INTRODUCTION

This Manual is intended as a brief reference source of information for three types of users: executives and plant designers; individuals engaged in industrial operations involving the use of water; and analysts, operators of special instruments, engineers, and consultants. It will not replace an adequate library on the subject for any of these users, but it provides basic information for routine use and cites references to the technical literature, thus serving as a point of departure for more specific and detailed studies.

For executives, plant managers, designers, and similar technologists and administrators, it offers information on the influence of water on industries in which it is used either as a raw material or in conjunction with manufacturing processes. The influence of water on various industries ranges from that in paper manufacture, for example, where very large volumes are used and its quality is of great importance, to small industries where only incidental supplies are needed. At no level, however, can the amount and nature of the available water be disregarded lest a plague of supply failure, contamination, corrosion, scaling, or other difficulty arise to interfere with the manufacturer’s operations and to sap his profits. The Manual should serve as a guide to the nature of water planning required at the supervisory and investment levels.

Operating personnel will find in the Manual a guide to the significance of the treatment they are applying. Combined with general discussion of the problems arising from industrial use of water are details of specific control procedures and instructions for such critical operations as sampling water under the various conditions and in the several forms in which it is employed. The Manual will be useful as a text for training plant operators and for the indoctrination of technologists from other fields.

Chemists and other technologists having special knowledge of water can use the Manual as a reference for specific information not assembled elsewhere. Standard methods for sampling, analysis, reporting, and testing water that have been developed cooperatively by ASTM Committee D-19 on Industrial Water are included for ready reference, together with constants, names, and factors of immediate usefulness to water practitioners. The techniques that have not yet achieved standardization are discussed to aid the water specialist in keeping abreast of new developments.

It is hoped that the Manual also will be used as a text in technical schools and colleges. While this was not the prime purpose of its preparation, the material presented should be suitable for classroom use. Suggestions for improvements in this respect will be particularly welcome for inclusion in later editions.

Despite the extensive use that can be made of the Manual, it should not be expected to replace competent and well-trained technologists. It will give general
information to some and detailed information to others, but the design and efficient application of the treatments and techniques discussed require experience that no books can supply.

The first two chapters provide general information about industrial uses of water. The first chapter discusses the uses themselves and the factors that must be considered in selecting a source of water; the second reviews the kinds of difficulties that may be caused by various impurities in industrial supplies. Chapter III is a new one that gives a brief account of the mechanism by which streams assimilate wastes. The next chapter introduces the more technical portion of the Manual by defining various terms and presenting the technologist's conception of water and water deposits. Chapter V comprehensively covers the treatment of process water and waste water and cites many references to technical literature where details of particular processes may be found. Chapters VI to IX deal with the procedures and precautions to be observed in sampling analysis, and examination of water and water-formed deposits and the reaction and corrosion products of water. Rapid expansion of industrial use of radioactive nuclides pointed to the desirability of including information on this subject in a new chapter which concludes Part I of the Manual.

Part II contains, in numeric sequence, all methods for the examination of water that are currently accepted by the American Society for Testing Materials. This section of the Manual is preceded by an introduction to laboratory practices which contains helpful advice for analysts, whether experienced or not. An Appendix provides certain data commonly needed by water analysts.

This edition of the Manual represents a substantial expansion of the first edition. It has been designed to satisfy the growing need for dependable information about water and the problems its use entails. The authors hope that it will properly serve the intended purpose.