

JOHN BEVIS AND HIS *URANOGRAPHIA* (ca. 1750)*

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INTRODUCTION

There are few artifacts of the history of astronomy which can rival, for sheer visual splendor, the Grand Celestial Atlases. Productions of a Golden Age which encompassed roughly the double-century from 1600 to 1800, these sumptuous folios must be ranked among the most magnificent books ever published. They are so appealing to the eye that we easily forget that the finest of the atlases were not only works of art but were also of great astronomical importance. Based on the most recent star catalogs at a time when positional astronomy was in its infancy, the atlases became the intimate working tools of astronomers until early in the nineteenth century. The number of the truly great ones, however, was small. Only four atlases published in this 200-year period acquired any professional standing; they were Bayer's *Uranometria* (1603), Hevelius's *Firmamentum* (1690), Flamsteed's *Atlas Coelestis* (1729, along with the important French quarto editions of 1776 and 1795), and Bode's *Uranographia* (1801).¹ Each of these is a lasting monument to the astronomer's science and the cartographer's art.²

* I wish to express a deep debt of appreciation to Prof. Owen Gingerich, who has researched this subject thoroughly himself and who generously shared with me the fruits of his labors; to the Linda Hall Library in Kansas City, whose acquisition of a Bevis atlas launched this research and whose Special Collection of Early Astronomical Works helped carry it to completion; to the Library of the American Philosophical Society, who provided me with copies of the very special Bevis atlas in their collection; and to the staffs of other libraries too numerous to mention, who answered my queries and often sent me on their own initiative much valuable information.

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¹ Johann Bayer, *Uranometria* (Augsburg, 1603); Johann Hevelius, *Firmamentum Sobiescianum sive Uranographia* (Gdansk, 1690); John Flamsteed, *Atlas Coelestis* (London, 1729), *Atlas Céleste*, ed. J. Fortin (Paris, 1776), *Atlas Céleste*, ed. J. Lalande and P.-F.-A. Mechain (Paris, 1795); Johann Bode, *Uranographia* (Berlin, 1801).

² There is a fifth atlas which deserves to be added to the list, namely Julius Schiller's *Coelum Stellatum Christianum* (Augsburg, 1627). This atlas was remarkably up-to-date; the explanatory tables were filled with useful information; in fact, in many ways it was more satisfactory than Bayer's widely acclaimed *Uranometria* (although Bayer himself seems to have had a hand—a rather large hand—in the preparation of Schiller's atlas). But because of what we might call Schiller's apostolic fervor in replacing the traditional pagan constellations with biblical counterparts, the atlas met with little favor from succeeding generations of astronomers.

In addition, there are two other works which are often grouped with Bayer, Hevelius, Flamsteed, and Bode: Andreas Cellarius's *Harmonia Macrocosmica* (Amsterdam, 1660) and Johann Doppelmayr's *Atlas Coelestis* (Nuremberg, 1742). Neither however was a working atlas. Cellarius's thick folio, in its hand-colored version,

Flamsteed's 1729 *Atlas* was probably the most acclaimed of the quartet. Although the engravings of the constellation figures were considerably less elegant than those of Bayer or Hevelius, the star positions were meticulously inserted according to an accurate system of projection, and these positions were taken from Flamsteed's own catalog, which set the standard for positional accuracy for the eighteenth century. To the French especially, Flamsteed's *Atlas* had no equal. To Lalande, it was "le plus bel ouvrage," "ce grand et magnifique recueil . . . le meilleur qu'on ait jamais fait."³ Fortin praised it as "le plus estimé de tous ceux qui existent."⁴ In France it was often referred to simply as "l'Atlas céleste"—the Celestial Atlas.⁵

To one French astronomer, however, "l'atlas céleste" meant something entirely different. Charles Messier, in his 1781 catalog of nebulous objects, made frequent reference to "l'Atlas céleste anglais" and "le grand Atlas anglais" as he pointed out previous depictions of many of his nebulae.⁶ The reference,

was one of the most splendid books of its century, but it contains no catalog or tables, depicts the stars only on planispheres, and seems to have found its niche in illustrating modern history of science textbooks. The Doppelmayr *Atlas* is also a beautiful set of colored engravings, and its depiction of the Riccioli and Hevelius moonmaps is especially striking, but the six charts of the stars are neither reliable nor particularly usable. Jerome Lalande indicates that eighteenth-century opinion of both Schiller and Doppelmayr was rather low; see his *Bibliographie Astronomique* (Paris, 1803), pp. 190, 416.

³ Jerome Lalande, *Astronomie*, 3rd ed. (3 v., Paris, 1792), 1: para. 722, p. 241; *Bibliographie Astronomique*, p. 388.

⁴ P.-F.-A. Fortin, "Discours Préliminaire" to his edition of John Flamsteed, *Atlas Céleste* (Paris, 1776), p. iii.

⁵ In retrospect Bode's *Uranographia* seems equally deserving of praise, since it depicted many more stars than Flamsteed's *Atlas* and also included the Messier and Herschel nebulae. Time, however, was out of joint for the Bode atlas; as positional accuracy in the early nineteenth century approached fractions of a second of arc, the large atlas simply ceased to be useful as a primary reference tool. Astronomers turned to smaller, unadorned sectional charts, and the handsome folio atlases were left to the interested public and amateur star-gazers. The *Uranographia* thus never became as much a part of the astronomer's working library in the nineteenth century as Flamsteed's *Atlas* had in the eighteenth century.

⁶ Charles Messier, "Catalogue des Nébuleuses et des Amas d'Étoiles," *Connaissance des Temps pour 1784* (Paris, 1781), pp. 227-269. The quotations are from Messier's descriptions of M1 and M11. A translation of this catalog may be found in Kenneth Glyn Jones, *The Search for the Nebulae* (Chalfont St. Giles, Science History Publ., 1975), pp. 61-73. The 1781 catalog was reprinted unchanged in the *Connaissance des Temps pour 1787* (Paris, 1784), and a facsimile of this version (reduced) is now available in John H. Mallas and Evered Kreimer, *The Messier Album* (Cambridge, Mass., Sky Publishing Corp., 1978), pp. 18-27, which also contains an excellent historical introduction by Owen Gingerich.

however, was not to Flamsteed, since the Flamsteed *Atlas* contains no nebulosities. Messier instead was referring to one of the great curiosities of the Celestial Atlas Golden Age, the beautiful and mysterious *Uranographia* of John Bevis.

The *Uranographia*, or to be technically correct, the [*Uranographia*], is that rarest of bibliographic oddities—a book which predeceased its author.⁷ Engraved at great expense and heralded with much fanfare in the late 1740s, the atlas was stillborn, a victim of the publisher's bankruptcy. Its premature demise was a considerable loss to astronomy, since the *Uranographia*, if published as scheduled, would certainly have joined the elite ranks of the Grand Atlases. Fortunately for posterity, a number of sets of impressions were taken from the plates before they were sequestered by the courts, and a large fraction of these have survived to the present day. An assessment of the *Uranographia* is thus possible. Surprisingly, it has never been undertaken, and this article attempts to remedy this deficiency. My purpose is fourfold: to introduce the atlas to the many historians and astronomers who are unfamiliar with it; to clear up the confusion surrounding its production and lay several "ghost" editions to rest; to call attention to a unique copy of the *Uranographia* which contains printed explanatory tables and a star catalog, long thought never to have been printed; and to analyze the contents of the plates, tables, and catalog in order to assess the importance of the *Uranographia* as an astronomical artifact.

SURVIVING COPIES OF THE *URANOGRAPHIA*

The *Uranographia* would certainly be described as "extremely rare" in a dealer's catalog, but it is not so scarce as one might think for a book which was never published. When Henry Sotheran and Heinrich Zeitlinger turned one up in 1923 while compiling their *Bibliotheca Chemico-Mathematica*, they were so excited by what was thought to be a unique specimen that they priced it at £250, and this, mind you, was when Bayer's *Uranometria* could be obtained for £3 10s.⁸ By 1927, however, Sotheran had learned that other copies were extant, and the price dropped to £10 10s.⁹ The number of complete or nearly complete known copies has since grown to twelve.¹⁰

⁷ The irony of course is that the dice fell the other way for many authors of celestial atlases; Hevelius, Schiller, Flamsteed, and Lacaille all died before their masterpieces appeared in print.

⁸ See "Catalogue 786" (1923) in Heinrich Zeitlinger and Henry Sotheran, *Bibliotheca Chemico-Mathematica*, 2nd Suppl. (London, 1937) I: no. 2876.

⁹ Henry Sotheran, *Catalogue 804* (London, 1927), no. 3093.

¹⁰ These twelve copies may be found in the Linda Hall Library in Kansas City, the Library of the American Philosophical Society (henceforth referred to as the APS copy), the British Library (Map), the Royal Astronomical Society, the Royal Greenwich Observatory, Cambridge University Library, the Detroit Public Library, the private collections of Deborah J. Warner, John Booth, and Samuel

A typical surviving copy, such as the one recently acquired by the Linda Hall Library, contains fifty-one star charts and an elaborate engraved frontispiece but lacks a title page.¹¹ The first forty-eight charts are devoted to each of the forty-eight Ptolemaic constellations, and there is in addition a plate of the southern constellations and two planispheres of the Ptolemaic stars. Anyone familiar with Bayer's *Uranometria* will find that this accounting has a familiar ring, and indeed the *Uranographia* is patterned very closely on Bayer's work. The star charts measure 375 mm by 275 mm, making them the same size as Bayer's, slightly larger than those of Schiller or Hevelius, and appreciably smaller than Bode's or Flamsteed's. The engraved constellation figures are quite beautiful, much more appealing than the often awkward renditions of the Flamsteed engravers. In addition to the star charts, each plate carries a rather elaborate dedication to an institution or individual, indicating that the atlas was issued by subscription.¹²

The most *atypical* surviving copy, and consequently the most interesting, is that in the Library of the American Philosophical Society. In addition to the 52 engraved plates, the APS copy has explanatory tables for 32 of the plates and a fourteen-page star catalog at the end. The additional information provided by this material is of great interest and importance, and we shall discuss their contents in detail below.

All of the surviving copies, however, lack important information. Although the 51 plates are numbered form I to LI, they bear no date, no reference to the title of the work, no attribution to an author, nor are any of the plates themselves named. This has resulted in some confusion as to the proper title and date of the atlas. The identity of the author, however, has never been in doubt. He was one of the more unrenowned astronomers of eighteenth-century England, John Bevis.

JOHN BEVIS

John Bevis, at least as a name, is reasonably familiar to both astronomers and historians of astronomy, since as the first observer of M1, the Crab Nebula, his name crowns the column labeled "Discovered By" in any list of the Messier objects. He has also achieved some distinction by being the last mortal to observe the oc-

Barchas, Blackwell's Antiquarian Department, and Robert Douwma Ltd (the last two at the time of this writing being offered for sale). Mr. Barchas has a second set which is 3/4 complete, and the British Library (Map) has a partial set of proof plates in an incomplete state. There is evidence of at least two other broken sets, since individual plates occasionally come on the market. Other copies probably exist and I would appreciate being notified as to their location.

¹¹ Several of the surviving copies have additional printed matter such as added indexes and title-pages. These will be discussed in more detail below.

¹² If the engraved dedication is included, each plate measures 375 mm by 310 mm.

cultation of one planet by another, since he saw Venus eclipse Mercury in 1737.¹³ Otherwise, except for his ill-fated atlas, his life seems to have been relatively untouched by fame. Born on October 31, 1695, in Old Sarum, Wiltshire, he attended Christ Church, Oxford, where he studied medicine, and he began practicing as a physician in London in 1730.¹⁴ He had however long indulged an interest in astronomy, and he began contributing papers to the *Philosophical Transactions* in 1737 on such topics as eclipses, comets, and occultations. In 1738 he embarked on an extensive program of nightly observations of the stars at an observatory he had constructed in Stoke-Newington, north of London. This endeavor seems to have lasted only a year or two, but Bevis accumulated in this period a great number of observations.¹⁵ Subsequently he confirmed for Bradley the effects of aberration in right ascension (Bradley had done so only in decli-

nation), and in 1743 Bevis discovered, or so he thought, the great comet of 1744.¹⁶ Much of the information Bevis collected was sent to Bradley, with whom he maintained a sporadic, and somewhat one-sided, correspondence.¹⁷

The star-atlas, which we will discuss in detail below, consumed much of Bevis's time from 1746 to 1750, although in the same period he was also preparing Halley's moribund astronomical tables for publication. This effort, unlike the atlas, was carried to fruition.¹⁸ After the publishing fiasco of 1750, Bevis seems to have maintained his interest in astronomy, taking an active part, for example, in the observations of Halley's comet in 1759 and the transits of Venus in 1761 and 1769. He received some recognition from his contemporaries for his work, including membership in the Berlin Academy of Sciences and, rather belatedly, a fellowship in the Royal Society of London.¹⁹ He died on Nov. 6, 1771, reputedly in good Baconian fashion, by falling from his telescope while taking the sun's meridian altitude.²⁰

THE PRODUCTION OF THE *URANOGRAPHIA*

The complete story of the *Uranographia* enterprise will probably never be told. But we can certainly do better than has been done so far. Many modern scholars have trusted rather unwisely to the account given in Basil Brown's *Astronomical Atlases*.²¹ Some of Brown's facts are accurate, such as his attribution of the atlas to Bevis, his estimated date of 1750, and his statement that publication was halted by bankruptcy.²² But Brown provides no details concerning the production nor does he offer any evidence for the 1750 estimate. Moreover, he then goes on to state that the

¹⁶ In both instances Bevis was anticipated by other astronomers. Eustachio Manfredi demonstrated aberration in right ascension nine years before Bevis, in 1730, while Cheseaux's comet was observed on the Continent three weeks before Bevis saw it in England. See Stephen P. Rigaud, *Miscellaneous Works and Correspondence of the Rev. James Bradley* (Oxford, 1832), pp. xxxiii, lvii.

¹⁷ There are six letters from Bevis to Bradley which were printed in Rigaud, *Miscellaneous Works of Bradley*. There is one reply by Bradley.

¹⁸ Edmond Halley, *Tabulae Astronomicae* (London, 1749), and *Astronomical Tables with Precepts* (London, 1752). Bevis, as seems to have been his fate, was unmentioned in either edition, although he wrote the introductory precepts. See his letter to Bradley of April 24, 1745, in which he mentions some of his editorial tribulations. Rigaud, *Miscellaneous Works of Bradley*, pp. 431-432.

¹⁹ His election to the Berlin Academy came in 1750; he was not made a Fellow of the Royal Society until 1765. Bevis subsequently became foreign secretary of the Royal Society, and in 1768 he was made a foreign correspondent of the Paris Academy. See Horsfall in Bernoulli, *Recueil* 2: p. 335.

²⁰ The obituary in *The Gentleman's Magazine* 41 (November, 1771): p. 253, read: "John Bevis, M.D. and F.R.S., in the Middle Temple, whose great abilities were well known to the learned all over Europe."

²¹ Basil Brown, *Astronomical Atlases, Maps and Charts: An Historical and General Guide* (London, Search, 1932).

²² *Ibid.*, pp. 51-52.

¹³ John Bevis, "Mecurius a Venere occultatus . . ." *Philosophical Transactions of the Royal Society of London*, 40 (1738): pp. 394-395. There is a brief account of the significance of this observation by Joseph Ashbrook, "John Bevis and an occultation of Mercury by Venus," *Sky and Telescope* 16 (1956): p. 68.

¹⁴ The only known contemporary account of Bevis's life is that of his executor, James Horsfall, and it survives only in a French translation in Jean Bernoulli, *Recueil pour les astronomes* (3 v., Paris, 1771-1776), 2: pp. 331-336. According to J. Houzeau and A. Lancaster, *Bibliographie générale de l'astronomie* (2 v., Brussels, 1882-1889), 2: col. 85, Condorcet wrote a memoir in the *Histoire de l'academie royale des sciences* for 1783, but I have been unable to locate it in this volume, or indeed in any other eighteenth-century volume of the *Histoires* or *Memoires*. A "Life of John Bevis" by T. S. Evans, mostly derived from Horsfall, appeared in *The Philosophical Magazine* 23 (1805): pp. 247-252. Charles Hutton gave a short biographical account in *The Philosophical Transactions of the Royal Society of London . . . Abridged* (18 v., London, 1809), 8: pp. 117-118, which also seems to have been based entirely on the Horsfall narrative. This account reappeared substantially unaltered in Hutton's *A Philosophical and Mathematical Dictionary* (2 v., London, 1815), 1: p. 226. J. H. V. Mädler, *Geschichte der Himmelskunde* (2 v., Braunschweig, 1873), 1: p. 485, offers merely a distillation from Hutton. The only biography to provide any new information is the article by Agnes Clerke in the *Dictionary of National Biography* 4 (London, 1885-1901): pp. 451-452. While relying for the most part on Horsfall, her account differs in some respects; for example, she has Bevis born in 1693 in Tenby, Pembrokeshire. Since my concern in this article is primarily with the atlas, I have made no attempt to resolve such discrepancies, although there is probably a great deal of manuscript material relating to Bevis in various British libraries which, when unearthed, will settle such disputes. The biographical account given here is by way of introduction only, and the reader should consult Clerke or Hutton for additional details.

¹⁵ The fact that Bevis's ambitious observing program was relatively short-lived was not noticed by either Clerke or Horsfall; in fact both give the impression that observations were made right up to 1745. However the explanatory tables in the APS copy (discussed below) reveal frequent references by Bevis to his own observations, and they all date to 1738 or 1739 (with one lone mention of 1740). This is consistent with the fact that when Horsfall makes reference to the records of Bevis's observations, he mentions only three folio volumes which were filled between March 6, 1738, and March 6, 1739; see Bernoulli, *Recueil* 2: p. 332. It is of course possible that Bevis continued his observing program beyond 1739, but there is no record of it.

atlas was finally published in 1786 with the title of *Atlas Celeste*, using the original plates, and he adds that there was a further edition in 1818.²³ None of this is true, and there are numerous other errors in Brown's short description which have led to considerable confusion.²⁴ In order to dispel this confusion, it will be well worthwhile to attempt a new reconstruction of events from the various scattered bits of data which can be assembled. We will see that a much clearer—if still incomplete—picture of the *Uranographia* enterprise then emerges.

Chronologically the first mention of the *Uranographia* comes in a letter written to Bevis by Abbé Lacaille, sometime before December, 1748. Lacaille wrote that he was astonished to learn that Bevis had made him a present of the *Uranographia*, and he offered Bevis a set of tables for "taking out Dr. Bradley's two motions" (i.e., nutation and aberration) from the star positions. An extract of this letter survives because Bevis then sent it to Bradley, asking in a covering letter what he should do about the offer.²⁵ In this same letter, dated Dec. 23, 1748, Bevis commented that he had little spare time because he was "tied down to the direction or correcting of the press in Mr. Neale's affair." Since Mr. Neale is the person mentioned in the Horsfall account as the publisher of the *Uranographia*, it is clear from Bevis's somewhat plaintive remark that by late 1748, production of the atlas was reasonably far along.²⁶

²³ *Ibid.*, pp. 57–58.

²⁴ For example, Brown states, *ibid.*, that the constellation figures of the supposed 1786 *Atlas Celeste* at the British Library resemble those of Flamsteed's *Atlas*. This is completely untrue, but it was sufficient to mislead the Detroit Public Library into classifying their Bevis atlas as a 1786 Flamsteed atlas. Brown says that the 1786 work was "based" on Bevis's 1750 edition, which makes little sense if it used the original plates, as he subsequently claims. Brown states that the royal figure on the frontispiece of the 1786 version is George III, and that it may have been altered in the supposed 1818 edition; neither is true. There are other mistakes of sheer carelessness, such as his reference to the 1750 Bevis atlas first as the *Uranographia*, and then as the *Uranometria*. Brown's errors are easily understood once you realize that he never saw a Bevis atlas in any of its supposed editions. But I am not certain that this constitutes a valid excuse.

Brown's book has mercifully been superseded quite recently by Deborah J. Warner's *The Sky Explored: Celestial Cartography, 1500–1800* (Amsterdam, Theatrum Orbis Terrarum, 1979). This work is masterfully done and will prove invaluable to the student of star atlases. I regret that my research came too late to be of use, because the only serious blemish in the book is the account of Bevis, pp. 22–23; it unfortunately repeats many of Brown's errors and has regrettably given extended life to the spurious editions of 1786 and 1818.

²⁵ The extract from Lacaille is in Rigaud, *Miscellaneous Works of Bradley*, pp. 457–458. Bevis's covering letter is on p. 456. He also sent along an extract of a letter from De l'Isle, reprinted on pp. 456–457. Apparently both Lacaille and De l'Isle were having trouble getting responses from Bradley and were using Bevis for leverage to pry answers from the Astronomer Royal.

²⁶ The identification of the publisher is not actually made by Horsfall himself, but by a certain Magalhaens, who was the person responsible for sending Horsfall's account to Bernoulli, and who also added some details in the form of footnotes. Bernoulli printed both

Horsfall dates the beginning of the enterprise to 1745.²⁷ There is no concrete basis for such an assertion, but as a conjecture, it is quite plausible. The best circumstantial evidence supporting such a chronology comes from the newly-discovered explanatory tables in the APS Bevis atlas, where we find that the stars have been reduced to the epoch 1746. This does not prove that the reduction was done in or near that year; after all, the Flamsteed *Atlas*, published in 1729, was reduced to epoch 1690. But it seems unlikely that Bevis would have chosen the epoch 1746 unless he began work in that year or shortly before; had he begun later, he would certainly have selected 1750 for the base epoch, as he would subsequently do for his printed catalog.

Sometime between 1747 and 1749 subscriptions were taken and the plates were engraved. There is a great deal of evidence to support this statement, most of it deriving from the plates themselves. The dedicatory inscriptions on each plate are rather explicit as to titles and positions, and these often provide either upper or lower limits to the period of the subscription process and presumably the actual engraving. The Gemini plate, for example (XXIV), is dedicated to William Stukeley, "Rector of St. Georges Queen's Sq.," since Stukeley did not receive this appointment until 1747, the plate must postdate this year. On the other hand, the subscriber of the Cygnus plate (IX), John Montagu (see fig. 3), died in 1749, and must have subscribed to the atlas before then. The best single example comes from the Pegasus plate (XIX), which carries the dedication: "To the Reverend James Bradley, D.D. F.R.S., Royal and Savilian Professor of Astronomy, and Member of the Royal Academies of Paris and Berlin." Since Bradley became a member of the Berlin Academy in 1746, the Paris Academy in 1748, and the St. Petersburg Academy in 1750, we can only conclude that the plate was engraved between 1748 and 1750.²⁸ When all such limits are collated,

Horsfall's narrative and Magalhaens's notes. The note identifying Neale is on p. 333.

²⁷ Bernoulli, *Recueil 2*: p. 333; Agnes Clerke repeats this in her biographical article.

²⁸ I am grateful to Prof. William McCrea, Fellow, and Mrs. E. Lake, Librarian, of the Royal Astronomical Society, for suggesting the possible fruitfulness of this approach toward dating the plates and for providing some of the examples. They have also made a very thorough study of the allegorical frontispiece, which depicts Urania, the muse of astronomy, presenting a copy of the atlas to a royal figure seated on a throne, and they conclude that the recipient is Frederick, Prince of Wales, and not George II or George III, as has been sometimes suggested (for example, by Brown, *Atlases*, p. 57). Their conclusion is based not just on facial resemblance, but on such details as the fact that the Feathers of the Prince of Wales are on the back of the throne. Since Frederick died in 1751, this also provides an outside limit for the time of the engraving.

Prof. McCrea and Mrs. Lake also noticed that there is one plate dedication which is somewhat anomalous. The Eridanus plate (XXXVI) is inscribed "To the Right Reverend Thomas Hayter, D.D., Lord Bishop of Norwich and Preceptor to His Royal Highness, the Prince of Wales." Hayter did not become Lord Bishop until

