INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS
COMMITTEE ON DATA FOR SCIENCE AND TECHNOLOGY

CODATA 12 NEWSLETTER

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CODATA'S NEW SECRETARIAT

Following the decision taken by the 8th General Assembly (Stockholm, September 1973), to transfer the CODATA Central Office from Frankfurt/Main to Paris and to operate with a reduced staff, the CODATA Permanent Secretariat is now established in the former Hôtel de Noailles, the ICSU Headquarters. In addition to ICSU and CODATA, this building will house three other members of the ICSU family: SCOPE, COSPAR and IUBS.

In accordance with the new Constitution, the Secretariat is now headed by an Executive Secretary, Mr. Bertrand Dreyfus who took up his post on March 1st. Mrs Phyllis Glaeser is the Secretariat's Administrative Assistant.

The CODATA premises in the Hôtel de Noailles consist of three offices, occupying a total floor area of 52 square meters. A Conference Room and a Library are available for the joint use of the five organizations as well as some common facilities for reprography, publication of documents and, in the near future, telecommunications (telex).

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SUMMARY OBSERVATIONS ON THE FREIBURG SYMPOSIUM OF THE CODATA TASK GROUP ON COMPUTER USE*

by R.N. JONES

I. Computer based techniques to store, access and retrieve data in numeric, alphanumeric, graphic and other diagrammatic formats (such as chemical structural formulae) have been demonstrated in a wide range of disciplines, including chemical spectroscopy, geology, mass spectroscopy, meteorology, molecular biology, nucleonics, and X-ray crystallography. This can now be done in a manner which enables the scientist or technologist to address the computer in the symbolism, terminology or graphic formats that are most familiar to him and to obtain the computer output in a similar format. Given sufficient motivation, it can be assumed that such techniques could be developed in most fields of science and technology.

II. Techniques for the generation of printed, photo-offset, or teletyped textual material have now been developed to a stage where the process can be performed under complete computer control once the manuscript has passed through an initial coding stage. Such systems can deal with complex mathematical texts and (potentially) any desired combination of symbols and alphabets can be incorporated. A trained technician is needed initially to transcribe the manuscript into machine readable form. Direct optical scanning of the original text has not yet developed sufficiently to make computer scanning of the raw text practical except under closely prescribed conditions where the lettering format is restricted and rigidly defined (e.g. bank handling of cheques).

III. The technical feasibility of accessing large centralized data banks from remote terminals using the regular commercial telecommunications networks has been amply demonstrated and numerous systems capable of doing this are now functional. Most of these currently operate on an evaluation basis using selective data bases (e.g. mass spectroscopy). Decentralized data banks, updated by the mutual interchange of tapes in standardized formats, offer an alternative method of computer based data dissemination ; this has been developed with high efficiency in the field of nucleonics.

IV. The logistic and economic pros and cons of the large remote computer in comparison with the local computer center or the dedicated in-house mini-computer will not be rationalized for some time. It appeals strongly to many scientists to have direct access to a large remote computer from a typer terminal in his own laboratory, but the uses to which such direct access time-shared facilities are being applied are becoming more selective. The time shared terminal is invaluable where there is need to communicate with the computer during the computation. This applies particularly to the debugging of new programs and in the on-line modification of selected parameters in certain types of computational and data file search algorithms. In other circumstances (such as the routine searching of numerical data files) where a response time of a few hours is permissible, the batch mode process can be more efficient in the overall use of the scientist's time.

The growing potential of the in-house dedicated mini-computer to handle problems of increasing complexity (including the storage of sizable selective data bases) tends to increase the role of such systems in data base management. A new factor has been injected with the development of the pocket sized mini-mini computer. There were predictions at the symposium that these may soon diversify into a range of highly specialized units that could have real relevance in the data management field. Simple problems of data interpolation, scale change, (e.g. conversions between Cartesian and polar co-ordinate systems) could be taken over by such units to bring the scientist's goal of instant computer capability one stage nearer.

V. The symposium dealt primarily with technical problems associated with the hardware and software aspects of computer based data handling, and its thesis that these problems are germane both to physical property data and to time- and location-dependent data was substantiated.

As the symposium proceeded it became evident that the long-term problems are becoming increasingly economic and socio-political rather than technical. Many of the present systems of data handling by computer are experimental in the sense that they are assembled with the object of demonstrating their technical feasibility. They are only now beginning to function under the economics of the market place ; the rate and manner to which they will pass into general use will depend critically on progress in establishing the group rules by which their operating costs will be shared among the generators, compilers, evaluators and users of the data.

These are broad problems which we also encounter in the older, long-established methods of data management. However, the greater scale and the more rapid rate of technical change introduced by computerization make the issues more acute. During the discussions at Freiburg, matters relating to the security of the information, proprietary control and copyright, and their bearing on the economics of the systems tended to take precedence over the purely technical matters. This concerned both the exchange of the data themselves and the computer software developed for their handling.

Fair recompense and economic motivation for the value added at each stage of data generation, file assembly, and management must be provided. There is, however, a wide latitude in the manner in which this can be accomplished. At the symposium, views were expressed which ranged from support for strictly cost-benefit economics applicable to selective data bases assembled for commercial and industrial purposes to an opposite extreme in which all the data should be considered as in the public domain and its generation, assembly and dissemination funded from governmental, intergovernmental or non-commercial private sources. The inter-governmental aspect of this problem is one to which CODATA might address itself and its more technical aspects could come within the scope of this Task Group.

If this Task Group were to organize another symposium in the future, it might center on this theme, bringing together (a) Technical aspects of computerized data compilation projects ; (b) Financial aspects of computerized data compilation projects ; (c) The role of the financial sponsors ; (d) The users.

VI. At a more concrete level there was a plea at the symposium for the establishment of guidelines and technical specifications to aid

* *Presented to the 8th CODATA General Assembly, September 1973, Stockholm, Sweden. A full report and abstracts will be published in a CODATA* Bulletin.

the standardization of procedures for the exchange of both data tapes and program tapes between computerized data centers. These should assure that the user is provided with sufficient technical information to set up the tape on his computer without complications and modifications. This could take the form of written instructions accompanying the tape reel or, preferably, similar information incorporated into a lead run on the tape in a standardized format. Both I.S.O. and A.S.T.M. already have committees working on these problems but CODATA could contribute in the more specialized fields with which it is concerned.

VII. The need for an updated edition of the CODATA Compendium was forcefully expressed during discussions at the symptosium. Though this may not come fully within the purvue of this Task Group, it was urged that the Task Group consider the manner and extent to which it could help in this project concerning both the extraction of the information from the literature and the rapid assembly of the material. A continuing loose-leaf format was advocated rather than a printed and bound volume.

VIII. At this symposium, engineering science was well represented. In discussion it was proposed that an effort should be made to clarify with WFEO the manner and extent to which scientific and engineering data interact and define the areas of overlap. A small technical seminar organized jointly with WFEO could be helpful to achieve this, and might avoid unnecessary duplication of effort.

IUPAC THERMODYNAMIC TABLES PROJECT*

S. ANGUS

IUPAC Thermodynamic Tables Project Centre,
Department of Chemical Engineering and Chemical Technology,
Imperial College of Science and Technology, London

1. THE SCOPE AND ORGANISATION OF THE PROJECT

The IUPAC Thermodynamic Tables Project aims to produce tables of the thermodynamic properties of the more important fluids, based on the critical assessment and correlation of the available experimental results. Insofar as these permit, the tables cover the gas, liquid and two-phase regions and present a thermodynamically consistent set of tables for the whole field. Only the tabular values are the subject of agreement by IUPAC, but equations which will satisfactorily reproduce them are given. The end product is published by Butterworths.

The Project was inaugurated by the IUPAC Commission on Thermodynamics and Thermochemistry (Commission 1.2), who have given responsibility for general policy to a Sub-Commission (1.2.2), which at present consists of:

Dr. J.D. COX (Chairman), NPL, U.K.
Dr. S. ANGUS, Thermodynamic Tables Project Centre
Prof. H.D. BAEHR, Bochum University, Germany
F. DENNERY, Air Liquide, France
Prof. J.S. ROWLINSON, Imperial College, U.K.
Prof. V.V. SYTCHEV, Akademia Nauk, U.S.S.R.
Dr. H.J. WHITE, Jr., Office of Standard Reference Data, National Bureau of Standards, U.S.A.

Within the Project, each fluid or group of fluids is the responsibility of an international Working Panel, whose membership is detailed in the appropriate part of Section 2. In summary, tables are prepared from various sources and their values compared with one another. As a result, an interim report is prepared, which details the state of the subject and the methods which might be used to produce the final table, and which is given wide circulation. The comments received are passed on to the Working Panel, and with their approval the final tables are prepared at the Project Centre. These form the subject of a final report, which is to be approved not only by the Working Panel but also by the Sub-Commission and the other appropriate IUPAC organs before being published.

In practice, ad hoc measures must be taken to deal with, for example, the discovery of work on a given fluid by those unaware of the IUPAC Project, and to balance the need for the tables to be as up-to-date as possible against undue delays in waiting for work in progress to be completed.

The work of the Sub-Commission, the Working Panels and the various correlators is all undertaken voluntarily, their only reward being the knowledge that their work goes towards the codification of this difficult field ; but there is a permanent, salaried Project Centre of $2\frac{1}{2}$ scientists who prepare the interim and final reports and are responsible for liaison within the Project, including circulation and preparation of documents, translations, the identification of relevant work in progress and simple propaganda. (Fuller details of the work of the Project Centre are given in Section 3).

2. PRESENT STATE OF FLUIDS UNDER STUDY

Notes on the present state of fluids under study are given below, grouped according to the Working Panel to which they are assigned.

* *A Review of Work prepared for IUPAC Sub-Commission I.2.2 (February 1973).*

Atmospheric Gases Working Panel

Membership

Mr. V. JOHNSON, National Bureau of Standards (Cryogenics Division), U.S.A.
Mr. A.G. MONROE, Consultant, U.K.
Prof. V.A. RABINOVICH, GS SSD (Government Standards Service), U.S.S.R.
Prof. R.B. STEWART, University of Idaho, U.S.A.
Dr. A.A. VASSERMAN, Odessa Institute of Marine Engineers (OIIMF), U.S.S.R.
Dr. P. MALBRUNOT, Centre National de la Recherche Scientifique, France.

Argon

Tables of the properties of argon have now been published (1), having been produced by the Project Centre from studies by Hust, Gosman and McCarty (2) of the NBS Cryogenics Research Division, U.S.A., and by Vasserman and Rabinovich (3, 4) of the Odessa Institute of Marine Engineering (OIIMF), U.S.S.R.

Nitrogen

Tables have been received from Stewart and Jacobsen (5) of Idaho University, U.S.A.; from Bender (6, 7) of Bochum University, BRD; from Wagner (8, 9) of Braunschweig T.U., BRD; and from Vasserman (10) of OIIMF, U.S.S.R. They are now being compared, after which recommendations for the IUPAC tables will be made.

Oxygen

Tables have been received from Stewart and Jacobsen (5) of Idaho University, U.S.A.; from Bender (6, 7) of Bochum University, BRD; and from Vasserman (10) of OIIMF, U.S.S.R. These are now being comparend, and recommandations for the IUPAC tables will be made.

Air

Tables have been received from Bender (6) of Bochum University, BRD, and equations capable of generating tables from Sytchev, Kozlov and Spividonov (11) of MEI, U.S.S.R. They will be studied when new experimental work on the two-phase region becomes available from Thomas of the PTB.

Aliphatic Hydrocarbons Working Panel

Membership

Dr. D.R. DOUSLIN, Bartlesville Energy Research Center, U.S.A.
Prof. P.T. EUBANK, Texas A & M University, U.S.A.
Mr. W. FEATHERSTONE, Imperial Chemical Industries Ltd., Billingham, U.K.
Dr. F. LAZARRE, Société Nationale des Pétroles d'Aquitaine, France
Prof. J.L. POWERS, University of Michigan, U.S.A.
Prof. D.S. VISWANATH, Indian Institute of Science, Bangalore, India
Prof. V.A. ZAGORUCHENKO, Odessa Institute of Marine Engineers (OIIMF), U.S.S.R.

Ethylene

Tables of the properties of ethylene have been completed and are now in the press (12), having been produced by the Project Centre from studies made there, and by Featherstone and Gibson (13) and Méline (15) of SNPA, France, and by Vashchenko et al. of the Kiev Technological Institute (16), U.S.S.R.

Methane

Tables are now in the course of preparation, based on the work of Zagoruchenko and Zhuravlev (17), of the OIIMF, U.S.S.R.; of Goodwin (18) of the NBS Cryogenics Research Division, U.S.A.; of Bender (19) of Bochum University, BRD; and of Holt (20) of Texas A & M University, U.S.A. The work follows the recommendations made by Eubank (21) of Texas A & M in a study made while he was visiting the Project Centre, and approved by the Working Panel.

Ethane

No tables have yet been produced because of a lack of sufficient experimental data, but new results are now available and a report on the possibility of producing tables is being prepared by Prof. Eubank of Texas A & M University, U.S.A.

Propane

Tables are being prepared by Powers, of Michigan University, Viswanath of the Indian Institute of Science, Bangalore, and Jůza and Šifner of the Institute of Thermomechanics, Czechoslovakia.

Propylene

One set of tables has been received from Vashchenko et al. (16) of the Kiev Technological Institute, U.S.S.R., and others are being prepared by Viswanath of the Indian Institute of Science, Bangalore, and by Jůza and Šifner of the Institute of Thermomechanics, Czechoslovakia.

Ammonia Working Panel

Membership

Dr. L. HAAR, National Bureau of Standards, Heat Division, U.S.A.
Prof. I. TANISHITA, Keio University, Tokyo, Japan
Prof. D.S. TSIKLIS, GIAP, U.S.S.R.

Tables for liquid ammonia have been published by Tsoiman (22) of the Odessa Institute of National Economy, U.S.S.R.; and complete tables are in preparation by Haar of the NBS Heat Division, U.S.A., and at the Project Centre. The ideal gas heat capacity of ammonia has been re-calculated by Haar (23).

Carbon Dioxide Working Panel

Membership

Prof. H.D. BAEHR, Bochum University, Germany
Prof. P. JOHANNIN, University of Rennes, France
Dr. W.A. STEIN, Farbwerke Hoechst AG, Frankfurt, Germany
Dr. J.R. SUTTON, National Engineering Laboratory, U.K.
Prof. V.V. ALTUNIN, Moscow Energetics Institute, U.S.S.R.
Dr. T. WASSENAAR, Van der Waals Laboratory, Amsterdam, Holland
Prof. U. Grigull, München Technical University, Germany

Tables are now in the course of preparation by the Project Centre, based upon the work of Altunin and Gadetskii (24) of the Moscow Energetics Institute, U.S.S.R., which is itself based upon earlier work by Vukalovich and Altunin (25) of the MEI; by Stein (26) at Braunschweig T.U., BRD; and by Sutton (27) of the NEL, U.K. Account has also been taken of the work of Bender (7) of Bochum University, BRD.

Halogenated Hydrocarbons Working Panel

Membership

Prof. J.J. MARTIN, University of Michigan, U.S.A.
Dr. S. RIVKIN, All-Union Thermotechnical Institute (UTI), Moscow, U.S.S.R.
Dr. D. STRAUB, Karlsruhe Technical University, Germany
Prof. I. TANISHITA, Keio University, Tokyo, Japan
Mr. P. RATHBONE, Imperial Chemical Industries Ltd., Runcorn, U.K.

This is a large class of substances, even if it is restricted to those of immediate industrial interest. Interest in halogenated hydrocarbons as heat transfer fluids for use above room temperature is beginning to grow, but most of the existing data were obtained with refrigerating processes in mind. It is therefore necessary to narrow the field somewhat, and the following programme is suggested :-

1. Some of the substituted-methane group of halocarbons should be examined first.

2. The Working Panel members should arrange between themselves to study various different equations of state, with the eventual aim of using one equation for all the halocarbons. This is not in keeping with the general policy of making the tables the objects for which approval is sought, but this group of fluid are so closely related that to publish tables based on different equations would be inadvisable.

3. As a first step, the existing members of the Halogenated Hydrocarbons Working Panel should exchange and collate their bibliographies, via the Project Centre, which already has the U.S.S.R. bibliography.

Work is in progress in the U.S.S.R. under a special Working Panel set up by the Akademia Nauk Commission on Thermodynamic Tables, headed by Rivkin of the All-Union Thermotechnical Institute (UTI), Moscow. Some preliminary findings are given in Ref. (28). A combined experimental and correlational programme is in progress at Keio University, Japan, under Tanishita (29, 30). Work is also in progress at Karlsruhe T.U. under Ernst. Tables for CHF_2Cl have been prepared by Kletskii of the Leningrad Technological Institute (31).

Inert Gases Working Panel

Membership

Dr. D.R. DOUSLIN, Bartlesville Energy Research Center, U.S.A.
Prof. V.A. RABINOVICH, GS SSD, U.S.S.R.
Prof. N.J. TRAPPENIERS, Van der Waals Laboratory, Amsterdam, Holland.

Neon

A preliminary set of tables has been prepared by Stewart and Stutzman of Idaho University, U.S.A. (32); and tables are also being prepared by Rabinovich of GS SSD, U.S.S.R.

Krypton and Xenon

Tables for krypton have been received from Jůza and Šifner (33) of the Institute of Thermomechanics, Czechoslovakia, who are also preparing tables for xenon. Tables for both fluids are being prepared by Rabinovich of GS SSD, Moscow. Tables for liquid krypton have also been prepared by Streett on the basis of his experimental results (34).

Quantum Fluids Working Panel.

Membership

Dr. H.J.M. HANLEY, NBS, Cryogenics Division, U.S.A.
Dr. W.L. KELLER, University of California, U.S.A.
Dr. S.Y. LARSEN, University of Maryland, U.S.A.
Mr. H.M. RODER, NBS, Cryogenics Division, U.S.A.

Helium

Tables by McCarty (35) of the NBS Cryogenics Research Division, U.S.A. ; by Petersen (36) of the Atomic Energy Commission, Denmark ; and by Tsederberg, Popov and Morozova (37), now of the MEI, U.S.S.R., were considered by McCarty, who prepared a revised version of his own tables (38). These tables are now being reviewed by the Project Centre.

Hydrogen

Tables on para-hydrogen have recently been issued by McCarty and Weber (29) of the NBS Cryogenics Research Division, U.S.A., and an equation of state for liquid para-hydrogen has been published by Malyshenko (40) of the Institute for High Temperature Research (IHTR), U.S.S.R., as part of a continuing study of hydrogen in all its forms. A study of both liquid and solid hydrogen has been published by Esel'son and al. (41) of the Akademia Nauk, U.S.S.R., Physico-Technical Institute of Low Temperatures.

3. THE PROJECT CENTRE

The Project Centre is housed in the Department of Chemical Engineering and Chemical Technology of the Imperial College of Science and Technology, London, U.K. The College officer responsible to OSTI for the administration of their grant to the Project Centre is Prof. J.S. Rowlinson ; and the staff of the Project Centre consists of Dr. S. Angus, the Scientific Director, two scientific workers, Mr. B. Armstrong and Mrs. K.M. de Reuck (part-time), and a secretary. They are responsible for maintaining and progressing the work of the Project as a whole, including liaison between scientists, translation, and the encouragement of work, both on experiment and on correlation, wherever interest is expressed. These activities require the Scientific Director to undertake frequent visits and lectures which are an essential part of the successful furtherance of the aims of the Project.

The Project Centre is also responsible for preparing interim reports on work available, summing up the position and making the initial recommendations for future action. It prepares the final tables and accompanying text and sees the work through the printers.

The preparation of the final tables involves checking the chosen correlation against all the experimental results, amending the correlation as necessary, deciding on the tolerances and tabular intervals and preparing tapes of the final tables which are used to drive the type-setting machine.

The Project is also responsible for discovering its own sources of finance. In the past it has received "on-off" grants from the National Science Foundation, U.S.A., and the Volkswagen Stiftung, BRD, and received funds for a number of years from various sources in France, channelled through the Centre National de la Recherche Scientifique. Continuing assistance is being received from the Swedish Technical Research Council through the Swedish National Committee for Chemistry, but the main source of funds is what it has always been — the Office for Scientific and Technical Information of the Department of Education and Science of the U.K.

Lately, a pilot project has been tried with Air Liquide to see if the Project Centre in confidence. Several other points are included, such as acknowledgement of assistance in publications, and the the Project Centre for internal use in the Project, and reports received from others — not including, of course, those sent to the Project Centre in confidence. Several other points are included, such as acknowledgement of assistance in publications, and the right to send observers, at their expense, to meetings of Working Panels. This scheme proved so successful that the Project Centre is now offering the service generally to industry. At the time of writing, the British Oxygen Company Ltd. and ICI Ltd., both of the U.K., have agreed to join, and negotiations are in progress with several other firms.

4. RELATIONS WITH OTHER BODIES

a) Within IUPAC

The Project Centre has been able to be of assistance to some of the ad hoc working groups set up by Commission 1.2.

The report prepared by the Centre as a guide to procedures in the reporting of experimental results (42) was used in the preparation of the report by Westrum et al. covering a wider range of experimental properties (43), and so is now subsidiary to it, but it is still useful for details not covered in the more general report.

The Centre's report on the relation between IPTS-48 and IPTS-68 (44) is now superseded by the official document on their relation (45), and by Rossini's paper on the consequences of the change (46).

The ad hoc working group responsible for symbols, units and nomenclature has been informed of the problems peculiar to the Project.

The work of Sub-Commission 1.4.1 on Standard Calibration Substances overlaps with that of this Project to a small extent, and our Chairman, Dr. Cox, is a member of this Sub-Commission, while Dr. Angus is a member of the team responsible for *PVT* properties.

b) OSTI

The Office for Scientific and Technical Information, as the major financial backer of the Project Centre, has established an Advisory Group which reviews the progress and future of the Project Centre. It consists of: Prof. J.S. Rowlinson of the Sub-Commission, who is Chairman; Dr. R.E. Fairbairn of OSTI; an industrial representative, Mr. C.F. Beaton, of British Petroleum; and two scientific representatives, Prof. M.L. McGlashan and Dr. D. Ambrose.

c) Akademia Nauk SSSR

The U.S.S.R. Academy of Sciences makes a grant for use in the U.S.S.R., both on experiment and on correlation, designed to be of use to the IUPAC Project. The large programme resulting is overseen by an Academy Commission on Thermodynamic Tables, whose Chairman, Prof. Sytchev, is a member of the IUPAC Sub-Commission 1.2.2.

The results of the work of the U.S.S.R. Commission from 1964-71 are listed and discussed in a report, in Russian, from the U.S.S.R. Commission to the Project Centre (48). Supplements will be issued at two-yearly intervals.

Another result of the work in the U.S.S.R. has been the establishment of a journal, *Thermophysical Properties of Gases and Liquids*, containing papers of importance to the IUPAC Project. The journal is published, in Russian, at approximately one-year intervals. Five issues have now been made and are being translated into English: the English version of Vol. 1 has been issued.

One side-effect of the programme has been to enable scientists connected with the IUPAC Project to visit the U.S.S.R. to meet those concerned in the same field.

d) National Bureau of Standards and National Science Foundation

The officer of the Office of Standard Reference Data, NBS, who is responsible for thermodynamics is a member of Sub-Commission 1.2.2. The NBS and NSF have, individually and jointly, assisted the Project in such ways as funding research programmes within the U.S.A. connected with the Project, arranging symposia on specialist topics and establishing the programme for the translation of Russian books.

The NBS Cryogenics Data Center, at Boulder, furnishes literature searches of an extensive character as a contribution to the Project.

e) CODATA

Apart from the link through IUPAC itself, the Project Centre has an indirect link in that Dr. Angus is a member of the U.K. Committee on Data for Science and Technology, the U.K. adhering body to CODATA.

f) International Association for the Properties of Steam

This, the successor body to the International Committee on the Properties of Steam, has a provision in its Constitution for the attendance at its Executive Committee meetings of observers from bodies working in allied fields. This obviously includes the IUPAC Project, but any official approach by IAPS will have to be made to a higher level of IUPAC than the Sub-Commission. In the meantime, Dr. Angus has been invited to Executive Committee meetings in a personal capacity. A subsidiary link with IAPS is that Dr. Angus is a member of the U.K. Committee on the Properties of Steam, the U.K. Member of IAPS.

g) International DATA Series, Selected Data on Mixtures

This Project, which aims at collating the experimental results on mixtures in standard form, will form a valuable complement to the work of the IUPAC Project. It is envisaged that correlations of results covering a small range will be done by the mixtures project, and should correlations over a wide region be necessary, then the advice and assistance of the IUPAC Project will be sought.

5. GENERAL

Translations

It is the practice for U.S.S.R. tables, if approved by the Academy Commission and by GS SSD, to be issued in a book which deals in considerable detail with the reliability of all the available experimental data, the methods of correlation and previously issued correlations and tables. These somewhat lengthy books are issued in single editions which may be difficult to obtain. English translations are made by the Israel Program for Scientific Translations, and a hard-back edition is published by them in Jerusalem, while a paperback edition is issued from Washington, U.S.A., jointly by the NSF, NBS and Department of Commerce. Those relevant to the Project have been noted under the appropriate fluids (refs. 3, 4, 17, 31, 37 and 41).

The Project Centre produced a translation of the German dissertation of Dr. Bender (6), which has been published by Verlag

C.F. Müller of Karlsruhe. The Centre also translated a major part of the French thesis by Malbrunot (47), but this has been circulated only to members of the Atmospheric Gases Working Panel.

A large number of the documents circulated within the Project have been translated into Russian under the direction of Prof. Sytchev and Dr. Kozlov of the Academy Commission.

The report to the Project Centre of the Akademia Nauk Commission referred to earlier is too long for translation, but sections of it will be sent to those who require them and who offer to supply an English version in return. For convenience, ref. (48) lists the sections of the report.

Methods of Correlating Experimental Data

The most recent generation of electronic computers has made possible a considerable change in the technique of correlating experimental thermodynamic data. Hitherto, the saturation region and the single-phase region had to be handled separately, and the resulting equations reconciled in an arbitrary manner; and there was no method of handling different properties on an equivalent basis.

It was as long ago as 1955 that Bain and Le Fèvre (49) laid down the principles that should govern thermodynamic properties from an ensemble of results of varying reliability for different properties, and in 1967, Hust and McCarty (50), dealing with the same problem, set out the necessary equations in some detail. It was not until 1970 that it was possible to apply these methods conveniently, and this was done simultaneously and independently by Wagner of Braunschweig T.U. and Bender of Bochum University.

Wagner (8) used only *PVT* data, but included in his least-squares criterion the Maxwell relation (i.e. effectively, the saturation *PVT* properties and the single-phase *PVT* properties were treated simultaneously) to a classical double-power series in density and temperature. Bender (6) did the same, but used an extended Benedict-Webb-Rubin (or "modified Strobridge") equation and showed how the resulting equations could be combined to represent the properties of simple binary mixtures and a ternary mixture (air).

These studies gave an impetus to work already under way elsewhere, and McCarty (35) showed how to use properties other than *PVT* in his work on helium, as did Stewart and Jacobsen (5) on oxygen and Altunin and Gadetskii (24) on carbon dioxide. Stewart and Jacobsen also included a method for the systematic assessment of the need for each individual coefficient.

In addition, the investigation of the representation of the properties in the critical region has reached a point where an empirical description of these properties can be used by tablemakers, and this is being done at the Project Centre, where the carbon dioxide tables will include critical region values derived by Chapela, of Imperial College, London, from the equation first proposed by Schofield, Litster and Ho (51) for the magnetic critical point.

Similar work is continuing and extending in scope, and it may well be that the Project might set up a Working Panel to discuss methods of correlation as a subject independent of any particular fluid. A Working Panel with such aims — the Correlating Functions Working Panel — was one of the earliest set up, but it was premature, and now might be revived with different personnel.

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Section 1	Inert Gases	7	Ammonia
2	Hydrogen	8	Alcohols
3	Nitrogen, Oxygen and Air	9	Sulfur Hexafluorid
4	Carbon Dioxide	10	Miscellaneous
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DATA COMPILATION ACTIVITIES IN ISRAEL*

Aim

The Israel National Committee for CODATA, at its meeting on April 15, 1971, decided to initiate a survey of data compilation activities in Israel. The aim of this survey was:

— to ascertain what sources of data are used by Israeli scientists and engineers in their work.
— to indicate what additional compilations are needed.
— to determine the areas in which data are now being compiled, evaluated and correlated by Israeli scientists and engineers.

Methods

A questionnaire, similar in design to that used by H.M. Weisman (National Bureau of Standards, Washington, D.C.) and distributed to members of the American Chemical Society *(J. Chem. Doc. 7 (1)* 9 (1967)), was sent to senior scientists in all institutions of higher learning and industrial enterprises engaged in research. Together with the questionnaire, an explanatory résumé about the aims and purposes of CODATA, based on an article published by Prof. F.D. Rossini in *J. Chem. Doc. 10 (4)* 261 (1970), was sent. The questionnaire is reproduced as Appendix A. A total of 1400 questionnaires were distributed and 221 replies were received.

Evaluation

Appendix A, question 4: Sources of data used by Israeli scientists and engineers.- Although explanatory notes about aims and purposes of CODATA were distributed with the questionnaire, the responses to this question did not refer only to numerical data sources but included secondary sources in general. The replies to the questionnaire indicate that there is a need to make information on existing numerical data compilations more widely available.

Appendix A, question 5: Data compilation requirements.- Lack of data was felt in a number of areas of general interest and it was felt that additional data compilations would be worthwhile. These needs were indicated in general terms and the areas suggested for the accumulation of data were not delineated with sufficient precision. As expected, there were overlapping areas of interest among the various scientific disciplines. The following is an attempt to classify the data requirements into spheres of interest and disciplines.

In *Physics,* a specific need for ESR data was indicated, in addition to the other types of spectral data. Additional needs are felt in the areas of solid state physics, and meteorological data (from satellites).

In *Chemistry,* it appears that a considerable need exists for spectral data of all types, especially infrared data. These are required in connection with other properties of materials such as structure, activity (biological and other), physical constants and reaction velocities. Thermodynamic and solubility data are also very much sought after, e.g. in connection with the properties of polymers.

In *Engineering Sciences,* needs for data were indicated in materials engineering, hydrology and hydrodynamics, air pollution, electro-optics, and rocks and soil physics and mechanics.

In *Biology,* need for data was indicated in four areas: evolutionary processes; life processes in water; characterization and classification of plants; and genetic diseases and means for their prevention.

In *Medicine,* there is interest in data on blood and its properties, and in the properties and mode of action of nerves and the brain. Another area of interest is data on bio-engineering medicine.

Appendix A, question 6: Data Compilation Activities.

EXISTING DATA COMPILATIONS

PHYSICS

1. Environmental Data Center.
Regional data on spectral intensities of solar radiation; selected meteorological data including data from satellites; data on atmospheric radiation and earth surface; IR radiation; night light intensities of celestial bodies.
Prof. Z. Alterman and Dr. Joachim (Department of Environmental Sciences, Tel Aviv University).

2. Data on Elementary Particle Cross Sections (as part of UCRL 20000).
Prof. G. Alexander (Department of Physics, Tel Aviv University).

3. Tables of Matrix Elements for the Calculation of Coulomb Energies in Nuclei.
Dr. I. Unna, Dr. E. Nir and Mr. Y. Shoshani (Dept. of Physics, Hebrew University, Jerusalem).

CHEMISTRY

4. Equilibrium Constants of Liquid-Liquid Distribution Reactions.
Prof. A.S. Kertes, Y. Marcus and E. Yaniv (Dept. of Inorganic and Analytical Chemistry, Hebrew University, Jerusalem).

*) *Preliminary Report (June 1972) prepared by the Israel National Committee for CODATA under the auspices of the Israel Academy of Sciences and Humanities.*

5. Equilibrium Constants of Mixed Complexes.
Prof. I. Eliezer (Dept. of Chemistry, Tel Aviv University).

6. CD of Metal Complexes.
Prof. I. Eliezer (Dept. of Chemistry, Tel Aviv University).

7. Critical Evaluation of Thermodynamic Properties in Non-aqueous and Mixed Solvents.
Drs. J. Padova and M. Gazith (Soreq Nuclear Research Center, Yavneh).

8. Ion Exchange Equilibrium Constants.
Prof. Y. Marcus (in collaboration with D.G. Howery, U.S.A.) (Dept. of Inorganic and Analytical Chemistry, Hebrew University, Jerusalem).

TECHNOLOGY

9. Panel Flutter. Self-excited vibrations of thin elastic plates and shells located in a flow of air - a complete bibliography.
Dr. A. Kornetzki (Dept. of Aeronautics, Technion - Israel Institute of Technology, Haifa).

10. Transport of Viscous Fuels by Pipelines. Data viscosity curves of various fuels and thermal conductivity of several types of insulation.
Mr. C. Roth (Dept. of Technical Services, Israel Institute of Petroleum, Tel Aviv).

BIOLOGY

11. Palynological Collection. A collection of miscroscope slides of pollen, spores and dinoflagellates assemblies, and a collection of cards of photographs of the same.
Dr. G. Martinotti (Dept. of Paleontology, The Geological Institute).

PLANNED DATA COMPILATIONS

1. Solubility Data Research Center Israel.
Prof. I. Eliezer, A. Ben-Naim, O. Levy, Y. Marcus, G.Y. Markovits, J. Padova, M. Zangen, A.S. Kertes (Dept. of Inorganic and Analytical Chemistry, Hebrew University, Jerusalem).

2. Data Compilation on Type Soil Properties. Planned compilation and description of the "Gilat" soil in the Northern Negev, including location, climatic data, crops grown, textural analysis, distribution of salts, etc.
Prof. D. Hillel and E. Rawitz (Dept. of Soil Sciences, Faculty of Agriculture, Rehovoth and Hebrew University, Jerusalem).

3. Values of "Standard Production Rates" in the Construction Industry. An information pool for standard values of "Inputs per units of building-products", man-hours and/or machine-hours for a unit of product is to be formed. The various factors affecting the a/m standard values will be analyzed in order to have them evaluated quantitatively.
Dr. D. Armon and Mr. Z. Herbsman (Faculty of Civil Engineering, Technion - Israel Institute of Technology, Haifa).

4. Compilation of Delayed Neutron Cross Sections.
Prof. S. Amiel (Soreq Nuclear Research Center, Yavneh).

FUTURE ACTIONS PLANNED

1. Dissemination of information on data compilations, to ensure that existing information is adequately brought to the knowledge of the country's scientists.

2. More precise delineation of data needs as a result of feedback followed by a more detailed questioning.

3. Further analysis and classification of present and potential data compilation activities (Possibility of forming new groups and data centers ?)

4. Setting up priorities with regard to data needs and data compilation activities.

5. Promotion of adequate links with the international community of scientists engaged in data activities.

6. Possible financial support of high priority data activities.

7. Promoting the activities of CODATA within the scientific community of Israel through newsletters, symposia, special interest groups, etc.

APPENDIX A

Questionnaire — Data Compilation Activities

Name, department, institution and address.

1. Mark your field of activity and indicate area of specialization, for example :

[X] CHEMISTRY *(physical)* [X] ENGINEERING *(civil)*

Chemistry, Physics, Mathematics, Biology, Medicine, Agriculture, Earth Science, Engineering, Space Sciences, and other.

2. Which chemical, physical, mechanical and biological properties of substances and systems do you seek most often in the literature ? For example : Free energy of formation of hydrocarbons, infrared spectrum of pesticides.

3. How well do existing compilations of data satisfy your needs ? Completely, Moderately, or Poorly.

4. Which data sources do you consult most often ? Please list some highly specialized compilations as well as comprehensive compendia.

5. Which properties would you like to see made the subject of a comprehensive *critically evaluated compilation ?*

6. Are you at present preparing any compilation yourself or do you know of any in preparation ? If yes, please give name and address of compiler, and specific subject area.

LABORATOIRES FRANÇAIS METTANT A DISPOSITION ET ELABORANT DES DONNEES NUMERIQUES EN THERMIQUE

M. J. BRUN

Institut Français des Combustibles et de l'Energie, Paris

Dans le cadre du recensement CODATA des sources de données, le Comité Français du CODATA a décidé d'entreprendre, à titre d'essai-pilote, un tel recensement dans un domaine pluridisciplinaire, la thermique, en tenant compte tant des besoins de la recherche que de ceux de l'industrie.

L'Institut Français des Combustibles et de l'Energie a été chargé de ce travail, qui cadre avec sa mission d'information en matière de thermique. Il a reçu l'aide et l'appui de la Société Française des Thermiciens et de la D.R.M.E. (Direction des Recherches et Moyens d'Essais).

Le recensement concerne :

— les différentes propriétés thermiques,
— les principaux corps solides ou fluides à la température ordinaire.

Il regroupe quarante laboratoires, appartenant à l'industrie, à des organismes de recherche, à l'Université. Chacun de ces laboratoires fait l'objet d'une fiche de présentation : nom, adresse, matériel, méthodes de travail.

Un tableau à double entrée permet d'identifier par propriété et par corps le (ou les) laboratoire(s) disposant de données.

DEROULEMENT DE L'ENQUETE

L'enquête a été menée en trois étapes successives de 1971 à 1973 en procédant, à partir d'un premier jeu de réponses, à un affinement progressif tant du mode d'interrogation que des organismes consultés.

1ère étape

Dans un premier stade, une liste d'une cinquantaine d'organismes industriels et universitaires a été constituée par des spécialistes en thermique à partir du fichier I.F.C.E. et de différents annuaires et répertoires
Ces organismes ont été interrogés à l'aide d'un formulaire d'enquête semblable à celui du CODATA, afin de permettre l'insertion de ce recensement dans la prochaine édition du Compendium.

Cette première enquête n'a donné que 8 réponses dont 3 négatives.

2ème étape

Il a alors été décidé de procéder à une enquête téléphonique auprès des 25 organismes paraissant le plus susceptibles de donner une réponse. 16 nouvelles réponses ont ainsi été obtenues.
Un premier dépouillement de l'enquête a alors été effectué et envoyé à tous les organismes consultés, pour contrôle et complément. 7 nouvelles réponses ont été enregistrées.

3ème étape

Un modèle de fiche technique, permettant de rassembler d'une manière systématique l'ensemble des renseignements recueillis pour un laboratoire, a alors été établi avec l'aide de spécialistes de la S.F.T. et en se guidant sur les renseignements recueillis.

Afin d'élargir les résultats de l'enquête, il a été décidé de procéder à un nouveau recensement d'organismes à consulter : organismes signalés à l'occasion des enquêtes précédentes, relance auprès de certains autres précédemment consultés et auprès des membres de la S.F.T., soit un total de 40 laboratoires. Ils ont été consultés en mars 1973 en leur adressant, avec le questionnaire, le résultat provisoire de l'enquête. 15 autres laboratoires ont répondu.

De nouvelles démarches personnelles et directes ont été entreprises en juin-juillet 1973, portant à 40 le nombre de laboratoires recensés.

RESULTATS - INTERET DE CETTE EXPERIENCE

Il s'agit d'un recensement effectué par voie indirecte. Ceci a l'avantage d'en réduire le coût (il représente une somme globale de 2 à 3 mois d'ingénieur) mais l'inconvénient d'en prolonger la durée, puisque des relances successives ont été nécessaires.

Le délai d'exécution peut paraître démesuré avec le nombre de laboratoires recensés. En fait il a permis une coopération progressive d'un certain nombre d'entre eux, une prise d'intérêt croissante, la mise en place de la présentation en fonction des résultats recueillis et de l'avis de spécialistes utilisateurs de données, et le contrôle précis du travail par les intéressés tout au long du déroulement de l'enquête.

Ainsi l'intérêt de cette expérience est-il :

— d'avoir une idée valable des difficultés et du temps d'enquête,

— d'avoir pu étudier une formule de présentation adaptée à son utilisation et susceptible de s'appliquer à d'autres secteurs,

— de pouvoir toucher un public large et divers du fait du caractère de la thermique,

— de tester l'utilité et l'utilisation d'un tel répertoire auprès des utilisateurs effectifs ou potentiels.

Cependant :

— Il ne s'agit là que d'un essai-pilote et d'une collecte incomplète. Il a pour objet immédiat d'appeler des mises au point, des compléments, des critiques, des suggestions.

— En fonction de ces résultats, on pour ait envisager de publier régulièrement un document à jour. Dans ce cas il serait nécessaire de procéder à des visites aux intéressés afin de réaliser une enquête dans des délais rapides, et de contrôler directement la rédaction des fiches de laboratoires.

Référence

DAVID A., Centres d'analyse de l'information et de données relatives à la thermique. *Communication au 3ème Congrès CODATA, Le Creusot, 26-30 juin 1972.*

	Éléments *Elements*	Solides mono-cristallins *Mono-crystalline solids*	Solides organiques *Organic solids*	Composés (nitrures, carbures, halogénures, sulfures, oxydes) *Compounds (nitrides, carbides, halides, sulfides, oxides)*	Sels fondus *Molten salts*	Métaux et alliages *Metals and alloys*	Métaux liquides et vapeurs métalliques *Liquid metals and metallic vapors*	Céramiques, réfractaires *Ceramics, refractories*	Semi-conducteu *Semi-conducto*
Masse moléculaire *Molecular weight*									
Enthalpie de formation *Enthalpy of formation*	20, 25	5	14, 15	20, 25, 36, 37	36	5, 14, 36			14
Volume molaire Masse volumique *Molar volume Density*			26			21, 24	24		
Coefficient de compressibilité *Compressibility coefficient*		5			33	5, 21			
Dilatation *Dilatation*		5	9	29		5, 40		27, 40	
Tension de vapeur *Vapor pressure*	31		15	36	36	21, 36			
Température et enthalpie de changement d'état *Temperature and enthalpy of transition*	34	37	14, 15	37	33	7, 14, 21, 37			14
Chaleur spécifique Enthalpie *Specific heat Enthalpy*	20, 25	5, 37		20, 25, 29, 37	33	3, 4, 5, 14, 21, 37, 40		27, 40	4
Entropie *Entropy*	20, 25		14	20, 25		14, 21			14
Tension superficielle *Surface tension*							24		
Tension interfaciale *Interfacial tension*						24			
Viscosité dynamique *Dynamic viscosity*									
Conductibilité thermique *Thermal conductivity*		5				3, 5, 8, 9, 18, 40		27, 40	
Diffusivité *Diffusivity*	9		9			18, 40		4, 27, 40	
Diffusion solide - solide et solide - gaz *Solid-solid and solid-gas diffusion*	16		16	16, 34		16, 34			
Émissivité thermique *Thermal emissivity*									
Chaleur de réaction *Heat of reaction*	31		14, 15						
Température et enthalpie de combustion *Temperature and enthalpy of combustion*	31		13, 15			21			
Limites d'inflammabilité, vitesses de déflagration et de détonation *Limits of inflammability, speed of conflagration and detonation*	31		13, 14, 15			21			
Fluage et relaxation *Creep and relaxation*								27	
Adsorption et désorption de l'eau *Water adsorption and desorption*						7			
Transformation allotropique *Allotropic transformation*						3, 7			
Pouvoir thermoélectrique *Thermoelectric power*		30				30			3
Mesure de flux thermique *Measurement of thermal flux*									

TABLEAU 1
TABLE 1

Hauts polymères *High polymers*	Plastiques *Plastics*	Ciments, bétons, granulats *Cements, concretes, granulates*	Pierres, tuiles, briques *Stones, tiles, bricks*	Isolants *Insulating materials*	Bois, panneaux agglomérés *Wood, hardboard panels*	Matériaux poreux *Porous materials*	Métal-graphite Composés semi- et inter métalliques *Metal-graphite Semi- and inter-metallic compounds*	Composés organo-métalliques *Organo-metallic compounds*	Laitiers *Slags*	Combustibles solides et pulvérisés *Solid and pulverized fuels*	Poudres, poussières *Powders, dusts*
5				5			5, 14	14			
	35	35	35	35					24	11	
5, 10		10	10	5, 10, 40			5				
5, 10	38, 40	9, 10, 38	10, 27, 38	5, 10, 40	38	38, 40	5			11	9, 40
							14	14			
5	38, 35, 40	35, 38	27, 35, 38	3, 5, 35, 40	38	38, 40	5				40
							14	14			
11											
									24		
11									24		
5, 10	35, 38, 40	9, 10, 35, 38	10, 27, 35, 38	5, 8, 9, 10, 18, 35, 39, 40	38	38, 40	5				9, 40
10	35, 40	10, 35	10, 27, 35	3, 10, 18, 35, 40		40					40
										11	
	38	38	38		38	38		14		11	
11, 13	13, 38	38	38		38	38				11	
13	13, 38	38	38		38	38				11	11
10, 11	38	10, 38	10, 38	10	38	38					
10	35	10, 12, 35	10, 35	10, 35		11				11	
											30
10	35, 38	10, 35, 38	10, 35, 38	10, 35, 39	38	38					

CORPS À L'ÉTAT SOLIDE À LA TEMPÉRATURE ORDINAIRE

SOLIDS AT ORDINARY TEMPERATURES

	Air	H_2O (g)	N_2	O_2	H_2	Gaz rares *Inert gases*	CO_2	Composés chimiques gazeux minéraux *Gaseous inorganic compounds*	Composés chimiques gazeux organiques *Gaseous organic compounds*
Masse moléculaire *Molecular weight*									
Enthalpie de formation *Enthalpy of formation*	18	1, 2, 18	1, 2	1		1, 8, 18	8, 18	1, 18, 37	1
Équation d'état *Equation of state*	1, 18	1, 18	1, 41	1		1, 8, 18, 41	1, 18	1, 18	1
Volume molaire Masse volumique *Molar volume Density*	1, 18	1, 18	1, 22	1		1, 8, 18, 41	1, 8, 18, 22	1, 18	1, 22
Coefficient de compressibilité *Compressibility coefficient*	1, 18	1, 18	1, 22, 41	1		1, 8, 18, 41	1, 8, 18, 22	1, 18	1, 22
Température et enthalpie de changement d'état *Temperature and enthalpy of transition*	1	18	1	1, 34		1, 8, 34, 41	1, 18	1, 18, 37	1
Tension de vapeur *Vapor pressure*	1	18	1	1		1, 8	1, 18	1, 18	1
Chaleur spécifique *Specific heat*	1, 18	1, 18	1, 22, 41	1		1, 8, 18, 41	1, 8, 18, 22, 41	1, 18, 37	1, 22
Enthalpie, énergie interne *Enthalpy, internal energy*	1, 18	1, 18	1, 22	1		1, 8, 18	1, 8, 18, 22, 41	1, 18	1, 22
Entropie *Entropy*	1, 18	1, 18	1, 22	1		1, 8, 18	1, 8, 18, 22	1, 18, 37	1, 22
Coefficient Joule-Thompson *Joule-Thompson coefficient*	1, 18	1, 18	1, 22	1		1, 8, 18	1, 8, 18, 22	1, 18	1, 22
Tension superficielle *Surface tension*	1	1	1	1		1, 8	1, 8	1	1
Tension interfaciale *Interfacial tension*	1	1	1	1		1, 8	1, 8	1	1
Coefficient de diffusion et d'autodiffusion *Coefficient of diffusion and self-diffusion*	1, 18, 32	1, 18	1, 32	1, 32		1, 8, 18, 32	1, 8, 18	1, 18	1, 2, 32
Viscosité dynamique *Dynamic viscosity*	1, 18, 32	1, 18	1, 32, 41	1, 32		1, 8, 18, 32, 41	1, 8, 18	1, 18	1, 2, 22, 32
Conductibilité thermique *Thermal conductivity*	1, 18, 32	1, 18, 41	1, 32	1, 32		1, 8, 18, 32, 41	1, 8, 18	1, 18	1, 2, 22, 32
Diffusivité *Diffusivity*	1, 18	1, 18	1	1		1, 8, 18	1, 8, 18	1, 18	1, 2
Nombres de Prandtl, Lewis, Schmidt *Prandtl, Lewis and Schmidt Numbers*	1, 18	1, 18	1	1		1, 8, 18	1, 8, 18	1, 18	1, 2
Émissivité thermique *Thermal emissivity*	1, 2, 18	2, 18	1, 2	2		18	18	11, 13, 18	2, 11, 13
Chaleur de réaction *Heat of reaction*									2
Température et enthalpie de combustion *Temperature and enthalpy of combustion*	1, 2, 11		1, 2	2	21			1, 2	1, 2, 11
Limites d'inflammabilité, vitesses de déflagration et de détonation *Limits of inflammability, speed of conflagration and detonation*	1, 2, 11	2	1, 2, 21	2	21				2, 11
Mesure de flux thermique *Measurement of thermal flux*	1			2					11
Coefficient de convection *Coefficient of convection*									
Diffusion solide-gaz *Solid-gas diffusion*	16		16, 34	16, 34	21		16	16	16
Chaleur d'adsorption de dissolution, de mélange *Heat of adsorption, solution and mixing*	16		16	16, 34	16		16	16, 37	16

TABLEAU 2
TABLE 2

Hydrocarbures gazeux *Gaseous hydrocarbons*	Fluides cryogéniques *Cryogenic fluids*	Mélanges gazeux *Gaseous mixtures*	Mélanges liquide-vapeur *Liquid-vapor mixtures*	Liquides minéraux *Inorganic liquids*	Hydrocarbures liquides *Liquid hydrocarbons*	Liquides organiques Fluides caloporteurs *Organic Heat-Transfer Fluids*	Mélanges liquides *Liquid mixtures*	Isolants électriques *Electrical insulators*	Solutions liquide-liquide liquide-solide *Liquid-liquid, Liquid-solid Solutions*
				26	26	26		26	
1	1, 2, 8	1	1, 37	14, 36, 37	1, 2, 14	15	14		
1	1	1	1		1			26	
1, 22	1	1, 22	1, 11, 22	22, 26	1, 22, 26	26	22	26	
1, 22	1	1, 22	1, 2, 22	22, 26	1, 22, 26	26	22	26	
1, 34	1,8	1	1, 37	11, 14, 17, 26, 37	1, 11, 14, 26	4, 15, 26	11, 14, 17, 26	26	
1	1,8	1	1, 23	11, 14, 17, 26, 19, 31, 36	1, 11, 14, 26	4, 15, 26	11, 14, 17, 19, 23, 26	26	
1, 22	1	1, 22	1, 11, 22, 37	14, 17, 26, 37	1, 11, 14, 22, 26	11, 26	11, 14, 17		
1, 22	1, 5	1	1, 11, 22	14, 17, 19, 22	1, 14, 22		5, 17, 14, 19	26	
1, 22	1	1, 22	1, 22, 37	14, 22, 37	1, 14, 22		14		
1, 22	1	1, 22	1, 22	22	1				
1	1	1	1	26	1, 26	26	26		
1	1	1	1	26	1, 26	26	26		
1, 2, 32	1	1, 32	1		1				
1, 2, 22, 32	1	1, 32	1	11, 22, 26, 40	1, 11, 26, 40	11, 26, 40	11,22, 26, 40		
1, 2, 22, 32	1, 5	1, 32, 41	1	11, 22, 26	1, 11	11	5, 11, 22	26	
1, 2	1	1	1		1				
1, 2	1	1	1		1				
2, 11, 13, 24, 28		1, 2, 11, 13, 24, 28	11	11	2, 11, 24, 28	11	11		
2, 22		2, 22		11, 14, 22, 26	2, 11, 14, 26	11, 15, 26	11, 14, 22, 26		
1, 2, 11, 24, 28		1, 2, 11, 24, 28		14	1, 2, 11, 14, 24, 28	15			
2, 11, 28		1, 2, 11, 13, 21, 28			2, 28	15	21		21
11, 28		11, 13, 21, 28	6	6, 11	11, 28		6, 21		21
			6	6	6	6	6		
16, 34		16							
16, 34		16	23, 26, 37	23, 31, 36, 37	23	23	23		26

CORPS FLUIDES A LA TEMPÉRATURE ORDINAIRE
FLUIDS AT ORDINARY TEMPERATURES

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NEW PUBLICATIONS

BIO-SCIENCES

Fused Pyrimidenes, Part II, *Purines* (1971, 655 pp, $ 49,50, Wiley-Interscience, New York) by J.H. Lister et al., (D.J. Brown, ed.), is the second part of a four-part set on the chemistry of fused pyrimidenes, covering properties, reactions, syntheses, and application. The present volume includes 39 tables of melting points of about 3000 purine derivatives and references to the literature from the earliest work up to late 1970, as well as 20 additional tables of ultraviolet spectral and other data

Handbook of Fluorescence Spectra of Aromatic Molecules, 2nd ed. (1971, 473 pp, $ 19, Academic Press, New York) by Isadore B. Berlman is a greatly expanded edition of a reference work giving in graphical form the fluorescence and absorption characteristics of aromatic molecules. Data characteristics of the fluorescence process are included, e.g. decay time, quantum yield, statistical width, Stokes loss, and average wavelength. Approximately 200 compounds are covered, more than twice the number in the first edition (1965, 258 pp), in the following classes: p-oligophenylenes, indole derivatives, fluoranthene derivatives, naphthalene derivatives, biphenyl derivatives, and biological stains. Name and formula indexes to the spectra are included.

Handbook of Naturally Occurring Compounds, Vol. 2, *Terpenes* (1972, 576 pp, $ 21, Academic Press, New York) by T.K. Devon and A.I. Scott, contains chemical structural diagrams for approximately 400 compounds of the following types: monoterpenes, sesquiterpenes, diterpenes, sesterpenes, triterpenes, steroids, carotenoids, polyprenoids, and miscellaneous compounds of terpenoid origin. Alphabetical, molecular weight, and molecular formula indexes are given.

Inorganic Chemistry of Vitamin B_{12} (1972, 348 pp, $ 18,75, Academic Press, New York, London) by J.M. Pratt, is a review of the inorganic chemistry of vitamin B_{12}, and includes an extensive compilation of relevant spectroscopic and structural data. The literature is covered through 1969, and some more recent references are given in an appendix.

Physicochemical Characteristics of Oligonucleotides and Polynucleotides (1971, 213 pp, $ 14.50, Plenum, New York, London) by B. Janik, is a compilation of data on the dissociation, spectral, and melting properties of polynucleotides, oligonucleotides, and their complexes. Literature references are cited through 1970.

Spectral Data and Physical Constants of Alkaloids, Vol. VII (1972, 20 pp + 100 cards, $ 25), and Vol. VIII (1972, 84 pp + 100 cards, $ 25), Academia, Prague (Socialist countries), Heyden, London and Rheine/Westf. (rest of world), J. Holubek, ed., continue this compilation of physical and optical data useful in the identification of alkaloids. For each compound, both IR and ultraviolet spectra are given, with molecular and semi-structural formulas, melting point, optical rotation, and apparent dissociation constant. These two most recently published volumes, together with the previous Vols I—VI (1965—1971, $ 190), now comprise a compilation covering approximately 1000 alkaloids.

CHEMISTRY

Three of the nearly 50 volumes in the series **Analytical Chemistry of Elements,** containing general physico-chemical data on the elements and their compounds, published by the Academy of Sciences of the U.S.S.R. and translated by the IPST, have recently been issued, as follows:

Analytical Chemistry of Fluorine (Nov. 1972, 191 pp, $ 20) by N.S. Nikolaev et al., Nauka Publishing House, Moscow (1970), translated 1972.

Analytical Chemistry of Aluminium (Nov. 1972, 264 pp, $ 20) by V.N. Tikhonov, Nauka Publishing House, Moscow (1971), translated 1972.

Analytical Chemistry of Selenium and Tellurium (Dec. 1972, 249 pp. $ 20) by I.I. Nazarenko and A.N. Ermakov, Nauka Publishing House, Moscow (1971), translated 1972.

These volumes are distributed by IPST (Keter) Ltd and Wiley, Chichester, from whom information on previous and future titles in the series is available.

Gmelins Handbook of Inorganic Chemistry — Gmelins Handbuch der anorganischen Chemie, produced by the Gmelin Institute for Inorganic Chemistry, Frankfurt/Main, and published by Verlag Chemie, Weinheim/Bergstr., Germany, Fed. Rep. The following volumes in this comprehensive and continuing reference series have been issued during 1972:

14. Carbon-Kohlenstoff, Part C2, Chemical Reactions of CO and CO_2 (1972, 208 pp, DM 291);

46. Tin-Zinn, Part C1, Compounds with Hydrogen, Oxygen, Nitrogen and Halogens (1972, 503 pp, DM 676);

47. Lead-Blei, Part B2, The Element (Electrochemical Behaviour) (1972, 416 pp, DM 505);

61. Silver-Silber, Part B2, Compounds With Bromine, Iodine, and Astatine (1972, 481 pp, DM 578); **Part C,** Alloys (1972, 501 pp, DM 676);

Transuranium Elements — Transurane (New Supplement Series, Vol. 4), Part C, Compounds (1972, 279 pp, DM 386).

Metallurgy of Iron — Metallurgie des Eisens (4th revised edn, Supplement to System No. 59, Iron, Part A, Sections 3-5), Vols 4a and 4b, The Blast Furnace, Part 2 (Vol. 4a, 1972, 353 pp; Vol. 4b, 160 pp; DM 498).

The Organic Chemistry of Palladium. Vol. I, *Metal Complexes* (1971,319 pp, $ 19, Academic Press, New York, London) by P.M. Maitlis, is the first of a two-volume monograph on the chemistry or organometallic complexes of palladium. The present volume covers the metal complexes and their structures, bonding and reactions, with Vol. II covering the catalytic processes and other reactions induced by palladium. Available data on both the complexes and on the catalyzed reactions are compiled. The literature is covered through 1970.

Organometallic Compounds, *Methods of Synthesis, Physical Constants and Chemical Reactions,* 2nd edn, Vol. 3, *Compounds of Arsenic, Antimony, and Bismuth,* First Supplement, Covering th Literature from 1965 to 1968 (1972, approx. 640 pp, DM 78.2($ 24.80, Springer-Verlag, Berlin, Heidelberg, New York), M. Dul ed. Coverage in this series has been extended to Soviet literatu and patents, and to the biological properties and applications (these compounds.

Physical Chemistry of Alloys and Refractory Compounds (Thorium and Uranium (1972, 264 pp, £8.75, IPST (Keter) Ltd., ar Wiley, Chichester), D.S. Ivanov, ed., Nauka Publishing Hous Moscow (1968), translated 1972. This book includes the results (original research on alloys and refractory compounds of thoriu and uranium, including phase diagrams. The transformations solid solutions in various alloys, and their mechanical, physical, ar corrosion properties are described. Information is also given on tl structure and properties of alloys of refractory metals with vario monocarbides, and on the high-temperature mechanical properti of intermetallic compounds of uranium with aluminium, berylliur silicon, and carbon. The physical chemistry of compounds uranium oxide with other metal oxides at high temperatures discussed. The book contains numerous figures, tables, and cor prehensive bibliographies.

HANDBOOKS FOR BROAD FIELDS OF SCIENCE AND ENGINEERING

Composite Index for CRC Handbooks (1972, 352 pp, £25.50, CR and Blackwell), R.C. Weast and G.L. Tuve, eds, provides a key the millions of items of scientific and technical data contained in t ten current volumes of the CRC Handbook series. It consists of alphabetical merging of every book into a composite index; t location of any specific item of data or information can be fou with a single index reference.

Fibres, Films, Plastics and Rubbers. *A Handbook of Comm Polymers* (1971, 704 pp, £15, Butterworth, London) compiled W.J. Roff and J.R. Scott, includes data and information on structural, chemical, physical, thermal, electrical, and mechani properties of a wide range of natural and man-made polymers in following classes: olefin and vinyl-type, carbohydrate-type, p teins, synthetic condensation-type, natural and synthetic rub types, organo-silicon, and inorganic polymers.

Handbook of Chemistry and Physics, 53rd edn (Sept. 1972, 2: pp, £13.50, Chemical Rubber Co., Cleveland, Ohio, and Blackw Oxford), R.C. Weast, ed., is the latest edition of this well-kno reference book, first published in 1913. As in previous editions, d have been up-dated, non-essential material deleted, and new tat added, as follows: low temperature liquid baths, mass attenuat coefficients, X-ray cross-sections, lattice spacing of common ana sing crystals, radiative transition probabilities for K and L X- lines, radioactive tracer diffusion data for pure metals, part tables and atmospheric electricity.

Handbook of Chromatography (Dec. 1972, 960 pp, £27.50, Che ical Rubber Co., Cleveland, Ohio, and Blackwell, Oxfo:

G. Zweig, ed., provides a review of the history, nomenclature, and terms used in chromatography, together with a description of the variations, functioning and applications of the technique. Analytical applications, materials, and procedures are outlined, and important chromatographic information is tabulated.

Handbook of Lasers — *With Selected Data on Optical Technology* (Feb. 1972, 656 pp, £14.25, Chemical Rubber Co., Cleveland, Ohio, and Blackwell, Oxford), R.J. Pressley, ed., is intended to provide access to the ever-increasing amount of theoretical and experimental data on lasers in both the published and unpublished literature. The data on related optical elements represent a selection of some of the more useful and important items.

The Oxide Handbook (1972, 460 pp, £18.45, $ 44.24, Plenum, London, New York), G.V. Samsonov, ed., translated from the Russian by C.N. Turton and Tatiana I. Turton. This comprehensive handbook covers the physico-chemical properties of all known oxides; data from 700 literature sources are systematically tabulated. Crystal structure, entropy, thermodynamic potentials of formation reactions, melting and boiling points, molar heat capacity, vapour pressure, thermal stability characteristics, colour, chemical and catalytic properties, are among the more than 50 properties covered.

MECHANICAL AND ENGINEERING DATA

Abrasives (1971, 177 pp, DM 51, $ 14.60, AS 350, Springer-Verlag, Vienna and New York) by L. Coes, is the first volume in a series of monographs *Applied Mineralogy-Technische Mineralogie,* and describes all important natural and synthetic abrasives in terms of occurrence, preparation, properties, and use.

Creep-Rupture Data for the Refractory Metals to High Temperature (1971, 797 pp, $ 45, Gordon and Breach, New York, London) by J.B. Conway and P.N. Flagella, is a comprehensive compilation of available creep-rupture data for refractory metals and alloys (tungsten, rhenium, tantalum, molybdenum, niobium, and their alloys) at temperatures up to 3000°C. Mathematical techniques for creep data analysis, parametric procedures pertinent to measuring stress-rupture data, and relevant experimental techniques are also discussed.

Electroplating Engineering Handbook, 3rd edn (1971, 845 pp, $ 29.95, Van Nostrand-Reinhold, New York), A.K. Graham, ed., is a revised and expanded edition of this reference handbook covering electroplating engineering fundamentals and practice, and general processing data. New chapters on electrochemical machining and electrophoresis have been added.

The **Engineering Sciences Data Unit (ESDU),** 251-259 Regent St., London W1R 7AD, U.K., issues a wide range of authoritative data for engineering applications in the form of data sheets and memoranda, prepared by the ESDU staff under the guidance of Technical Committees which have the support of the appropriate institutions in the U.K. Currently supporting the work of ESDU are the Royal Aeronautical Society, the Institution of Mechanical Engineers, the Institution of Chemical Engineers, and the Institution of Structural Engineers. ESDU data are issued in four series divided into subseries as follows : aeronautical (sub-series, aerodynamics, dynamics, fatigue, performance (aircraft), structures, transonic aerodynamics); chemical engineering (heat transfer, fluid mechanics internal flow, fluid mechanics external flow, physical data (chemical engineering); industrial data for engineering application (stress and strength, fluid mechanics internal flow, fluid mechanics external flow); and mechanical engineering (stress and strength, heat transfer, fluid mechanics internal flow, fluid mechanics external flow, physical data (mechanical engineering), machine design, mathematical methods). For detailed information, the recently-published *ESDU Index* 1972 and *ESDU Titles* 1972, together with price and classified lists, are available free of charge from ESDU.

Guide to World Screw Threads (1972, 318 pp, $ 12, Industrial Press, New York), P.A. Sidders, ed., contains tabular information and data on the thread geometry for all commonly-used types of screw thread

Machinery's Handbook, 19th edn (1971, 2420 pp, $ 19, Industrial Press, New York) by E. Oberg, includes the latest developments in manufacturing and design practices, and recent or revised British and American engineering standards. Although English units are still given, SI units are used in appropriate parts of the book.

Manufacturing Engineer's Manual : American Machinist Reference Book Sheets (1971, 317 pp, $ 14.50, McGraw-Hill, New York), R. Le Grand, ed., comprise a compilation of data and information on various aspects of manufacturing processes of value to production engineers. The material is ordered as in the *American Machinist Handbook,* and was either written by engineers for articles in the *American Machinist* or extracted from the literature of metal working companies, trade associations, engineering societies, and materials suppliers

N/C Machinability Data Systems (1971, 203 pp, $ 13.50, Society of Manufacturing Engineers, Dearborn, Michigan), N.R. Parsons, ed., is a guide to the collection and use of machinability data for the efficient operation of numerically-controlled (N/C) machine tools. Concepts and techniques of various systems now in use or being developed, including computer applications, are covered, and the availability and economics of machinability data are discussed. An appendix describes the U.S. Air Force Machinability Data Center.

Newnes Radio Engineers' Pocket Book, 14th edn (April 1972, 192 pp, £1.20, Butterworth, London) by H.W. Moorshead, is the most recent edition of this ready reference source of electrical and electronic data, formulas and definitions.

Sodium-NaK Engineering Handbook, Vol. I, *Sodium Chemistry and Physical Properties* (1972, 327 pp, $ 27.50, £11.45, Gordon and Breach, New York, London), O.J. Foust, ed., is the first volume of a

handbook on high-temperature sodium and NaK technology, with emphasis on the use of these materials in the liquid metal fast breeder reactor. Volume I covers mechanical, thermophysical, electrical, nuclear, and miscellaneous properties, analytical chemistry, and chemical interactions of sodium and sodium-potassium alloys.

Tables of Antenna Characteristics (1971, 393 pp, $25, IFI/Plenum, New York, London) by R.W.P. King, is a selection of tabulated results from extensive research on antennas carried out at Harvard University. Representative tables are given of characteristics of cylindrical and loop antennas and dipole arrays. This information is useful for computer evaluation of analytically-derived formulas and for direct numerical solutions.

Transistor Substitution Handbook, 12th edn (1972, mixed pagination, $ 2.25, Sams, Indianapolis) by the Engineering Staff, Howard W. Sams, is the latest annual edition of this handbook containing substitution information for over 10 000 bipolar transistors, arranged in numerical and alphabetical order. The substitutions (including general purpose substitutions) were determined by computer within given limits from information concerning shape, physical dimensions, and seven of the most critical parameters.

NOMENCLATURE, SYMBOLS, UNITS, STANDARDS AND CONSTANTS

The following definitive recommendations are now available from the IUPAC Secretariat:

Definitions, Terminology, and Symbols in Colloid and Surface Chemistry-I. (1972, 62 pp, £0.75, $ 2.25).

Definitive Rules for nomenclature of Steroids (1972, 40 pp, £0.50, $1.50).

Nomenclature, Symbols, Units and their Usage in Spectrochemical Analysis-I: General Atomic Emission Spectroscopy (1972, 30 pp. £0.40, $ 1.20).

IUPAC Information Bulletin (Annual subscription £1, $ 2.50), *Appendices on Tentative Nomenclature, Symbols, Units, and Standards,* IUPAC Secretariat, Bank Court Chambers, 2/3 Pound Way, Cowley Centre, Oxford OX4 3YF, U.K.

No. 14 (Feb. 1972, 4 pp), Recommendations on Nomenclature for Contamination Phenomena in Precipitation from Aqueous Solutions.

No. 15 (Feb. 1972, 17 pp), Recommendations on Nomenclature for Chromatography.

No. 16 (Feb. 1972, 5 pp), Recommendations for Nomenclature of Thermal Analysis.

No. 17 (Feb. 1972, 7 pp), Recommendations for Nomenclature of Mass Spectrometry.

No. 18 (Feb. 1972, 4 pp), Recommendations on Nomenclature of Scales of Working in Analysis.

No. 19 (Feb. 1972, 43 pp), Rules for the Nomenclature of Carotenoids.

No. 20 (Feb. 1972, 24 pp), Quantities and Units in Clinical Chemistry.

No. 21 (Feb. 1972, 24 pp), List of Quantities in Clinical Chemistry.

No. 26 (Nov. 1972, 24 pp), Nomenclature, Symbols, Units and their Usage in Spectrochemical Analysis-II. Terms and Symbols related to Analytical Functions and their Figures of Merit.

No. 27 (Nov. 1972, 47 pp), Nomenclature, Symbols, Units and their Usage in Spectrochemical Analysis-III. Analytical Flame Spectroscopy and Associated Procedures.

No. 28 (Nov. 1972, 18 pp), Electrochemical Definitions and Symbols.

No. 29 (Nov. 1972, 31 pp), Nomenclature of Regular Single-Strand Organic Polymers.

IUPAC Information Bulletin, *Technical Reports,* IUPAC Secretariat

No. 4 (1972, 7 pp), Recommended Method for Benzo (a) pyrene in Foods.

No. 5 (1972, 8 pp), A Survey of Analytical Procedures for Traces of N-Nitrosamines in Foods.

No. 6 (Nov. 1972, 11 pp), Collaborative Study of the Stability of Aflatoxin M Standards.

Pure and Applied Chemistry, the Official Journal of IUPAC, four issues per volume (ca. 600 pp, £13.50, $ 40-50), four volumes in 1972, Butterworth, London, Vol. 29, Nos 1-3 (1972, 492 pp) included "Guide to Procedures for the Publication of Thermodynamic Data". Vol. 29, No. 4 (1972, 194 pp) included "Report of the Commission on Physicochemical Measurements and Standards of the Physical Chemistry Division - Catalogue of Physicochemical Standard Substances"; "Recommendations on Ion Exchange Nomenclature"; "Recommendation for the Presentation of NMR Data for Publication in Chemical Journals".

SOLID STATE PROPERTIES

Electronic Properties of Materials: A Guide to the Literature, Vol. 3 (1972, Part 1: 1161 pp, Part 2: 757 pp, £70, $172.50, IFI/Plenum, New York, London), D.L. Grigsby, ed., is the most recent in a continuing literature index/bibliography series from EPIC, including an index (Part 1) and a bibliography (Part 2) of the literature received by the Center since January 1967, thus continuing the coverage provided by Vol. 1 (1961-65) and Vol. 2 (1965-67). The series covers semiconductors, insulators, ferroelectrics, dielectrics, ferrites, ferromagnetics, electroluminescent materials, thermionic emitters, and superconductors.

Handbook of Electronic Materials, compiled by the Electronic Properties Information Center (EPIC), Hughes Aircraft Co., Culver City, California; Vol. 4, *Niobium Alloys and Compounds* (1972, 70 pp, £5.85, $ 14.50) by M. Neuberger, D.L. Grigsby, and W.H. Veazie, Jr.; Vol. 5, *Group IV Semiconducting Materials* (1971, 67 pp. $ 10) by M. Neuberger; Vol. 6, *Silicon Nitride for Microelectronic Applications. Part 2: Applications and Devices* (1972, 117 pp, £5.85, $ 14.50, IFI/Plenum, New York, London) by J.T. Milek. The *Handbook of Electronic Materials* series are com-

piled using the computerized data retrieval system of the Electronic Properties Information Center (EPIC), a designated Information Analysis Center of the U.S. Department of Defense, which compiles and evaluates experimental data on the electronic, optical, and magnetic properties of materials. The retrieval system contains more than 42 000 documents and covers more than 100 properties of 7000 materials. The original literature in English, German, French, and Russian is covered, including technical journals and reports, textbooks, theses and dissertations, conference and symposium proceedings, manufacturers' literature, and reference works. Volume 4 consists mainly of data tables of optical, thermal, mechanical, electrical, magnetic and electronic properties of 39 alloys and compounds of niobium (including superconducting materials), compiled from more than 1500 articles. Volume 5 includes physical and other pertinent data in tabular form for semiconducting compounds such as diamond, germanium, silicon, and silicon carbide, while Volume 6 discusses the uses of silicon nitride in the semiconductor and microelectronics industries, complementing Volume 3 in the series which dealt with the preparation and properties of this compound.

Physik Dünner Schichten, Gesamtbibliographie, Teil I/II Physics of Thin Films, Complete Bibliography, Parts I/II; Physique des Lames Minces, Bibliographie d'Ensemble, Tome I/II (1972, Part I: 898 pp, Part II: 304 pp, DM 320, Wissenschaftliche Verlag, Stuttgart) is a bibliography compiled from the world literature on the physics of thin films and related topics. The 18 800 references are ordered alphabetically in Part I, and in Part II by key numbers permitting reference to particular topics, elements and compounds.

Solid State Physics Literature Guides, Vol. 2, *Semiconductors: Preparation, Crystal Growth and Selected Properties* (1972, approx. 208 pp, £6.80, $16.50), Vol. 3, *Groups IV, V, and VI Transition Metals and Compounds: Preparation and Properties* (1972, approx. 200 pp, £6.80, $16.50), and Vol. 4, *Electrical Properties of Solids: Surface Preparation and Methods of Measurement* (1972, approx. 100 pp, £6.80, $16.50, IFI/Plenum, New York, London) prepared under the auspices of the Research Materials Information Center, Oak Ridge National Laboratory, Oak Ridge, Tenn. 37831, U.S.A. (T.F. Connolly, General ed.). This current and comprehensive series of bibliographies, including citations to books, periodicals, reports, theses, patents, and manufacturers' literature, covers the preparation and properties of elements, compounds, and materials of importance in the electronics industry.

SOLUTION PROPERTIES

Crystallisation, 2nd edn (1972, 500 pp. £12, Butterworth, London) by J.W. Mullin, is a review of recent research on nucleation and crystal growth, and applications to the design of industrial crystallisers. In an appendix to the book, a wide range of physico-chemical properties of solutes, solvents and solutions are tabulated, including solubilities, densities, viscosities, diffusion and activity coefficients, conductivities, and heats of solution and fusion.

Lehrbuch der Elektrochemie, 5th Revised edn (1972, 631 pp, DM 72, Verlag Chemie, Weinheim/Bergstr., German, Fed. Rep.) by G. Kortüm, comprises a comprehensive discussion of the physical and thermodynamic aspects of electrochemistry, which also includes, in 70 tables, compilations of new experimental results extracted from the literature up to 1970.

SPECTRA COLLECTIONS

Comprehensive Index of API RP44 TRC Selected Data on Thermodynamics and Spectroscopy, 2nd edn (early 1973, 600 pp, Publication 100, Thermodynamics Research Center, Texas A & M University, College Station, Texas 77843, U.S.A.) by B.J. Zwolinski and R.C. Wilhoit, is a one-volume index to the more than 9000 compounds for which thermodynamic and spectroscopic data are available in the compilations of both the API Research Project 44 and the TRC Data Project (see *CODATA Newsletter* 6, June 1971, p. 12). Data are located from an alphabetical compound name listing and a standardized formula index, compatible with the *Chemical Abstracts* style.

Index of Vibrational Spectra of Inorganic and Organometallic Compounds, Volume 1 (1972, 762 pp, £15, Butterworth, London) by N.N. Greenwood, E.J.F. Ross and B.P. Straughan, provides a comprehensive index to the literature (books, periodicals, review articles) published from 1935 to 1960 which includes information on the vibrational spectra of inorganic and organometallic compounds.

Mössbauer Effect Data Index, Covering the 1970 Literature (1972, 382 pp, $ 29.50 ($19.50 for individuals), Plenum, New York and London), J.G. Stevens and Virginia E. Stevens, eds, is the latest volume in a continuing series of reference guides to Mössbauer data, and contains over 1000 systematically arranged references and data on more than 2400 samples. Summaries of the nuclear and Mössbauer properties of the various isotopes, and a partial listing of 1971 references, are also included.

Survey of Analytical Spectral Data Sources and Related Data Compilation Activities (Reprinted from *Analytical Chemistry* **44** 7 (1972) 30A) by L.H. Gevantman, describes the activities and output of more than 40 continuing data centres and projects concerned with the compilation, evaluation, and publication of spectral data in nine areas, as follows: infrared spectra, ultraviolet visible spectra, Raman spectra, microwave spectra, mass spectra, NMR spectra, activation analysis, Mössbauer effect, and gas chromatography. New initiatives for automation and easy access and retrieval are considered for some spectral areas, and recent efforts to up-grade the quality of published spectral data are discussed. The survey of continuing projects is supplemented by an appendix listing "one-shot" reference sources to spectral data.

THERMODYNAMIC PROPERTIES

Atlas of Thermoanalytical Curves, Vol. 1 (1972), £11.50, $ 28, DM 103, Heyden, London and Rheine/Westf.), G. Liptay, ed., is the first volume in a continuing series intended to provide users of thermoanalytical methods with a comprehensive collection of com-

parative data on the thermal properties of a wide range of materials. The information given in the present volume was obtained by running simultaneous differential thermoanalytical (DTA), thermogravimetric (TG), and derivative thermogravimetric (DTG) curves on a variety of specimens, including inorganic, organic, and synthetic organic compounds, minerals, rocks, and carbons. To each material is devoted a single page, on one side the thermoanalytical curves (with curves for a fast heating rate on a transparent overlay), and on the reverse side, relevant experimental and structural data, and literature references.

New Reference Tables for Pt 10 Rh/Pt and Pt 13 Rh/Pt Thermocouples have been prepared through a co-operative programme between the U.S. National Bureau of Standards, the U.K. National Physical Laboratory, and the National Research Council of Canada. The new tables, which are in the process of adoption by ASTM and the British Standards Institute, eliminate differences between existing U.S. and U.K. tables, and take into account both the substantial improvements in the purity of platinum and rhodium now attainable, and the changes incorporated in the 1968 IPTS scale. Details of the manufacture and calibration at NBS, NRC and NPL of the new reference thermocouples are given in *NBS Technical News Bulletin, 56,* 9 (Sept. 1972) 225. Copies of the tables and additional information may be obtained from any of the organizations concerned.

MISCELLANEOUS

Angular Scattering Functions for Spheroids (1972, 105 pp, $12, Wayne State University Press, Detroit, Mich.) by W. Heller et al., consists of tables for use in determining the size and shape of nonspherical rigid scattering bodies, such as solid or liquid pollutants in water or air, and the conformation of flexible bodies, particularly low molecular weight compounds. The data were computer-calculated.

Quantitative Evaluation of Spectrograms by Means of I-Transformation (1972, 40 pp + tables, £3.50, $ 9, DM 32, Heyden, London and Rheine/Westf.) by T. Török and K. Zimmer, provides a step-by-step description of the principles of the method, using a number of practical examples. A bibliography and a set of removable tables are included.

Tables of Resolving Agents and Optical Resolutions (1972, 308 pp, $ 14.95, University of Notre Dame Press, Notre Dame, Ind.) by S.H. Wilen; E. L. Eliel, ed.

MISCELLANEOUS NEWS

FEED INFORMATION CENTRES

Scientists from seven countries convened at Hohenheim University, Stuttgart-Hohenheim, September 18, 1973, to finalize an International Network of Feed Information Centres. Representatives of FAO participated in the meeting.

Agreement was reached on international terminology and methods to collect and organize data by computer. This will make it possible to pool data on a world-wide basis.

The function of the Feed Network is to collect, process and retrieve numerical data on chemical composition and nutritive value of feedstuffs as well as the literature and summary abstracts on the use of feedstuffs. Numerical data are to be published in tables using a unique terminology in five languages (English, French, German, Portuguese and Spanish). These tables will be appropriate for the area to be served. The abstracts will outline how a feed may be utilized by livestock producers. These data together with nutrient requirements of animals may also be used to formulate balanced rations for animals. This will promote the production of meat, milk, eggs and fibre for humans.

The "International Bank" of chemical and biological data allows to provide rapid answers to a wide range of inquiries on feeds and feeding. When the "International Bank" is fully operative it is envisaged that inquiries from Africa and the Near East should be made to FAO, Rome ; from Europe to the Dokumentationsstelle, Stuttgart-Hohenheim ; from Canada, Latin America and the United States to the International Feedstuffs Institute at Utah State University, Logan, Utah ; from Australia, New Zealand, Papua-New Guinea and Indonesia to the Australian Feed Centre, Canberra. Other areas may contact any of the above centres.

It would be appreciated if organizations or laboratories that generate or hold feed data would make these available to the "International Network".

ANNOUNCEMENTS

Symposium on Chemical Kinetics Data For the Lower and Upper Atmosphere

September 16-18, 1974

Airlie House, Warrentin, Virginia, U.S.A.

Organized by the CODATA Task Group on Data for Chemical Kinetics

The theme of the meeting is the chemical kinetics of reactions occurring in the natural and polluted atmosphere : what data are available, what is their quality and what measurements are needed.

Tentative Program

Plenary lectures covering the general topics of :

— Reactions in the stratosphere.
— Meteorology (dynamics) of the stratosphere.
— Modeling of ground level pollution.
— Meteorology at ground level.
— Aerosols and sulfur compound reactions.
— Accuracy and precision of modern kinetics techniques.
— Estimation of rate constants.

Contributed Papers and Discussion of :

— Laboratory measurements of the kinetics of elementary gas phase reactions of importance to atmospheric chemistry, primarily : reactions of O, O_3, H, HO, HO_2, NO, NO_2, etc. ; reactions of alkoxy and peroxy radicals.

— Laboratory measurements of reactions of sulfur oxides formation and reactions of aerosols.

— Comparison of precision methods for gas phase kinetics.

— Estimation, correlation and evaluation of rate constants.

The contributed papers will be presented in a discussion format : brief (5 minute) expositions to supplement long abstracts distributed in advance, followed by general discussion of groups of papers.

CODATA PUBLICATIONS

International Compendium of Numerical Data Projects
Springer-Verlag, Berlin, Heildelberg, New York, 1969, 295 pp, DM 48. —, US $20.—, FF 120.—.

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 × 210 mm, DM 30.—, US $12.—, FF 60.—.

CODATA Newsletter (twice a year) :

No. 1 (Oct. 1968), 12 pp; No. 2 (Aug. 1969), 12 pp; No. 3 (Dec. 1969), 8 pp; No. 4 (May 1970), 16 pp; No. 5 (Dec. 1970), 28 pp; No. 6 (June 1971), 20 pp; No. 7 (Dec. 1971), 20 pp; No. 8 (May 1972), 16 pp; No. 9 (Dec. 1972), 12 pp; No. 10 (June 1973), 12 pp; No. 11 (December 1973), 20 pp.

CODATA Bulletin (irregular):

No. 1 (Oct. 1969), 12 pp, *Automated Information Handling in Data Centers*
(Report of the CODATA Task Group on Computer Use, June 1969), superseded by Bulletin No. 4.

No. 2 (Nov. 1970), 6 pp, *Tentative Set of Key Values for Thermodynamics - Part I*
(Report of the CODATA Task Group on Key Values for Thermodynamics, Oct. 1970), superseded by Bulletin No. 5.

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

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

No. 5 (Dec. 1971), 6 pp, *Final Set of Key Values for Thermodynamics - Part I*
(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*
(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*
(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*
(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*
(Report of the CODATA Task Group on Publication of Data in the Primary Literature, Sept. 1973).

No. 10 (Dec. 1973), 12 pp, *CODATA Recommended Key Values for Thermodynamics, 1973*
(Report of the CODATA Task Group on Key Values for Thermodynamics, Nov. 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).

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