are influenced by the average field of their surrounding neighbors, the full beauty of the development of statistical mechanics is not included. The development given is not one that would appeal to an axiomatic mathematician. The fuller treatment is promised, by implication at least, in the second volume.

With these critical comments, which are obviously matters of taste rather than of substance, there is little that one can say except to praise. The book is clearly written in concise and logical language. The physical, as well as the mathematical, reasoning is well presented. The typography is pleasing.

One of the noteworthy characteristics of the book which will make it of great usefulness to many is the wealth of detailed approximation developments. These are given for such cases as the partition functions for anharmonic oscillators, as well as for the contributions to all the thermodynamic functions, U, F, C, S, etc. Similar equations are given for polyatomic molecules, including the "interaction anharmonicity" of different degrees of vibrational freedom, as well as for rotation at high temperatures and its interaction with vibrational degrees of freedom, and for "hindered" rotation. A very minor criticism of detail is that, without explanation, the German Gothic Cof, Sin is used for the hyperbolic functions usually written cosh, sinh in America. However even the most unwary user is not apt to use trigonometric functions, and a check of the meaning is very easy from the equations.

Particularly the fourth chapter, on temperature-dependent quantum states, which this reviewer might have preferred to see deferred for pedagogical reasons to the second volume, is an extremely useful chapter. It is a very welcome treatment of a rather confusing subject, done with clarity and skill.

Finally it should be mentioned that there is an excellent appendix of tables.

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The Physical Chemistry of Metallic Solutions and Intermetallic Compounds. Proceedings of a Symposium held at the National Physical Laboratory on 4th, 5th, and 6th June, 1958. Symposium No. 9. Volumes I and II. National Physical Laboratory. Her Majesty's Stationery Office, York House, Kingsway, London, W.C. 2, England. 1959. xli + 649 pp. 17 × 23.5 cm. Price, £1. 17s. 6d.

These two volumes comprise the papers and edited discussion presented at the Symposium which was held at the National Physical Laboratory on June 4, 5 and 6, 1958. The general topics discussed were: 1. Experimental Methods, 2. Metallic solutions, 3. Intermetallic Compounds, 4. Phase Transformations, 5. "Practical Applications" Thermodynamics and Phase Diagrams, 6. "Practical Applications" Gas–Metal and Slag–Metal Reactions, 7. "Practical Applications" Non-Stoichiometry in Metallic Compounds.

Many of the scientists in the world who are concerned with the general subject of this Conference attended and contributed papers which summarized their particular field of interest or which presented results of recent research. Because of the scope of the Conference it was necessary to limit, to some degree, the length of the papers and also the time for presentation. The discussions reflect the severe curtailment of the presentations, and free exchange of viewpoint was somewhat difficult to obtain due to this pressure.

In spite of the limitation on length, the papers reviewing the various sub-divisions of the subjects, as listed above, are of considerable value to people who would like to know more about the particular experimental methods and research results which are not immediately in their area of interest. These papers also provide excellent sources of references. The research papers cover a number of experimental methods and the results therefrom. Included are calorimetry, the structure and thermodynamic properties of metallic solutions, bonding in intermetallic compounds, and the properties of some metallic phases such as viscosities and densities.

In contrast to the large amount of information presented what might be called the theoretical aspect of this topic, sections dealing with practical applications include relatively few contributions. As was noted in the discussion, this is very disappointing. It would appear that it is easier to measure a property or the behavior of a substance or a system than it is to apply this understanding to the interpretation of the behavior of a material or to the analyses of complex systems such as are encountered in engineering work. If the publication of this volume serves no other end than to point up the fact that there is much to be done in the area of application of our understanding, and that this application requires perhaps even more ingenuity than does the generation of the actual basic information, the publication will have served a purpose.

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Nouveau Traité de Chimie Minérale. Tome XVIII. Complexes du Fer, du Cobalt et du Nickel. Edited by PAUL PASCAL, Membre de l'Institut, Professeur honoraire á la Sorbonne, Masson et Cie., 120, Boulevard Saint-Germain, Paris 6, France. 1959. xxxix + 944 pp. 17.5 × 25.5 cm. Price, Broché, 9.500 fr.; cartonné toile, 10.700 fr.

The bulk of this volume deals with the coördination complexes of iron, cobalt and nickel. Each element is treated in a different manner.

The chapter on iron (383 pages) by Clement Duval conforms to the general format of the series. The chemistry of iron in two of its oxidation states (+2 and +3) is described insofar as it is covered by the compounds formed with the halogens and with the oxy-anions of the elements of periodic groups III to VII. With the exception of the halogen compounds, binary compounds are treated in another volume. The presentation is for the most part uncritical. Compounds are listed: a brief statement of the method of preparation and properties is given. Sometimes the formula is written as a complex such as $Na_3[Fe_2(P_2O_7)_3]$ and in other cases in Berzelian style $3Na_2S_2O_3 \cdot FeS_2O_3 \cdot 8H_2O$. A vast amount of useful information is presented, and there are almost three thousand references.

The iron carbonyls and nitrosyls are competently discussed in a separate section by A. Michel. Only one reference is made to cyclopentadienyl compounds which presumably are described in another volume. About 120 references cover this topic up to 1958.

In contrast to the treatment given the iron compounds, the chapter on cobalt by Paul Job deals exclusively with the coördination complexes of cobalt(III). It is fortunately so organized that the inadequate index is not necessary. Cationic complexes are arranged in order of decreasing coordination with nitrogen and with regard to magnitude of the charge. Anionic complexes are in order of increasing charge. Polynuclear complexes are accorded a similar treatment, but in addition the nature of the bridging group is taken into consideration. The carbonyl and nitrosyl complexes are succinctly described by J. Amiel in 21 pages with 95 references. In the chapter on cobalt the references are placed at the end of each section, and the convenience of this system is realized when it is abandoned by Raymonde Duval in his chapter on the complexes of nickel (149 pages). All of the 966 references are given at the end. The organization in this case is based on the oxidation state of nickel from zero to four. A substantial section deals with the so-called inner complexes which nickel forms with two molecules of many bidentate organic ligands.

The advantages of a topical treatment of descriptive chemistry over the systematic organization based on the periodic table are revealed by comparing the chapters on the complexes of cobalt and nickel with the chapter on iron salts and complexes. The latter, however, provides a place to record the existence of many compounds which have not been certainly classified. This useful function is perhaps the main reason that treatises such as this are by no means outmoded.

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