The Microscope Series

A Short History of the Early American Microscopes

Donald L. Padgitt

A SHORT HISTORY
OF
THE EARLY AMERICAN MICROSCOPES

Donald L. Padgitt
Chicago, Illinois

Microscope Publications Ltd.
London, England
Chicago, Illinois

1975

Microscope Publications Ltd.

2 McCrone Mews, Belsize Lane
London NW3 5BG, G.B.

or
2820 South Michigan Avenue
Chicago, IL 60616 U.S.A.

Library of Congress Catalog Card Number: 74-30750

Printed in England
by
Whitstable Litho Printers

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Dedicated to my wife, Joy, and children for putting up with me while I spend so much of their time on my hobby.

— about the author

D. L. PADGITT

Was born in Chicago, July 3, 1930. After attending Chicago public schools he attended Knox College in Galesburg Illinois where he received an AB degree in Economics in 1954. He then attended the University of Chicago Law School as a National Honors scholar. In spite of a two year stint as Lieutenant in the U.S. Army he attained his Juris Doctorate in 1958.

He has since engaged in the general practice of law with the Chicago firm of Peterson, Ross, Rall, Barber & Seidell. He now lives with his wife and three children in Wilmette, Illinois dividing his time between his family, job and hobby of studying 19th Century American microscopy. He first became interested

in microscopes as a result of trying to establish the provenance of an antique microscope purchased from a junk shop. He has since found the study of the history of scientific instrument making fascinating in terms of what has been written and mysterious in terms of what still needs to be done.

His interest has been encouraged by Marigene Butler, then Curator of the State Microscopical Society of Illinois Collection and Roderick Webster, Curator of the Adler Planetarium instrument collection. He began his research by compiling a catalogue of all known makers of microscopes and soon realized the overlapping nature of their work with studies already completed, or underway by people such as Gerard Turner of the Museum of the History of Science at Oxford and the Websters. He then devoted most of his time to American makers of the 19th Century. He has been a consultant for both The Billings Microscope Collection of the Armed Forces Institute of Pathology and the Smithsonian Institutions. He is presently engaged in assisting with the preparation of the first detailed catalogue of the Smithsonian microscope collection to be published later in 1975.

PREFACE—INTRODUCTION

This work represents the first attempt at describing the development of the microscope industry in America. To date only short biographical sketches concerning some makers and many unrelated historical details on the general subject have been available. The purposes of this book include that of presenting an illustrated chronology of the many models of microscope stands that have been made in America, and to present all known information on their designers and makers, many of whom have escaped notice, and few of whom have been given the credit they deserve.

Sources utilized for this project include the existing firms of Bausch & Lomb, Inc. and American Optical Company, the latter being the ultimate successor to a long line of American microscope makers originating with Charles A. Spencer in about 1840. In addition, city directories and the contemporary microscopical books, journals and patents have been reviewed for factual information and clues. Lastly, the inventories of the two major public collections of microscopes in America, The Billings Microscope Collection* and the Smithsonian Institution, have been examined for the hints they offer.

There is an enormous amount of work remaining to be done: more city directories should be thoroughly examined for clues as to the time span of many known makers and information on their products; probate court records should be examined for information they may contain on the disposition of the businesses and assets of the makers; and the content of the various existing private collections of microscopes must be made known. This last mentioned project is critical to the advancement of this task, for the reader will find that many microscopes alleged to have been designed and made by American firms are not known to exist today in the public and private collections of which the author has knowledge. Statements throughout this book to the effect that a form of instrument by a particular designer or maker is not extant are to be read in this context. Additional effort should be directed toward the development of biographical and historical information on some of the many

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*In Washington D. C. at the Armed Forces Institute of Pathology.

men who influenced the American makers and who had a profound effect on the development of the American microscope and microscope technology, men such as Hamilton L. Smith, J. L. Riddell, J. Lawrence Smith and Joseph J. Woodward, to name only a few.

It is hoped that the reader will keep in mind the foregoing limitations while reading the book, and if he or she has information or source materials bearing on the subject matter, I will be most appreciative to know.

Donald L. Padgitt

January, 1975

ACKNOWLEDGMENTS AND CREDITS

The author is indebted to the following persons for information, encouragement and assistance in the preparation of this work: Helen DeGrave, Librarian, and Herbert Lettau of Bausch & Lomb; Andrew I. Liberty of American Optical Company, Scientific Instrument Division; Col. Joshua E. Henderson, U.S.A., Curator, Armed Forces Institue of Pathology, Medical Museum; Audrey B. Davis, Curator, and Doris Leckie, Research Assistant of Division of Medical Sciences, Smithsonian Institution; Oscar W. Richards, Resident Lecturer, Pacific University; Elda-Jo Klandrud of Evanston, Illinois; Mr. and Mrs. Don Vento of Evanston, Illinois; Mr. and Mrs. Roderick S. Webster of the Adler Planetarium, Chicago, Illinois and F. W. Palmer, Department of Physics, Science Museum, London England.

Credits for the figures in this volume are due to: American Optical Company, Scientific Instrument Division: Figures 1, 3, 4, 6 and 25; Bausch & Lomb, Figures 41, 42, 43, 44, 47, 48, 49 and 50; Armed Forces Institute of Pathology, Figures 5, 10, 26, 38, 65 and 67; James McCormick, M.D., Figure 29; and D. Randall Padgitt, Figures 33, 45 and 62.

CREDITS

Typing and Composition	—	Cleopatra Brown
Drafting	—	James Graft
Editorial Assistant	—	Sylvia Graft
Printing and Binding	—	Whitstable Litho Printers

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A SHORT HISTORY OF THE EARLY AMERICAN MICROSCOPES

CHAPTER 1
THE MICROSCOPE IN AMERICA BEFORE 1840

The early development of the microscope in America is somewhat lost in periods of time unattended by historians, the Civil War, and the great fires that at one time or another ravaged cities and the establishments of several instrument makers. A proper history of this development is made more difficult because American microscope makers, unlike many of their European counterparts, were not regulated or subsidized by institutions that might have maintained records or left other published histories of clues covering the makers and their trade. In many European countries we find that universities, nobility, guilds or even governments would commission, subsidize, regulate or control many of the activities of the scientific instrument makers and, in so doing, would leave documentation of the nature or shape of the industry. In an America where guilds and nobility were nonexistent and where freedom of enterprise was a reality, early scientific instrument makers were independent individuals who labored under relative obscurity.

Scientific instrument making as an industry started in America early in the Eighteenth Century. By 1800 there were at least 65 individuals identifiable as makers of various types of scientific instruments. The majority were clock and watch makers, silversmiths, goldsmiths and bell founders. They would often make or deal in surveying instruments and navigation aids as a sideline; to the extent that they actually manufactured such items, they can be classified as America's earliest scientific instrument makers. Others held themselves out to be mathematical, optical and philosophical instrument makers, a category which would, of course, include the making of microscopes, but none are known to have actually made microscopes, and it is even doubtful that any handled microscopes as their stock in trade.[1]

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[1]See e.g. Bedini, Early American Scientific Instruments and Their Makers, 1964. For a listing of early surveying instrument makers in the United States of America, consult Smart, The Makers of Surveying Instruments in America Since

An ingenious Salem, Massachusetts clergyman, John Prince, may have been an exception to several of the foregoing general statements. Prince, a Harvard graduate of 1776, was the Senior Pastor of the First Church of Salem. In addition, he dealt in scientific instruments with many colleges, including Harvard, Yale, Dartmouth, Brown, Rutgers, Amherst, Williams and Union. In 1792, he was commissioned by Harvard to make a lucernal microscope.* The instrument was delivered to the college in 1796 with a name plate proclaiming it to be "Adams Lucernal Microscope improved by John Prince".[2] George Adams the Elder, of London, actually invented this form of microscope prior to 1787. Prince did, in fact, make suggestions for improvements in its original construction and, in so doing, received the acknowledgment of the inventor's son, George Adams the Younger.[3]

1700, Vol. I, 1962 and Vol. II, 1967. George Evans of Philadelphia is listed by Bedini and Smart as having advertised himself in a 1796 newspaper as "(m)athematical and philosophical instrument maker from London" and as having". . . brought with him (a) han(d)some assortment of instruments consisting of quadrants, telescopes, microscopes. . . All kinds of mathe matical instruments made, cleaned and repaired. . ." This is the earliest reference to an American dealer in microscopes.

[2]This information concerning Prince is from Wheatland, The Apparatus of Science at Harvard 1765-1800, 1968. Of the ninety-some pieces of apparatus described by Wheatland, only seven had been the product of, or had some connection with American dealers or makers. The College, like almost everyone else during that period, had to rely largely upon English sources of supply for their instruments.

[3]See George Adams (the Younger), Essays on the Microscope, 2nd Edition, with additions and improvements by F. Kanmacher, p. 84 et seq., 1798. Kanmacher's comments refer to Prince as ". . . a valuable correspondent and friend of our late author. . ."; and ". . . his . . . contrivances shew real ingenuity." For a good description of the lucernal microscope and its place in the history of the microscope, see Bradbury, The Evolution of the Microscope, p. 160 et seq., 1967.

*a lamp-illuminated projection microscope.

Eighteenth Century America was almost wholly a rural nation with little in the way of a community of people concerned with natural sciences. Microscopy during that period was considered, particularly in England, a diversion, entertainment or, at best, a hobby by many of its activists. It was such people who created the great demand for the microscopes of the English opticians. Americans, on the other hand, had little time to waste on such an "idle" pursuit. The real need for scientific instruments in America arose from the demands created by the practical requirements of land delineation and navigation. This gave rise to the rather early development of a market for surveying and navigational instruments which was met in one of three principal ways: 1) importation from England; 2) manufacture by native clockmakers and silversmiths and 3) immigration of English mathematical instrument makers to the United States.[4]

Thus, we see that during the Eighteenth Century Americans interested in microscopy were in the inconvenient position of having to purchase their instruments abroad since there were no native professional or even amateur microscope makers. Yale University, Harvard College and Brown University were among the first American institutions to import microscopes in the Eighteenth Century,[5] and some of these were the misnamed "Wilson" screw-barrel variety which were in reality simple, not compound, microscopes.[6] Undoubtedly, a few interested

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[4]See Bedini, op. cit., for a good analysis of the early American mathematical instrument trade, particularly in relation to surveying instruments.

[5]Yale obtained its first microscope (a Culpeper model probably by Matthews Loft) in 1734; Harvard obtained its first screw-barrel microscope in 1732, lost it in a fire in 1764, obtained a superior microscope (a chest model by Edward Nairne of London) in 1792, and the lucernal microscope referred to earlier in 1796; by 1769 Brown University had more than one compound microscope.

[6]James Wilson (1665-1730), a London instrument maker, described the so-called screw-barrel microscope in an article appearing in the Philosophical Transactions of the Royal Society in 1702. He never claimed to be its inventor, and it now

professional and amateur microscopists also possessed microscopes during this period, but such instruments most certainly were not the product of American craftsmen.

Not only did no American microscope maker appear on the scene until near the middle of the Nineteenth Century, but microscopes were not even customarily carried in stock by scientific instrument dealers in America before at least 1838. Thomas H. McAllister, an optician first in Philadelphia from about 1825 and later in New York City, reported a search instituted in 1838 to obtain a microscope for the United States Exploring Expedition. This expedition was under the command of then Lieutenant Charles Wilkes, a naval officer. It was to be the greatest effort to that date in world circumnavigation by America, consisting of a squadron of six ships with participants to include specialists in various scientific fields. Notwithstanding the importance and scope of the expedition, "(t)he various makers of scientific and philosophical instruments were applied to, but none of them could furnish the expedition with the desired microscope."[7]

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appears that the screw-barrel form of microscope was described by Nicolaas Hartsoeker in 1694 and even earlier (1685) by C. A. Tortona, an Italian (See Bradbury, op.cit., p.89 et seq.).

[7] Frey, The Microscope and Microscopical Technology, translated and edited by G. Cutter, M.D., p. 77, New York 1880. Cutter's comments to Frey's text indicate the search for the expedition microscope took place in 1840. This must be in error, since the expedition left Hampton Roads, Virginia, in August, 1838, and was engaged in exploring the Fiji Islands in 1840 on its route around the world. Cutter goes on to say that "(i)n this dilemma a private individual was applied to, and an instrument was finally obtained from Dr. Paul Goddard of Philadelphia. It was a French microscope, which would be considered very inferior but was the best instrument then to be had in this country." Further evidence of the mistaken date is the fact that by 1840 Charles A. Spencer was engaged in manufacturing fine microscopes in Canastota, New York, and had published at least one catalogue of which McAllister would probably have been aware.