Gordon Research Conferences: Supplemental Information

Colby Junior College

Scientific Information Problems in Research

Illness has effectively taken Ken Zabriskie out of circulation at a crucial time. Consequently, responsibility for the development of the program and the administration of the conference has devolved on an Ad Hoc Committee of past chairmen: Karl F. Heumann, Francois Kertesz, Douglas B. Remsen, and Robert A. Harte, chairman.

13 July. Informal mixer.

14 July (*morning*). Overview of published user studies.

14 July (*evening*). William Paisley, "Criteria of user studies."

15 July (*morning*). Karl F. Heumann, chairman, International non-government organizations. FID: Ralph E. McBurney, president; IFLA: Sir Frank Francis, president; and IFIP: Speaker to be designated.

15 July (*evening*). Harrison Brown, chairman. UNISIST, the Joint ICSU–UNESCO feasibility study for a world system for scientific information. Speakers: Scott Adams and J. Ronald Smith.

16 July (*morning and evening*). Francois Kertesz, chairman. Impact of secondary services' tapes on user patterns. Speakers: Arthur Herschman, Arthur Elias, Gloria Smith, and Robert McRorie.

17 July (*morning*). Bart Holm, chairman. Advances and problems in chemical structure handling.

17 July (*evening*). Douglas B. Remsen, chairman, "The sex syndrome in documentation," Phyllis Parkins and Jeanne Poyen.

18 July. User study desiderata, a panel discussion. Panelists: Mary Herner, Harold Wooster, and Robert A. Harte, moderator.

Interested individuals are encouraged to register through the procedures outlined in the announcement of the Gordon Research Conferences [*Science* **163**, 1085 (1969)]. Correspondence explicitly concerned with the program may be directed to Robert A. Harte, 9650 Rockville Pike, Bethesda, Maryland 20014.

Measurements in the High-Pressure Environment

Physicists and chemists have long had the opportunity to correlate experimental results from different laboratories through use of the International Practical Temperature Scale. The possibility of developing an analogous pressure scale was the theme of an international symposium entitled "Accurate Characterization of the High Pressure Environment," held at the National Bureau of Standards, Gaithersburg, Maryland, 14–18 October 1968.

The symposium was attended by about 140 participants from the United States and abroad. Other countries represented included Canada, England, France, Japan, South Africa, the Soviet Union, Sweden, and West Germany. Thirty-eight papers were presented, and four panel sessions held, covering research at high pressures in static systems and in shock wave experiments.

The tone of the meeting was effectively set by the opening speakers, who emphasized the importance of improved accuracy in measurements at high pressures and in calibrations relevant to such measurements. The point was made that in current work, involving a wide range of phenomena and many types of apparatus, a series of "interlocking" standards is needed.

About one-fourth of the papers dealt with matters relevant to selection of reproducible and reversible reference points on the pressure scale—so-called "fixed points"—indicated by phase changes in selected substances. The importance attached to establishing such agreed-on fixed points was indicated by these papers and the discussions throughout the week. On the final day these matters were considered by an informal committee, and the following outline of the report of this committee and of the ensuing floor discussion summarizes the informal consensus reached.

It was recommended that phase transitions and accompanying pressures shown in Table 1 be used as pressure fixed points. The fixed points recommended represent equilibrium values.

Users are to consider the fixed points as exact. The values of "present estimated uncertainty" are given only to indicate the range within which a value may be expected to shift as a result of improved measurements in the future. The reproducibility of pressures based on these phase changes may be better or poorer than these uncertainties and, in any given case, depends strongly on technique. It is the responsibility of the experimenter to establish reproducibility and hysteresis for his own apparatus and technique, and the relationship between his experimental values and the above equilibrium values.

In addition to the five points listed in Table 1 covering the pressure scale up to 77 kilobars, a consensus was reached that the cesium II to III and III to IV transitions on *increasing pressure* be taken as 42.5 kilobars and 43.0 kilobars, respectively, with a present estimated uncertainty of 1 kilobar, and that the tin I to II transition be tentatively used as a fixed point with an equilibrium transition value of 100 kilobars and a present estimated uncertainty of 6 kilobars.

In addition to the fixed point of 7.569 kilobars at the freezing pressure of mercury at 0°C, the committee favored use of the mercury melting curve to establish other reference pressures up to 15 kilobars, corresponding to the freezing pressure of mercury at about 36.8°C. It recommended that such reference pressures be based on the Simon equation, adjusted to agree with the value 7.569 kilobars at 0°C as follows:

$$P = 38227\left[\left(\frac{T}{234.29}\right)^{1.1772} - 1\right]$$

where T is the temperature in kilobars on the International Practical Temperature Scale (1948), and P is the pressure in bars. Small adjustments in this equation will be needed when the new temperature scale, IPTS 1968, is used.

Several pressure scales derived from equations of state of cubic solids were proposed at the meeting. Both metallic and nonmetallic substances, such as the cesium halides, were considered. Sodium can be treated most accurately from the theoretical viewpoint, but its high chemical reactivity is inconvenient. Aluminum can be treated by quantum mechanical methods if parameters are adjusted to fit some of the observed properties. Both aluminum and copper have been investigated experimentally as