

## PREFACE

This book provides a description of the scientific scene and some aspects of the cultural scene in France in the Revolutionary era, a period when some could claim that science really came of age. It was a time when science in France blossomed to its full maturity, moving from a stage in which it had been largely of interest to a handful of serious students to a situation where it became the everyday concern for a significant body of professionals. The author of this account, Thomas Bugge, was a Danish astronomer who systematically recorded places, events, and people in Paris during his six-month stay in 1798–1799 to attend what might be described as one of the first international scientific conferences.

Although it is hoped that it will be of some use to those interested in the history of science and of education, no claim can be made for this book beyond that of being a contribution to the literature of the history of scientific institutions. It is, therefore, not a history of science but a source for historians of science and others. When the definitive history of science in France after the Revolution is written, it will be based on a wide variety of evidence, ranging from debates in the assemblies and personal evidence in letters to technical accounts of scientific research. All will contribute to an assessment of the inter-relation between science and society in this crucial period. When this tribunal comes to consider what evidence is relevant, I should like to enter a plea for consideration of the accounts provided by visitors to France with some special interest in science.

The description of events and people by an eyewitness provides a dimension lacking from more formal records such as the minutes of the National Institute. The critical use of such personal testimony can complement official documents to provide a more complete picture. As explained in the Introduction, Bugge was in a particularly good position to assess the scientific scene. Yet the impressions of visitors other than men of science cannot be ignored. It was, after all, the favorable impact of the Ecole Polytechnique outside France which led to the establishment of technological universities in other countries. The German *technische Hochschulen* were modeled directly on the Ecole Polytechnique and sprang up in the wake of its growing reputation: Prague (1806), Vienna (1815), Karlsruhe (1825), Munich (1827), Dresden (1828), Stuttgart (1829), and Hanover (1831). Polytechnics were founded in Europe from Copenhagen to Zurich and even at St. Petersburg. American education too was affected. One of the graduates of the Polytechnique, Crozet, brought its methods to the U.S. Military Academy at West Point, and Greene introduced the educational principles of the Polytechnique at Rensselaer Polytechnic Institute (Troy, New York). The Massachusetts Institute of Technology (founded in 1865) derives from the same tradition.

An admirable survey of eighteenth-century institutions concerned with the teaching of science in France has been published recently.<sup>1</sup> Unfortunately, it stops short of the complex Revolutionary period. The present book may go part of the way toward filling this important gap. The editor offers this book as a contribution from a particular viewpoint to a greater knowledge and understanding of the scientific institutions established in France after the Revolution. Just as it was believed that society could be reformed by the establishment of appropriate political institutions, so scientific institutions had been set up as

<sup>1</sup>R. Taton, ed., *Enseignement et diffusion des sciences en France au XVIIIe siècle*, Paris, 1964.

the basis of advance in science. The evidence of Bugge is supplemented by that of several other visitors to Paris at the time of the Directory or Consulate where the interests or education of these visitors prompted them to comment on the state of institutionalized science. The bibliography contains a selection of such published accounts, many of which have been completely overlooked hitherto.

Although Thomas Bugge wrote in Danish, contemporary translations of the account of his visit to France were published in English and German.<sup>2</sup> The English edition of 1801 is reproduced here with corrections and occasional omissions and alterations in the interests of accuracy, brevity, and intelligibility. Some minor changes in spelling, capitalization, and punctuation have been made. Certain archaic words have been changed, particularly if they might mislead the reader.<sup>3</sup> Bugge, in accordance with current French practice, gives dates according to the Republican calendar, the details of which are explained here in a glossary. In this edition the dates according to the Republican calendar are given in a standardized form and the equivalent on the ordinary calendar is usually added. A very large number of proper names were incorrectly given in the 1801 edition. This has been rectified, at least in the great majority of cases. The occasional use of the title C[itizen] is abandoned for the sake of consistency.

Several parts of the book (Chapters 5 and 7 and part of Chapter 4) now appear for the first time in English. The original Danish edition contained thirty-one "letters" or

<sup>2</sup>See bibliography, pp. 216–219.

<sup>3</sup>Thus arc is substituted for "arch" in geodesic measurements, cellars for "caves," factory for "manufactory," morning for "forenoon," platinum for "platina," prize for "premium," program for "programma," room or gallery for "saloon," and school for "nursery" and "seminary." Other changes are indicated by footnotes in the text, marked "J. J." (John Jones, the translator of the 1801 English edition).

In one place, the terms "complementary" and "noncomplementary" are used in the 1801 edition to refer to the odd and even days of the republican week of ten days. The proper use of the term "complementary day" is explained in the glossary under "Calendar."

chapters. Of these, only a selection of the first eighteen was translated into English, although the translator gave the impression that this edition was complete. A complete German translation was made in 1801 with the assistance of Bugge himself and has been used as the source of the additional material, the Danish edition being consulted as a check. Details of the French budget for science and art, scientific societies, instrument makers, the metric system, steam engines, and the manufacture of gunpowder and cannon have been included. In order that the reader may see what selection has been made, a full list of contents of the original edition is given, indicating comparative lengths of chapters and showing what sections have been omitted.

The principle adopted in editing this work has been to preserve the bias toward the description of scientific institutions without suppressing the author's comments on such important centers of culture as the Louvre and the Bibliothèque Nationale. It would have been possible to edit Bugge's work so that only the best in the French scene was included, but I have avoided this one-sided approach and indeed the book opens with an account of the primary schools—almost a national scandal. The Observatory too was not at its best immediately after the Revolution. In contrast, there are full descriptions of such famous institutions as the Ecole Polytechnique, the Muséum d'Histoire Naturelle, and the First Class of the Institute. Notes to the text have been kept to an absolute minimum. Most of Bugge's account speaks for itself. To have elaborated every allusion would have doubled the size of the book without increasing its value proportionately. Bugge's footnotes are marked by symbols whereas the editor's are numbered consecutively throughout each chapter.

The price to be paid for an over-all survey is lack of thoroughness in the treatment of any one aspect. In many cases this text will serve to raise certain questions rather than to provide final answers. For example, the summary

treatment of the metric system may annoy those who find this of particular interest. It will be justified, however, if it stimulates a complete study of the establishment of the metric system, including its social and political implications.

In the preparation of this book I have received valuable assistance from several friends and the staffs of various libraries. Dr. W. A. Smeaton generously agreed to read the original typescript and was able to make some helpful suggestions and to correct many errors. Professor Roger Hahn has not only provided me with several important references, but also made a considerable number of detailed and useful criticisms, for which I am grateful. Dr. Eric Forbes was kind enough to read the chapter on the metric system and to help with the translation of several difficult passages. Among others, whose help with the historical background I gratefully acknowledge are Professor John Boshier and Dr. Ernst Wangermann. I would like especially to thank my wife for her invaluable assistance in translating many passages from the German. Although I take this opportunity of expressing my gratitude to all concerned, responsibility for the presentation of this work must rest with me. I cannot be certain about the complete absence of mistakes or misprints in this edition, but any that remain can be no more than a small fraction of those in the original English edition.

I should like to thank the staff of the Brotherton Library, University of Leeds, for obtaining for me on interlibrary loan a copy of the original English edition of this work from Bristol City Library, a copy of the German edition, and a microfilm of the Danish edition from the Kongelige Bibliotek, Copenhagen. Other material was obtained in the library of the British Museum. I must thank MM. les Secrétaires Perpetuels of the Académie des sciences for allowing me to consult the dossier on Thomas Bugge in the archives of the Académie. The quotation from

a manuscript in the rare book room of the library of the University of California at Berkeley is by kind permission of the Department of Rare Books and Special Collections.

Finally I should like to thank the secretarial staff of the Department of Philosophy, University of Leeds, for the typing of this manuscript.

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*September 1968*