

C O D A T A 7
NEWSLETTER

DECEMBER 1971

THIRD INTERNATIONAL CODATA CONFERENCE

The Third International CODATA Conference on Generation, Compilation, Evaluation, and Dissemination of Data for Science and Technology will be held at Le Creusot, France, from 26-29 June, 1972, under the chairmanship of Prof. B. Vodar, Chairman of the French National Data Committee.

A programme committee, with, Dr. E. Brady, NBS, Washington, D. C., as Programme Chairman, and Dr. H. Viellard, DRME, Paris, France, as Vice-Chairman, has been set up in order to formulate the conference programme.

The Tentative Conference Programme will be announced in CODATA Newsletter 8.

UNISIST — WORLD SCIENCE INFORMATION SYSTEM

The United Nations Educational, Scientific, and Cultural Organization (UNESCO) and the International Council of Scientific Unions (ICSU) have recently completed a Feasibility Study on a World Science Information System (UNISIST). The results of this study have been published in the UNISIST-Study Report on the "Feasibility of a World Science Information System" (Paris, UNESCO House, 1971). The Report was used as a reference

document at the Intergovernmental Conference, for the Establishment of a World Science Information System (UNISIST), which was held 4-9 October, 1971 at UNESCO House, Paris. The President of ICSU-CODATA, Prof. Boris VODAR, presented the following report in French concerning the relation between CODATA and UNISIST. This report is based upon an English report (see p 3) which was distributed at the conference.

CODATA ET UNISIST

BORIS VODAR

Laboratoire des Hautes Pressions, Bellevue, France

Président de ICSU CODATA

I — Les objectifs du CODATA

L'information quantitative est un des produits les plus importants de la Science, exprimant d'une manière extraordinairement condensée les résultats et les lois scientifiques.

Pour ce type d'information l'évaluation, qui peut être précise, est particulièrement importante. Cela a été reconnu depuis longtemps par les scientifiques, comme en témoignent les tables classiques que nous connaissons tous.

Cependant la tâche est devenue très lourde au fur et à mesure que croissait la production scientifique, c'est la raison pour laquelle, dès 1966, grâce, notamment, au Prof. Harrison Brown, le Conseil International des Union Scientifiques a constitué le «Committee on Data for Science and Technology» ou CODATA. Le domaine d'action du CODATA porte sur les données numériques critiquement sélectionnées ou les autres données quantitatives évaluées.

Ainsi CODATA est un Comité au niveau scientifique international le plus élevé, et qui existe effectivement depuis 6 ans. Bien que simple observateur à cette Conférence, CODATA a voulu vous faire part de l'expérience de ce Comité, à cause de l'importance qui s'attache à l'évaluation des données, c'est-à-dire au problème du contrôle de la qualité dans le développement d'un programme global sur l'Information Scientifique.

La position du CODATA a été nettement précisée: c'est un comité de coordination et sa principale tâche est de prendre des initiatives et de souligner l'importance des aspects communs à plusieurs domaines de la science et de la technologie, ce qui comprend les activités suivantes:

- a) l'évaluation des méthodes de contrôle de la qualité,
 - b) la définition des besoins des utilisateurs,
 - c) les standards divers,
 - d) les techniques de l'information,
 - e) servir de clearing house pour les activités centrales du CODATA,
 - f) aider à l'organisation des conférences scientifiques.
- etc. . . .

Initialement l'activité de CODATA a été limitée aux domaines de la chimie et de la physique; il a été récemment décidé d'étendre la coordination à pratiquement tous les types de données scientifiques quantitatives évaluées.

De ce qui précède il apparaît, je pense, que CODATA correspond bien aux domaines de la recommandation 10 de l'UNISIST pourvu que l'on remplace la notion de «donnée numérique» par celle plus générale d'information quantitative qui comprend le graphique, les cartes, les structures spatiales etc. . . Cette remarque a déjà été très justement faite par le Délégué du Canada et par le Délégué Japonais.

II-Fonctionnement

CODATA comprend plusieurs catégories de Membres représentant soit des unions scientifiques, soit des nations, soit des organisations nationales. Récemment il a été décidé d'y adjoindre des Membres associés- en vue d'élargir, à l'ensemble de la communauté scientifique et technique, notamment à ceux qui sont plus des utilisateurs que des producteurs de données, la possibilité de participer pleinement au programme du CODATA.

Dans chaque pays membre le représentant national peut s'appuyer sur un Comité. Chacun de ces Comités peut contribuer ainsi à l'activité globale de CODATA.

Parallèlement CODATA cherche à stimuler l'activité au sein de chaque union concernant les données quantitatives. En effet, les unions ont un but plus général que celui de s'occuper des problèmes de données et si certaines d'entre elles ont été très actives à cet égard d'autres l'ont été beaucoup moins, et commencent à le devenir.

Dans les domaines interdisciplinaires, donc d'intérêt général, CODATA a créé des groupes de travail qui sont au nombre de 4. Ainsi dans le schéma qui vient d'être esquissé apparaît déjà un aspect «fédéral» reflété dans le partage des tâches entre les Comités nationaux, les unions scientifiques et les groupes de travail propres du CODATA, la coordination étant assurée par un petit bureau permanent situé en Europe. Ce mode de fonctionnement est vraiment une réalisation pratique de la recommandation no. 12

mettant l'accent sur la participation des hommes de science. On peut également faire remarquer qu'une constatation analogue s'applique aux recommandations 18, 20 et 21 de l'UNISIST. En effet CODATA a récemment prévu la création d'un groupe de travail sur la dissémination et l'accessibilité des données évaluées. Ce groupe a pour objectif, en particulier, d'aider à transmettre vers les pays en voie de développement les données qui les intéressent plus particulièrement.

Le Bureau Central du CODATA est aussi chargé des publications déjà mentionnées. Citons à ce propos la parution d'une première édition d'un Compendium qui est une sorte d'Annuaire des compilations existantes. L'usage d'un tel Compendium peut faire gagner un temps considérable à tous ceux, en particulier les non spécialistes, qui cherchent une donnée qui soit à jour et sûre.

Deux Conférences Internationales du CODATA ont déjà eu lieu. La prochaine aura lieu en France en 1972 et nous espérons qu'elle permettra de larges échanges de vue sur les problèmes qui se posent dans chaque discipline et dans chaque pays. De telles conférences peuvent aussi servir, dans une certaine mesure, à la formation des spécialistes, mais pour aller plus loin, il serait possible d'organiser des Ecoles d'Été qui pourraient avoir une audience encore plus large, surtout si les participants pouvaient bénéficier de bourses, dans le cadre d'une suggestion qui a été faite ici par la délégation polonaise.

III - Conclusion

CODATA est une partie modeste, mais réelle, du projet UNISIST. Du fait de la spécificité du problème de l'évaluation, il est à souhaiter que CODATA soit très étroitement associé à l'élaboration ultérieure du programme de l'UNISIST et soit représenté officiellement dans ses conseils, afin que les scientifiques — qui font l'évaluation — puissent intervenir harmonieusement dans l'ensemble du programme de l'UNISIST — et non rester isolés sans bénéficier des progrès et des moyens du projet global.

En effet l'évaluation des données est un problème difficile et coûteux. Bien qu'il apparaisse à première vue, que seul le jugement du spécialiste compte, celui-ci peut être aidé énormément par les moyens modernes. Néanmoins le coût sera toujours élevé, au delà de ce que peut couvrir même une publication payante normale. La reconnaissance de l'importance de la tâche est donc une première étape nécessaire, et cela sur les plans gouvernemental et intergouvernemental.

L'évaluation et la compression de la littérature scientifique sont répétons-le — un problème essentiel de l'information Scientifique et Technique. L'évaluation est utile, en effet, chaque fois que l'utilisateur n'est pas le producteur — c'est-à-dire le spécialiste capable de juger lui-même la donnée — et cela est le cas le plus fréquent dans le domaine des applications — mais aussi pour les scientifiques lorsqu'ils utilisent des données en dehors de leur champ d'étude principal. L'information quantitative évaluée est la forme la plus concentrée, la quintessence de l'information destinée aux utilisateurs. Les bonnes données quantitatives représentent d'autre part une forme hautement condensée des bases intellectuelles d'où elles sont issues.

Toutefois si elles sont difficiles à évaluer, elles sont heureusement relativement faciles à employer. Elles sont les éléments sur lesquels — parallèlement aux éléments économiques — reposent toutes les réalisations matérielles humaines — toutes les deux s'expriment numériquement et l'avenir d'un projet dépend de la

confrontation de ces deux types de données numériques. Dans ce sens les données quantitatives évaluées — c'est-dire sûres — sont le produit le plus immédiatement utilisable de la Science et de la Technique. Leur intérêt économique à court terme est une raison pour leur donner dans le projet UNISIST, l'importance qu'elles méritent. De plus ces données sont moins sujettes que d'autres aux restrictions imposées par la propriété individuelle, et sont donc un élément idéal pour construire une coopération internationale.

A ce propos, je voudrais évoquer la valeur particulière des données quantitatives pour des pays en voie de développement. En effet, ces données sont, comme il vient d'être dit, directement utilisables, mais en outre leur volume est relativement très limité, donc leur stockage représente un effort infiniment plus faible que pour l'ensemble de l'information scientifique. On peut, par conséquent, concevoir l'accessibilité de la fraction des données parti-

culièrement utiles à un pays donné grâce à l'établissement dans chaque pays, d'un centre régional très modeste.

L'évaluation de l'information scientifique est partie intégrante du projet UNISIST. Nous devons nous féliciter que l'UNESCO, l'ICSU et le Comité Responsable l'y aient introduit, cependant cette évaluation, et notamment celle des données quantitatives, est une activité mixte dont les limites extrêmes sont d'une part la métrologie et d'autre part la documentation pure. Il importe beaucoup que, dans les études futures, la place et les interconnexions les plus favorables soient prévues pour cette activité — non seulement au sein de l'UNISIST, mais aussi au sein de chaque pays, notamment au niveau de la coordination entre les Comités Nationaux. Sinon comme pour beaucoup d'activités interdisciplinaires son développement serait grandement gêné.

Des études préalables, déjà heureusement amorcées par l'UNESCO, et des opérations pilotes suggérées par le Délégué Japonais seront nécessaires.

CODATA AND UNISIST

BORIS VODAR

President of ICSU CODATA

I. The Scope of CODATA

The compilation of evaluated numerical and other quantitative scientific data is an important part of the general problem of a Science Information System, which encompasses abstracting, storage and retrieval of unevaluated scientific information, as well as the evaluation of this information in the form of selected and critical sets of quantitative data, including critical review papers.

Quantitative information can be considered as one of the most significant products of science, expressing in a condensed manner scientific achievements and laws.

Because the evaluation of numerical data has always been of great concern to scientists, ICSU established in 1966 a Committee to supply the leadership necessary to deal with this problem. The name of this Committee is the Committee on Data for Science and Technology or CODATA.

The CODATA Constitution identifies "critically selected numerical and other quantitative scientific data" as the scope of this Committee, stopping short of encompassing the larger problem of storage and retrieval of scientific information of all kinds.

Quantitative scientific data can roughly be divided into four categories:

1. Quantitative property data in Physics and Chemistry which are time and location independent and reproducible.
2. Quantitative property data in Engineering, which are time and location independent, but dependent on the history or processing of the material.
3. Quantitative property data in the Earth, Cosmic and Bio-Sciences which are time and/or location dependent, and therefore non-reproducible; Some data of this nature exist also in physics and chemistry (disintegration, events, etc.).

4. Descriptive data on definable objects, a large proportion of which are concentrated in the Geo- and Bio-Sciences; many of these data are also time and/or location dependent; some of them have a statistical nature.

All types of quantitative data can and should be subject to evaluation. The criteria of evaluation differ, however, considerably from field to field. For that reason, and because of its wide scope, CODATA should act as a focal point for the tasks of most general interest, and rely on the Scientific Unions or other bodies for tasks mainly of interest for a specific field of activity.

The above position was expressed in more detail in a Statement of Principles on the Scope of CODATA adopted at the CODATA Annual Meeting, 1971, from which are extracted the following points:

It is the main task of CODATA, to take initiative and give emphasis to those aspects common to many or all fields of science and technology, such as:

- a) evaluation of concepts and methods for quality control of data.
- b) definition of users needs, especially where data sources and users are in different disciplines.
- c) standards that should be common to all or most quantitative data information, such as fundamental constants, recommended units and conventions.
- d) sharing experience and facilitating interfaces in information technologies, such as computer usage.
- e) providing a clearing house for activities within the full scope of CODATA by adequate publications (Compendium, Newsletter, Bulletin) and other means.
- f) assisting in the organization of scientific conferences at which interested groups from all fields of Science and Engineering can share experience and gain access to the full scope of CODATA.

— the Compendium, a Directory describing numerical data projects in more than 20 countries. A detailed index provides access to the content of the many hundreds of listed data compilations and constitutes an essential tool in the hands of most scientists and engineers.

— the Newsletter, announcing new developments which are not yet incorporated in the Compendium.

— the Bulletin, for reports from some Tasks Groups.

The second responsibility of the Central Office is the preparation of International Conferences on the generation, compilation, evaluation and dissemination of scientific data. The first two CODATA Conferences were held in 1968 in Germany, Fed. Rep., respectively in 1970 in Scotland, U.K., and the third Conference in 1972 will take place in France.

The third responsibility of the Central Office is to assist in the operation of the Task Groups. At present, the following Task Groups on topics of general interest have been established:

- on Computer Use (in the evaluation and handling of quantitative scientific information).
- on Fundamental Constants.
- on Presentation of Data in the Primary Literature.
- on Improvement of Accessibility to Evaluated Data.

Other Task Groups lie within the province of a few or even only one Union;

- Key Values for Thermodynamics.
- Data in Chemical Kinetics.

Justification for establishing a Task Group within the field of one single Scientific Union is that in certain cases an active focal point for data problems did not exist within the Union. This is not surprising, since the purpose of the Unions is not only to foster data problems, but is more general. Therefore one main objective of CODATA is to promote the creation of focal points within the Unions, as stated already in part I of this report. Nevertheless, until this result is achieved it is not unlikely that some more Task Groups within the scope of only one or two Unions will be established in which CODATA would become more heavily involved at the initial stage.

Finally it should be mentioned that a joint working group between the World Federation of Engineering Organizations and CODATA has been established in order to look into the problem of compilation of data in the field of engineering.

The above operational scheme has some federal aspects. Indeed, when, hopefully, in the near future, inter Unions Groups in Geo- and Bio-Sciences will be the CODATA interlocutors in these fields, or similarly a W. F. E. O. Commission in the field of Engineering, this aspect will become stronger. Structurally, until now, CODATA has not established "Divisions" for dealing with each broad group of data, such as geo-data, bio-data or engineering data, etc, but a structure of this type, which would be, for the CODATA specific subject, in some respect similar to the structure of ICSU itself was discussed as a remote possibility for the future.

In any case, an essential task for the future will be to make CODATA into a well-defined and small focal point to achieve optimal results in the co-ordination of the existing and future data activities, with a proper distribution of scientific disciplines among its membership.

As it can be seen from the above presentation, CODATA mode of operation is a practical embodiment of the UNISIST recommendation nr. 12, stressing the necessary involvement of scientists which is realized in CODATA and its Task Groups.

The same applies to the UNISIST recommendation nr. 14, regarding research in science information, which corresponds to the work of the CODATA Task Group on Computer Use. The newly established Task Group on "Improvement of the Dissemination and Accessibility to Evaluated Data" is along the lines stressed by UNISIST in its recommendations 18, 20 and 21.

III. Financing

In addition to grants from ICSU, and contracts with UNESCO, the main part of the CODATA budget is made up of contributions from official governmental or non-governmental bodies within the member countries. The amount of these national membership dues is calculated in a way similar to the UNESCO scale. For CODATA to be effectively a focal point for all evaluated quantitative scientific information a large organization does not seem to be necessary, as it is planned to decentralize the relevant activities to the appropriate scientific groups or Unions. Nevertheless, CODATA's catalytic role in providing money for the initiation of specific tasks as well as its central role regarding problems of general nature common to all scientific data requires financial means exceeding the present resources. Therefore, a considerable increase of CODATA financial resources should be achieved gradually over the next few years. It does not seem realistic to expect to obtain this result via the present mode of financing only. Therefore, it is necessary that the possible implementation of CODATA within the development of UNISIST be studied, and it is hoped that this study can be started as soon as possible in co-operation with CODATA.

Taking into account the nature of CODATA activities which require a number of permanent and long ranges actions, it would be preferable within the scope of the implemented UNISIST programme, that the support received from UNESCO will be, at least partly, in the form of an increased allocation to ICSU, specifically assigned for use by CODATA.

IV. Conclusion

CODATA is already, a modest, but existing part of the programme broadly described in the UNISIST report. It is the only international organization dealing with the difficult problem of the evaluation of scientific data. It has achieved some practical results, and is recognized as being a necessary and useful activity.

It is hoped that in course of the further study regarding UNISIST, the position of CODATA within UNISIST will be carefully considered. It seems quite appropriate that an exofficio representative of CODATA be part of the bodies which will be responsible for the further studies, and for the functioning of UNISIST, when it is implemented.

Evaluation and compression of the scientific literature are the most important problems in the field of scientific information. Evaluated quantitative scientific information is the most concen-

trated form of information available to the users. Good evaluated data have not only practical value, but achieve a highly condensed form of the intellectual background from which they originate and which is the basis of the evaluation of their accuracy. This is the reason why the evaluation of quantitative data is a difficult task. On the other hand, quantitative data are the most severe judge of theoretical or practical developments; they are difficult to obtain, but their use is much more immediate.

Quantitative data being relatively easy to use, in particular by engineers, can have a short range usefulness for the industry of all countries. They have a particular importance for developing countries, provided that all countries have an easy access to these, this implying that their dissemination is made from some local focal point in each country or group of countries.

Summarizing, it appears that CODATA should be an important component of the UNISIST project in its present or future modified form, as CODATA is the only international focal point for the evaluation of scientific data. Since evaluation necessitates the use of scientific methods, rather than documentation technologies, one could think of the possibility to constitute, sometime in the future, within UNISIST, a Division on the Evaluation of Scientific Information, which would be characterized by its high level of scientific stature, that is essential for insuring an internationally accepted quality control.

CODATA MEETINGS 1971 AND 1972

CODATA BUREAU AND ANNUAL MEETINGS

The 13th CODATA Bureau Meeting was held in Washington, D. C., U. S. A., on July 18 and 20, 1971.

The 6th Annual Meeting took place at the National Academy of Sciences, Washington, D. C., from July 19 - 20, 1971.

The 14th CODATA Bureau Meeting will be held in Frankfurt/Main, Germany, Fed. Rep., on January 6 and 7, 1972.

The 15th CODATA Bureau Meeting, together with the 7th CODATA Annual Meeting, will be held in Le Creusot, France, on June 24 and 25, 1972, and Annual Meeting on June 30 and July 1, 1972.

INCREASING THE SCOPE OF CODATA

Initially the activity of CODATA was limited to the *properties of chemistry and physics*. At the request of some CODATA member unions in the **geo-** and **bio-** sciences, as well as on the recommendation of the ICSU Officials, CODATA, at its General Assembly 1971, decided to broaden its scope to include **geo-**, **Cosmic-**, and **bio-**sciences. CODATA will include, therefore, into activities, not only the co-ordination of numerical property data of substances and materials, but also of time and/or location dependent quantitative as well as systematic scientific data. It was further felt, that CODATA should strengthen the role of the member unions by active co-operation with their scientific commissions. CODATA's own activities would concentrate on questions of general interest, as for instance; terminology, classification, collection, retrieval, systematization, evaluation, dissemination, computer use, and other general methodological aspects for CODATA.

SYMPOSIUM AND PANEL DISCUSSION ON DATA EVALUATION

Following the 6th Annual Meeting, a one-day Symposium and Panel discussion on the *Principles and Practices of Data Evaluation* organized by the U.S. Numerical Data Advisory Board was held on July 21, 1971, at the National Bureau of Standards, Gaithersburg, Maryland. The symposium was concerned with the application of statistical methods in error evaluation; evaluation of errors resulting from the choice of the wrong statistical tool, and from the application of the wrong physical model in the interpretation of experimental data, and evaluation of experimental errors. The Panel Discussion, involving journal editors and representatives of data centres, covered problems connected with the presentation of numerical data in primary literature, such as the economic aspects of presenting large amounts of data, and the description of research results in sufficient detail to allow meaningful evaluation.

The symposium program was selected by the Numerical Data Advisory Board:

A) SYMPOSIUM ON PRINCIPLES AND PRACTICES OF EVALUATION.

1. *Some pitfalls and pleasures of data analysis*. Dr. J. Ross Macdonald, Texas Instruments, Inc., Dallas, Texas, Chairman, Numerical Data Advisory Board.

2. *Systematic uncertainties (Atomic collisions)*. Dr. Gordon H. Dunn, Joint Institute for Laboratory Astrophysics, University of Colorado/National Bureau of Standards, Boulder, Col.

3. *An experimentalist's view of experimental uncertainties*. Prof. D. N. Langenberg, University of Pennsylvania, Philadelphia, Pa.

4. *Some remarks on the statistical treatment of random and systematic errors*.

Dr. D. A. Gardiner, Oak Ridge National Laboratory, Oak Ridge, Tenn.

B) PANEL DISCUSSION ON PROBLEMS CONNECTED WITH THE PRESENTATION OF DATA IN PRIMARY LITERATURE.

Three Journal Editors took part in this section: Dr. S. Pasternack (Physical Review), Prof. E. F. Westrum, Jr. (Journal of Chemical Thermodynamics), University of Michigan, Ann Arbor, Mich., Prof. N. Hackerman (Journal of the Electrochemical Society) President, Rice University, Houston, Texas, and four Data Center Operators: Dr. L. J. Kieffer (JILA Information Analysis Center) University of Colorado/National Bureau of Standards, Boulder, Col., Prof. Y. S. Touloukian (Thermophysical Properties Research Center) Purdue University, Lafayette, Ind., Dr. D. Garvin (Chemical Kinetics Information Center) National Bureau of Standards Gaithersburg, Md., Prof. B. J. Zwolinski (Thermodynamics Research Center) Texas A & M, College Station, Texas.

CODATA TASK GROUPS

TASK GROUP ON COMPUTER USE

The Task Group on Computer Use met in Paris on March 16, 1971, at the Laboratories of the Centre National d'Etudes des Télécommunications at Issy-les-Moulineaux.

Present: Chairman G. Black (U.K.), Secretary: R. N. Jones (Canada); Members: F. L. Alt (U.S.A.), I. Ansara (France), O. Kennard (U.K.), R. Stephan (France), R. Wigington (U.S.A.); C. Schäfer (Central Office CODATA); President of CODATA: B. Vodar; Guest: J. E. Dubois representing the IUPAC Commission on Machine Documentation in the chemical field.

At the Paris meeting, the Task Group appointed a program planning committee under the chairmanship of Dr. Kennard. The other members were Prof. Kizawa and Dr. Wigington, with the Task Group chairman and secretary and Dr. Schäfer as ex officio members.

The broadening and up-dating of the report on Automated Information Handling in Data Centres is proceeding under the editorship of Dr. F. L. Alt (U.S.A.).

The original report appeared in the CODATA *Bulletin No. 1*.

At the Paris meeting supplementary material was received concerning data centres in: Canada, France, Germany, Fed. Rep., Israel, Japan, U.K., U.S.A., U.S.S.R.

Automated Information Handling in Data Centres (Second Edition), Report of the CODATA Task Group on Computer Use, November 1971, was published in the CODATA *Bulletin 4*, December 1971.

The next meeting of the Task Group on Computer Use will be held in France during the last week in June 1972, at the time of the 3rd International Conference of CODATA.

TASK GROUP ON KEY VALUES FOR THERMODYNAMICS

The Task Group on Key Values for Thermodynamics, held a meeting at the National Bureau of Standards, Washington, D.C., U.S.A., on July 18-20, at the time of the 6th CODATA Annual Meeting and of the XXVI IUPAC Conference, by Chairman Prof. Stig Sunner (Sweden).

The Task Group has agreed, that evaluation work on the following species should be undertaken by the two compiling groups during the coming year, with a view to the preparation of Part III tables:

NH_3 (g), NH_4^+ (aq), NO_3^- (aq), SO_4^{2-} (aq), Li (g), Na (g), K (g), Rb (g), Cs (g), F (g), Fr (g), HH (g), F^- (aq), Ag (c), Ag (g), AgCl (c), Si (c), SiO_2 (c, α - quartz), Al (c), Al (g), Al_2O_3 (c, corundum), CO_3^{2-} (aq), Zn (c), Zn (g), Zn^{2+} (aq), ZnO (c).

The tentative set of values agreed upon by the Task Group at St. Andrews (Sept. 1970), was published in the CODATA *Bulletin 2*, November 1970, and later in their *Journal of Chemical Thermodynamics* (1971, 3, 1) and the *Journal of Research of the National Bureau of Standards* (1971, 75 A, No. 2), articles in a U.S.S.R., and Japanese journal are understood to be in press. *Final Set of Key Values for Thermodynamics - Part I*, report of the CODATA Task Group on Key Values for Thermodynamics, November, 1971, was published in the CODATA *Bulletin 5*, December 1971, and Part II, in the CODATA *Bulletin 6*, December 1971.

The next meeting of Task Group will be held in France during the last week in June, 1972, at the time of the 3rd International Conference of CODATA.

TASK GROUP ON FUNDAMENTAL CONSTANTS

The meeting was held at the National Physical Laboratory, Teddington, U.K., on 6/10 September, 1971, at the time of the 4th International Conference on Atomic Masses and Fundamental Constants. Chairman of the Task Group was Dr. E. R. Cohen (U.S.A.).

The Task Group is hoping to present a new recommended set of fundamental constants to CODATA, at the 7th Annual Meeting of CODATA, 1972. For this purpose a meeting of the Task Group will be necessary during the first half of 1972.

TASK GROUP ON DATA FOR CHEMICAL KINETICS

A Catalogue of Compilation and Data Evaluation Activities in Chemical Kinetics, Photochemistry and Radiation Chemistry, report of the CODATA Task Group on Data for Chemical Kinetics, September, 1971, was published in the CODATA *Bulletin 3*, December 1971.

NEW CODATA GENERAL TASK GROUPS

At the Bureau and Annual Meetings of CODATA in Washington, from July 18-20, 1971, two new CODATA "ad hoc" Task Groups were established:

1. Presentation of Data in Primary Literature

Chairman: Prof. Edgar F. WESTRUM, Jr.,
University of Michigan, Dept. of Chemistry,
Ann Arbor, Mich. 48104, U.S.A.

Members: Dr. David GARVIN,
Institute for Materials Research,
National Bureau of Standards,
Washington, D. C., 20234, U.S.A.

Dr. Tangis GOLASHVILI,
CODATA Central Office,
Westendstraße 19,
6 Frankfurt/Main, Germany, Fed. Rep.

Dr. Henry V. KEHIAIAN,
Université de Provence,
Laboratoire de Chimie Générale,
Place Victor Hugo,
13-Marseille 3e, France

Prof. N. KURTI, F.R.S.,
The Clarendon Laboratory,
Parks Road,
Oxford, U.K.

2. Data Accessibility (Tentative name)

Chairman: Prof. Masao KOTANI,
Science University of Tokyo,
Kagurazaka 1-3, Shinjuku-Ku,
Tokyo, Japan

Member: Dr. H. W. KOCH
Am. Inst. of Physics
335 E. 45th Str.
New York City, N.Y. 10017 U.S.A.

Others: to be appointed

It was pointed out that these two Task Groups are of "ad hoc" nature and that their first duty will be the recommendation to the Bureau of further names, as possible task group members and the advising of terms of references.

CODATA NATIONAL MEMBERS

POLAND

The progress of Polish work has mainly been concerned with the establishment of four Task Groups, as follows:

1. Data for Chemical Kinetics

Chairman: Prof. Dr. Adam Bielanski, Jagiellonian University,
ul. Krupnicza 41, Krakow.

2. Data for Industry

Chairman: Prof. Dr. Andrej Bylicki, Institute for Physical Chemistry, Polish Academy of Sciences, ul. Kasprzalla 44/52, Warszawa.

3. Computer Use

Chairman: Dr. Zbigniew Kierzkowski, Polytechnic Institute of Poznan, Regional Computer Center, M. Curie-Skłodowska Place 5, Poznan.

4. Data for Solid State Physics

Chairman: Prof. Dr. Julian Auleytner, Institute of Physics, Polish Academy of Sciences, ul. Zielna 37, Warszawa.

UNITED KINGDOM

DATA ACTIVITIES IN THE UNITED KINGDOM

SIR GORDON SUTHERLAND, F. R. S.

on Behalf of The British National Committee
on Data For Science And Technology

The Office for Scientific and Technical Information, of the Department of Education and Science, continues to support a number of data activities in the U.K., as follows:

Crystallographic Data Centre, University of Cambridge

Bibliographic and data files of the structure of organic and organo-metallic compounds are now on magnetic tape. The bibliographic files for the years 1931-1969 have been published in two volumes as part of a series *Molecular Structures and Dimensions*. The first supplementary volume for the years 1969-70, will appear early 1972. A further volume in the series will be a continuation of the *Tables of Interatomic Distances* for the years 1960-65. The volume will contain evaluated numerical data as well as conventional chemical structure diagrams and computer produced views of the molecular structures. The series is being extended to the investigation of structures in the gas phase by electron diffraction and microwave methods.

Mass Spectrometry Data Centres, U. K. Atomic Energy Authority, Aldermaston

An eight-peak index of 17,000 spectra has been published in 2 volumes. Magnetic tapes of the index are also available. Plans are being made for the production of programs for computer matching of mass spectra together with an accompanying explanatory manual.

**IUPAC Project Centre of Thermodynamic Properties of Gases,
Imperial College of Science and Technology, London**

The tables on argon are now with the publisher, to be followed by tables on chlorine, ethylene, methane, carbon-dioxide and nitrogen. The Project Centre has also been able to arrange that the National Science Foundation and the National Bureau of Standards should finance a programme for translating into English the monographs on the thermodynamic properties of fluids, published by the U.S.S.R. National Standard and Reference Data System. To date, an English version of six monographs have been published.

Kinetic Data for High Temperature Processes, University of Leeds

A total of 5 reports on critically evaluated reaction rate data, covering carbon-oxygen, hydrogen-oxygen and nitrogen-oxygen have been issued. It is planned to publish, as part of a new series of books on reaction rate data, the contents of a 6th report together with updated versions of the previous 5 reports. Volume I, to be published in Autumn 1971, will cover reactions of the hydrogen-oxygen types. Volume II will cover nitrogen-oxygen and hydrogen-carbon monoxide systems and Volume III will include hydrogen-nitrogen-oxygen and hydrogen-oxygen-sulphur systems.

The Establishment of a Protein Data Bank

It is proposed to establish a repository system for protein crystallographic data operated jointly by the Crystallographic Data Centre, Cambridge, England and the Brookhaven National Laboratory, USA. The system will be responsible for the storage of atomic coordinates, structure factors and electron density maps and will make these data available on request. Distribution will, whenever possible, be on magnetic tape in machine-readable form. There will be no charge for the service, other than handling costs.

Files will be updated as new material is received. Annual announcement of the total holding will be made in the organic bibliographic volumes of the reference series *Molecular Structures and Dimensions* published for the Crystallographic Data Centre and the International Union of Crystallography by Oosthoek's, Utrecht.

The success of the proposed system will depend on the response of the protein crystallographers supplying data. These will be accepted either "raw" or refined, in machine-readable form or as manuscripts. It would be helpful if laboratories intending to join the scheme would communicate, in the first instance, with Mrs. Olga Kennard or Dr. D. G. Watson at the University chemical Laboratories, Lensfield Road, Cambridge, who are responsible for the organisation of the systems. Data can be submitted to Cambridge, England, or to Dr. W. C. Hamilton at the Brookhaven National Laboratories, where the data will be computer processed.

The two centres will maintain identical files and both will provide data services. It should be emphasised that the proposed data bank is intended to supplement existing publication media and depositing material there should not be regarded as a substitute to the publication of the results of structural investigations in a scientific journal.

U. S. A.

National Standard Reference Data System (NSRDS)

The Journal of Physical and Chemical Reference Data

Appearing early in 1972, it will be published quarterly by the American Institute of Physics and the American Chemical Society and will contain the output of the National Standard Reference Data System (NSRDS).

The NSRDS program was initiated in 1963; its objective is to provide critically evaluated physical property data for the nation's scientists and engineers. A complex of data centres and individual evaluation under the program management of the office of Standard Reference Data at the National Bureau of Standards is engaged in this work. Located at NBS, and at universities, industrial and government laboratories, these data centres and individuals search the world literature on a regular basis. From these resources they extract the numerical data and carry out the critical evaluation leading to the publication of tables or reviews. Their efforts are co-ordinated by NBS with those of related projects under other sponsorship in the U.S. and around the world. Until now this vital data has been distributed largely through government channels. With the first volume of *The Journal of Physical and Chemical Reference Data*, a much wider audience will be reached.

Among some of the topics planned for Vol. I of this new journal are:

- *Thermal Conductivity of the Elements — Tables and Graphs of Recommended Values for all the Elements.*
- *Diffusion Coefficients in Gases — Critical Review and Tabulation of all Available Data.*
- *Rate Constants of Hydroxyl Reactions in the Gas Phase — Critical Review.*
- *Fundamental Vibrational Frequencies of Molecules — Tables of Frequencies and Related Infrared and Raman Spectral Data.*
- *Atlas of Ultraviolet Spectra of Carbon Monoxide.*
- *High Temperature and Decomposition Properties of Inorganic Salts.*
- *Electrical Conductance, Density, Viscosity, and Surface of Molten Salts.*
- *Thermodynamic Properties of Nitrogen.*
- *Evaporation and Condensation Coefficients for Simple Substances.*
- *Critical Supersaturations for Nucleation of Liquids from the Vapor.*
- *Heats of Combustion of Selected Organic Compounds.*

Among plans for the future are the revision and publication of two National Bureau of Standards data compilations that have been in use for years. One is NBS Circular 500, *Selected Values of Chemical Thermodynamic Properties* (F. D. Rossini, D. D. Wagman, W. H. Evans, S. Levine and I. Jaffe). The other well-known NBS compilation is Circular 467, *Atomic Energy Levels*, (Charlotte Moore-Sitterly). Both of these revised compilations will either appear in the Journal or as supplements.

Subscribers to the new publication, *The Journal of Physical and Chemical Reference Data*, will have access to the most reliable reference data available today. This means improved efficiency in research and development and avoidance of a great deal of duplication of effort.

Standard Reference Materials

The standard reference materials (SRM's) prepared and distributed by NBS are well characterized for chemical composition or for a particular physical or chemical property. SRM's are used in calibrating and evaluating measuring instruments, methods, and systems, or in producing scientific data that can be referred readily to a common base. Over 700 different samples are now available through this program, covering such diverse materials as steels of known alloy content, glass spheres of known size for calibrating sieves, and standard magnetic tapes for the computer industry. New demands are continually being placed upon the program, and new standards are being issued to meet these demands. For example, high purity cholesterol was issued at the request of the College of American Pathologists, and other standards in the fields of clinical and biochemistry have been issued or are now undergoing preparation and analysis. Catalogues and price lists are available from the Office of Standard Reference Materials, and announcements of new standards are made in the NBS Technical News Bulletin. Inquiries concerning SRM's should be made to: R. W. Seward, Office of Standard Reference Materials, National Bureau of Standards, Washington, D. C. 20234.

U. S. S. R.

Center of Molecular Spectroscopy

A Scientific Information Centre of molecular spectroscopy, sponsored by the Institute of Organic Chemistry of the Siberian Department of the Academy of Sciences U. S. S. R., in co-operation with following institutions of the Siberian Department Computer Centre, Institute for Automation and Electrometrics, State Public Library for Science and Technology, carries out work on the collection, evaluation and distribution of information on molecular spectroscopy. All spectrum characteristics of substances are stored in a computer.

The Rare Earth Research Group

The rare earth research group of the Laboratory of Rare Metals and Alloys, at the Institute of Metallurgy of the Academy of Sciences of the U. S. S. R., in Moscow, has been studying the rare earth metals since 1955. A wide variety of work is being conducted, ranging from the purification of the metals by distillation and zone-refining to the utilization of rare earth metals and alloys. Single crystals of Sc, X, Nd, Gd, Dy, No, and Er have been produced and their physical properties, such as thermoelectric power, work function, electrical resistivity, coefficient of thermal expansion, microhardness, etc., have been investigated. This group has determined about 70 binary and ternary phase diagrams of the rare earth metals with Mg, Al, Ca, V, Fe, Co, Cu, Nb, Pd, Hf, and Pt. Those alloys having interesting magnetic emissive or gas absorption properties were more extensively studied.

Twelve different mechanisms of the influence of the rare earths on other materials have been elucidated. The rules governing rare earth alloy formation between the cerium and yttrium group metals, and the influence of the electronic structure on the formation of the alloys and compounds are under study. For the last three years much of this work has been carried out by means of computers, utilizing the electronic structure of the components and a certain number of examples for training the computer.

Two data compilations, by the research workers of this Laboratory, have been translated into English: *Rare Earth Alloys* by E. M. Savitskii, V. F. Terekhova, I. V. Burov, I. A. Markova and O. P. Naumkin and *Yttrium* by V. F. Terekhova and E. M. Savitskii (see page 19).

CODATA UNION MEMBERS

THE INTERNATIONAL ASTRONOMICAL UNION (IAU)

The International Astronomical Union decided at its General Assembly in August, 1970, to set up a permanent Working Group on Numerical Data in astronomy and astrophysics. Dr. G. A. Wilkins (Royal Greenwich Observatory) has been appointed Chairman of the Group and IAU representative on CODATA. The principal aims of the Group are:

- (a) to collect and publish information about the existence and preparation of files of numerical data, especially those in machine-readable form, that are relevant to the interests of the Union;
- (b) to recommend ways by which the preparation of such data files and the retrieval of information from them may be carried out economically and effectively, and to offer advice on these questions to the appropriate commissions.

In carrying out these activities the Group will endeavour to complement, and not duplicate, the work of the Commissions of the Union in their specialised fields.

Information about the relevant activities at individual observatories and institutions, and by the IAU Commissions, is being collected, but it is too early to publish a comprehensive review. A report of the discussions arranged by the preparatory Working Group at the 1970 General Assembly contains a preliminary account of current activities and is published in *Transactions IAU*, Volume 14 B, 245-8, 1971. It is hoped that further information about IAU activities in the field will be published in the next edition of the Newsletter.

INTERNATIONAL UNION OF BIOLOGICAL SCIENCES (IUBS)

The International Union of Biological Sciences 17th General Assembly met in Washington, D. C. the week of 5-9 October 1970. During the general assembly, the IUBS representative to CODATA recommended that an effort be made to determine the existence of projects throughout the world that systematically extract, evaluate, and publish data of the biological sciences. The immediate benefit of developing a list of data sources, would be the establishment of available information and its source of obtainment. In the future, information gaps could be identified and steps taken to provide the required data. The co-ordination of data collection efforts could eventually be considered for the purpose of eliminating costly duplication.

With the support of CODATA and the cooperation of IUBS, a survey is being conducted to determine data-collecting activities in the biological sciences. Survey sheets have been mailed to section chairmen of the various IUBS divisions requesting information on organization, coverage, analysis and publications of numerical and non-numerical data projects. Results of the survey should be available in the spring 1972.

INTERNATIONAL UNION OF PURE AND APPLIED BIOPHYSICS (IUPAB)

The first volumes of the *Atlas of Protein Structures*, edited by David C. Phillips and Frederic M. Richards, will deal with ribonuclease and lysozyme. These, and subsequent volumes of the *Atlas*, are to be published by the Oxford University Press. The manuscript for the first volume is scheduled for delivery, probably in the first half of 1972. The council of IUPAC voted in Washington, on 21 and 23 July 1971: "that an 'ad hoc' committee be appointed to study the need for a Joint Commission of IUB, IUPAB and IUPAC, to undertake a critical compilation of thermodynamic data of biochemical processes and reactions, and that the composition of the committee should be recommended by consultation between the Unions."

INTERNATIONAL UNION OF GEOLOGICAL SCIENCES (IUGS)

The IUGS Committee on Storage, Automatic Processing and Retrieval of Geological Data (COGEODATA) met at Fontainebleau in September, 1970. A number of recommendations have been devised to enhance compatibility between geological data files. Reports on: rock description; geochemical data; geographic location; metallogenic and mineral deposit files; stratigraphic and paleontology were submitted and approved by the Committee. Also, the role of the Committee, its relation to other international organizations, CODATA among others, have been discussed. A series of resolutions have been adopted, of which resolution No. 10 is of special relevance here:

'Considering that CODATA, as presently organized, clearly serves only disciplines whose data relates to universally standard substances, the Committee recommends that a similar interdisciplinary organization for data of the environmental sciences be created, either as a parallel branch to CODATA or somehow linked to it, and possibly in the framework of UNISIST.

This organization would (a) make possible coherent application of data to the solution of local and international problems of health, agriculture, water supply, fuel and energy supply etc . . . ; (b) ensure that overlap in function was resolved; (c) be a suitable vehicle to administer funds needed by committees such as this one; (d) bring about compatibility in those aspects of environmental data that are common to two or more disciplines.'

The publications which most directly concern data, inside IUGS, are the "Recommendations prepared at the Fontainebleau meeting in September 1970", which appeared in *Geological Newsletters* Vol. 1971, No. 3, p. 175-194.

A most important event is going to take place next year, the 24th Session of the International Geological Congress, which will be held in Montreal, Canada, from August 21-30, 1972. The International Geological Congress takes place every four years and constitutes the peak of international geological activities. For the first time, a Section will be devoted to the problems of data handling: "Section 16 — Computer-based storage, processing and retrieval of geological information." The following topics will be examined:

- a) content notation and structure of data files, including the selection of standard parameters.
- b) operating computer systems applied to geological information.
- c) computer-based data files.
- d) computer-based bibliographic, abstracting and indexing services.
- e) simulation and modelling.

CODATA LIAISON REPRESENTATIVES

ICSU ABSTRACTING BOARD (ICSU AB)

ICSU AB announces the availability of:

1. *Proceedings of the Full Board Meeting, July 1971, Orleans, France*

In 1970, following the Full Board Meeting in Columbus, Ohio, Proceedings were published for the first time. The response with which it has been received has encouraged the Board to continue this publication.

The 1971 General Assembly and Full Board Meetings of the ICSU AB were held in Orléans, France, at the kind invitation of the Bureau de Recherches Géologiques et Minières.

This publication comprises:

- The first part, gives a detailed description of the activities of the Board.
- The second part, records the most recent developments in the activities of the ICSU AB Members, in particular Member Services (the largest Abstracting and Indexing Services all over the world) and Member Unions, in all aspects of scientific and technical information.
- The third part, comprises reports from the most important international organisation active in scientific and technical information.
- The fourth part, records a special session with representatives of primary publications devoted to the development of closer cooperation between primary and secondary publications.
- The fifth part is an outline of another special session which was devoted to an interchange of views about marketing of secondary information services.

This publication represents an up-to-date world-wide review of the most recent developments in scientific and technical information.

The PROCEEDINGS (219 pp.) are available at the ICSU Abstracting Board, Secretariat, 17 rue Mirabeau, Paris 16e, France. (U.S. \$ 15.00 plus mailing charges).

2. *Survey of the Activities of the ICSU Scientific Unions, Special and Scientific Committees and Commissions of ICSU in the Field of Scientific Information During the Year 1970.*

(September 1971, 396 pp., Price U.S. \$ 12.00 plus mailing charges). This report briefly describes the activities of ICSU Bodies in the field of scientific information.

It is published regularly each year since 1965.

More than 180 Commissions or Committees are listed; for each of them general information is given (name of the Commission, Chairman, Secretary, Periodicity of meetings, etc.) as well as a general description of the activities of the Commission and a summary of its activities during the year 1970.

This publication is now on sale and may be obtained from the ICSU AB Secretariat, 17 rue Mirabeau, Paris 16e, France.

3. *Tentative List of Publications of ICSU Scientific Unions, Special and Scientific Committees and Commissions of ICSU, Year 1970, and Corrections and Additions to the 1969 List*

(September 1971, 44 pp. Price: U.S. \$ 5.00 plus mailing charges) This publication is now on sale and may be obtained from the ICSU AB Secretariat, 17 rue Mirabeau, Paris 16e, France.

INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA)

IAEA Activities in the Field of Nuclear Structure and Reaction Data
In CODATA *Newsletter No. 6* the first meeting of the recently initiated International Working Group of the IAEA for *Nuclear Structure and Reaction Data* was announced and an outline given of the discussion topics for this meeting. Meanwhile IAEA has received numerous indications of interest and is in a stage of extensive correspondence and preparation for this meeting which promises to give the first fruitful international get-together in this very important data field. In order to avoid overlap, the date of the meeting has been postponed to 13–17 March 1972.

IAEA Neutron Nuclear Data Meetings in the Second Half of 1971
As announced in CODATA *Newsletter No. 6*, the IAEA Nuclear Data Section held a Specialists Meeting on the Status of Prompt Fission Neutron Spectra at its Headquarters in Vienna, 25–27 August 1971. It was attended by 19 experts from 8 countries and 2 international organizations. The meeting reviewed the recent research on fission spectra of U235, Pu239 and Cf252 and arrived at a number of recommendations, particularly regarding the clarification of persisting systematic errors in the experiments. Both the thermal neutron induced fission spectrum of U235 and the spectrum from spontaneous fission of Cf252 were recommended as basic standards for all other fission spectrum measurements. The proceedings of this meeting will be published in the first half of 1972; they will contain the contributed papers together with the list of recommendations and a meeting summary.

Between 30 August and 3 September, the IAEA Nuclear Data Section convened a Panel on *Neutron Nuclear Data Evaluation* which was attended by 24 participants from 11 countries and 2 international organizations.

In two plenary sessions and five parallel topical subgroups the Panel comprehensively reviewed the status and quality of the existing evaluated neutron nuclear data libraries and the evaluation activities in IAEA Member States. It adopted a number of recommendations related to the development, maintenance and exchange of evaluated neutron data libraries. The proceedings of this meeting will be published in the first half of 1972; they will contain the contributed papers, the list of observations and recommendations and the final subgroup reports.

The annual IAEA sponsored Meeting of representatives from the four neutron data centres, located at Brookhaven, Obninsk, Sacley (ENEA) and Vienna took place at Brookhaven between 25 and 29 October 1971. The meeting reviewed the last year's operational experience with the International exchange system EXFOR for experimental neutron data and discussed future expansion of the scope of EXFOR to include fission product yields and capture γ -ray data. The next meeting of the four neutron data centres is scheduled for November 1972.

ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT – OECD

The OECD with United Nations Economic Commission for Europe (ECE) has prepared the *Inventory of major Information Systems and Services in Science and Technology*, published in 1971 (340 pp.), which is available free of charge.

The purpose of this inventory is to list a number of major information services and systems in the field of science and technology, either in the government or in the private sector. If a distinction is made between traditional information systems such as libraries, documentation services etc., and the wide spectrum of mechanised systems, the inventory aims at retaining all mechanised systems and only important traditional ones. In particular, it includes all systems which are designed as mechanised systems from either a

search or storage viewpoint and to which general national access is possible. Some systems are also included, which consist of mechanised entry into systems which are based in other countries. Systems to which funds have been committed are also included, even if not yet fully developed.

WORLD FEDERATION OF ENGINEERING ORGANIZATION – WFEO

WFEO: Savoy Place, London, W.C. 2

Secretary General, G. F. Gainsborough

The WFEO Committee on Engineering Information has held two international meetings and a third is planned for February 1972 in Düsseldorf. The general objectives of the committee are to establish what information engineering require, particularly in the areas of patents, product data and physical properties. The committee has three Working Groups, one on user needs, another on the survey of Information Services, and a third on Lexicographic Tools, chaired by the members from the U.S.A., India and Rumania respectively. Under contract from Unesco, the committee has produced a report on UNISIST — *The Engineering Assessment*, copies of which are available from Unesco.

WORLD METEOROLOGICAL ORGANIZATION WMO*

It is perhaps appropriate to clarify at the outset the somewhat differing aims of CODATA and the WMO Global Data-Processing System storage and retrieval service. Whilst a basic objective of CODATA is to compile critically evaluated numerical data for science and technology generally, the aim of the storage and retrieval service now being developed as part of the World Weather Watch programme of WMO is to provide an adequate, easily accessible source of the material upon which virtually all meteorological research depends, namely the meteorological observations and the analyses and prognoses that resulted from the processing of these observations (the latter are needed for research to improve such processes and thereby the forecasts produced).

Many of these observations are collected and used in "real time" (i.e. within a few hours of the observations being made) for the purpose of preparing up-to-date weather forecasts. Subsequently they are assigned to the data banks where they are supplemented by other observational data which have been collected by mail, usually at fixed intervals of a week, month, etc.

The difficulties inherent in establishing such a service which would be agreed to by the 136 Members of WMO are compounded by the wide range in their data handling capabilities, not least among which is their ability to carry out quality control on their data, both in real time and otherwise.

Thus the storage and retrieval service aims at ensuring that:

- all meteorological observational data, analyses and prognoses are archived at appropriate centres,
- they have been subjected to some minimum standard of quality control,
- they are archived in a manner permitting ready retrieval,
- they are in standard formats suitable for either automatic processing or for manual purposes,
- through up-to-date catalogues all users of the stored data can easily locate the data they require.

* WMO: O. M. Ashford, Acting Director, Scientific and Technical Department,
Case postale no. 1
CH-1211 Geneva 20

During the year two meetings of importance to the storage and retrieval service took place. In September an informal planning meeting considered a proposed scheme for classifying and cataloguing meteorological data and literature. In this scheme each item of literature is allocated a descriptive group of 80 characters which follows a fixed format. This format is mirrored in a primary search group, to be composed by anyone searching for meteorological information from the archives. By a process of comparison – very simple to carry out automatically and reasonably easy to perform by eye – all items answering the specifications in the primary search group are indicated. Provision is made for a finer sifting of items (thus indicated) through a system of continuation groups containing supplementary information.

Subject to some amendments to details, the meeting recommended that this proposed scheme be considered as experimental and that it should be tested by WMO Member countries on a voluntary basis prior to being recommended for general application. The scheme, together with background and other incidental material, will be published early in 1972 in the series of World Weather Watch Planning Reports.

Immediately following the informal planning meeting the second session of the Executive Committee Panel on Collection, Storage and Retrieval took place. The recommendations of the planning meeting were endorsed by the panel, which also considered the

longer term aspects of the storage and retrieval service. It was agreed that for reasons of practicability the types of data to be embraced by the service should be limited to that data which is required for meteorological or hydrological purposes, thus somewhat narrowing the field originally conceived by the panel at its first session. Measures to ensure that where necessary National Meteorological Centres could obtain assistance to upgrade their data storage capabilities were recommended by the panel, which feared that unless this were achieved there was a serious risk that valuable data might be irretrievably lost.

Other main aspects of the storage and retrieval service which have received attention during the year include the elaborating of proposed standard formats to facilitate the international exchange of archived information. These formats appeared in outline in Planning Report No. 32, and when the elaboration is complete early in 1972 they will be submitted to the Commission for Basic Systems with a view to the eventual adoption of these formats as WMO standards. Work has also started on a study on quality control of internationally exchanged data. The focus will be on real-time quality control standards and procedures both at the observing point and also at the National Meteorological Centre where the observations are collected prior to being exchanged internationally via the global telecommunication System of the World Weather Watch.

NEW PUBLICATIONS

NUCLEAR PROPERTIES

CINDA 71, An Index to the Literature on Microscopic Neutron Data, Supplements. (See CODATA *Newsletter No. 6* for a more detailed description of CINDA.) The first supplement to CINDA 71 has been published with a cut-off date 1 June 1971. It has been distributed to all recipients of the main volume CINDA 71. A second supplement is being prepared and will be distributed early in 1972. CINDA 72 is scheduled for the middle of 1972.

Review of Particle Properties, by the Particle Data Group, *Rev. Mod. Phys.* 43, No. 2, Part II, Supplement April 1971.

Tables of Nuclear Quadrupole Resonance Frequencies, by I. P. Biryukov, U.G. Voronkov and I. A. Safin, Khimiya Publishing House U.S.S.R., Leningrad, translated from the Russian, KETER Publishing House Ltd., P.O.B. 7145, Jerusalem, Israel, 1971, 144 pp., \$ 10. This book contains frequencies of nuclear quadrupole resonance 1200 compounds, compiled from the available literature data and determined by the authors themselves.

A Tabulation of Gamma-Gamma Directional-Correlation Coefficients, by H. W. Taylor, B. Singh, F. S. Prato, and R. McPherson, *J. Nuclear Data Tables*, ed. Katharine Way, Volume 9, No. 1, February 1971.

Tables of Single-Particle Reduced Matrix Elements of Spherical Tensors, by W. K. Bell and G. R. Satchler, *J. Nuclear Data Tables*, ed. Katharine Way, Volume 9, No. 2, March 1971.

An Introduction to X-Coefficients and a Tabulation of Their Values, by P. L. Csonka, T. Hazatani, and M. J. Moravcsik, *J. Nuclear Data Tables*, ed. Katharine Way, Volume 9, No. 3, June 1971.

The 1971 Atomic Mass Evaluation, by A. H. Wapstra and N. B. Gove, *J. Nuclear Data Tables*, ed. Katharine Way, Volume 9, No. 4-5, July 1971.

Reaction List for Charged-Particle Induced Nuclear Reactions, by F. K. McGowan and W. T. Milner, *J. Nuclear Data Tables*, ed. Katharine Way, Volume 9, No. 6, August 1971. Part I. Reaction List for Charged-Particle-Induced Nuclear Reactions $Z = 1$ to $Z = 98$ (H to Cf); Part II. Reaction List for Coulomb Excitation Data (1956 June 1971).

BNL 50274 (T-601), Reactor Technology – TiD-4500, ENDF 102 Vol. 1, *Data Formats and Procedures for the ENDF Neutron Cross Section Library*, Edited by M. K. Drake, National Neutron Cross Section Center, Brookhaven National Laboratory Upton, New York, October 1970, Price: Printed copy \$ 3.00, Microfiche \$ 0.95. Available from National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22151.

Interaction Cross Sections of Elementary Particles, by V. S. Barashenkov, Moscow, U.S.S.R., translated from the Russian, KETER Publishing House Ltd., P.O.B. 7145, Jerusalem, Israel, 1970, 420 pp. \$ 25.00. This book includes tables of the cross sections of nucleon-nucleon, nucleon-antinucleon, pion-nucleon, kaon-nucleon, hyperon-nucleon, hyperon-meson, and meson-meson interactions. Interpolatory graphs have been drawn by the author, which are useful in numerical calculations involving cross sections.

Absorption and Colloidal Properties of Radioactive Elements in Trace Concentrations, by F. Kepak, *J. Chemical Review*, 1971, Vol. 71, No. 4, 357-368 pp., with tables and 170 Ref.

National Neutron Cross Section Centre (U.S.A.)

The following reports are available from the National Technical Information Service, Springfield, Virginia 22151, (U.S.A.):

Evaluation of Several ENDF/B-2 Cross Section Sets Using Monte Carlo Slowing-Down Age Calculations, by H. Alter, Catalogue No. AI-AEC-13001 (ENDF-149), May 1971, 18 pp.

Extension of the Program CHECKER, by J. L. Lucius, R. Q. Wright, and S. K. Penny, Catalogue No. ORNL-TM-3395, June 1971, 11 pp.

Compilation of Requests for Nuclear Cross Section Measurements, Nuclear Cross Sections Advisory Committee, Catalogue No. LA-4652-MS, (NCSAC-35), March 1971, 225 pp.

Evaluation of ^{238}U Neutron Cross Sections for the ENDF/B Version, II Fill, by T. A. Pitterle, Catalogue No. WARD-4181-1, March 1971, 74 pp.

The Gamma Emission of Radioactive Fallout, by Y. A. Izrael, E. D. Stukin, U.S.S.R., translated from Russian, KETER Publishing House Ltd., P.O.B. 7145, Jerusalem, Israel, 1970, 154 pp. \$ 9.10. Basic characteristics of radioactive products appearing after nuclear explosions.

Status of the Karlsruhe Evaluated Nuclear Data File KEDAK at June, 1971, by B. Hinkelmann, B. Krieg, I. Langner, J. J. Schmidt, and D. Woll, Kernforschungszentrum, Karlsruhe, Germany, February 1971, Catalog No KFK-1340.

ATOMIC AND MOLECULAR PROPERTIES

Compilations of Atomic Ultraviolet Photoabsorption Cross Sections.

During the past several years the Joint Institute for Laboratory Astrophysics (JILA) Information Centre at Boulder, Colorado, has been critically evaluating the reliability of cross section data for many atomic and molecular processes and producing comprehensive compilations of these data. Two compilations have recently been published which are the result of a joint effort between the JILA Information Centre and the National Aeronautics and Space Administration (NASA) Manned Space-craft Centre:

1. **Compilation of Ultraviolet Photoabsorption Cross Sections for Atoms Between 5 and 3500 Å**, by Robert D. Hudson, of the National Aeronautics and Space Administration (NASA) Manned Spacecraft Centre and L. J. Kieffer of the National Bureau of Standards, U.S.A., Scientific and Technical Information Division, NASA, Washington, D. C. 20546, U.S.A. Catalogue No. NASA SP-3064, 1971, \$ 3.00.

2. **Compilation of Atomic Ultraviolet Photoabsorption Cross Sections for Wavelengths Between 3000 and 10 Å**, by Robert D. Hudson and L. J. Kieffer, *Journal Atomic Data*, Vol. 2, May 1971.

NSRDS-NBS 36, Critical Micelle Concentrations of Aqueous Surfactant Systems, by Pasupati Mukerjee and Karol J. Mysels, Washington D.C. 20017, U.S.A., 1971, \$ 3.75.

NSRDS-NBS 38, Critical Review of Ultraviolet Photoabsorption Cross Sections for Molecules of Astrophysical and Aeronomic Interest, by R. D. Hudson, Washington D. C. 20017, U.S.A., 1971, \$ 1.00.

NBS-OSRDB-70-4, Bibliography of Photoabsorption Cross Section Data, by R. D. Hudson and Lee J. Kieffer, Washington D. C. 20017, U.S.A., 1970, Microfiche \$ 0.95, Paper Copy \$ 4.00.

NBS MONOGRAPH 115, The Calculation of Rotational Energy Levels and Rotational Line Intensities in Diatomic Molecules, by Jon T. Hougen, Washington D. C. 20017, U.S.A., 1970, \$ 0.55.

NBS Special Publication 320, Bibliography on Atomic Transition Probabilities, Supplement 1, July 1969 through June 1971, by J. R. Fulz and W. L. Wiese, 1971, \$ 0.65.

Handbook of Molecular Constants of Inorganic Compounds, by K. S. Krasnov, V. S. Timoshinin and others, U.S.S.R., translated from the Russian, Keter Publishing House Ltd., P.O.B.

7145, Jerusalem, Israel, 1970, \$ 15.00, is a volume of reference tables which gives the values of various molecular constants of some 1400 gaseous inorganic compounds. These include interatomic distances, valency angles, frequencies of normal vibrations, energies of dissociation, heats of formation and electronic terms of ground levels, and are mainly based on spectroscopic data; the literature has been covered up to early 1967. The compounds include diatomic and polyatomic molecules and are arranged in the tables by groups of the periodical tables.

Handbook of Hardness Data, by A. A. Ivanko. Edited by G. V. Samsonov, U.S.S.R., translated from the Russian, Keter Publishing House Ltd., P.O.B. 7145, Jerusalem, Israel, 1971, 66 pp., \$ 3.00. The data in this reference book is classified into the three following groups, according to the electron configuration of the valence electrons in the individual elements:

1. elements with atoms that have s-electrons and completely empty or completely filled inner electron shells (alkali metals, beryllium, magnesium, alkaline-earth metals, metals of the Cu and Zn subgroups);
2. elements with atoms that have partially filled d- and f-electron shells (transition metals);
3. elements with atoms that have valence sp-electrons (non-metals and semi-metals).

SPECTRA

A Guide to the Published Collections and Bibliography of Mass Spectra, R. W. A. Oliver and M. I. Lomax, University of Salford, Peel Park, Salford M5 4WT, Lancashire, U.K., 1971.

The guide is available from the Advertising Department, Perkin-Elmer Ltd., Beaconsfield, Bucks., England, in multiples of fifty copies. They will be sent on receipt of £ 5.00 to any address in the United Kingdom or Northern Ireland. For anywhere else in the world, the charge is \$ 25.00 or the equivalent. Single copies at a charge of \$ 1.00 may be obtained from Mrs. M. I. Lomax, The Library, University of Salford.

The guide includes electronic spectra, infra-red spectra, electron impact mass spectra, nuclear magnetic and electron spin resonance spectra published up to September 1970. Details of collections containing a total of 225,000 molecular spectra and of bibliographies with 297,000 literature references are given in a systematic, tabular form so that the reader may decide which data collection is most likely to be of use and of the indexing system employed so as to aid in the retrieval process.

IRSCOT - Infrared Structural Correlation Tables and Data Cards, by R. G. J. Miller-ICI Ltd., Petrochemical & Polymer Lab., Runcorn, U.K., and H. A. Willis - ICI Ltd., Plastics Division, Welwyn Garden City, U.K., 1971, IRSCOT Systems tables 1-10 complete with index £ 52,50.

IRSCOT consists of a master index - the key to the whole system - comprising ten correlation tables which direct the user to the relevant Data Cards containing concise information on the infrared absorption bands of a structural group together with literature references and examples where appropriate. A typical card will quote band positions in both frequency and wavelength and includes compound names and structural formula.

The ten tables now published are:

1. Hydrocarbons, 2. Halogen Compounds, 3. Oxygen Compounds (excluding Acids), 4. Carboxylic Acids and Derivatives, 5. Nitrogen (excluding N-O Compounds), 6. N-O Compounds, 7. Heterocyclics, 8. Sulphurs, 9. Silicon Compounds, 10. Boron Compounds.

Infrared Spectra of Selected Chemical Compounds, by R. Mecke and F. Langenbacher, Institute of Physical Chemistry, Freiburg, Germany, Fed. Rep., 1971, 8 Vol., DM 260. Specifically designed for educational institutes, and the smaller cost-conscious laboratory, this comprehensive—representative—collection contains over 1800 essential infrared spectra of compounds from most chemical classes.

Vacuum Ultraviolet Spectroscopy, by A. N. Zaidel and E. Ya. Shreider, U.S.S.R., translated from Russian, Keter Publishing House Ltd., P.O.B. 7145, Jerusalem, Israel, 1971, 408 pp., \$ 22.00. The main applications of UV spectroscopy are in space research and hot plasma physics. This is the first comprehensive monograph published in the Soviet Union dealing with all aspects of this problem. It presents a generalization of a tremendous volume of data published in a variety of periodicals and other scattered sources. Working procedures and methods, materials, and equipment are described in detail. The results presented include data from atomic spectroscopy, hot plasma research, solar radiation spectroscopy and spectroscopic analysis.

Atlas of Electron Spectra of 5-Nitrofurans, by J. Eidus, A. Ekmane, K. Venters and S. Hiller, Riga, U.S.S.R., translated from Russian, Keter Publishing House Ltd., P.O.B. 7145, Jerusalem, Israel, 1970, 169 pp., \$ 17.00. The atlas comprises the electronic absorption spectra of 50 nitrofurans derivatives, mainly 2-polyene-substituted compounds. The spectra are plotted both in the linear and on the logarithmic intensity scale. The spectral bandwidth is shown for each absorption band to enable quantitative measurements to be performed.

The descriptive part includes general information on the electronic absorption spectra of 5-nitrofurans, as well as a number of general relationships derived by one of the authors from the experimental material in the atlas.

Recommendations for Presentation of Raman Spectra for Cataloguing and Documentation in Permanent Data Collections, Appendix No. 11, 1971, to IUPAC *Information Bulletin*.

SOLID STATE PROPERTIES

Semiconducting Lead Chalcogenides, by Yu. I. Ravich, and others, all three authors are associated with the Institute of Semiconductors, Academy of Sciences of the U.S.S.R., Leningrad, translated from Russian, N.Y. Plenum, 1971, 377 pp., \$ 30.00. (Monographs in semiconductor physics, Vol. 5.) Presented: Physicochemical properties, optical and photoelectric properties, electrical properties, thermoelectric and thermal properties, magnetic properties, band structure and scattering mechanisms, applications of lead chalcogenides, literature cited, subject index. Revision includes new information on the mechanisms of carrier scattering, higher values of the thermoelectric figure and more accurate physical parameters of lead chalcogenides. Summarizes the results of investigations of the physical properties of lead chalcogenides and the structures of their energy bands.

Oxide semi-conductors, by Z. Jarzebski and S. Mrowiec, Scientific-Technical Publications (Wydawnictwa Naukowo-Techniczne, Warszawa, Poland, 1969, 215 pp.

Discussed are the problems of technology connected with manufacturing monocrystals from solutions and the gas phase. Another question is the obtaining of thin layers of oxide by the cathode sputtering method or by evaporating in vacuum. Thermodyna-

mic basis of lattice defects, equilibrium constants and their dependence on the temperature, defects of cooled crystals, the structure of defects, and the semi-conductor properties of the following oxides: ZnO, CdO, Al₂O₃, SiO₂, SnO₂, TiO₂, NiO and CoO are also given. Included are data for Hall coefficient, Hall mobility, electrical resistance, permability of radiation across thin layers, the seebeck coefficient and the anisotropy of electrical conductivity.

Physicochemical Principles of Semi-conductor Doping, by V. M. Glazor, and V. S. Zemskov, Moscow, U.S.S.R., translated from Russian, Keter Publishing House Ltd., P.O.B. 7145, Jerusalem, Israel, 1970, 400 pp., \$ 20.00. The book contains numerous figures and tables, and includes 638 references.

THERMODYNAMIC, THERMOPHYSICAL AND TRANSPORT PROPERTY

Thermophysical Properties of Non-Metallic Materials, by R. E. Krzhizkanovskii, Z. Yu. Shtern, Energia Publishing House, Leningrad, U.S.S.R., 1970, 675 pp., 1r. 63k. The handbook will include data on physical properties of oxides and carbides in a wide range of temperatures and other parameters. Attention is focused on thermophysical and thermodynamic parameters, such as thermal conductivity, heat capacity, linear expansion coefficient, etc.

Thermodynamic and Transport Properties of Ethylene and Propylene, by S. D. Labinov, Yu. A. Soldatenko, V. P. Provotor and others, Moscow, U.S.S.R., Publishing House for State Standards, 1971, 375 pp., 85k. The book presents data on ethylene and propylene in liquid and gaseous states. The properties covered are enthalpy, entropy, heat capacity, saturation vapour pressure, viscosity, thermal conductivity. The tables are compiled following the treatment of the experimental data obtained at Kiev Technological Institute for Light Industry. The book includes a review, a systematic and critical evaluation of major experimental and theoretical investigations of ethylene and propylene properties. The results of the most important of these are also presented.

Prediction of Transport and Other Physical Properties of Fluids, by S. Bretsznajder, translated from Polish J. Bandrowski, Scientific Technical Publications Wydawnictwa Naukowo-Techniczne Warszawa, Poland, and Pergamon Press Ltd., Oxford, 1969, 869 pp.

Approximation methods for calculating physico-chemical constants of gases and liquids useful by designing processes in chemical technology are described, within the following areas: thermodynamics and molecular physics, P-V-T, critical data, vapour pressures, heat of evaporation, enthalpy, entropy, molar heats, capacity, surface tension, viscosity, thermal conductivity and diffusivity. A critical review of methods is given.

Silicon – IVth Period Transition Metal Alloys, by P. V. Geld, F. A. Sidorenko, Metallurgia Publishing House, Moscow, U.S.S.R., 1971, 750 pp., 3r. 30k. The book presents a systematic description of the important physical and physico-chemical characteristics of solid and liquid alloys of IVth period transition metals with silicon. It includes data on temperature and concentration boundary lines of stability for silicides, and gives their basic thermodynamic properties. The authors generalize the data on silicides crystal structure, on their lattices and on the solution types involving these substances. Also covered are electrical conductivity,

magnetic susceptibility and other electrophysical and magnetic properties. The authors analyze various properties of liquid silicides.

Lithium-Hydride, Its Physico-Chemical and Thermophysical Properties, E. E. Spielrain, K. A. Yakimovich, Publishing House for State Standards, Moscow, U.S.S.R., 1971, 250 pp., 60k. The authors analyze literature data on thermophysical properties of lithium hydride in solid and liquid states, select reliable data, derive interpolation equations for calculating lithium hydride properties with condensed phase, and present the data in a tabular form. Proceeding from thermodynamic principles and using experimental data available and making some assumptions, the authors consider partial pressure of lithium hydride dissociation products along the saturation line, total pressure and vapour composition.

Oxides and Chalcogenides of Transition Metals, Handbook, by S. M. Arija, Khemia Publishing House, Moscow, U.S.S.R., 1970., 325 pp., 89 k. The book contains data on the phase relations of oxides, sulphides, selenides and tellurides of transition metals such as titanium, vanadium, iron, cobalt, niobium, cerium, scandium, tungsten, molybdenum, etc. Consideration will be given to thermodynamic, magnetic and electrical properties of the above compounds. The tables will be supplemented with a brief discussion of some general concepts and laws of property variations. This will, hopefully, enable the user to evaluate the reliability and the accuracy of the values included, as well as, in some cases, to estimate the characteristics of such compounds for which no data are available.

Thermophysical Properties of Mercury, by M.P. Vukalovich, A. I. Ivanov, L. R. Fokin, A. T. Yakovlev, Moscow, U.S.S.R., Publishing House for State Standards, 1971, 600 pp., 1r. 20k. The reference monograph will describe and evaluate the main experimental data on thermophysical properties of mercury. Calculations are carried out to obtain self-consistent tables of thermal and caloric properties, as well as of non-equilibrium properties such as viscosity, thermal and electrical conductivity, for solid mercury from 0° up to melting point, for liquid mercury up to 800° C at pressures up to the 20000 bars, and for mercury vapour up to 2000° C and 200 bars.

Thermal Constants of Substances, Vol. IV. (in two parts), by editor-in-chief, V.P. Clushkov, editor V. A. Medvedev, Publ. Academy of Sciences, U.S.S.R., All-Union Institute of Scientific and Technical Information (VINITI), Institute for High Temperature first part: 1970, 510 pp., second part: 1971, 432 pp., two parts, 4r. 58k. Substances: C, Su, Ge, Su, Pb.

Thermal Conductivity of Organic Liquids, by G. Kh. Mukhamedzanov, A. G. Usmanov, Khemia Publishing House, Leningrad, U.S.S.R., 1971, 250 pp. 73 k. The handbook contains results of measurements of the thermal conductivity of about 200 organic liquids.

Thermophysical Properties of Metals and Alloys, Handbook, by R. E. Krzhizhanovskii, Metallurgia, Publishing House, Moscow, U.S.S.R., 1970, 500 pp., 1r. 45k. The handbook covers physical and thermophysical characteristics of nearly all metals of the periodic Table.

Thermodynamic and Thermophysical Properties of Helium, by N. V. Tsederberg, V. N. Popov, N. A. Morozova, Moscow, U.S.S.R., 375 pp., 1r. 65k., translated from the Russian, Keter Publishing House Ltd., P.O.B. 7145, Jerusalem, Israel, 1971,

275 pp., \$ 17.00. The volume contains tabulated values of the above properties, and the equation of state used to calculate P, V, T-data. The properties covered are heat capacities and enthalpies in ideal gas state estimated from the laws of statistical thermodynamics. Pressure dependence of the caloric properties derived from P-V-T data. Entropy is calculated. Also presented are thermodynamic diagrams for helium, its thermal conductivity and viscosity as functions of temperature and pressure. There were experimentally determined by the authors, with the equipment specially designed for the purpose. The experimental data was combined with other literature data.

Transport Properties of Mixed Plasmas He-N₂, Ar-N₂ and Xe-N₂ Plasmas: at one atmosphere, between 5,000 K and 35,000 K Report by M. Capitelli and E. Ficocelli, Centro di Studio per la Chimica dei Plasmi del Consiglio Nazionale delle Ricerche - Istituto di Chimica Generale ed Inorganica - Università Degli Studi - Bari, Adriatica editrice Bari, Italy, 1970, 63 pp. In the present publication numerical values of transport properties (thermal conductivity and viscosity) of the systems He-N₂, Ar-N₂ and Xe-N₂ at one atmosphere, between 5,000 K and 35,000 K have been presented in tabular form for every 1,000 K and for compositions between 0 and 100% N₂ at interval Δ 10%

Equilibrium Compositions and Thermodynamic Properties of Mixed Plasmas — (Argon-oxygen plasmas at 10⁻² to 10¹ atmospheres between 2,000 K and 3,000 K) — report by M. Capitelli, E. Ficocelli and E. Molinari, Centro di Studio per la Chimica dei Plasmi del Consiglio Nazionale delle Ricerche - Istituto di Chimica Generale ed Inorganica - Università degli Studi - Bari, Adriatica editrice Bari, Italy, 1970, 139 pp. This report represents the second publication of the series dedicated to the presentation of thermodynamic and transport data of mixtures of diatomic gases with rare gases, up to 35,000 K. It contains in tabular form the results of equilibrium calculations for the system argon-oxygen between 2,000 K and 35,000 K at 10⁻², 10⁻¹, 1 and 10 atmospheres. Numerical values have been reported for every 1,000 K and for compositions between 0 and 100% O₂ at intervals of 20%. The species relevant to the system under investigation are the following O₂, O₂⁺, O, O⁺, O⁺⁺, O⁺⁺⁺, O⁻, Ar, Ar⁺, Ar⁺⁺, Ar⁺⁺⁺, e. There appears to be no evidence for the existence of gaseous negative ions other than O⁻.

Handbook of Vapour Pressures and Heats of Vaporization of Hydrocarbons and Related Compounds. The American Petroleum Institute, Research Project 44 (API RP44) and the Thermodynamics Research Centre (TRC) Data Project (API 44-TRC) Data Distribution Office, Thermodynamics Research Centre Texas A & M Research Foundation, F. E. Box 130, College Station, Texas 77843, U.S.A. Publications in Science and Engineering No. 101, 1971, 295 pp., \$ 10.00. This handbook is specifically designed to serve as a desk-copy reference for those who are concerned with the vapour-liquid equilibrium phenomena of compounds of importance in the refining of petroleum and the manufacture of petrochemicals. The data reported in the handbook is based on a selection of the "best" experimental measurements available on more than 700 compounds including American Petroleum Institute Standard Reference Hydrocarbons and Sulfur Compounds. In some cases, where experimental data is not available, the tabulated values are calculated from an empirical correlation or an extrapolation.

Chemical Thermodynamic Data for Hydrocarbons and Sulfur Compounds, The American Petroleum Institute. Research Project 44 (API RP 44) and The Thermodynamics Research Centre (TRC) Data Project (API 44-TRC), Data Distribution Office.

Thermodynamics Research Center, Texas A & M Research Foundation, F. E. Box 130, College Station, Texas 77843, U.S.A. *Publication in Science and Engineering* No. 102, 1971, 270 pp., \$ 10.00.

Thermodynamic Diagrams for High Temperature Plasmas of Air, Air-Carbon, Carbon-Hydrogen Mixtures and Argon, by H. Kroepelin, K. K. Neumann, K. U. Hoffmann, R. Kuthe, Braunschweig, Vieweg, 1971, 164 Diagrams, DM64.

NBS Tech. Note 270-5. Selected Values of Chemical Thermodynamic Properties, Tables for Elements 54 through 61 in the Standard Order of Arrangement, by D. D. Wagman, W. H. Evans and others, U.S.A., 1971, \$ 0.55.

Thermophysical Properties of Freon 22, by A. V. Kletskiy, Moscow, U.S.S.R., translated from Russian, Keter Publishing House Ltd., P.O.B. 7145, Jerusalem, Israel, 1971, 67 pp., \$ 6.00.

Heavy Water; Thermophysical Properties, by Y. Z. Kazavchinski and others, Moscow, U.S.S.R., translated from Russian, Keter Publishing House Ltd., P.O.B. 7145, Jerusalem, Israel, 1971, 265 pp., \$ 15.00 A critical survey and generalization of data on the thermophysical properties of heavy water. Equations of state are arrived from this data and then used to tabulate the thermophysical properties, properties of heavy water on the saturation line, density of heavy water, viscosity and thermal conductivity of heavy water, equations of heavy water and its vapour, tables of thermodynamic properties of heavy water.

Handbook of Thermodynamic Constants of Inorganic and Organic Compounds, by M. Kh. Karapetyants and M. L. Karapetyants, Moscow, U.S.S.R., translated from Russian, Keter Publishing House Ltd., P.O.B. 7145, Jerusalem, Israel, 1971, 472 pp., \$ 20.00. This handbook covers the fundamental thermodynamic properties of about 4,000 inorganic and organic compounds. Over 15,000 numerical values of standard heats of formation, standard free energies, standard entropies, and standard heat capacities at constant pressure are given. During seven years of research, data were obtained from Soviet and international sources. In addition, the authors include values for substances previously not investigated and constants which have been re-determined and/or recalculated.

Properties of Liquid and Solid Hydrogen, by B. N. Eselson and others, Moscow, U.S.S.R., translated from Russian, Keter Publishing House Ltd., P.O.B. 7145, Jerusalem, Israel, 1971, 128 pp., \$ 9.00. This reference book contains data on the physical properties of hydrogen in the liquid and solid states, taken from the most reliable Soviet and non-Soviet sources. There are 58 tables, 61 figures and 169 bibliographical references.

Thermochemistry of the Rare Earth Carbides, Nitrides and Sulfides for Steelmaking, by Karl A. Gscheidner, and Nancy Kippenhan, Rare Earth Information Centre, Institute for Atomic Research, Iowa State University, Ames, Iowa, U.S.A., August 1971, IS-RIC-5, 27 pp. This report tabulates the heats and free energies of formation of the rare earth carbides, nitrides and sulfides in the temperature range 278 K to 2700 K. The free energies of formation of the rare earth compounds are compared with the corresponding non rare earth carbides, nitrides and sulfides in 4 two-color figures. Each section contains a brief discussion of the methods which were used to calculate the thermodynamic values.

Thermophysical Properties Research Center (TPRC) Data Series, edited by Y. S. Touloukian, Director, Thermophysical Properties Research Center, Purdue University Research Park, 2595 Yeager Road, West Lafayette, Indiana 47906, U.S.A., and C.Y. Ho, Head, Data Tables Division, Thermophysical Properties Research Center. A thirteen volume compilation entitled *Thermophysical Properties of Matter* has been published (1971-1972) by IFL/Plenum Data Corporation, 227 West 17th Street, New York, N.Y. 10011, U.S.A. The titles, estimated number of pages of the 13 volumes and prices are as follows:

THERMAL CONDUCTIVITY			
Volume 1	Metallic Elements and Alloys	1600 pp	\$ 95.00
Volume 2	Nonmetallic Solids	1300	85.00
Volume 3	Nonmetallic Liquids and Gases	700	55.00
SPECIFIC HEAT			
Volume 4	Metallic Elements and Alloys	820	\$ 65.00
Volume 5	Nonmetallic Solids	1730	100.00
Volume 6	Nonmetallic Liquids and Gases	380	40.00
THERMAL RADIATIVE PROPERTIES			
Volume 7	Metallic Elements and Alloys	1650	\$100.00
THERMAL RADIATIVE PROPERTIES			
Volume 8	Nonmetallic Solids	880	\$110.00
Volume 9	Coatings	1690	100.00
THERMAL DIFFUSIVITY			
Volume 10		500	\$ 50.00
VISCOSITY			
Volume 11		400	\$ 50.00
THERMAL EXPANSION			
Volume 12	Metallic Elements and Alloys	1000	\$ 80.00
Volume 13	Nonmetallic Solids	1000	80.00

There is a special subscription price for the 13 volumes at \$ 595.00.

The Characterization of Chemical Purity, Organic Compounds, published as a Supplement to Pure & Applied Chemistry, 1971, Butterworths, London, 173 pp., \$ 15.00, £ 5.

Stability Constants of Metal-Ion Complexes, Supplement No. 1, 1971, 860 pp., published as Special Publication No. 25 (The Chemical Society, London in collaboration with IUPAC), £ 20.

Phase Diagrams of Chloride Systems, Handbook, by B. G. Kors-hunov, D. V. Drobot, V. V. Safonov, Khemia Publishing House Leningrad, U.S.S.R., 1971, 1125 pp., 2r. 59k. The book is a system of data of binary, ternary- and multi-components systems, including chlorides and oxichlorides. The national and international literature is covered from 1884 to 1968.

Selected Constants: Oxidation - Reduction Potentials of Inorganic Substances in Aqueous Solution, published as a Supplement to Pure & Applied Chemistry, 1971, in press, Butterworths, London.

The Chemistry of Thallium, by A. G. Lee, Amsterdam, Haigh & Hochland Ltd., University Foreign and Industrial Booksellers, 3990 Oxford Road, Manchester 13, U.K., 1971, 250 pp., £ 5. It provides a timely, comprehensive and critical review of all aspects of the chemistry of the heavy metal thallium. After an initial chapter describing the underlying principles governing thallium chemistry, all aspects of thallium chemistry and its compounds are reviewed. The literature coverage is very thorough. For ease of reference much material is presented in tabular form, and the text concentrates on discussion of the data together with discussion of those areas where considerable growth can be expected.

Chemistry and Physics of Carbon; A Series of Advances, edited by Philip L. Walker, Jr., Vol. 7 N.Y. Dekker, 1971. 403 pp., \$ 29.50. Electronic properties of doped carbons. Positive and negative magnetoresistances in carbons. The chemistry of the pyrolytic conversion of organic compounds to carbon. References. Author index. Subject index. The present collection is highlighted by two papers on graphitization. Photomicrograms, tables, graphs and extensive reference lists are included in each paper.

Tables of Dielectric Constants, Dipole Moments, and Dielectric Relaxation Times, by Worth E. Vaughan, University of Wisconsin, Madison, Wisconsin National Academy of Sciences, U.S.A., Reprinted from Digest of Literature on Dielectrics Volume 33, (1969).

The tables contain data reported in publications abstracted by *Chemical Abstracts* for 1969. In most cases the values cited have been taken from the original literature. In cases where the original literature was unavailable, the *Chemical Abstracts* Citation follows the reference. The tables cover measurements on pure materials and dilute solutions but do not include work on mixtures or poorly characterized substances.

The following tables are given: 1. Static Dielectric Constants of Pure Liquids, 2. Static Dielectric Constants of Pure Solids, 3. Dipole Moments, 4. Unresolved Relaxation Times, 5. Resolved Relaxation Times. Tables 2, 3 and 5 are followed by brief descriptions of measurements reported in a form unsuited for inclusion in the tables.

Cases where the original literature was unavailable and the abstract did not contain sufficient information are included here.

Handbook of Solid-Liquid Equilibria in Systems of Anhydrous Inorganic Salts, edited by N. K. Voskresenskaya, Academy of Sciences of the U.S.S.R., Moscow - Leningrad, U.S.S.R., translated from Russian, Keter Publishing House Ltd., P.O.B. 7145, Jerusalem, Israel, 1970, 1446 pp., in two volumes, \$55.00. A most comprehensive handbook in two volumes: the first volume is devoted to binary systems, and the second volume deals with ternary, reciprocal ternary and more complex systems. The data for each system is arranged in tabular form and in phase diagrams.

Gmelins Handbook of Inorganic Chemistry, System No. 46 Tin, Part B. The Element, 1971, VI, XIX, 423 pp., 130 illustrations, DM 513. Part A3, System No. 61 Silver, 1971, VI, X, 224 pp., 14 illustrations, DM 281.

Gmelins Handbook of Inorganic Chemistry, System No. 47 Lead, Part B1. The element, 1971, VI, XX, 497 pp., 87 illustrations, DM 596,00. System No. 49 NIOB, Part B3, 1971, VI, XXII, 330 illustrations, DM 411,00.

The Analytical Chemistry of Sulfur and its Compounds, Part 3, compiled by N.F. Chamberlain and J. J. Reed, edited by J. H. Karchmer, Esso Research and Engineering, Co., U.K., 1971, 336 pp., £ 8.40. A compilation of data on the nuclear magnetic resonance of sulfur compounds, this volume contains a table that lists the N.M.R. chemical shifts and the spin coupling constants for 1393 different sulfur compounds. Part I (published in 1970) treats inorganic sulfur compounds. Part 2 (due in late 1971) and 3 deals with organic sulfur compounds. (Chemical Analysis Series, Volume 29).

NBS-OSRDB-71-2, Bibliography of Kinetic Data on Gas Phase Reactions of N₂, O₂ and Nitrogen, by Francis Westley Chemical Kinetics Information Center, N.B.S., U.S.A., 1971, 140 pp., \$ 3.00. Microfiche \$ 0.95. A bibliography of references to published papers and reports containing rate data for reactions of N, N₂, N₃, N₂O, N₂O₂, N₂O₃, N₂O₄, N₂O₅, NO, NO₂, NO₃, NO₄, O, O₂, and O₃ with each other is presented. In addition two lists of critical review dealing with the above reactions are included. Over 900 papers are listed.

Rate Constants of Homolytic Liquid-Phase Reactions, by E. T. Denisov, Nauka Publishing House, Moscow, U.S.S.R., 1971.

The publication presents a brief account of modern measurement techniques for relative and absolute rate constants for the following reaction types: molecule reaction, (reactions of detachment and attachment), recombination and rearrangement of atoms and radicals, one-electron oxidizing reactions between ions and molecules, ions and radicals, reactions with solvated electrons. In addition to rate constants (pre-exponent and activation energy), the tables also include information concerning the experiment conditions, measurement technique and a reference to the primary study.

The reference book covers literature up to 1969. For reactions repeatedly investigated, the author calculates average rate constants. In addition to absolute values, constants ratios are also presented. Special tables summarize data on the influence of pressure and solvents on rate constants of molecular and radical reactions.

The Mechanical Properties of Pure Metals, by A. Buch, Scientific-Technical Publications/Wydawnictwa Naukowo-Techniczne/Warszawa, 1968, 203 pp. The mechanical properties of pure metals, within the range of O K and by melting points, were critically reviewed. The following properties were compiled: elasticity (Young's modulus, modulus of rigidity), elongation (tensile elongation, uniform elongation, neck elongation, static elongation, dynamic elongation), strength (ultimate tensile strength, compression strength, cohesive strength fracture stress), plasticity (yield limit, creep time resistance), hardness (Brinell or Vickers hardness, Rockwell hardness) of the metals: Li, Na, K, Rb, Cs, Be, Mg, Ca, Sr, Ba, Se, Y, La, the metals of rare earths, Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W, Mn, Re, Fe, Ni, Co, Pt, Pd, Rh, Os, Ru, Ir, Cu, Ag, Au, Zn, Cd, Hg, Al, Ga, In, Tl, Si, Ge, Sn, Pb, Bi, Sb, Th, U, Pa. The influence of several physical parameters like temperature, crystal structures and heat content on interatomic bonds has been discussed.

Yttrium: Properties, Phase Diagrams, Industrial Applications, by V. F. Terekhova, and E. M. Savitskii, U.S.S.R., translated from Russian 1970, Keter Publishing House Ltd., P.O.B. 7145, Jerusalem, Israel, 176 pp., \$10.00. The range of application of yttrium is expanding rapidly. Part 1 contains generalized data on methods of purification of yttrium and its properties. Part 2 gives phase diagrams of yttrium alloys and describes their properties. The most important fields of the application of yttrium in practice are fully described in Part 3.

Carbides; Properties, Production, and Applications by T. Ya. Kosolopova, U.S.S.R., The author is with the Institute of Ferrous Metallurgy, Academy of Sciences of the Ukrainian, translated from Russian, N.Y. Plenum, 1971, 298 pp, \$30.00. The structure and physico-chemical properties of carbides. Carbides of metals of group I. Carbides of metals of group II. Carbides of the transition metals, Carbides of elements of the boron group. Silicon carbide. Chemical properties of carbides. References. Index. Includes a literature survey with a bibliography of 954 items. Numerous tables and graphs.

NBS Special Publication 324, The N.B.S. Alloy Data Center: Permuted Materials Index, by G. C. Carter, D. J. Kahan, L. H. Bennett, J. R. Cuthill and R. C. Dobbyn, 1971, \$ 7.00.

NBS-OSRDB-70-2, The NBS Alloy Data Center: Author Index, by G. C. Carter, D. J. Kahan, L. H. Bennett, J. R. Cuthill, and R. C. Dobbyn, 1970 microfiche \$ 0.95, Paper Copy \$ 10.00.

Phase Diagrams of Silicate Systems, Handbook Part 2, Metal-Oxygen components in silicate systems by N. A. Toporov, V. P. Bazakovskii, I. A. Bondar, Ju. M. Udalov, Leningrad Branch of Nauka Publishing House, U.S.S.R., 1970, 750 pp, 2r. The volume presents comprehensive information concerning industrially important metal-oxygen systems. Description is given of all oxides of rare earth elements, titanium, zirconium vanadium, niobium, tantalum, chromium, molybdenum, tungsten, uranium, manganese, iron, cobalt, nickel and other metals, whose oxygen containing compounds exhibit high temperature of fusion. A detailed account is given of oxides of Si, Al, Ge, Sn, Pb, as well as polymorphism of common oxygen-containing compounds of these elements. In addition to characteristics of the regions of

stability for corresponding oxide phases and their polymorphism (in terms of T and P), some physical (structural and optical) properties are covered.

Rare Earth Metals in Steels. Copies of these reports are available without charge from the Rare Earth Information Centre, Institute for Atomic Research, Iowa State University, Ames, Iowa 50010, U.S.A., or from Molybdenum Corporation of America, 280 Park Avenue, New York, N.Y. 10017, U.S.A., Report 1971, 21 pp. The information is presented according to increasing complexity of the steels involved. Data on the effect of rare earth on the various characteristics and properties of steel as well as the effect.

GEO AND COSMIC SCIENCES

Atmospheric Tides, Thermal and Gravitational, by Sydney Chapman and Richard S. Lindzen., D. Reidel Publishing Company, Dordrecht-Holland, 1970, 203 pp., \$ 10.65. Chapter 2 S: *The Solar Daily Atmospheric Oscillations as Revealed by Meteorological Data*, Chapter 2L: *The Lunar Atmospheric Tide as Revealed by Meteorological Data*. References. Index of Names, Index of Subjects, Index of Places.

Mineralogical Applications of Crystal Field Theory, by R. G. Burns, U.K., Cambridge Earth Science Series, Catalog No. 0521 076102, 1970, 224 pp., £ 4,20. Presented: Spectra, Crystal Chemistry and Thermodynamic Properties of Minerals, 68 figures, 23 tables.

Physics and Astronomy of the Moon, edited by N. Y. Kopal, Zdenek, 2nd ed., N.Y. Academic Press, 1971, 303 pp., \$ 15.00. Geometrical and dynamical properties of the moon. Optical properties of the lunar surface. Other volumes on the physical properties of the lunar surface, its chemistry and mineralogy was published by Academic Press in the Advances in Astronomy and Astrophysics series.

Atmospheric Transparency in the Visible and the Infrared, by V. E. Zeuv, U.S.S.R., translated from Russian, Keter Publishing House, Ltd., P. O. B. 7145, Jerusalem, Israel, 1970, 220 pp., \$ 17.00. A survey of experimental work up to the end of 1964 dealing with absorption, scattering, and attenuation of infrared and visible radiation in the Earth atmosphere.

Interpretation of Observation Data from Meteorological Satellites, by K. Ya. Kondratiev, E. P. Borisenkov, A. a. Morozkin, Moscow, U.S.S.R., translated from Russian, Keter Publishing House, Ltd., P.O.B. 7145, Jerusalem, Israel, 1970, 376 pp., \$ 13.00. A compilation from recent publications, including the proceedings of the 1964 WMO Tokyo Seminar, on uses and interpretation of weather satellite data. The detailed treatment and wealth of synoptic charts, specimen computer printouts and numerical tables make it suitable for use as a Textbook or a manual by meteorologists in weather satellite centres.

MATHEMATICAL METHODS AND COMPUTER PROGRAMS FOR DATA

NBS Tech. Note 470, Edpac: Utility Programs for Computer-Assisted Editing, Copy-Production, and Data Retrieval, by Carla G. Messina and Joseph Hilsenrath, 1969, \$ 0.75.

Tables of Trigonometric Functions for the Numerical Computation of Electron Density in Crystals., by I. M. Kuntsevich, N. M. Olekhovich, and A. U. Sheleg, U.S.S.R., translated from Russian, Keter Publishing House Ltd., P.O.B. 7145, Jerusalem, Israel, 1971, 220 pp., \$ 12.00. The computation of the electron density involves tedious numerical work associated with the summation of three-dimensional Fourier series. The tables of trigonometric functions assembled in this volume are intended to cut down the computation time and they are arranged in such a way that all the computations of the electron density distribution in cubic crystals may be carried out on a simple desk calculator.

Discrimination between Equations of State, by J. Ross Macdonald and Donald R. Powell, Texas Instruments, Inc., P. O. Box 5936, Dallas, Texas 75222, U.S.A., 23 pp., N. B. S. Journal of Research, Vol. 75 A, No. 5, Sept.-Oct., 441-453 pp., 1971.

Computer Processing of Meteorological Data, by S. L. Belousov, L. S. Gandin and S. A. Mashkovich, Moscow, U.S.S.R., translated from Russian, Keter Publishing House Ltd., P.O.B. 7145, Jerusalem, Israel, 1971, 216 pp., \$ 15.00. This monograph presents a systematic description of routine computer processing of current synoptic and aerological data as conducted in large meteorological forecasting departments. The book is based mainly on experience of the U.S.S.R. Hydrometeorological Centre in Moscow. The techniques and applications of similar methods at other centres in the Soviet Union and elsewhere are briefly described as well. An extensive bibliography is provided. Initial computer processing of meteorological data. Objective analysis for data-sparse areas. Automatic data processing in numerical weather forecasting.

Dictionary of Quantities & Units, by J. V. Drazil, Leonard Hill Books of Reference, U.K., 1971, 200 pp., £ 2.60. Part I is a dictionary of the units (and combinations of the units) of the SI system and other presently used systems and their up-to-date symbols. Useful conversion factors are included. Parts 2 and 3 are dictionaries of the quantities and constants used in nearly all branches of science and technology and of their symbols. Dimensions, French and German equivalents and corresponding SI units are given. Useful conversion tables and French and German indexes are included.

Nomenclature of Inorganic Chemistry - 2nd Edition (IUPAC), 1971, 120 pp., £ 2.75. The second edition of IUPAC's Red Book revises and extends the precious volume published in 1959. Since then, the Commission on Nomenclature of Inorganic Chemistry has been working continuously, and the new edition shows many changes. The section on co-ordination compounds has been extended to reflect the importance of this field in modern inorganic chemistry. The Principle of an alphabetical order of citation of ligands in co-ordination entities has been adopted, and the rules now make detailed provision for the naming of complexes with unsaturated molecules or groups, the designation of ligand positions in the co-ordination sphere, the nomenclature of polynuclear compounds and those with metal-metal bonds, and the nomenclature of absolute configurations for six co-ordinated complexes based on the octahedron. A short section on boron hydrides and their derivatives has been included, and the material which dealt with crystalline phases of variable composition has been revised and expanded. There is now a fuller treatment of polyanions.

A Dictionary of Scientific Units: Including Dimensionless Numbers and Scales, by H. G. Jerrard, and D. B. McNeill, 3rd Ed., Chapman & Hall, U.K., 1971, 200 pp., £ 1.75. In appendices references, a table of fundamental physical constants, details of standardization committees and conferences and several conversion tables are given. This new edition devotes special attention to S. I. Units.

The Viscosities of Eleven Common Gases: A critical compilation, by G. C. Maitland and E. B. Smith, report Physical Chemistry Laboratory, University of Oxford, South Parks Road, Oxford, U.K., Sept. 1971. By a critical reassessment of the available experimental data, recommended values are given here for the coefficients of viscosity of eleven common gases (He, Ne, Ar, Kr, Xe, N₂, H₂, O₂, CO₂, CH₄, air). A compilation of the measured viscosities of these gases is given in the Appendix.

PHYSICAL QUANTITIES, UNITS, AND NOMENCLATURE

Nomenclature of Organic Chemistry, Sections A, B, & C, published as a Supplement to *Pure & Applied Chemistry*, Butterworths, London, 1971, 337 pp., \$ 24.00.

Nomenclature of Inorganic Chemistry, 2nd edition, reprinted from *Pure & Applied Chemistry*, Vol. 28, No. 1, Butterworths, London, 1971, 110 pp., \$ 8.25.

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