMORIAM BORIS VODAR

Professor Boris Vodar died in Paris on 15 February 1982, leaving the world richer for his having been here, but depriving it of an eminent scientist, a founding father of CODATA, and a warm, generous, enthusiastic human being.

Born in Petrograd, U.S.S.R. in 1910, Boris Vodar became a French citizen in 1934. He studied at the Sorbonne in Paris where he received his PhD in physics on the study of electronic spectra in 1934 under the tutelage of Professor Eugène Darmois.

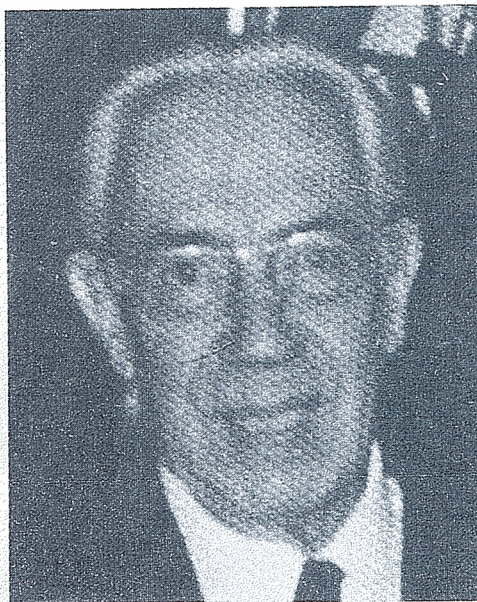
In 1948 he founded and became Director of the Laboratory of High Pressures at Bellevue (later to become the Laboratory of Molecular Interactions and High Pressure, LIMHP). In his initial work he developed techniques for far ultraviolet spectroscopy in order to study the structure of simple light molecules; the experimental progress made in U.V. spectroscopy later was used to investigate the density dependence of electronic spectra. While performing experiments in the new field of optical studies on compressed gases he discovered the general importance of high pressure as a new frontier in many areas of atomic and molecular science. His research on molecular substances extended from the study of interactions between molecules in the ground state to spectroscopic studies involving rotational, vibrational and electronic interactions. One of his first achievements was to increase both pressure and temperature of high pressure equipment (much of which he designed himself) in order to observe simple dense gases under conditions where the theories based on the hard sphere model were more likely to apply.

Later, Professor Vodar launched shock wave studies and carried out the first experiment of its type on liquefied argon where he obtained supercritical argon at about 70 kbar and 1200 K. One of the first scientists to undertake measurements of transport properties in wide temperature and pressure ranges, he measured the thermal conductivity of several gases up to 1 kbar at 700 °C and up to 10 kbar at room temperature. In addition, he measured the viscosity of nitrogen up to 6 kbar and of a number of rare gases using a capillary flow method.

The entirety of his scientific work is too enormous to recount here. He touched upon photoelectric receptors, their reflecting layers, crystalline resistivity and a wide range of work effected as a function of pressure and temperature in the domains of spectroscopy, thermodynamics, biology and solid state physics. He published over 300 scientific articles and edited two books.

Among his many scientific distinctions were the Médaille Bourdon 1950, the Prix Daistan-Blutel and the Prix Hughes of the French Academy of Sciences, Commandeur des Palmes Académiques, Officer of the National Order of Merit, Officer of the Legion of Honor, Bridgman Award, Honorary Fellow of the International Association for the Properties of Steam (IAPS) and Fellow of the American Physical Society.

While his scientific achievements were many, he simultaneously animated those around him with his intense desire to bring scientists together from all over the world. Prior to CODATA's establishment in 1966 he was a member of the ICSU Working



Group on Critical Tables (1964-1966) along with Academician V.A. Kirillii (U.S.S.R.), Prof. W. Klemm (F.R.G.), Prof. F.D. Rossini (U.S.A.), Sir Gordon Sutherland (U.K.) under the chairmanship of Prof. Harrison Brown (U.S.A.). This group was to examine the proposal for a voluntary coordination of compilations of critically evaluated numerical and other quantitative data being compiled in all appropriate disciplines in various countries to assure that the data were available as a meaningful whole to all who desired them. This Working Group was the precursor of the ICSU International Committee on Data for Science and Technology (later known as CODATA) whose first Bureau Meeting was held in June 1966 with Professor Vodar present as delegate from France. CODATA was to be one of the vehicles he would use for realizing his dream of international cooperation among scientists, along with the International Association for the Advancement of Research in Technology of High Pressure (AIRAPT) and the International Association on the Properties of Steam (IAPS). He remained French delegate until 1970 at which time he was elected President of CODATA, an office he held until 1974. Under his presidency, membership increased from 22 to 28 Union and National Delegates and he was instrumental in the establishment of the World Data Referral Center, and the Associate Organization Committee within CODATA. Simultaneously he was President of CODATA-France and after his term as President of CODATA International he continued to occupy the post of chairman of the Committee of Associate Organizations. At the General Assembly in Kyoto in 1980 he was named chairman of the newly established Task Group on Critical Interdisciplinary Survey of Property Data on High Pressure Phases of Materials.

Professor Vodar was an accomplished conference organizer and excelled in it. He was responsible for organizing six international conferences in France including the unforgettable 3rd International CODATA Conference at Le Creusot in 1972.

His indelible personality was marked by his great kindness, simplicity, thoughtfulness and respect for others. In 1979, on the occasion of Professor

Vodár's retirement from LIMHP and his being named Honorary Director, Professor Jean Saurel, a former student and currently Director of the Conservatoire National des Arts et Métiers, traced the development of the LIMHP. The following conclusion of his discourse is printed here for it expressed an appreciation of Boris Vodár shared by his numerous colleagues.

"And then, how can one not evoke your legendary faculty of assimilation. It sufficed for you to hear a lecture, to visit an outside laboratory in order to immediately understand everything that was to be learned from what was said, from what you saw. Your return from a trip was epic. You made the round of our labs indicating to everyone the experiments you had imagined stemming from your observations. In those days you should have had multiple-headed researchers. Under such an avalanche, the poor one-headed researchers we were, were reduced to integrating all you said to try to keep a stable trajectory. But often, very often, you were right; experience proved it, sometimes after a great lapse of time. In fact, you should have had an army.

"What is even more remarkable is that this faculty of assimilation and this impetuosity were not limited only to the scientific domain. You nurtured, you turned over and cultivated the land. When you became interested in abstract painting, you became an expert. You became a connoisseur

oenologist, a high dignitary of the Tastevin, a competent arboriculturist to the point of planting the seeds yourself. All this in the midst of a life in the form of a tornado which led you to all the laboratories in the world. For very quickly, from the first decade of LIMHP, foreign countries fully accorded you the consecration which all your qualities called for and which, I know, has not been denied since.

"I still have something to add, but which this time is addressed to Madame Vodár. Madame, you lived intensely the period of the laboratory's birth. That creates a certain complicity which does not allow me to use the usual clichés destined for the boss's wife during this type of ceremony. You helped us very much. Thank you Madame. Moreover you have not stopped working since. I will simply say that to be simultaneously the wife and with perseverance, the collaborateur "of the boss", merits admiration and a warm acknowledgment on our behalf.

"To return to you, Professor Vodár, to speak an instant in the name of all the scientists who have worked with you...in order to tell you, that if we have all been, at one moment or another, left dizzy by your dynamism, even exasperated by the fireworks of ideas which, at certain moments, sprang out in all directions, we all have, for you, a great admiration; and we all have for you a very profound affection."

P. Glaeser

~~~~~  
IN MEMORIAM  
GEORGE T. ARMSTRONG

The scientific community suffered a loss on March 9, 1982 with the death of George Armstrong caused by a sudden heart attack while at home.

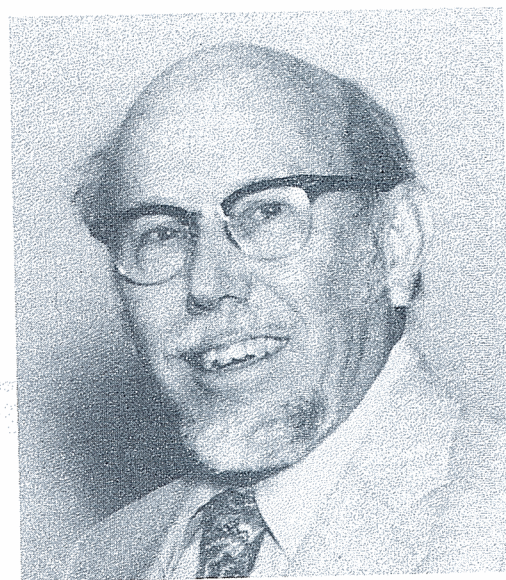
George T. Armstrong was born on December 8, 1916 in Castor, Alberta, Canada of parents who had been missionaries in China. He received his bachelor's and master's degrees at the University of Florida. During World War II he was a staff member of the Radiation Laboratory of the Massachusetts Institute of Technology. He received his Ph.D. in 1948 at John Hopkins University under the direction of Donald H. Andrews for research on the low temperature heat capacity of niobium nitride. He became an instructor at Yale University where he remained until 1951 when he joined the National Bureau of Standards where he spent the remainder of his scientific career, making very significant contributions to chemical thermodynamics.

His first research at NBS involved the measurement of the vapor pressures of methane and deuteromethanes, nitrogen, mixtures of nitrogen and oxygen, and terpenes. Later, he turned to combustion calorimetry and, with Ralph Jessup and Thomas Mears, made very careful determinations of enthalpies of combustion of aviation gasoline.

The needs for better methods of rocket propulsion during the 1950's and 1960's led to a recognition of the importance of understanding the thermodynamics of high energy propellants; combustion calorimetry was an essential tool in any such effort. The staff of the NBS Heat Division's combustion laboratory, which was led by George Armstrong, used both flame and bomb calorimetry to determine enthalpies of formation of aluminum fluoride and carbide, boron trifluoride, oxygen difluoride, chlorine trifluoride, chlorine monofluoride,

hydrogen fluoride, and several other borides and fluorides which, because of the highly reactive nature of either the reactants or products, had defied accurate measurement. Their investigations were carried out with great attention to detail and with a view towards the highest practical accuracy and precision. The most recent NBS certification of benzoic acid, the standard for much of the world's combustion calorimetry, was carried out by Churney and Armstrong in 1968.

As Chief (1968 to 1977) of the Thermochemistry Section (now the Chemical Thermodynamics Division), George Armstrong oversaw a very substantial effort in chemical thermodynamics which included both the





Chemical Thermodynamics Data Center and most of the experimental calorimetry at NBS. The scope of the experimental group in the Chemical Thermodynamics Division included combustion and solution calorimetry, microcalorimetry directed towards biological processes, pulse (millisecond) calorimetry, heat capacity calorimetry, and instrument and method development. Both as an individual investigator and as a Section Chief, he continually emphasized the need for standards and standard reference materials and data. He personally aided in the development of combustion standards for the coal, petroleum, and fuel gas industries.

An experienced calorimetrist always interested in the details of current work, he could time after time make valuable contributions to the daily progress in the laboratory. Also, he was outstanding at analyzing an applied problem in terms of its scientific content and need for standards. Briefly and cogently he could summarize the sense of a meeting and direct it to new topics. During the last few years he also served as a consultant to the Environmental Protection Agency where he aided that agency in establishing the environmental

standards which have been mandated by the U.S. Congress under the Toxic Substances Control Act. His publications and reports number over one hundred and sixty.

George Armstrong was extremely active in National and International thermodynamic efforts. He was both a Chairman (1964) and a Councilor of the Calorimetry Conference for several years; a President of the Philosophical Society of Washington; active in the American Society for Testing and Materials and Chairman of their Committee on Gaseous Fuels; Chairman of the CODATA Task Group on Biothermodynamic Data; a member of the IUPAC Commission on Thermodynamics and the International Commission on Biothermodynamics; and an editor of the *Journal of Chemical Thermodynamics*. He was awarded the U.S. Department of Commerce Silver medal for outstanding contributions to chemical thermodynamics. His wit and critical insight as well as his scientific and administrative judgment will be missed by his family, his colleagues at NBS, and the world scientific community.

Robert N. Goldberg  
(with the assistance of several colleagues)

## A NUCLEAR WASTE STORAGE DATABASE

A computerized database consisting of critically evaluated stability constants, solubilities and Nernstian potentials is being established at the Lawrence Berkeley Laboratory. Elements associated with nuclear waste disposal such as plutonium, americium, copper, uranium and lead are included. Emphasis is placed on stability constants with those ligands expected in natural waters including OH, F, Cl, CO<sub>3</sub>, SO<sub>4</sub>, PO<sub>4</sub>, and humic acids. Stability constants are fit to an extended Debye-Hückel equation or the Davies equation to provide log stability constants up to ionic strength 3. For high temperatures, stability constants and solubility data are fit to a van't Hoff equation. Results of the database compilation are given as tables or graphs; the initial compilation at 25 °C consists of: (1) tabulated stability constants, with assigned uncertainties where data permit; (2) references to sources of the data; and, (3) a tabulation of coefficients for an extended Debye-Hückel equation and the Davies equation.

For further information, contact:

Dr. Sidney L. Phillips  
MS 50-209  
Lawrence Berkeley Laboratory  
University of California  
Berkeley, CA 94720 U.S.A.

## F.D. ROSSINI LECTURE

Professor Edgar F. Westrum, Jr. has been invited to present the third F.D. Rossini Lecture at the International Conference on Chemical Thermodynamics which will take place in September 1982 in London under the auspices of the International Union of Pure and Applied Chemistry.

The first lecture was given by Professor Rossini himself in Montpellier, France in 1975. The second was given by Professor M.L. McGlashan in Ronneby, Sweden in 1977.

## WORKING GROUP ON A HYBRIDOMA DATA BANK

A Working Group comprised of international experts on hybridoma antibodies and monoclonal products was set up by CODATA under the chairmanship of Professor Alain Bussard, Chief of Cellular Immunology at the Pasteur Institute in Paris. Members of the group include Dr. R. Accolla, University of Lausanne; Dr. V. Houba, World Health Organization; Dr. B.W. Janicki and Dr. M. Krichewsky, National Institutes of Health; Dr. E.S. Lennox, Medical Research Council; Dr. J. Natvig, Institute of Immunology (Oslo); Dr. Tomio Tada, University of Tokyo.

At its first meeting at the WHO headquarters in Geneva on 15-16 February 1982, the group set up initial guidelines for a standardized data reporting for data on hybridoma antibodies and other monoclonal products with immunological reactivity. It is envisaged that, with support from several national and international organizations, a hybridoma data bank will be established and maintained under the guidance of the Working Group.

It was decided that the minimum requirements for cell line data to be stored would be that it concern an extant established clone with at least one demonstrated immunological reactivity; and for product data, that there be an adequate supply and that it have at least one demonstrated immunological reactivity.

## IVTANTERMO DATABANK ON THERMODYNAMIC PROPERTIES OPERATIONAL

This bank heralded by Professor Lev Gurvich et al. of the USSR Academy of Sciences' Institute for High Temperatures, at the Kyoto CODATA Conference is now on-line and operational. Critically-evaluated thermal functions of substances together with equilibrium data on chemical reactions and other thermodynamics data together with adjuvant values (vapor pressures, statistical data, molecular constants, atomic masses, nuclear spins, etc.) are provided together with program modules for providing temperature dependence of values, statistical treatment, and assessment of errors.

More than 1400 substances incorporating more than 50 elements including transition elements, alkali and alkaline earth metals, actinides, lanthanides, oxides, halides, chalcogenides, and pnictides are already in the bank -- more are to be added soon.

The work of the Task Group on the Internationalization and Systematization of Thermodynamic Data Tables is of the greatest significance in the procurement of completely consistent sets of thermochemical values for "fueling" such data banks and/or printed tables. This program is described in a forthcoming CODATA Bulletin (May, 1982).

For further information contact:

Professor L. Gurvich  
KMS IVTAN  
Korovinskyoe Chausse  
127412 Moscow  
U.S.S.R.

## CARBON DIOXIDE INFORMATION CENTER

A Carbon Dioxide Information Center has been established at the Oak Ridge National Laboratory, providing a focal point for the compilation and distribution of CO<sub>2</sub> - related information under systematic quality control.

It is presently working on the compilation of what will be a dynamic and changing list of needs for CO<sub>2</sub> - related data and information in research. It plans to serve as a networking mechanism between the user community and the large number of established national and international data centers containing relevant data to the CO<sub>2</sub> - climate issue (such as atmospheric CO<sub>2</sub> measurements, fossil fuel utilization, forest conversion, characterization of ocean properties, historical records from ice cores, tree rings, etc.). CDIC will provide details on content, accessibility, format and usefulness of the needed data sets.

A major activity of the Center will be to provide a clearinghouse for evaluated information. Final data sets should have a quantitative estimate of the uncertainty in the data and traceability to the primary sources of information.

An existing 3000-citation bibliographic data base can be queried by writing to:

Carbon Dioxide Information Center  
Oak Ridge National Laboratory  
P.O. Box X, Bldg. 6025/13-W  
Oak Ridge, Tennessee 37830, U.S.A.

## CODATA TASK GROUP ON FUNDAMENTAL CONSTANTS

The Task Group met on 13 June 1981 to discuss the status of the data available for the revision of the 1973 recommended set of fundamental physical constants, the methods for the analysis of the consistency of discrepant data, and the general procedures for the new adjustment which is now planned to be available in 1982.

The amount of data is relatively large. In 1973 there were 31 items of stochastic data encompassing the determination of 12 different combinations of 5 basic unknowns in the adjustment. This year there may be as many as 50 items of stochastic data encompassing 15 different combinations with

4 basic unknowns. A major emphasis in this adjustment will be the investigation and comparison of algorithms for the handling of discrepant data and the assignment of statistical weight. In the past, the weight to be assigned to measurement was determined *a priori* based on an analysis of the inherent precision of the measurement process. In the new adjustment the Task Group will take into account the stochastic character of this assignment. As a result, an experimental result which differs from other direct measurements, or from an indirect value determined from combining other data, by several times its assigned error will in general not be rejected but will be retained in the analysis with an expanded error assignment (and hence lower weight). This concept was first introduced into the analysis of the fundamental constants by workers at the Mendeleev Institute of Metrology in Leningrad (the Soviet All Union Scientific Research Institute of Metrology) and has been further explored and extended at the U.S. National Bureau of Standards.

## CODATA BULLETINS

Newsletter readers are reminded that the CODATA Bulletin is now available on a subscription basis of \$40/year from Pergamon Press, Oxford. The following CODATA Bulletins have appeared since January 1981 and may be ordered as single issues:

- N° 40 April 1981  
Data Bases in Molecular Spectroscopy
- N° 41 May 1981  
Data Collection which has Contributed to the Formation of New Ideas in the Biosciences
- N° 42 June 1981  
CODATA Directory of Data Sources for Science and Technology Chapter 5: Seismology
- N° 43 July 1981  
CODATA Directory of Data Sources for Science and Technology Chapter 6: Chemical Kinetics
- N° 44 August 1981  
Calorimetric Measurements on Cellular Systems  
Recommendations for Measurements and Presentation of Results
- N° 45 January 1982  
An Abridgement of Evaluated Kinetic and Photochemical Data for Atmospheric Chemistry: Supplement I
- N° 46 April 1982 (in press)  
Guide to the Presentation of Astronomical Data
- N° 47 May 1982 (in press)  
A Systematic Approach to the Preparation of Thermodynamic Tables
- N° 48 June 1982 (in press)  
CODATA Directory of Data Sources for Science and Technology Chapter 7: Nuclear and Elementary Particle Physics



## NEW PUBLICATIONS

AIP PHYSICS VADE MECUM, (1981, 330 p., \$25.00, American Institute of Physics, 335 East 45th Street, New York, NY 10017, U.S.A., ISBN 0-88318-289-0) Herbert L. Anderson, Editor-in-Chief.

It is usual for people and organizations to receive tributes and presents on their Silver or Golden Jubilees. The American Institute of Physics has turned the tables: it presented its members with a Physics Vade-mecum. This book of 330 A-4 pages deserves a detailed review but that must wait for another occasion. Suffice to say that the Editor-in-Chief Professor H.L. Anderson and his Chapter Editors have done an excellent job in bringing before their colleagues judiciously selected data from pretty well all areas of knowledge pertaining to physics, from Astronomy to Rheology, from Energy Demand to Elementary Particles. The book, as a whole, gives the lie to the old and slowly dying notion that physicists live in a dream world of ivory towers. How can such an idea be reconciled with the fact that, for instance, data on charmed mesons and charmed baryons is followed a mere 16 pages later by comparative data on various means of transport ranging from autobuses to aeroplanes -- alas, not a word about walking and the pedal bicycle.

Well done AIP! But since no review is complete without a bit of carping, I suggest that the term Vade-mecum could be misunderstood. Anyone thinking of the definition in the Oxford Concise Dictionary ("Handbook...carried about the person constantly") or of the first definition in the American Heritage Dictionary ("a useful thing constantly carried by a person") will be chastened by the Vade-mecum's 800 g. But fortunately the American Dictionary gives a second definition which admirably fits this volume: "A ready reference book". And, to end on a cheerful note: at \$25.00 it's a bargain.

N. Kurti

### CHEMICAL KINETICS

HANDBOOK OF BIMOLECULAR AND TERMOLAR GAS REACTIONS, Volume 1: (1981, 464 p., about £58.50, 08493 0375 3, Blackwell Scientific Publications Ltd., Osney Mead, Oxford OX2 0EL, U.K.) Volume 2: (1981, 240 p., about £37.75, 08493 0376 1), edited by J.A. Kerr, BSc, PhD, DSc, Reader in Chemical Kinetics, University of Birmingham; and S.J. Moss, BSc, PhD, Lecturer in Physical Chemistry, University of Aston, Birmingham.

### CHEMISTRY

OPTICAL SPECTRA OF NONMETALLIC INORGANIC TRANSIENT SPECIES IN AQUEOUS SOLUTION, (1981, 167 p., \$5.50, National Bureau of Standards/NSRDS No. 69, Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, U.S.A.) by Gordon L. Hug.

INFRARED SPECTRA HANDBOOK OF PRIORITY POLLUTANTS AND TOXIC CHEMICALS, (1981, \$210, Sadtler Research Laboratories, 3316 Spring Garden St., Philadelphia, PA 19104, U.S.A.)

RADIOACTIVE DECAY DATA TABLES, (1981, 227 p., \$13.75, National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161, U.S.A., DOE/TIC-11026) by David C. Kocher, Oak Ridge National Laboratory.

CARBON CYCLE MODELLING (1981, 390 p., £18.95, John Wiley & Sons, New York, NY, U.S.A.) edited by Bert Bolin, Scientific Committee on Problems of the Environment (SCOPE).

SOME PERSPECTIVES OF THE MAJOR BIOGEO-CHEMICAL CYCLES, (1981, 175 p., John Wiley & Sons, New York, NY, U.S.A.) edited by Gene E. Likens, Scientific Committee on Problems of the Environment (SCOPE).

AQUEOUS-ORGANIC SYSTEMS, ORGANIC HYDROXY COMPOUNDS, SUPPLEMENT 1, VOL. 1, PART 1A, (1981, DECHEMA, Postfach 970146, D-6000 Frankfurt am Main 97, German Federal Republic).

### COMPUTER SCIENCE/DATA BASES

DATA ACCESSIBILITY AND DISSEMINATION, DRTC Refresher Seminar -12, (1980, several hundred pages, Documentation Research and Training Centre, Indian Statistical Institute, 31, Church Street, Bangalore-560 001, India). The Working Document prepared for the DRTC Refresher Seminar-12 held on 25-29 August 1980, edited by G. Battacharyya, M.A. Gopinath, S. Seetharama.

DIRECTORY OF DATA BASE PRODUCERS, (April 1981, Groupement Français des Producteurs de Bases et Banques de Données (French Association of Data Base Producers), Secrétariat Générale, Département Documentation, 103, rue de Lille, 75007 Paris, France.)

LES BASES ET BANQUES DE DONNEES, PETROLE GRIS, UNE CHANCE POUR LA FRANCE, (October, 1981, Groupement Français des Producteurs de Bases et Banques de Données, Département Documentation, 103, rue de Lille, 75007 Paris, France.

### EARTH SCIENCES

MANAGEMENT OF GEODETIC DATA, (1981, 448 p., \$10, C.A. Reitzels Boghandel A/S Nørregade 20, DK-1165 København K, Denmark), edited by C.C. Tscherning, Proceedings of the International Symposium, København, 24-26 August 1981.

### PHYSICS

PHYSICS DATA: GASES AND CARBON IN METALS (THERMODYNAMICS, KINETICS, AND PROPERTIES) Pt. 13: Ferrous Metals (1) Iron-Hydrogen (Fe-H). (1981, 107 p., Fachinformationszentrum, Energie-Physik-Mathematik GmbH, 7514 Eggenstein-Leopoldshafen 2, Karlsruhe, German Federal Republic) by E. Fromm, H. Speck, H. Jehn, G. Hörz.

PHYSICS DATA: NUCLEON - NUCLEON SCATTERING DATA SUMMARY TABLES

(1981 edition, 225 p., Fachinformationszentrum, Energie-Physik-Mathematik GmbH, 7514 Eggenstein-Leopoldshafen 2, Karlsruhe, German Federal Republic), J. Bystricky and F. Lehar.

PHYSICS DATA: NUCLEON - NUCLEON SCATTERING DATA DETAILED TABLES (SUPPLEMENT 1),

(1981, 184 p., Fachinformationszentrum, Energie-Physik-Mathematik GmbH, 7514 Eggenstein-Leopoldshafen 2, Karlsruhe, German Federal Republic), J. Bystricky and F. Lehar.

HANDBOOK OF HEL PHOTOELECTRON SPECTRA OF FUNDAMENTAL ORGANIC MOLECULES (1981, 278 p., \$53.25, John Wiley, Sussex PO229SA, U.K.) by K. Kimura, S. Katsumata, Y. Achiba, T. Yamazaki and S. Iwata.

## THERMODYNAMIC PROPERTIES/ENERGETICS

SELECTED VALUES OF CHEMICAL THERMODYNAMIC PROPERTIES, Compounds of Uranium, Protactinium, Thorium, Actinium, and the Alkali Metals. (1981, 149 p., \$5.50, National Bureau of Standards Technical notes 270-8, U.S. Government Printing Office, Washington, DC 20402, U.S.A.) by D.D. Wagman, W.H. Evans, V.B. Parker, R.H. Schumm and R.L. Nuttall.

AN EQUATION OF STATE FOR FLUID ETHYLENE, (1981, 164 p., \$5.50, U.S. Government Printing Office, Washington, DC 20402, U.S.A., NBS Technical Note 1045) by R.D. McCarty, R.T. Jacobsen.

PHYSICAL PROPERTIES DATA COMPILATIONS RELEVANT TO ENERGY STORAGE. IV. MOLTEN SALTS: DATA ON ADDITIONAL SINGLE AND MULTI-COMPONENT SALT SYSTEMS, (1981, 870 p., \$11.00, U.S. Government Printing Office, Washington, DC 20402, U.S.A., NSRDS-NBS 61) by G.J. Janz, R.P.T. Tomkins.

VYPARNA TEPLA KAPALIN [HEAT OF EVAPORATION OF LIQUIDS], (1980, 128 p., Academia, Studie CSAV, Prague, Czechoslovakia) by Václav Svoboda and Vladimír Jajer.

SELECTED VALUES OF PROPERTIES OF HYDROCARBONS AND RELATED COMPOUNDS, Serial Publication of Thermodynamics Research Center Hydrocarbon Project, Supplementary Vol. No. A-81 and A-82, (1981, Thermodynamics Research Center, Texas A & M University, College Station, Texas 77843, U.S.A.) contributed by Kenneth R. Hall, Randolph C. Wilhoit, Lois B. Beach, Jing Chao, Carol Chen, Atri Das, Anna M. Ferguson, Satish K. Gupta, Aleksander Kreglewski and G. Raam Somayajulu.

SELECTED VALUES OF PROPERTIES OF CHEMICAL COMPOUNDS, Serial Publication of Thermodynamics Research Center Data Project, Supplementary Vol. No. A-45, (1981, Thermodynamics Research Center, Texas A & M University, College Station, Texas 77843, U.S.A.) contributed by Kenneth R. Hall, Randolph C. Wilhoit, Lois B. Beach, Jing Chao, Carol Chen, Atri Das, Anna M. Ferguson, Satish K. Gupta, Aleksander Kreglewski, Alan S. Rodgers, and G. Raam Somayajulu.

PHYSICS DATA: OPTICAL PROPERTIES OF METALS PT. 1: THE TRANSITION METALS, (1981, 306 p. Fachinformationszentrum Energie-Physik-Mathematik GmbH, Karlsruhe, German Federal Republic) by J.H. Weaver, C. Krafka, D.W. Lynch, and E.E. Koch.

PHYSICS DATA: OPTICAL PROPERTIES OF METALS PT. 2: NOBLE METALS, ALUMINUM, SCANDIUM, YTTRIUM, THE LANTHANIDES AND THE ACTINIDES, (1981, 274 p., Fachinformationszentrum Energie-Physik-Mathematik GmbH, Karlsruhe, German Federal Republic) by J.H. Weaver, C. Krafka, D.W. Lynch, and E.E. Koch.

PHYSICS DATA: GASES AND CARBON IN METALS, (THERMODYNAMICS, KINETICS, AND PROPERTIES), PT. 7: GROUP V A METALS (1) VANADIUM (V), (1981, 68 p., DM 9.50, Fachinformationszentrum Energie-Physik-Mathematik GmbH, Karlsruhe, Germany) by G. Hörz, H. Speck, E. Fromm, and H. Jehn.

PHYSICS DATA: GASES AND CARBON IN METALS (THERMODYNAMICS, KINETICS, AND PROPERTIES), PT. 8: GROUP V A METALS (2) NIOBIUM, (1981, 120 p. DM 16.-, Fachinformationszentrum Energie-Physik-Mathematik GmbH, Karlsruhe, German Federal Republic) by G. Hörz, H. Speck, E. Fromm and H. Jehn.

PHYSICS DATA: GASES AND CARBON IN METALS (THERMODYNAMICS, KINETICS, AND PROPERTIES) PT. 9: GROUP V A METALS (3) TANTALUM (TA) (1981, 78 p., Fachinformationszentrum Energie-Physik-Mathematik GmbH, Karlsruhe, German Federal Republic) by G. Hörz, H. Speck, E. Fromm and H. Jehn.

PHYSICS DATA: GASES AND CARBON IN METALS (THERMODYNAMICS, KINETICS, AND PROPERTIES) PT. 12: GROUP VII A METALS MANGANESE, TECHNETIUM, RHENIUM, (Mn, Tc, Re), (1981, 32 p., DM 7.50, Fachinformationszentrum Energie-Physik-Mathematik GmbH, Karlsruhe, German Federal Republic) by H. Jehn, H. Speck, E. Fromm, and G. Hörz.

PHYSICS DATA: EVALUATION OF THE CROSS-SECTIONS FOR THE REACTION  $^{27}\text{Al}(n,\alpha)^{24}\text{Na}$  (1981, 66 p., Fachinformationszentrum Energie-Physik-Mathematik GmbH, Karlsruhe, German Federal Republic) by S. Tagesen and H. Vonach.

A CATALOG OF DATA COMPILATION ON PHOTO-CHEMICAL AND PHOTOPHYSICAL PROCESSES IN SOLUTION, (1980, 27 p., \$1.75, U.S. Government Printing Office, Washington, DC 20402, U.S.A.) by James G. Brummer, W. Phillip Helman and Alberta B. Ross.

HANDBOOK OF HEATS OF MIXING, (1982, 688 p., \$80.00, John Wiley, Suxxex PO229SA, U.K.) by J.J. Christensen, R.W. Hanks and R.M. Izatt.

CODATA SECRETARIAT  
51 BD. DE MONTMORENCY  
75016 PARIS  
FRANCE