MARCH 1976

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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.
5TH INTERNATIONAL CODATA CONFERENCE

BOULDER, COLORADO, USA

MONDAY, JUNE 28, 1976

8:30 - 10:00
INTRODUCTORY SESSION, R. F. Tasche, Chairman
Welcome from the City of Boulder
Honorable Frank A. Buchanan, Mayor of Boulder
INTRODUCTORY ADDRESS
Harrison Brown, USA (President, CODATA)

10:30 - 11:45
STATISTICAL TECHNIQUES IN THE CORRELATION AND EVALUATION OF DATA
N. Kurti, Chairman
Modern Statistical Techniques in Data Analysis
John Tukey, USA (Princeton University and Bell Laboratories)

13:30 - 15:30
GENERAL PROBLEMS OF DATA EVALUATION & ANALYSIS
G.K. White, Chairman
The Particle Data Group's Experience in Handling Systematic Errors - A Retrospective Study of 18 Years of Reviewing Particle Properties
A.H. Rosenfeld (USA)

PARALLEL SESSIONS
13:30 - 15:30
13:30 - 15:30

DATA FOR TECHNOLOGY
R. W. McIntyre, Chairman
Importance of Engineering Data to Technology
E. P. Barkus (USA)
Useful Data for Engineers
A. David (France)
Physical Property Needs in Computer-Aided Process Design
R. L. McDermott (USA) and P. Hinter (UK)
The International Data Bank for Computer-Aided Design
B. Edmonds (UK)

DATA TAGGING AND RELATED ACTIVITIES
L. Cline, Chairman
Data Tagging in Information-Accessing Services
F. Tate and D.P. Zave (USA)
Computer Tagging in Physics
R. Lerner (USA)
Evaluation of Numerical-Data Tagging and Flagging in a Real-World Aerospace Environment
J. E. Freeman, J. P. Kottenstette
V. A. White, C.W. Hargrave (USA)

DISCUSSION
Teaching Data Tagging and Related Manipulations
M.P. Barnett and B.H. Barnett (USA)
Capturing Numeric Data in Machine-Readable Form and Generating Graphic Arts Output Displays
D. Stalger (USA)
Data Centers Management and Policies
K. Thibeau, H. Reader and J.E. Updike (USA)
Review of Federal Legislation
Establishing Numerical Data Bases
J. Sherrard (USA)

DATA ON FLAVOR AND AROMA
B. Duncan, Chairman
Volatile in Grapes and Wines
A. D. Webb (USA)
Correlation of Instrumental Analysis of Flavors with Sensory Data
A. C. Noble (USA)

20:00 - 21:30
OPEN MEETINGS
PARALLEL SESSIONS
Presentation of Biological Data in the Primary Literature
Task Group on Key Values for Thermodynamics
Working Group on Data for Industrial Needs
TUESDAY, JUNE 29, 1976

8:30 - 11:45  COMPUTER TECHNIQUES IN THE HANDLING AND DISSEMINATION OF DATA
O. Kennard, Chairman

PLENARY SESSIONS

SPIR - Canadian Network for the Identification of Infrared Spectra
R. Norman Jones, Canada (National Research Council) and Elizabeth N. Kirby, Canada, (Ontario Research Foundation)

Crystallographic Data Services in Japan
Takehiko Shimanouchi, Japan, and
Takeo Yamamoto, Japan (Computer Center, University of Tokyo)

13:30 - 15:00  OPEN MEETINGS

PARALLEL SESSIONS

Task Group on Presentation of Data in the Primary Literature
Task Group on Transport Properties
Task Group on Accessibility and Dissemination of Data
CODATA Activities in Spectroscopy
International Cooperation on Thermodynamic Tables

19:30 - 22:00  NATIONAL AND INTERNATIONAL DATA PROGRAMS
M. Kotani, Chairman

PLENARY SESSION

National Program of Research in the Field of Numerical Data on Science and Technology
V. V. Sychev and A.D. Koslov (USSR)

An Information System for Physics Data in the Federal Republic of Germany
H. Behrens and G. Ebel (FRG)

Two Projects on the Evaluation and Compilation of Scientific Data in Japan
Takehiko Shimanoouchi (Japan)

The National Archives as a Resource for Scientific and Technical Information
Kenneth Thibodeau (USA)

User Reactions to a Network System Data Base
Rachelle S. Heller, USA (University of Maryland),
David C. Maxwell and Andrew McCormick, UK (Mass Spectrometry Data Centre, Aldermaston)

Data Access for Research in the Space Environment Laboratory of ERL
Thomas B. Gray, Jr., USA (National Oceanic and Atmospheric Administration)

Experiences with Remotely Accessed Data Bases
A. William Gindra, USA (General Electric Company)

15:00 - 16:30  OPEN MEETINGS

ICSIU-AB/CODATA Joint Working Group on Data Tagging and Flagging
Task Group on Fundamental Constants
Task Group on Training in Data Handling
Advisory Panel on Geosciences
Solubility Data

The Role of the UNISIST Programme in the Development of National and International Data Activities
Adam Wysoki (Unesco)

Role of Associate Organizations in Achieving the Goals of CODATA
B. Vodar (France)

Data Concerns and Programs of the World Federation of Engineering Organizations
L. E. Eicher and F. K. Willenbrock (USA)

The IAEA Nuclear Data Center - Its Role in the International Scientific Community
A. Lorenz (Austria)

Solubility Data Project
A. S. Kertes (Israel)
WEDNESDAY, JUNE 30, 1976

8:30 - 11:45
DATA NEEDS FOR ENERGY AND ENVIRONMENTAL PROBLEMS
V. V. Sychev, Chairman

PLENARY SESSION

Organized Data Collection Needs for Energy Research, Development, and Demonstration
David M. Richman and Charles M. Gottschalk, USA (Energy Research & Development Administration)

Competitive Forms of Energy and Relevance of Numerical Data
Jean-Claude Balascanu, France (French Institute of Petroleum)

Monitoring for Environmental Information
Albert C. Trekowsky, USA (U.S. Environmental Protection Agency)

Environmental Problems in Developing Countries
R. D. Deshpande, India (Department of Science and Technology)
The Effects on Stratospheric Ozone from Organochlorine Compounds
F. Sherwood Rowland, USA (University of California)

13:30 - 15:30
DATA ACTIVITIES RELEVANT TO ENERGY RESEARCH & DEVELOPMENT
J. E. Dubois, Chairman

PARALLEL SESSIONS

Data and Documents on Patterns and Efficiencies of Energy End Use
Arthur H. Rosenfeld (USA)

Data Needs for Energy Policy Assessment
M. O. Goldberg (USA)
The Information Center As a Link Between Basic and Applied Research
S. Pearlstein (USA)

Geothermal Properties of Aqueous Sodium Chloride Solutions
S. L. Phillips and J. A. Falc (USA)

Volcanic Accretions: Energy Research and Data Center Activities
G. J. Janz (USA)

Central Computerized Data Base for Liquid Metal Fast Breeder Reactors
W. H. George, C. F. Flanagan, and H. Alter (USA)

Evaluated Nuclear Structure Data File (ENSDF) for Basic and Applied Research
W. B. Enkin (USA)

Data Collected by the Shock Wave Data Center and Applications of Its Output
M. Yan Thiel (USA)

BIOLOGICAL DATA BANKS & NETWORKING
R. R. Colwell, Chairman

Botanical Data Banking & Networking
T. J. Crowell (USA)
The Ecological Data Bank of the James Bay Hydro-electric Development
P. Legendre and M. Gagnon (Canada)

Microbiological Data Bank Activity in Japan
K. Komagata (Japan)

Information Management System for Genetic Resources
D. J. Rogers, G. N. Hersh, and J. April (USA)

Experience in Collection and Publication of Data in Microbiology
V. B. D. Skerman (Australia)

Some Information-Management Problems Raised by the International Nature of Systematic Biology Data
L. E. Morse (USA)

BIOLOGICAL DATA COMPILATION AND APPLICATION
R. Donovick, Chairman

Utilization of Computer Technology for Reproductive Studies in Nonhuman Primates
I. J. Kuehl and W. R. Dubois (USA)

Compilations of Evaluated Thermodynamic Data for Biological Applications
G. F. Armstrong and R. H. Goldberg (USA)

Estimation of the Structure of the Proteins of All Living Organisms
M. O. Dayhoff, K. L. Hunt, W. C. Barker, R. M. Schwartz, and B. C. Orcutt (USA)

Studies Illustrating the Need for the Publication of Evaluated Spectral and Chromatographic Data for Compounds of Clinical Interest
R. W. A. Oliver (UK)

CONSTRUCTION AND INDEXING OF FILES IN THE GEOSCIENCES
M. Carapezza, Chairman

A Data Structure for Land Description and Investigation
F. Benfatti and P. Tiberio (Italy)

Dealing with the Sparse Data Matrix - OSGD Data Management Procedures
P. B. Woodbury (USA)

ENDEX - A System for Locating Historical Environmental Data
C. D. Hae (USA)

Automated Classification of Sediments as a Geological Tool
L. Much and S. Bearman (USA)

A Fault Tolerant Approach to Processing Volume Data from an Error Prone Experiment
S. Bearman (USA)

DATA SERVICES IN THE ASTRO- AND GEOSCIENCES
G. A. Winkin, Chairman

The U.S. Environmental Data Service - A Multidisciplinary, Multipurpose National Service in the Geosciences with Relations to the ICESI World Data Center System
A. M. Shapley (USA)

International Cooperation of Centers for Ephemerides and Astronomic Data
R. L. Duncombe, A. D. Fiala, and P. R. Seidelmann (USA)

Experience of the Stellar Data Center as a Data Bank in Astronomy
C. Jaschek, and E. Ochsenbein (France)

The International Oceanographic Data Exchange
G. Peluchon (France)

Development and Applications of a Regional Environmental Data Base for Southeastern United States
R. J. Olson and F. G. Goff (USA)

20:00 - 21:30
OPEN MEETING
S. Vodar, Chairman

CODATA Associate Organizations
THURSDAY, JULY 1, 1976

8:30 - 10:30  PANEL DISCUSSION ON PROBLEMS OF DATA CENTER OPERATION
Moderator: E. L. Brady, USA (National Bureau of Standards)

10:45 - 11:45  PANEL DISCUSSION ON THE FUTURE OF CODATA
Moderator: F. D. Rossiini, USA (Rice University)

13:30 - 15:30  PARALLEL SESSIONS

- EVALUATION OF DATA ON THERMOPHYSICAL PROPERTIES OF FLUIDS
  - S. Angus, Chairman
  - Thermodynamic Properties of Propane
    D. N. Seshadri and D. S. Viswanath (India)
  - A Method for the Development of Thermodynamic Equations of State by the Representation of Multiple Data Forms
    R. J. Jacobsen and R. B. Stewart (USA)
  - Compilation and Evaluation of Thermophysical Data on Properties of Fluids by Computer Numerical Experiment
    V. V. Sychev, A. D. Koslov, and G. A. Spiridonov (USSR)
  - A Rational Equation of State for Thermodynamic Properties of Fluids
    R. D. Goodwin (USA)
  - The PVT Surface of Simple Liquids at Densities Near Melting
    H. M. Roder (USA)
  - On the Evaluation of Physical Property Data of High Pressure Fluids
    J. Osugi, Y. Takezaki, H. Iwasaki, T. Makita, and K. Watanabe (Japan)
  - Viscosity of Multicomponent Mixtures of Gases
    J. Kestin, H. E. Khalifa, and W. A. Mekhem (USA)

15:30 - 17:00  COMPUTER TECHNIQUES IN NUMERICAL DATA HANDLING

- N. G. Rambidi, Chairman
- Comparative Studies of the Data Base Systems of NODC and W. J. Morawski, Jr. (USA)
- A Model of Protected, Shareable, and Portable Scientific Data Bank
  - F. Bouille (France)
- Classification of Data Banks
  - J. Michel, H. Viallard, and E. Labin (France)
- NOSTRUMS for Rapid Information Retrieval
  - S. Forman and R. T. Rickard (USA)
- Basis of On-Line Retrieval and Analysis of Large Numeric Data Bases
  - J. B. Fried (USA)
- An International Mass Spectral Search System (MISS)
  - R. Heller, G.W.A. Milne, and R. J. Feldmann (USA)
- Acquisition, Storage, Retrieval, Display and Utilization of Computerized Data in the LLL Data Bank
  - V. J. Sharp and E. A. Henry, R. M. Kuhn, and L. Lydés (USA)

13:30 - 15:30  PARALLEL SESSIONS

- EVALUATION OF THERMOCHEMICAL DATA
  - L. V. Grivich, Chairman
  - A Combined Least Squares and Least Squares Approach to the Evaluation of Thermodynamic Data
    D. Rasey, Y. B. Parker, D. D. Wagen, and R. H. Evans (USA)
  - Computer Analysis of Thermochemical Data
    J. B. Pedley and J. Rytance (UK)
  - Statistical Uses and Abuses of Thermochemical Data
    J. W. Kennedy (UK)
  - The Discrepancy Between 2d Law and 3d Law Analyses of (Equilibrium Constant, Temperature) Data
    R. D. Freeman (USA)
  - Procedures for the Critical Evaluation of Activity and Osmotic Coefficients of Electrolytes
    B. A. Staples (USA)
  - Electrochemical Data
    T. Kuman and L. Molese (USA)

15:30 - 17:00  COMPUTER SYSTEMS FOR NUMERICAL DATA HANDLING

- N. G. Rambidi, Chairman
- The Generalized Applications System of NODC
  - W. J. Morawski, Jr. (USA)
- A Model of Protected, Shareable, and Portable Scientific Data Bank
  - F. Bouille (France)
- Classification of Data Banks
  - J. Michel, H. Viallard, and E. Labin (France)
- NOSTRUMS for Rapid Information Retrieval
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- Acquisition, Storage, Retrieval, Display and Utilization of Computerized Data in the LLL Data Bank
  - V. J. Sharp and E. A. Henry, R. M. Kuhn, and L. Lydés (USA)

13:30 - 15:30  PARALLEL SESSIONS

- EVALUATION OF DATA ON SOLID STATE PROPERTIES
  - C. H. Rao, Chairman
- Data Requirements in Properties of Solids: Past, Present and Future
  - H. P. R. Frederikse (USA)
- Methodology in the Generation of Critically Evaluated, Analyzed and Synthesized Thermal, Electrical, and Optical Properties Data
  - C. Y. Ho and Y. S. Touloukian (USA)
- Data on Crystal Structure Transformations
  - C. H. Rao (India)
La Conférence Générale des Poids et Mesures, lors de sa 15e réunion tenue à Paris au mois de juin 1975 a officiellement créé deux nouveaux préfixes destinés à désigner les multiples 10^{-15} et 10^{18} d'une unité quelconque du Système International, et a également instauré deux nouvelles unités de mesure dans le domaine des rayonnements ionisants.

Les nouveaux préfixes sont exa- (noté E et signifiant 10^{18}) et peta- (noté P et signifiant 10^{15}). La gamme des puissances positives et négatives de 10 s'étend donc maintenant de 10^{-18} à 10^{18} et sa liste complète est la suivante :

<table>
<thead>
<tr>
<th>Puissance de 10</th>
<th>Préfixe</th>
<th>Symbole</th>
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</thead>
<tbody>
<tr>
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<td>atto</td>
<td>a</td>
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<tr>
<td>-15</td>
<td>femto</td>
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<td>-12</td>
<td>pico</td>
<td>p</td>
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<td>-9</td>
<td>nano</td>
<td>n</td>
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<td>-6</td>
<td>micro</td>
<td>μ</td>
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<td>-3</td>
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<td>3</td>
<td>kilo</td>
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<td>6</td>
<td>mega</td>
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<tr>
<td>9</td>
<td>giga</td>
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<tr>
<td>12</td>
<td>téra</td>
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<tr>
<td>15</td>
<td>exa</td>
<td>E</td>
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<tr>
<td>18</td>
<td>peta</td>
<td>P</td>
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</tbody>
</table>

Les nouvelles unités créées par la CGPM sont destinées à exprimer la radioactivité et la dose absorbée. Désormais l'unité SI d'activité sera celle d'une source radioactive subissant 1 désintégration (ou tout autre transformation nucléaire) par seconde. Cette unité sera appelée le becquerel (symbole : Bq) en l'honneur de l'auteur de la découverte de la radioactivité en 1896. Jusqu'à maintenant l'unité d'activité était le curie, dont la valeur correspond à 37 milliards de becquerels (1Ci = 3.7 × 10^{10} Bq).

L'autre unité, qui sert à exprimer la dose de rayonnement absorbée par un orgaisme lors d'une irradiation ionisante est le grays (symbole : Gy). Nommée en l'honneur de Louis Harold Gray, radiobiologiste britannique qui fit des travaux fondamentaux sur la mesure des doses de rayonnement, le gray correspond à l'absorption d'une dose d'1 joule par kilogramme de tissu. L'ancienne unité, le rad, correspondait à l'absorption de 0,01 joule par kilogramme.

At the General Assembly of the International Union of Geodesy and Geophysics (IUGG) in Grenoble, September 1975, the International Association of Geodesy passed the following resolution:

Recognizing its responsibility for providing representative estimates for fundamental geodetic parameters to the scientific community, recommends that the following numerical values be considered as currently representative estimates:

- velocity of light in vacuo
  \[ c = (299 792 458 ± 1.2) \text{m.s}^{-1} \]
- newtonian gravitational constant
  \[ G = (6.67259(1) × 10^{-11} \text{m}^3\text{kg}^{-1}\text{s}^{-2}) \]
- angular velocity of the Earth (rounded value)
  \[ \omega = 7.292 115 × 10^{-11} \text{rad.s}^{-1} \]
- geocentric gravitational constant including the atmosphere
  \[ GM = (3.986 × 10^{5} ± 3) \times 10^{8} \text{m}^3\text{s}^{-2} \]
- geocentric gravitational constant of the atmosphere only
  \[ GM_A = (35 ± 0.3) × 10^{7} \text{m}^3\text{s}^{-2} \]
- zonal harmonic coefficients
  \[ J_2 = (108 263±1) × 10^{-8} \]
  \[ J_3 = (-254±1) × 10^{-8} \]
  \[ J_4 = (-16±1) × 10^{-8} \]
  \[ J_5 = (-23±1) × 10^{-8} \]
  \[ J_6 = (54±1) × 10^{-8} \]
- equatorial radius of the Earth
  \[ a = (6 378 140±3) \text{m} \]
- equatorial gravity
  \[ g_e = (978 032±1) × 10^{-5} \text{m.s}^{-2} \]
- flattening : \(f\)
  \[ f/E = (298 257±1.5) × 10^{-3} \]
- geoidal potential
  \[ W_0 = (6 263 683±5) × 10^{6} \text{s}^{-2} \]
- geopotential scale factor
  \[ R_0 = (6373 676±5) \text{m} \]

The values of \(c\) and \(G\), as well as their standard errors, are taken from the CODATA System of Physical Constants of 1973. These standard errors have been computed on the basis of internal consistency of the least-squares adjustment; the other standard errors are intended to represent realistic estimates of accuracy; and the value of \(\omega\) is accurate to the given digits.

It is further remarked that this resolution does not affect the validity of the Geodetic Reference System 1967 for reference purposes, that the IGSN 1971 is to give information on the global distribution of gravity, and that more details on the fundamental geodetic parameters are found in the report of the Special Study Group 5.39 at the same General Assembly, a copy of which may be obtained by writing to: Mr. Michel Louis Association Internationale de Geodesie 39ter rue Gay Lussac 75005 Paris, France
A FRENCH STUDY ON DATA BANKS

According to a recent study on the "typology of data banks" conducted by the French scientist, Dr. Edouard Labin, the total number of data banks which would be required to cover some 60 scientific and technological fields on a world scale would be about 1500. At present, 150 to 200 are in actual operation (between 80 and 100 in the U.S., about 50 in France, 20-30 in the U.S.S.R., about 15 in Germany and the rest divided among the U.K., Italy, Spain, Japan and Canada).

Contrary to what was believed 10 years ago, setting up a data bank is not an easy task. Putting one into operation requires the equivalent of 30 man-years of work, an initial cash outlay in the order of $0.8 to $1 million and an annual operating expenditure of between $120,000 and $200,000. The choice of what data bank to create and support will no doubt cause serious problems to public officials because of the magnitude of the costs involved.

The method used by the author in his typological study of data banks consisted of breaking down each data bank according to 13 "functional viewpoints" (such as useful life of the data, reliability, homogeneity), and grading each of these viewpoints between 0 and 10. Thus, each data bank studied had a quantitative "characteristic profile" which allowed various correlations to be made and resemblances or dissimilarities to be brought to light.

A closer factorial analysis of these profiles (comprising 17 data banks in all) revealed that data banks fell into two main categories:

- "observatory-type" banks (e.g. meteorological data banks or oceanographical data banks) where huge quantities of data are being stocked, the data being significant only if the circumstances under which they were obtained are known in detail. This kind of bank can only be interrogated in direct-file mode and is mainly used to elaborate secondary, integrated data, these being the really useful data.

- "depository-type" banks (e.g. thermophysical or thermodynamical data) whose data are interesting per se and are stored only after having been duly validated. This kind of bank can be interrogated either in direct- or in inverted-file mode.

Of all the problems raised by the creation of a data bank, the most severe is that of data validation, since experience has shown that many of the data found in the literature are far from reliable. Yet, a data bank must be responsible for the quality of its data. Some data bank managers have thought they could avoid this responsibility by providing along with the data, the list of sources from which they had been extracted, but this is unacceptable. Nevertheless, it should be noted that for the second category of banks, the validation procedure can absorb up to 75% of the time required to set up the bank.

In a very substantive concluding chapter, Dr. Labin does not try to hide the fact that if data banks have been very successful from a technical point of view, their "commercial" performance (or, in other words, their acceptance by data users) has been, on the whole, most disappointing. The reasons for this are twofold:

1) Psychological factors. A good many scientists are still firmly reluctant to address themselves to a machine when they need an important piece of information, and

2) Epistemological factors. By its very nature, scientific knowledge is practically never formulated in a form amenable to direct use. In other words, scientific information is, in essence, difficult to store, to retrieve and to disseminate.

In his final recommendations, Dr. Labin wonders if there isn't a sound case for organizing the information market by passing a law which, without in any way restricting liberty of expression or creation, would require authors of scientific papers to provide their numerical results and other data in a standardized, internationally-agreed format (perhaps in the form of an Appendix) so that these could be fed directly into data banks or other documentation centers.

This study which was carried out under a contract from the Bureau National de l'Information Scientifique et Technique will be published in French by Editions de la Documentation Française, 31 Voltaire, Paris under the title "Etude sur la Typologie des Banques de Données".

IAU COLLOQUIUM ON "COMPILATION, CRITICAL EVALUATION AND DISTRIBUTION OF STELLAR DATA"

This Colloquium will be held August 19-21, 1976 at Strasbourg, the week before the IAU General Assembly. The purpose of the Colloquium is to discuss the techniques for the compilation, critical evaluation and distribution of astronomical data, with particular (but not exclusive) reference to data on stars and stellar systems. The emphasis will be on how best to provide data of high quality in forms and ways that are convenient for the users.

Six sessions are scheduled and the provisional topics are: Standards for the presentation of data, Influence of acquisition techniques, Critical evaluation of data, Distribution of data, Survey of facilities, and Future role of data centers. For further information please contact:

Dr. C. Jaschek
Strasbourg Stellar Data Centre
Strasbourg, France

7
SPIR - SEARCH PROGRAM FOR INFRARED SPECTRA

The Division of Chemistry of the National Research Council of Canada and the NRCC Computation Centre are now providing a Search Program for Infrared Spectra (SPIR). The system is based on the FIRST-1 Infrared Search Program.

In order to use the program the user must connect his terminal to the NRCC computer in Ottawa, either via a standard telephone line or via a leased data line. In conversational mode data are entered about the physical and chemical properties and infrared spectrum of the unknown material. The computer compares these data with approximately 142,000 sets of spectral data in a master file created by the American Society of Testing and Materials (ASTM). The computer prints out the ASTM identification serial numbers and brief descriptions of the twenty spectra in the master file that are most similar to the spectrum of the unknown. Each spectrum carries a correlation coefficient indicating the closeness of the match. The user may then start another search or disconnect from the computer.

Provision is also made for the user to create a personal file of reference spectra which may be searched in addition to or instead of the ASTM file. Such personal files are accessible only to the user unless he permits others to access them. Privacy of data is ensured by the use of a password known only to the user.

Availability. The SPIR system is available to the user whenever the Time Sharing System (TSS) is operational on the NRCC computer. TSS normally operates 24 hours daily, seven days a week, except for maintenance shutdowns from 0700 to 0900 on weekdays. Any deviations from this schedule are described in a recorded message which can be dialled.

Charges. A basic charge of $25 per month is levied against the user's account with the Computation Centre. This charge covers the cost of storing and maintaining the program and the data base.

A count is kept of the number of searches carried out and a royalty charge of one dollar per search is levied by the Division of Chemistry on behalf of DNA Systems Inc.

The only other charge levied by the NRCC is a monthly billing for computer costs in excess of $10. The cost per search is a variable depending on the amount of input data supplied, the time of day at which the search is carried out, and the extensiveness of the search. Experience to date would indicate that the computing cost for a single search will vary between $4 and $12 with the average cost being about $8. Details of ways to minimize costs are given in the instruction manual for the program.

Other costs the user must consider are the charges for renting or buying and maintaining a time sharing terminal, and the telephone line charges or the cost of leasing a data line to the computer. Information on sources of suitable equipment may be obtained from the NRCC Computation Centre or from companies dealing in computing equipment. The user will also need the ASTM spectral indices, which are described below. A demonstration of the program can be arranged through the Division of Chemistry by telephoning Dr. D. C. Cameron at (613) 992-4769.

Access to the Computer and Program. If the user does not already have an account with the NRCC Computation Centre he should proceed as follows:-

a) Complete an application form.
b) Apply for the right to access the SPIR program by completing a contract.
c) Arrange for his own terminal facilities and acquire the ASTM spectral indices. When the account has been set up and access to SPIR has been granted the user will be informed and instruction manuals for the computer and the SPIR program will be supplied. This usually takes about one week.

Access to Spectral Data. It must be emphasized that SPIR is only a service for searching through the files of encoded spectra and no spectral reference collections are held by the operators of SPIR.

Many of the references and collections of spectra in the ASTM file are held by the National Research Council of Canada's Institute for Scientific and Technical Information (CISTI). Enquiries should be directed to the Interlibrary Loan Section of CISTI. All requests concerning access to the spectral collections should be addressed to the Chemistry Librarian.

ASTM Indices. These consist of the following six volumes which can be obtained from Sadler Research Laboratories, Inc., 3316 Spring Garden Street, Philadelphia, Pa.

| AMD 31 | Molecular Formula List of Compound Names, Formulæ, and References to Published Infrared Spectra. |
| AMD 31.S15 | 14th and 15th Supplements. |
| AMD 32 | Serial Number List of Compound Names References to be |
| AMD 32.S15 | 14th and 15th Supplements. |
| AMD 34 | Alphabetical List of Compound Names, Formulæ and References to Published Infrared Spectra |
| AMD 34.S15 | 14th and 15th Supplements. |

The total cost of the set is approximately $435. The minimal essential volumes to operate SPIR are AMD 32 and AMD 32.S15 at a cost of $145, but the acquisition of the complete set is recommended.

For further information concerning SPIR write to:

Mr. G.A. Young
National Research Council of Canada
Division of Chemistry
100 Sussex Drive
Ottawa, Ontario, Canada K1A OR6

* Copyright DNA Systems, 1258 So. Washington Ave., Saginaw, Michigan, U.S.A.


- Note: The first in a new series for biochemists. This volume concerns researchers who wish to prepare and use an immobilized derivative of some biologically active compound. Methodology is a strong point throughout the work. Editor: with Corning Glass Works.

CELL BIOLOGY (1976, 454 pp, $45.00, Federation of American Societies for Experimental Biology, Bethesda, MD 20014, U.S.A.), edited by Philip L. Altman and Dorothy Dittrich Katz. - Contents: General cell characteristics; cell environment; cell periphery; mitochondria; endoplasmic reticulum, microsomes, ribosomes, and Golgi; lysosomes, peroxisomes, granules, and microbodies; and nuclei. The seven sections constituting this reference data book consist of 102 tabulations of numerical and descriptive information. An introduction to each section, prepared by a member of the Cell Biology Advisory Committee provides a synopsis of current thought on the topic, and places in perspective the particular organelles for which data were included. Each table was prepared by an outstanding authority on the subject, and reviewed by other specialists in the same field. The pertinence and reliability of the data are attributable to the expertise of the 340 contributors and reviewers involved. Appended to each table are the literature citations -- 5,625 in all -- from which the information was obtained. The 40-page index assures easy access to any item of data in a table.

CHEMICAL KINETICS

- Note: Continues a series on chemical constants of major organic building blocks. As with Vol. 1 excellent documentation is provided. For all comprehensive science collections.

EARTH SCIENCES

CONTRIBUTION À LA METHODOLOGIE D'UN SYSTEME D'INFORMATION EN GÉOLOGIE. APPLICATION À LA GÉOCHIMIE (1974, 277 pp, 99 figures, 80 FF, Sciences de la Terre, Série "Information Géologique", n° 2, 94 avenue de Lattre de Tassigny, 54000 Nancy, France), par Philippe Grandclaude. - On suit que l'information géologique, dans la mesure où elle dépend étroitement des conditions régissant dans l'espace et le temps, pose des problèmes spécifiques aux informaticiens. Dans cet important mémoire, qui a constitué sa thèse de doctorat, l'auteur décrit le système qui a été conçu et réalisé au Centre de Recherches Pétrographiques et Géochimiques de Nancy pour permettre l'exploitation en profondeur d'une base de données géochimiques portant sur quel-
que 14 000 échantillons. Après une introduction très générale et très intéressante, consacrée à la "philosophie" de l'informatique et aux contraintes introduites par la nature même des données géologiques, l'ouvrage aborde dans le détail la description du système mis en œuvre au CRFG et donne de nombreux exemples concrets sur la description des échantillons, les langages de programmation, la gestion et l'exploitation des fichiers et même le prix de revient d'une banque de données de ce type. La 3e et dernière partie présente quatre exemples récents d'applications du système en question.

- Note: This work draws together the various bits of evidence that have led to present knowledge of the distribution of density throughout the interior of the Earth. Details of other properties with which density is closely linked are also presented. For comparison purposes, density distributions of other planets are discussed. Author is with the University of Sydney.

- Note: The first of a four-volume handbook translated from the German version and updated to some extent. There are no literature references but rather lists of "recommended reading" for each chapter. The basis of this volume is rather broad, where soil mechanics are conceived as a physics of granular material which can be interpreted as a particulate state of matter. Primarily geared to the needs of civil engineers.

HANDBOOKS FOR BROAD FIELDS OF SCIENCE & ENGINEERING

- Note: A heavily revised
of regional patterns by nearest-neighbor methods. Regional forecasting. Glossary of notation. Appendix. List of references and author index. Subject index. — Note: A significant contribution to the quantitative literature on the structure of spatial series. The study includes consideration of both static features and dynamic structures. Applications which are involved in regional planning issues conclude the work. British statistical data is used throughout. The senior author is with the University of Cambridge.

MECHANICAL AND ENGINEERING DATA

ATLAS MICROFRACTOGRAPHIQUE DES FONTES (1974, Volume 1: Généralités, 45 pp; Volume 2: Planches, 119 pp, 150 FF, Editions techniques des industries de la fonderie, 12 avenue Raphaël, 75016 Paris) par Guy Henry et Jean-Claude Margether. — Depuis quinze ans la technique de la microfractographie a permis d’apporter aux métallurgistes de précieux renseignements sur la façon dont les fissures s’amorcent et se propagent au sein d’une pièce métallique, au point d’en provoquer éventuellement la rupture. Limitée primitives aux aciers, la microfractographie a récemment été étendue aux fontes, cependant que, dans le domaine des techniques, le microscope électronique à balayage venait s’adjoncter au microscope électronique à transmission. Le présent ouvrage, sans prétendre être exhaustif, présente un très vaste choix de fractures typiques rencontrées au cours d’une étude sur la fragilité par galvanisation des principales sortes de fontes. Après un rappel des diverses catégories de fontes (grises, malleables, alliées et blanches) et un chapitre de généralités sur les techniques de la microfractographie, les auteurs décrivent en détail les faciès de rupture pour chacune des 210 illustrations photographiques figurant au volume 2. Chaque photographie est accompagnée d’une échelle légende (en français et en anglais) spécifiant les caractéristiques de l’échantillon et les conditions de sa rupture, et donnant une description détaillée de la topographie de la cassure.

MATHEMATICAL METHODS AND COMPUTER PROGRAMS

TRAITEMENT NUMERIQUE ET CARTOGRAPHIQUE DES DONNEES SUR L’EFFORT ET LES PRISES DE LA PECHE DES PALENGRIERE THONIERE DE L’OCEAN ATLANTIQUE (1975, 47 pp, Centre Océanologique de Bretagne, Contribution No. 255), par Jean-Yves Le Gall. — Dans le cadre de la Circulaire des Pêches de la FAO, ce document décrit un chaînage de programmes sur calculateur, dont le but est d’obtenir une vision tridimensionnelle que constituent, en latitude, en longitude et en temps, les données brutes portant sur l’effort de pêche et les captures de 13 espèces de thons, l’effort de pêche étant défini, dans un cadre donné, par le nombre d’hameçons posés, et la capture par le nombre d’individus capturés. D’où la possibilité de déterminer pour une zone donnée l’espèce la plus abondante ou pour une espèce donnée la zone la plus favorable. — Les listings complets des programmes utilisés sont disponibles sur demande.


*(since 1967)* summary of chromatographic and electro- phoretic methods and applications to a wide variety of substances. Provides comprehensive coverage of basic theory, techniques and terminology. Documentation is superb. For research works in industry, government, and the university.


* TRANSISTOR SUBSTITUTION HANDBOOK, 18th ed. (1975, mixed pagination, $4.50—paper, Howard W. Sams, Indianapolis, U.S.A., ISBN 0-672-21169-6), by Howard W. Sams Engineering Staff. — Note: An important handbook for electronic technicians. Transistors are listed in alphanumeric order followed by possible replacements. For critical applications, the specifications of the replacing component should be checked against those of the component being replaced. For electronic technicians and hobbyists.

*(1975, mixed pagination, $4.50—paper, Howard W. Sams, Indianapolis, U.S.A., ISBN 0-672-21169-6), by Howard W. Sams Engineering Staff. — Note: An important handbook for electronic technicians. Transistors are listed in alphanumeric order followed by possible replacements. For critical applications, the specifications of the replacing component should be checked against those of the component being replaced. For electronic technicians and hobbyists.

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form an important contribution to the structure of metals and the resulting practical properties. The first part of this volume, "Fractography," contains 14 articles on this subject by experts in this field. The atlas part contains 1816 illustrations. As in previous volumes, the index and illustrations are excellent. An important reference work for many libraries.


* INTERNATIONAL SEAL INTERCHANGE GUIDE: WORLD'S MOST COMPLETE HISTORY OF OIL AND GREASE SEAL ALTERNATIVES (1975, mixed pagination, $35, Interchange Inc., St. Louis Park, Mn, USA). - Note: A comprehensive guide of oil and grease seals. It combines, in one source, information from domestic and foreign seal manufacturers thereby allowing the user to quickly find substitutions and other options. The first part of this volume lists seals in numerical sequence. The second part consists of arrangement by shaft size. An important guide for design engineers and purchasing agents.


NUCLEAR PROPERTIES

TABLE OF RADIONUCLIDES. Part 1 1975, 232 pp, 150 FF, Commissariat à l'Energie Atomique, Laboratoire de Métrologie des Rayonnements Ionisants, 91190 Gif-sur-Yvette, France, ISBN 2-7272-0004-8), edited by J. Legrand, J.P. Pérrotat, F. Lagoutte, Y. Le Gallic. - This table which, in its first part, includes 29 radionuclides, is intended for meeting the growing need for high-quality radioactive measurements. It gives the evaluation for the following decay scheme data: half-lives, transition energies and intensities, internal conversion coefficients, fluorescence yields, intensities for the main radiations. An uncertainty is associated with each datum and is defined for a given confidence level. Moreover, compiled values of the energies and relative intensities are given for X-ray and K-Auger electrons. Each radionuclide is the subject of a separate entry which comprises the following: decay scheme, tables of nuclear, atomic, and radiation data, major production methods, references employed in evaluation, decay table, γ, X-ray and conversion electron spectra. Furthermore, the tables are preceded by a short description of the radioactive processes and of the evaluation rules used. The 29 nuclides are: $^{22}$Na, $^{24}$Na, $^{24m}$Na, $^{31}$Cr, $^{54}$Mn, $^{57}$Co, $^{58}$Co, $^{58m}$Co, $^{60}$Co, $^{60m}$Co, $^{75}$Se, $^{103}$Ru, $^{103m}$Rh, $^{110m}$Ag, $^{110}$Ag.
SOLID STATE PROPERTIES

INTERNATIONAL DIRECTORY OF SOLID STATE MATERIALS PRODUCTION AND RESEARCH (1975, 161 pp, Research Materials Information Center, Oak Ridge National Laboratory, Oak Ridge, Tennessee, 37830, USA), compiled by George C. Battle, T. F. Connolly and Anne M. Keesee, provides the addresses of some 600 laboratories engaged in crystal growth and allied activities (preparation of ultrapure inorganic materials, crystalline synthesis, etc.). In addition to the usual practical information (name, address, telephone number, etc.) the entries give list of crystal species grown, prepared or studied in each laboratory as well as the specific techniques and apparatus used for that purpose. A detailed subject index, listing the materials alphabetically, concludes this very useful directory.

SOLUTION PROPERTIES

TABLES OF SOLUBILITY IN BI- AND TRI-COMPONENT AQUEOUS SYSTEMS (Tabulky rozpustnosti v dvou- a treslizových vodných systémech). - 1975, 104 pp, 10 Kcs, Publishing House of the Czechoslovak Academy of Sciences. - In Czech), by Jaroslav Nyvit and Jirina Wurzelova, summarize data on the solubility of compounds (most of them inorganic) in aqueous systems. The first part contains data on bi-component systems and the second part deals with tri-component systems. Critical processing of the data in the form of constants in equations describing phase equilibria in tri-component systems makes it possible to use them for temperature interpolations and moderate extrapolations in quadrilateral and multi-component systems. A programme for computers is added in the Appendix.

SPECTRA COLLECTIONS

THE ELECTRONIC SPECTRA OF ANTHRAQUINONES is the English translation by Dr. R. W. A. Oliver, of the University of Salford, of V. Ya. Fain's book. Tabely Elektronnych Spektrov Anthrakoshinona i ego Proizvodnykh, published in 1970 by Khimia Publishing House, Moscow. It contains digitized electronic spectral data on 1316 substituted anthraquinones. This English version is available in a loose-leaf spiral binding from Dr. Oliver, Department of Chemistry, University of Salford, Peel Park, Salford 5, Lancs, England, at a charge of $15 (including packaging and postal charges).


TABLES OF SPECTRAL LINE INTENSITIES (1975, NBS Monograph 145; Part I: Tables arranged according to elements, 403 pp, $8.55; Part II: Tables arranged according to wavelength, 228 pp, $6.80), edited by William F. Meggers, Charles H. Corliss and Bourbon F. Scribner, is a revised and expanded edition of NBS Monograph 32. The present tabulation gives the intensity, character, wavelength, spectrum, and energy levels of 39 000 lines between 2000 A and 9000 A in the spectra of 70 elements. Part I lists the lines by element, arranged in alphabetical order. Part II tabulates all of the lines in order of increasing wavelength. Several improvements over the 1961 edition may be mentioned: 8500 additional lines have been assigned energy levels, the accuracy of about 9000 wavelengths has been improved and the relative intensity has been multiplied by ten to eliminate fractional numbers. The Tables may be ordered as SD Catalog No. C15.44:145/I and II.

THERMODYNAMICS AND THERMOCHEMISTRY

BULLETIN OF THERMODYNAMICS AND THERMOCHEMISTRY (No. 17, May 1974, 674 pp, $12, University of Michigan, Publications Distribution Service, 615 East University Avenue, Ann Arbor, Michigan, 48106 USA), edited by Edgar F. Westrum, Jr., provides a comprehensive yearly panorama of research in progress in thermodynamics and of the results completed so far but not yet published. As in former years, the 1974 edition essentially consists of a very thorough substance-property index (230 pages) which in turn refers the reader to a 180-page bibliography. An abstracts section includes some 700 items describing the research activities presently going on in 350 laboratories all over the world.

systems of fluid mixtures among those considered to be of the greatest engineering importance. The data on pure fluids have been critically evaluated, and "recommended reference values" are presented, while the data on fluid mixtures have been smoothed graphically and are being presented, along with the experimental data, in both graphical and tabular forms.

As usual in the volumes of the TPRC Data Series, the main section, entitled Numerical Data, is preceded by a 120–page introduction on the Theory, Estimation and Measurement of viscosity which provides a detailed discussion of the subject and refers the interested reader to a 1200–item bibliography.

MISCELLANEOUS

COMMENT ORGANISER SA DOCUMENTATION SCIENTIFIQUE (1975, 228 pp, 39 FF, Gauthier–Villars, Paris), par Hélène Desvals. Sous ce titre modeste, voici un livre qui se révèle être à chacune de ses pages une mine de renseignements irremplaçables. Tout au long de leur carrière scientifique, presque tous les chercheurs, quelle que soit leur discipline, se trouvent en butte au triple problème consistant à dépister des références pertinentes par rapport à l’objet de leurs recherches, puis à localiser et à acquérir les documents en question, et enfin à stocker les informations ainsi recueillies, et ce d’une manière efficace c’est-à-dire "retrouvable". Le livre de Madame Desvals aborde tour à tour ces trois problèmes et en décrit les principales solutions depuis les plus simples jusqu’aux plus récentes, en prenant constamment soin de renforcer ses explications par des fac-similés de documents ou des exemples de typographie ou de mise en page. Par les références qu'il fournit, les adresses qu'il signale, les exemples qu'il donne, les mises en garde qu'il énonce, et plus généralement par le nombre et la qualité des renseignements qu'il procure. Ce petit livre rendra d’éméntes services non seulement aux chercheurs mais également aux bibliothécaires, aux documentalistes et, plus généralement, aux "information officers".

  - Contents: General introduction. Experimental evidence on aromaticity. Theoretical ideas on aromaticity. Simple examples of aromaticity. Aromaticity of some selected classes of compounds. Homoaromaticity. Antiaromaticity. Conclusion and comments. Appendix. References. Index. - Note: Provides a semi-empirical, yet general, account of the problem of aromaticity. Still there is a confinement to a critical examination of experimental and theoretical aspects. Consideration of inorganic aromatics is excluded. A most unusual text which is suitable for a wide range of scientists. For university, special, and public libraries. Author: with University of London. (This publication is distributed by Crance, Russak.)


* Grateful acknowledgement for the reprint of this review is given to New Technical Books, The New York Public Library, Fifth Avenue and 42nd Street, New York, N.Y., 10018, U.S.A.
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CODATA PUBLICATIONS

International Compendium of Numerical Data Projects

The “CODATA Compendium” provides a comprehensive world-wide survey and analysis of the organisation, coverage, services and publications of the existing data analysis centres in the physical and chemical sciences. In addition to its usefulness as a directory, the book provides a key* or index to the substance-property content of the published data compilations. A descriptive brochure is available on request.

Proceedings: Third International CODATA Conference; Le Creusot, France, 26—30 June, 1972
CODATA, Frankfurt Main, F.R.G., Aug. 1973, 100 pp, 297 x 210 mm, DM 30.—, US $15.—, FF 75.—

CODATA Newsletter

CODATA Bulletin: Annual subscription: US $ 20 or 100 French Francs
No. 1 (Oct. 1969), 12 pp, Automated Information Handling in Data Centers, US $ 1.50
No. 2 (Nov. 1970), 6 pp, Tentative Set of Key Values for Thermodynamics - Part I, US $ 1.50
No. 3 (Dec. 1971), 28 pp, A Catalog of Compilation and Data Evaluation Activities in Chemical Kinetics, Photochemistry and Radiation Chemistry
No. 4 (Dec. 1971), 12 pp, Automated Information Handling in Data Centers, US $ 1.50
No. 5 (Dec. 1971), 6 pp, Final Set of Key Values for Thermodynamics - Part I, US $ 1.50
(Report of the CODATA Task Group on Key Values for Thermodynamics, Nov. 1971), superseded by Bulletin No. 10
No. 6 (Dec. 1971), 8 pp, Tentative Set of Key Values for Thermodynamics - Part II, US $ 1.50
(Report of the CODATA Task Group on Key Values for Thermodynamics, Nov. 1971), superseded by Bulletin No. 10
No. 7 (Aug. 1972) 4 pp, Tentative Set of Key Values for Thermodynamics - Part III, US $ 1.50
(Report of the CODATA Task Group on Key Values for Thermodynamics, June 1972), superseded by Bulletin No. 10
No. 8 (Dec. 1972), 32 pp, Geological Data Files: Survey of International Activity, US $ 3,50
No. 11 (Dec. 1973), 6 pp, Recommended Consistent Values of the Fundamental Physical Constants, 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. 15 (March 1975), 32 pp, Man-Machine Communication in Scientific Data Handling, US $ 5.00
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

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