A NOTE ON
CONVENTIONS

The Nature of the Book makes extensive use of manuscript and printed sources dating from the sixteenth, seventeenth, and eighteenth centuries. In quotations from such materials, spelling, punctuation, and typography have generally been kept as close as possible to the originals, except that ã, ñ, ñ, ñ, ñ, and ñ have been modernized. Use of the intrusive "sic" has been kept to a minimum. I have occasionally capitalized letters in quotations that happened to appear at the start of my sentences.

The City of London was (and is) not quite the same as the city of London. The former refers to the area within the walls, which fell under the traditional jurisdiction of Lord Mayor and Aldermen. The latter signifies the general conurbation as it had developed and spread beyond the bounds of the City itself. Parts of this conurbation therefore lay under different authorities, in particular those of Middlesex, Surrey, and Westminster.

In early modern England the legal year began in late March. England also recognized the Julian calendar (often called "old style"), which was ten days behind the Gregorian calendar ("new style") by this time employed in most of Europe. This can easily result in confusion over dates. In this book, dates are generally given in the old style, and in the form 11 February 1635/6. On the rare occasions when some confusion may arise, the Gregorian date is also given: e.g., 11/21 February 1635/6.

Some delicate issues of terminology arise when one discusses early modern books. Among the most salient are the following:

- The term publisher was known and used in early modern England, but it carried different meanings from its modern counterpart. Some of its contemporary connotations are teased out in the text of this book; I have tried to use the word only where those connotations are intended. More commonly I have employed the term undertaker, which is less ambiguous and more historically appropriate.

- Strictly speaking, a stationer (with a small s) was someone who followed the trade of a paper-stationer. A Stationer (capital S) was someone who was a member of the Stationers' Company—which included not only paper-stationers, but also printers, booksellers, and binders, plus a relatively small number of individuals who did not actually practice any of
the skills associated with paper and printing. After the incorporation of the Company in 1557, all of these "faculties" were, as a participant remarked, "constituted in one Body and Society, under one generical and individual term of Stationer."1 I follow suit. Incidentally, I refer to Stationers—both printers and booksellers—as "he or she." This is not simply modern propriety; both men and women worked in the book trade. It has long been maintained that the Stationers' craft was unusually tolerant of, and profuse with, female practitioners operating in their own right—something the legal status of which still remains in need of investigation.2

- A still more controversial term is piracy. It appears many times in this book. I have used it to mean any attributed violation of copy-ownership (or "propriety"). John Feather has argued for a more restricted usage, claiming that even though contemporaries used it in just such a wide sense, they were wrong to do so.3 Feather points out that there is a formal legal definition (that is, the printing without his or her permission of a text that was clearly and legally owned by another agent), and claims that to honor actors' categories in this case is to generate unnecessary confusion. It is a point that has been repeated by other authors and is discussed in the course of this book. However, while such precision is probably necessary in matters of technical bibliography, the stipulation seems rather too restrictive for a work such as this, which deals with social, cultural, and intellectual history. Such a book is entitled to recover the broader meanings recognized by contemporaries—indeed, it is its duty to do so. Contemporary usage provides warrant. Someone might call an unauthorized printing of personal letters a piracy, for example, even though their ownership had not been registered beforehand; similarly, an unauthorized reprint produced in another country for sale on the Continent might be accounted a piracy, although it was outside English legal jurisdiction. There are no legal terms for such cases, although individuals certainly felt them to be transgressions of some sort. It would be awkward to have to resort every time to "unauthorized reprint" or some such formula. For the sake of conciseness and dramatic value, then—and not least to capture something of the sheer sense of outrage displayed by the aggrieved—I have chosen to follow what I take to be the emerging usage of the time, and call these activities by the generic label of piracy. This

2. Erickson, Women and Property, 303; Earle, City Full of People, 107–55.
Introduction

The Book of Nature and the Nature of the Book

Pick up a modern book. This one will do: the one you are looking at right now. What sort of object is this? There are certain features about it of which you can be reasonably confident. Its professed author does indeed exist and did indeed write it. It contains information believed to be accurate, and it professes to impart knowledge to readers like you. It is produced with its author's consent, and it is indeed the edition it claims to be. If the dust jacket announces that it is the product of a given organization—in this case the University of Chicago Press—then this too may be believed. Perhaps you may even say to yourself that that fact vouches for the quality of its content. You may safely assume that the book you now hold will have been printed in many copies, and a copy of the same book bought in Australia, say, will be identical in all relevant respects to one bought in the United States or in Great Britain.

Begin to use this object. It should immediately become clear that there are things about its proper utilization of which a reader like you can be equally confident. This book has not been produced with a specific, individual reader in mind. To some extent, at least, it is a commercial product, designed to appeal to purchasers. Its cost may have limited its readership somewhat, but its distribution will still have been fairly widespread, and it may be available for consultation in a number of libraries. Readers will not have to endure any formal vetting or approval process before being permitted to read this book. You yourself are free to carry it around and to lend it to others. You are not free, however—beyond certain legal limits—to reproduce its contents in your own right for commercial gain. Nor may you now proceed to issue translations, epitomes, or abridgments of those contents. It is improbable (but not impossible) that you will choose to declaim the text of this book aloud in a public place, and it is even more unlikely that you will make it the focus of a collective act of commemoration, worship, or similar ritual. Some books are indeed used in these ways, incidentally, but this is probably not going to be one of them. In short, while in
CHAPTER ONE

INTRODUCTION

some respects this book's usage is up to you, in others it appears to be quite closely constrained.

That we can assume all these things of such an object—that such an object actually exists—derives from our living in what many people call "print culture." Such phenomena, we say, are due to printing. Or rather, we would say this, but so infallibly reliable are they that we rarely even have to articulate the relation. It is obvious, self-evident, even necessary. The practical consequence is that we do not have to agonize over the reliability of a published book before we can put it to use. We do not need to undertake investigatory work to verify that its author does exist and that its text is authorized. No literary spy need be hired to ascertain that it was indeed printed texts are identical and reliable because that is simply what printing does. This book contends that what we experience it only by virtue of hard work, exercised over generations and across nations. That labor has long been overlooked, and is not now evident. For this term, see below, pp. 10-11, and Eisenstein, *Prinosign Press, 1*, 43-159. I am not sure of its genesis; Eisenstein, its prime recent exponent, seems to take it from McLuhan (E.g., *Gutenberg Galaxy, 146-9*).
The economic, cultural, and moral implications of these, as in the battles raging over computer and music software, are truly massive, or confrontations between the USA and China over the latter, see Faison, "Copyright rates."

The Nature of the Book begins by asking the question of what printing was. It addresses how the people of the sixteenth, seventeenth, and eighteenth centuries constructed and construed the craft, in their own setting and for their own ends. This entails comprehending the complex social processes by which books came to be made and used in their society—the society in which printing first really thrived, and in which any consequences it might have were first fully manifested. The result is that what began as a tactical decision to forget our own knowledge is soon vindicated as rather more. As chapter 2 will show in detail, early modern printing was not joined by any obvious or necessary bond to enhanced fidelity, reliability, and truth. That bond had to be forged.

If an early modern reader picked up a printed book—De Natura Libri, perhaps—then he or she could not be immediately certain that it was what it claimed to be, and its proper use might not be so self-evident. Piracy was again one reason: illicit uses of the press threatened the credibility of all printed products. More broadly, ideas about the correct ways to make and use books varied markedly from place to place and time to time. But whatever the cause, it is not easy for us to imagine such a realm, in which printed records were not necessarily authorized or faithful. What could one know in such a realm, and how could one know it? We ourselves routinely rely on stable communications in our making and maintenance of knowledge, whether of the people around us or of the world in which we live. That stability helps to underpin the confidence we feel in our impressions and beliefs. Even the brisk skepticism we may express about certain printed materials—tabloid newspapers, say—rests on it, inasmuch as we feel confident that we can readily and consistently identify what it is that we are scorning. Instability in records would equally rapidly translate into uncertainty of judgment. The most immediate implication, then, would be epistemic.

... a sense, the point is a well-entrenched one. It has been made at least since the sixteenth century, when printers and others took to laundering their craft for its power to preserve. The contrast they drew was with previous scribal forms of reproduction, which they delineated as intrinsically corruptive. It now seems almost indisputable. We should recognize, however, that the first identification of that contrast was partly a product of interest. Printers stood to gain from what was originally a contentious argument, not a straightforward observation. If, on the other hand, it is not printing per se that possesses preservative power, but printing put to use in particular ways, then we ourselves may usefully draw some rather different distinctions. We may look not just for differences between print and manuscript reproduction, but for different ways in which the press itself and its products have been (and continue to be) employed. The roots of textual stability may be
sought as much in these practices as in the press itself. And knowledge, such as it is, has come to depend on that stability. Here, then, is one way in which a social history of print can prove not just interesting, but consequential. A reappraisal of print in the making can contribute to our historical understanding of the conditions of knowledge itself.

TYCHO BRAHE, GALILEO GALILEI, AND THE PROBLEMS OF "PRINT CULTURE"

The central concern of this book is the relation between print and knowledge. As its title suggests, to pursue this theme it focuses in particular on natural knowledge—knowledge of Creation and of humanity’s place within it. To that extent, The Nature of the Book may be regarded as contributing to the discipline known, rather anachronistically, as the history of science. It proposes a new account of how early modern Europeans put printing to use to create and maintain knowledge about the natural world.

The focus on the history of science is not, however, an exclusive one. The ambit of The Nature of the Book is not exhausted by scientific knowledge, and none of its conclusions should be regarded as restricted to science alone. Science is treated here as just one among a range of activities characterized by the creation and use of knowledge. The historical problems identified in the course of this book were so general that they applied to all of them, from scriptural exegesis, through astronomy, experiment, and alchemy, to the formation of political ideologies and representations of gender. All make their appearances in the following chapters. Nonetheless, the widely accepted status of modern science as the most objective, valuable, and robust kind of knowledge currently available makes it a peculiarly appealing subject for the historian of printing. This high status means that any conclusions demonstrable for science stand a chance of being accredited a fortiori for other activities now held in lower repute. Furthermore, the history of science offers an unusually clear opportunity to discuss the assumptions and implications of the historiography of print. For it is in the history of science that one finds the figure who, more than any other, personifies print culture as conventionally understood. That figure is the Danish nobleman and astronomer Tycho Brahe (fig. 1.1).

4. As explained further below, I share other historians’ doubts about using the terms “science” and “scientist” in reference to periods before they became recognized by contemporaries, and will therefore employ them sparingly in this book. For the issues involved, see Jardine, “Writing Off the Scientific Revolution”; Copenhagen, “Did Science Have a Renaissance?”; Pickstone, “Past and Present Knowledges”; and the polemical argument in Cunningham and Williams, “De-centring the 'Big Picture.'”

5. I should stress the attributive and pragmatic character of such a representation; claims that scientific knowledge actually is objective are, of course, extremely controversial, and the image of science as such has been questioned many times.

FIG. 1.1. Tycho Brahe: different representations for different readers. (top left) Hand-copied portrait. Reproduced from Tycho Brahe, Opera Omnia. 1. (By permission of the Syndics of Cambridge University Library.) (top right) Printed portrait from the work in which Tycho attacked Ursus. Tycho Brahe, Epistolarum Astronomicarum Libri. (By permission of the Syndics of Cambridge University Library.) (above left) Tycho with his mural quadrant, as portrayed in a presentation impression of the Astronomiae Instauratae Mechanica (1590). (By permission of the British Library, C.45.h.3.) (above right) Michael Sparke’s English version of Tycho’s mural quadrant portrait, published with his astrological prophecy in 1638 as Learned Tycho Brahe His Astronomical Conjectur. (By permission of the Syndics of Cambridge University Library.)
In 1576 the king of Denmark granted Tycho feudal powers over a small island named Hven, lying in the sound just north of Copenhagen. Here Tycho erected a remarkable castle-observatory, in which he lived and worked for the next two decades. His work at this palatial observatory, which he called Uraniborg (fig. 1.2), resulted in an unequaled series of observations and interpretations of the heavens. They secured for him a reputation as the greatest of all astronomers. Almost immediately, Tycho himself became an icon of the very enterprise of astronomy. Mathematical practitioners in succeeding generations came to see in him an unimpeachable model of the harmony of nobility and "mechanic" skill. In the hands of modern historians, moreover, Tycho has again proved a powerful emblem, in two important and revealingly paradoxical respects. First, Uraniborg has become the outstanding Renaissance exemplar of the importance of locale in the making of knowledge. This is an important issue, to be addressed

6. Hannaway, "Laboratory Design." Shackelford has responded to Hannaway, with more heat than really necessary, in "Tycho Brahe."
Eisenstein can claim that the Renaissance and Reformation were rendered permanent by the very permanence of their canonical texts, that nationalism developed thanks to the stabilization of laws and languages, and that science itself became possible on the basis of phenomena and theories reliably recorded. 

With this new foundation of certainty at their disposal, "scientists" (as Eisenstein insists on calling them) could begin to develop new doubts about their previous authority, namely antiquity. The "Scientific Revolution" was thus inconceivable without a preceding printing revolution. And for Eisenstein Tycho Brahe personifies both.

Eisenstein's Tycho was an autodidact. This in itself was remarkable: before the printing revolution, not enough editions could have been amassed in one place to enable him to teach himself. But while he was doing this, Tycho was able to place authoritative printed representations of the Copernican and Ptolemaic systems of the heavens side by side before his eyes. By this simple process of juxtaposition, he could immediately see that there were serious discrepancies. Later, working on Venetian, he instigated a program to rectify the data and theories on which astronomy was based. He and his assistants labored for years to produce a systematic corpus of recorded observations of the heavenly bodies, using not only Tycho's own careful observations but those sent to him by astronomers across central Europe. When ready, Tycho could then supervise the correct printing of this vital material in his own printing house, using paper made in his own paper mill (figs. 1.3 and 1.4). As a result, one novice—"Tycho's stars"—as it came to be called—became "fixed" to the extent that it continued to be shown on celestial globes long after it had disappeared from the earth.

In this guise has Eisenstein's Tycho entered a current debate about science itself. Bruno Latour has built an account of the making and power of science on her representation of a print culture, first in his concept of "immovable mobiles" and more recently in that of "mediators." Latour identifies the collection and deployment of durable paper entities as the foundation
of science’s success. The creation and circulation of such objects, Latour maintains, enabled Tycho to master natural and social entities that were otherwise beyond reach. He could use print both to capture heavenly bodies, as Eisenstein claimed, and, furthermore, effectively to turn every observatory in Europe into an extension of Uraniborg. This he achieved by distributing printed forms on which astronomers could enter their observations before returning them to the central site of Hven. In doing so, he pioneered a practice central to the development of modern science. For this, Latour thinks, is essentially how the modern laboratory sustains its authority too. The Latourian laboratory is an inscription engine, dedicated to the construction, collation, dispersal, and accommodation of such materials. It is a compelling and enormously influential argument. And it is consonant not only with Eisenstein herself, but more extensively still with her inspiration and bête noire, Marshall McLuhan. Latour’s vision of science in


16. A plausible summary of McLuhan’s views in relation to Latour’s might run as follows. Like Latour, McLuhan urged the importance of what he called the “network” as a category of analysis, important in deciding ways of perceiving the world. He too identified a railway system as the representative network par excellence (compare Latour, *We Have Never Been Modern*, 117; and Latour, *Arrows*). What McLuhan’s networks achieve—what lends them their power—is their ability to produce changes in scale. They permit individuals and organizations to localize and universalize by allowing them to magnify and reduce traces of the
action depends on Eisenstein's "print culture"—and thereby implicitly on McLuhan's "Gutenberg Galaxy"—to underwrite the stability of both knowledge and society.  

The Tycho of Eisenstein and Latour has become the incarnation of textual, social, and epistemic order. But just how credible is this Tycho? There is something altogether too neat, too immaculate, about the figure and his achievements. As Philip Marlowe put it in The Big Sleep, such testimony displays "the austere simplicity of fiction rather than the tangled woof of fact."  

Maybe the Tycho so far portrayed will change somewhat if we investigate more closely how his "mediators" actually came into being and were put to use. For Tycho does indeed represent perhaps the purest example of a particular kind of printing, and a particular way of using the products of the press. Like Regiomontanus before him, and Hevelius after, he controlled his own printing operation. His was a singular printing house, however. It was as geographically isolated on the island of Hven as it was socially isolated from the companies of the European book trade. It was even physically embedded in the five-meter high, five-meter thick wall that enclosed his entire estate. Such isolation meant, at least in principle, that Tycho could produce books when, for whom, and in whatever form he liked. Works like his Astronomiae Instauratae Mechanica, which described Uraniborg in all its glory, were scarcely intended to be published at all, but were to be distributed as gifts to patrons at courts and universities (fig. 1.5). The more prestigious were not just printed books, but hybrids—hand-colored, individualized tributes, presented to their intended recipients on specific dates. Tycho meant to bypass the structures of the international book trade altogether.

The recipient of a book like Tycho's Astronomiae Instauratae Mechanica was thus likely to be found in a distinctive place: a royal court or a university. Here a book took its place and gained its meaning only amid a vast arsenal of other objects directed to similar ends. It would be encountered alongside natural curiosities, thaumaturgical wonders, mathematical devices, paintings, musical compositions, alchemical medallions, magical machines, and other books (fig. 1.6). In such surroundings, every aspect of appearance and handling mattered for creating an impact. The reader of such a work, in such a place, would be consciously engaging in a distinctive system of practices and ideas—in Tycho's case, feudal ones. The giving and receiving of such gifts was an important part of court culture, enmeshed in conventions of status recognition, reciprocation, and reward. This could not fail to affect the way in which that reader regarded the book. It was invested with enhanced credit, being untainted by "mechanick" influence, and it was accorded the privileged reception due to such a noble gesture. The veracity of its contents warranted respect. They could not be dismissed without cost. Yet at the same time such a gesture all but commanded creative responses—including challenges—from suitably prestigious interlocutors. Tycho's book would now fall subject to the conventions surrounding philosophical and mathematical disputes in these settings. The variables that determined both whether a "scientific" debate would even take place, and, once battle had been joined, how it would proceed, were local ones: to whom one pre-

FIG. 1.5. The presentation of an astronomical volume to an absolute monarch: Hevelius offering his Cometographia to Louis XIV of France. The vignette portrays Hevelius's dedication of the book to Louis; it does not represent a real scene. Hevelius, Cometographia. (By permission of the Syndics of Cambridge University Library.)