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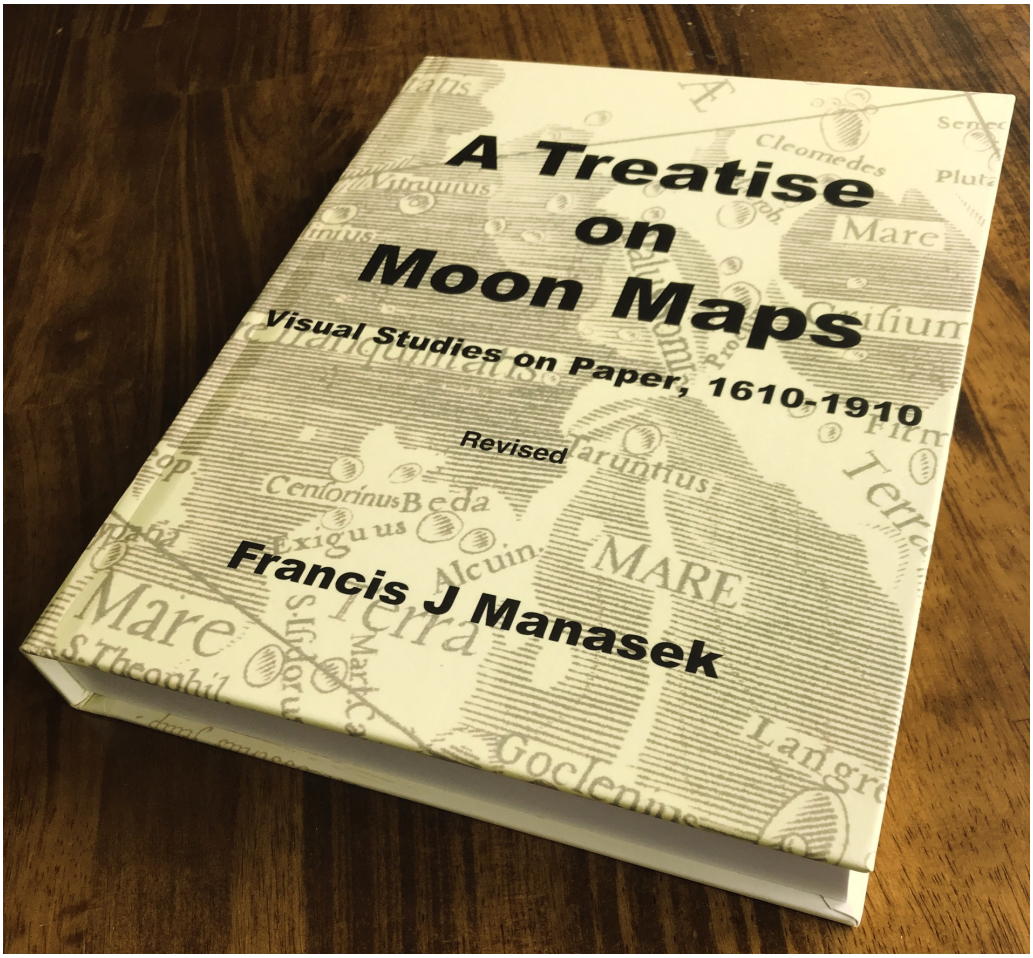

This profusely illustrated analysis of pre-photographic Moon maps is *newly revised* and available in 8 1/2x11 inch hard cover format from Kuenzig Books, specialist bookdealers in science and technology.

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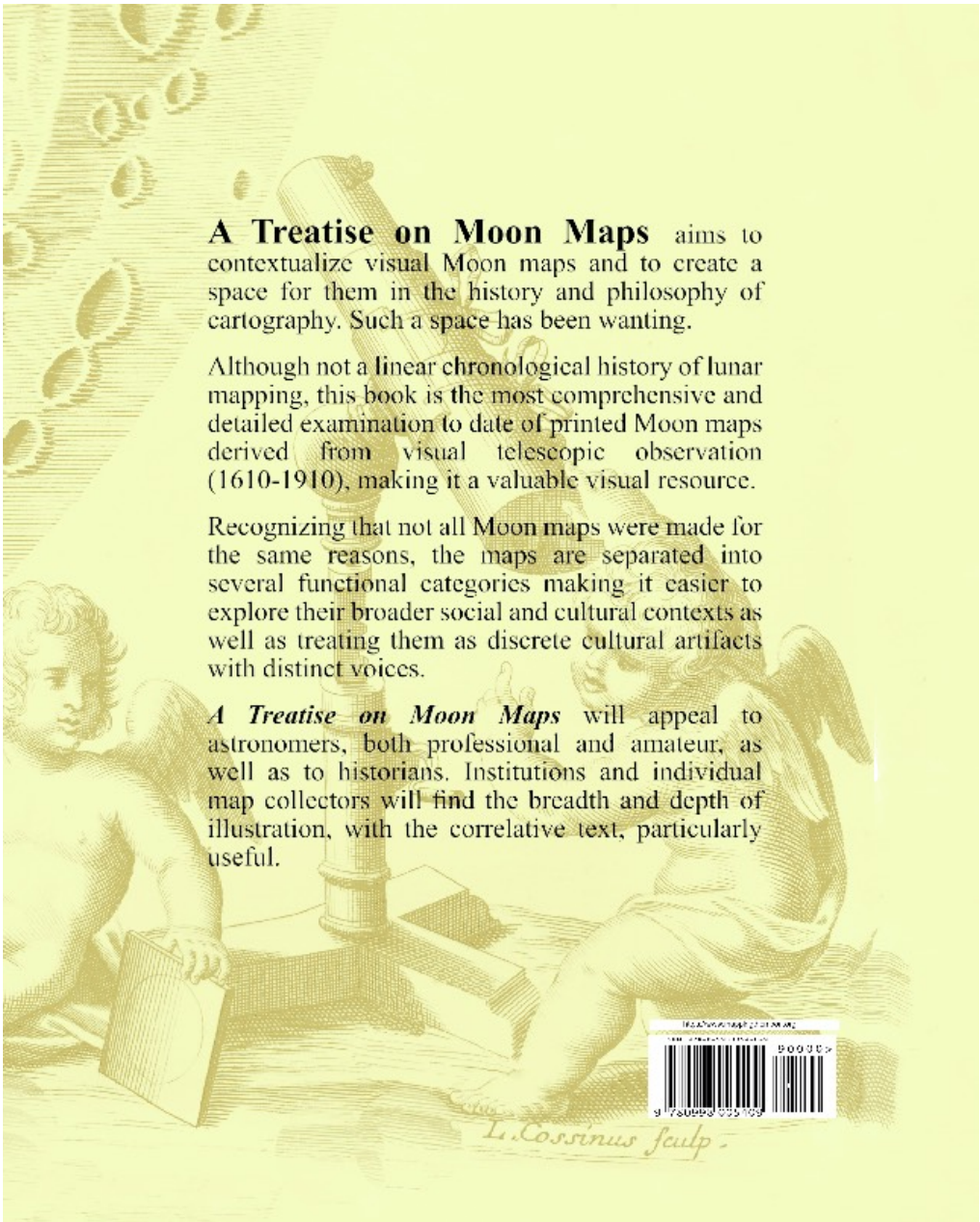

The Author: For several decades I had a career as an academic basic scientist studying early heart development and have an extensive list of papers published in peer-reviewed journals. For almost sixty-five years I've been collecting antiquarian maps and books and for a similar period I've observed the lunar surface using a variety of telescopes. I'm the author of *Collecting Old Maps*, currently in its second edition (revised by Kurt and Marti Griggs). After retirement I studied the history of science at Oxford University and emerged with a Master's degree. I have attempted to draw upon these disparate experiences in undertaking this study of Moon maps.

As an octogenarian, I decided to avoid the endless tribulations of conventionally publishing this book. Academic presses would only consider it if much abbreviated and with but few illustrations of small size, making them irrelevant. The book was initially online for free distribution in PDF format. Now, a Revision has been made and the revised book is available as an 8 1/2x11-inch hardbacked publication with excellent, large-format illustrations.

The book: 8 1/2x1 inches, hardback, 357 pages, several hundred illustrations.

Contents: Preface by Bill Sheehan, Introduction, ten illustrated chapters covering printing, telescopes, in-depth studies of lunar maps, very detailed illustrations, summary and discussion. The bibliography contains over 300 entries.

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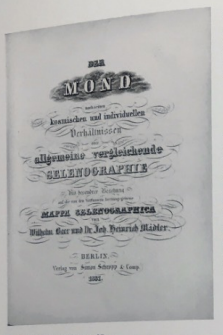

DER
MOND
nach seinen
kosmischen und individuellen
Verhältnissen
und
allgemeine vergleichende
SELENOGRAPHIE
Mit beiliegender Mondkarte
und der zum Selbstmalen bestimmten gradirten
MAPPA SELENOGRAPHICA
von
Wilhelm Beer und Dr. Joh. Heinrich Mädler.
BERLIN.
Verlag von Simon Schropp & Comp.
1837.

Figure 7.18 (above) Title page of Beer and Mädler's *Der Mond*, 1837. Approximately 25x31 cm.

was a "complete" map. The hachures appear visually clumsy compared to those in Figures 7.15 and 7.17, and I suspect that the images in *Der Mond's* appendix leaves are regular lithographs and not lithographic engravings.

Edmund Neison's 1876 Lunar Atlas

For several decades the *English Mechanic and Mirror of Science* (see Chapter 9), known generally as the *EM*, hosted a robust selenography discussion that included people such as Edmund Neison (1849-1940), whose Moon map (24 inches to the lunar diameter) and text became a most influential lunar work in English.[41] Neison's was the only major detailed English Moon map completed in the 19th century but both the map and descriptive text were still based upon Beer and Mädler's. The century belonged to the German selenographers.

Neison explicitly wrote for a professional audience:

> As the work is primarily intended for the use of astronomers in the proper wide sense of the term, it has been thought un-

seem to be drawn backwards. Such casualness in the laying down of hachures was noted earlier in the case of Lohrmann's maps, but if we have familiarity with the lunar surface we are not misled by the hachure direction.

The five appendix pages to *Der Mond* contain many such drawings, or additions to *Mappa Selenographica*. It may well be that this apparent attention to adding detail suggested that the few omissions had been corrected and indeed, the map

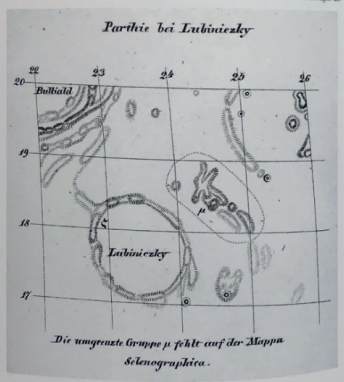

Figure 7.19 (right) Mädler noted some items missing from the large map. In this case, in *Der Mond*, he illustrated the group marked **μ** and enclosed by a dotted line that had been omitted from the map. This image is from the fifth unnumbered appendix leaf. Approximately 1.5X.

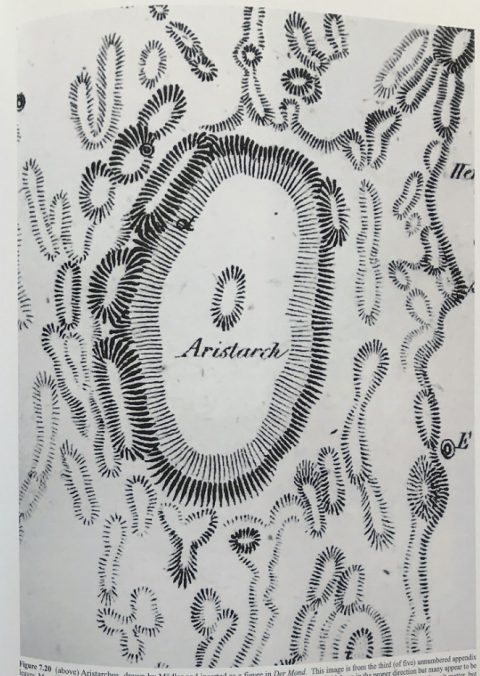

Figure 7.20 (above) Aristarchus, drawn by Mädler and inserted as a figure in *Der Mond*. This image is from the third (of five) unnumbered appendix leaves. Magnified approximately 3.5X. The hachures on the outer wall of Aristarchus are mostly laid down in the proper direction but many appear to be indicating an incorrect slope. If we already know which of the "caterpillars" are raised or depressed structures the hachure direction doesn't matter, but the hachures are difficult to interpret if we don't already know this. Compare the detail to Schroeter's rendition, Figure 1.18.

Illus: Linda Hall Library of Science, Engineering & Technology.

Figure 6.24 (left) Briga included Bianchini's earlier (1728) chorographic study of the Lunar Alps, the region of Plato (**17**), Eudoxus (**22**), and the Alpine Valley. The illustration has been inverted. North is now at the top. Bianchini's original showed South at the top (Figure 4.33). Briga's copy is not very detailed and the Alpine Valley is but cursorily indicated and not labeled. Again, this copy has the general appearance of a pencil sketch, superimposed over a series of background parallel horizontal lines.

Melchior dalla Briga (1686-1749), comprising the last part of the volume. Titled *Plenilunium Nova Forma Accurate Expressum Cum Maculae Claris Et Obscuris*, the map (Figure 6.20) has remained in relative obscurity despite having been displayed prominently by Whitaker,[30] who was principally concerned with its nomenclatural anomalies.

Briga's engraved map, folded to fit the volume, shows the Moon to a diameter of 25 centimeters, surrounded by an unusual wealth of information. The engraving style demonstrates a remarkable freedom and deviation from the earlier formalisms that dictated a more rigid adherence to regularly spaced parallel lines.

The engraver, Joseph Medici, clearly used the swelling-line technique, introduced to lunar cartography by Mellan (Chapter 4), as evidenced by the image in Figure 6.21. These deeply engraved lines are superimposed over an underlying layer of horizontal parallel lines, giving the region great visual complexity. Similar swelling lines are displayed in the enlargement of Mare Nectaris (**D**, Figure 6.23). This detail added to the upper right corner of the image purportedly shows observations made by Briga himself.

Neither the craters Bullialdus nor Gassendi have their rims circumscribed but rather suggested by engraved relief shadow. Edges of the maria are defined clearly by means of thin, sharp lines (Figures 6.21, 6.22). The maria themselves are shown dark, using a combination of lines (Figures 6.21, 6.22).

A curious feature of the engraving in regions of Briga's map are areas that show similarity to the highly stylized " lozenge and dot"[31] technique (Figure 6.22). Although not as rigid as seen on formal portraits done for the artistic print trade, this style's appearance on Briga's map seems unique among lunar maps.

Nineteen years after Bianchini published his original chorographic study (Figure 4.33) of the Lunar Alps showing the Alpine Valley, Briga included the image in the lower left of his map (Figures 6.24). However, he inverted the image, reproducing it with North at the top as seen through a Galilean telescope. Briga's reproduction is rudimentary and lacks much of the original's detail, but it does show the Alpine Valley, albeit unlabeled. It is not nearly as well reproduced as Doppelmayr's copy (Figure 4.39).

Bianchini's study of Plato, (Figure 4.35), is copied in the upper left of Briga's map. Here, as elsewhere on the plate, Briga uses the generic term "macula" (spot) as a descriptor for all craters.

Tobias Mayer's Map

This chapter begins with a derivative map by the Italian telescope maker Eustachio Divini, using a curious style to depict surface features, a technique of some interest but of minor importance. I shall end with a most important original hemi-

Figure 6.25 (above) Tobias Mayer's Moon map published posthumously in 1775. The diameter of the original is 18 cm polar, and 19.5 cm equatorial.

sphere map by Tobias Mayer[32] (1723-62), a map that had great impact on 19th-century selenography and was perhaps the last original lunar planisphere to utilize the "raster" parallel-line technique.

With training both as a mathematician and cartographer, Tobias Mayer worked on the problem of using the Moon's features as a celestial clock. In principle, the time of ingress and egress of a lunar feature relative to the terminator or a specific feature could be used to determine time, enabling the determination of longitude. Similarly, one's position could be determined by timing the disappearance of lunar features when they became obscured by the umbra during a total lunar eclipse. Such methodology required refined lunar tables and a lunar map with precisely plotted features. Finding existing maps inadequate, Mayer decided to construct one himself (Figure 6.25.) This is perhaps the last map to be constructed with the purpose of using it to determine longitude. The development of the chronometer helped replace the Moon as a timepiece and later mapping efforts were devoted to more detailed mapping of the surface, now