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Peter Apian

Astronomie, Kosmographie und Mathematik
am Beginn der Neuzeit

mit Ausstellungskatalog

Polygon-Verlag Buxheim · Eichstätt

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A Survey of Apian's Astronomicum Caesareum

OWEN GINGERICH

Zusammenfassung:

Veranlaßt durch den Faksimile-Nachdruck des *Astronomicum Caesareum* nach einer Vorlage, deren Scheiben z.T. falsch zusammengefügt sind, hat der Autor über 100 Originale untersucht. Es stellte sich u. a. heraus, daß die Scheiben in Apians Werkstatt schon vor dem Ausschneiden bemalt wurden, daß nur ganz wenige Exemplare mit allen Scheiben, sämtlichen Fäden und dem vollen Dutzend der Perlen erhalten sind und daß die „De-luxe-Version“ aus festerem Papier mit Wasserzeichen besonders prachtvoll kolorierte Initialen besitzt.

Nach dem letzten Blatt des Werkes lassen sich drei Varianten unterscheiden:

I: Apians großes Wappen mit einköpfigem Adler und darunter die Inschrift *Insignia Petri Apiani*.

II: Neues großes Wappen Apians mit zweiköpfigem Adler und darunter die Inschrift *INSIGNIA PETRI APIANI SACRI PALATII CO^{is}*.

III: (nur in den De-luxe-Exemplaren) Kleines rundes Wappen mit einköpfigem Adler im Kranz, darüber die Inschrift *INSIGNIA PETRI APIANI, Mathemat. Ingolstadien*.

PP: Ein Blatt mit den kleinen runden Wappen in beiden Formen, der Inschrift *INSIGNIA P. APIANI VTRAQVE. PRIORA. POSTERIORA.*, Versen von Marcus Tatius und der Ernennung Apians zum Mathematiker bzw. Astronomen und Familiaren Karls V. am 24. 7. 1571 in Regensburg ist der Variante I (Ausnahme: Tübingen) beigelegt.

Weitere Abkürzungen: **v**: sichtbare Papierteile, **t**: farbige Fäden, **p**: Perlen; **0**: Blatt O6 fehlt.

Die Namen der Städte wurden im Amerikanischen belassen, sofern solche existieren. De-luxe-Exemplare sind zusätzlich mit einem Asterisk gekennzeichnet.

The *Astronomicum Caesareum*, from the private press of Petrus Apianus in Ingolstadt, is one of the greatest masterpieces of sixteenth-century printing. Designed for Charles V and his brother Ferdinand, the volume was in every way a luxurious and princely production.



Fig. 1: *Astronomicum Caesareum*: headline, front page.

In this large folio volume the paper instrument found its supreme realization in a series of intricate volvelles, with five or even six layers of movable paper disks. Published in 1540, the book graphically displayed Ptolemaic astronomy in a fashion fit for a monarch's eyes.

In 1967 Edition Leipzig published a handsome facsimile of Apianus's magnum opus¹. The multicolor lithography was a technological „tour de force“. Unfortunately, the Leipzig publishers did not pay the same careful attention to the assembly of the moving parts as they did to printing them, so that many of the volvelles are on the wrong pages, and the units that are on the proper pages generally do not rotate in the correct and complex manner intended by Apianus. Ironically, the Leipzig facsimile makers even reproduced Apianus's private guides for pasting the pieces together, which are normally completely hidden in an assembled copy, but they ignored these instructions.² In reviewing the facsimile, I was puzzled as to how the Leipzig publishers could have erred so badly, and therefore I began to look at copies of the original edition to see how accurately they had been assembled. I have now personally collated over 100 copies. In the course of this survey I became very impressed by the care and accuracy with which Apianus oversaw the production of the book. Except for a handful of copies in which the ravages of time have caused some of the volvelles

to come unglued, or in which misguided „conservation“ had taken place, the copies work with remarkable precision. The volvelles yield positions always within one degree of the more accurate (but more tedious) numerical tables. The copy used for the facsimile, from the library in Gotha, was one of those that had come apart in the centuries since the original printing. Consequently, the publishers used their imagination in reconstructing the volume instead of consulting the well-preserved copy nearby in the Leipzig University Library.

In my examination of these books, it became obvious that all of them were colored in Apian's printing shop, and not by the buyers themselves (as was often the case for sixteenth-century books). In fact, the sheets were colored before(!) they were cut, as is revealed by the reverse of a volvelle in some copies: apparently an error was made in coloring, and the paper was recycled and printed on the other side. The color patterns are not identical from one copy to another, but the huge are all from the same palette. A handful of deluxe copies, printed on specially watermarked, heavier paper, have more elaborate coloring, especially including the beautiful large initials that open each chapter. These deluxe copies include wonderful gold stars on a dark blue background for the movable planisphere on f. B3. A few copies on ordinary paper also have the elaborate coloring of the initials and planisphere. Only a single uncolored copy exists, in the Staatsbibliothek in Munich, apparently a set of proof pages that has been bound.

With respect to the final colophon leaf, Petrus Apianus's *Astronomicum Caesareum* comes in three different states. One has the arms with a single-headed eagle and only the words *Insignia Petri Apiani*. The second state shows Apian's new arms with a double-headed eagle and the words *INSIGNIA PETRI APIANI SACRI PALATII CO^{IS}*. The third state, reserved for the deluxe copies, has a small round insignia and the words *INSIGNIA PETRI APIANI Mathemat. Ingolstadien*. In addition to these variations, there are several cancel leaves, occasionally found in sequence in the book, and somewhat more frequently as extra pages at the end.

My survey has shown that perfectly preserved copies, having not only all the moving parts but also all the threads and the dozen small sliding pearls, are rather rare. Having all the paper parts intact is unusual but not exceptional. The following table gives the collation of a complete copy; v indicates a visible paper part (there

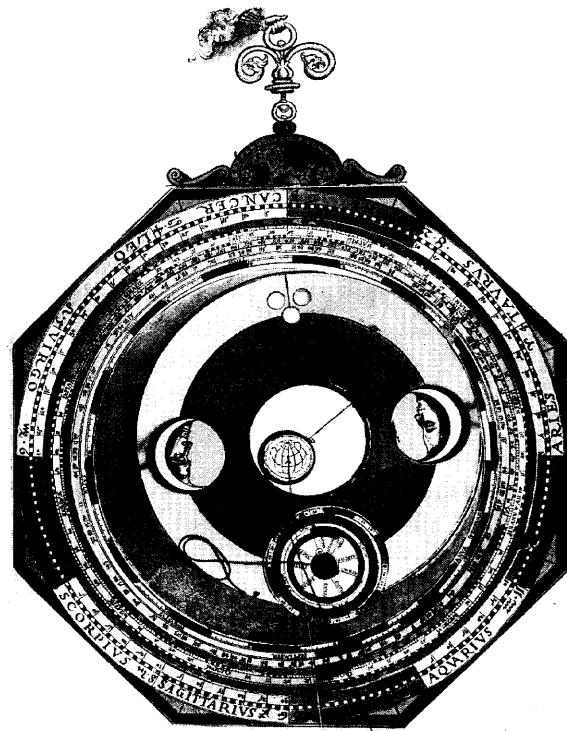


Fig. 2: The mechanism for the lunar longitude, set for the birth of Charles V (*Astronomicum Caesareum*, f. F II).

being many more hidden paper disks required in some of the assemblies to provide for movements around multiple axes), t indicates a colored thread, and p indicates a sliding pearl on a thread. (There are 12 pearls in a complete copy.) Square brackets indicate an inferred signature letter and number.

[A]	AII	AIII	[A4]
B	B2	B[3] v t	[B4]
C t	Cii	C[3] v ⁷ t ³	[C4] t p
D v ⁷ t ³	DII t p	DIII v ⁷ t ³	[D4] t p
E v ² t	EII v ⁷ t ³	EIII t p	[E4] v ⁹ t ³
F t p	FII v ⁹ t ³	FIII v ² t	[F4] v ² t
G t p	GII t p	GIII v v ⁵ t	[G4] v ⁴ t [G5] v ³ t
H t p	HII t	HIII	[H4]
J	JII t ² p ²	JIII	[J4]
KI	KII	KIII v ⁴ t	[K4] v ³ t
LI v ³ t	LII v	LIII v	[L4] v ²
MI v ² t	MIIMIII	v ² t [M4]	t ⁴ p ²
NI	NII	NIII	[N4]
O	OII	OIII	OIII [O5] [O6]

The 111 copies listed below are those I have personally examined (except for the copy in Vicenza, the copies in Bamberg and Ingolstadt, which I apparently overlooked in my survey, and two deluxe copies that have passed through the market: Hamburg and Paris). The notes generally indicate if paper parts are missing, plus other information about cancel leaves and sometimes about provenances.

Because the brief descriptions here were compiled throughout a quarter century, some of the books may have in the meantime been repaired. Several of the copies have changed hands since I examined them, so the privately owned copies may now be in other collections. The survey is obviously to some degree incomplete – for example, it lists no copies in the French provinces – because it depends in part on national catalogues and earlier surveys such as F. Van Ortry's

Bibliographie de l'oeuvre de Pierre Apian (Besançon, 1902). I have not made any attempt to locate all the copies that have passed through the auctions during the last few decades, but my guess is that fewer than 25 copies are missing from my survey.

Incidentally, Apianus also issued a German handbook to accompany his larger volume. Fewer than ten examples are known of this *Eine Gründliche außlegung des Buchs Astronomici Caesarei*. Copies are found in Augsburg, Halle, Munich, Vienna, at the Vatican, and at Harvard.

In the list that follows, the copies are arranged alphabetically by country and city. An asterisk (*) designates a deluxe copy.

Key for emblem sheet on f. O6

- | | |
|-----|--|
| 0 | [Sheet lacking] |
| I | Insignia Petri Apiani. [large arms with single-headed eagles] |
| II | INSIGNIA PETRI APIANI SACRI PALATII CO ^{is} . [large arms with double-headed eagles] |
| III | INSIGNIA PETRI APIANI, Mathemat. Ingolstadieñ. [small circular arms] |
| PP | INSIGNIA P. APIANI VTRAQVE. PRIORA. POSTERIORA. [small circular arms in both forms, poem, and decree of Charles V] |

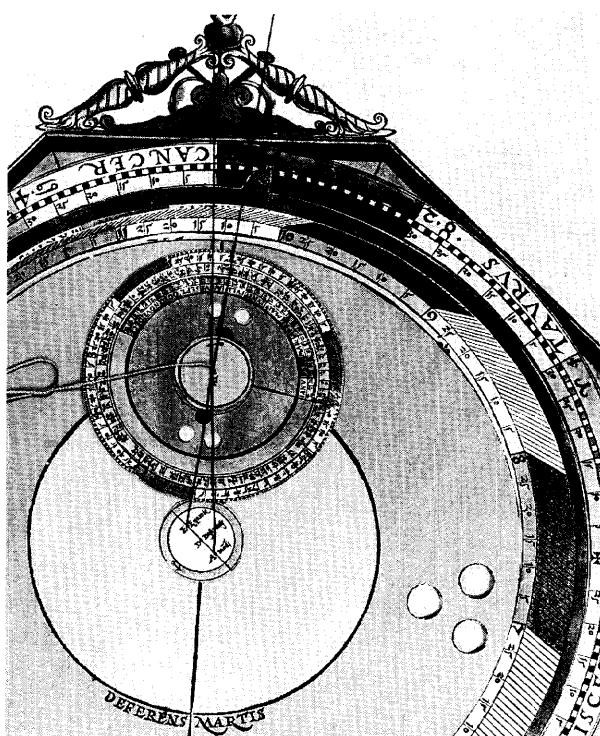


Fig. 3: *Astronomicum Caesareum*: Detail of f. D III, the equatorium for the Martian longitude, set for the birth of Charles V.

AUSTRIA

Vienna, Österreichische Nationalbibliothek, 72.0.1
9 pearls; II.

Vienna, Universitätsbibliothek, III 34.636
7 pearls; 0.

Vienna, Sternwarte, 704A.
Lacks LII and LIII volvelles; 10 pearls; I.

BELGIUM

Antwerp, Stadsbibliotheek, G 13121

Contains cancel GII and GIII with volvelles in place of regular leaves; ex libris Prince Frederick Henry of Orange; II.

Brussels, Observatoire Royale, 66c

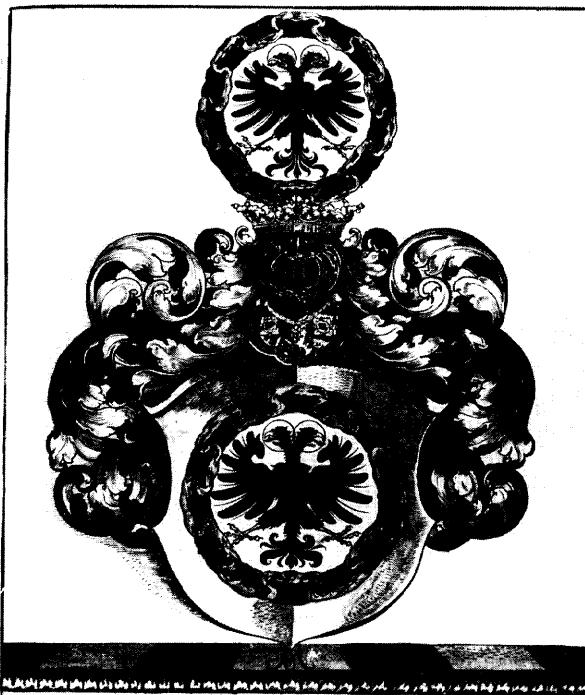
Some disks misplaced or lost; II.

Brussels, Bibliothèque Royale, V 5123

Bound with Schöner's *Aequatorium astronomicum*; I, PP.



Fig. 4



IN SIGNIA PETRI APIANI SACRI PALATII CO

Fig. 5

I N S I G N I A

PETRI APIANI, Mathemat. Ingolstadien.



Fig. 6



*Fig. 4-7: P. Apian's arms in the Astronomicum Caesareum:
Large arms with the single headed eagle (variant I, Fig. 4).
Large arms with double-headed eagle (variant II, Fig. 5).
Small circular arms with single-headed eagle (variant III,
Fig. 6).*

*In the BSB-Munich copy Rar. 818 of the Astronomicum
Caesareum small Apianus arms is pasted in from another
source (Fig. 7). Above the arms in the book is written: „Aus
der an den Maler Erdmannsdorffer ... verkauften Doublette
von Pet. Apians Astronomicum Caesareum Ingolstad.“ and
„Ad Bibliothecam S. S. Franciscanorum Ingolstadij.“*

Fig. 7

CZECH REPUBLIC

Prague, Universitní knihovna, Tres Aal [=14A1]
Lacks GIII volvelles; 1 pearl; I.

DENMARK

Copenhagen, Universitetsbibliotek, Q304
Deluxe coloring of initials and planisphere,
regular paper; 0.

FRANCE

Paris, Bibliothèque nationale, Rés V 219
Cancel GIII in back; I.
Paris, Bibliothèque nationale, Rés V 220
FII volvelles incomplete; 4 pearls; ex libris
Daniel Huetius, 1692; II.
Paris, Bibliothèque nationale, Rés V 221
Early facsimiles of GIIIv volvelles; a few
small pieces missing; II.
Paris, Bibliothèque nationale, Rés. Ge.DD.1948
Incomplete, folios in mixed order and some
volvelles lacking or misplaced; 0.
Paris, Bibliothèque de l'Arsenal, S.A.1175
No pearls, several volvelles missing, some
misplaced; I, PP.
Paris, Bibliothèque de l'Arsenal, S.A.1176
No pearls, lacks GIII-GS; I, PP.
Paris, Bibliothèque Mazarine, 4634 B
No pearls, replacements for 2 small parts; II.
Paris, Observatoire
Lacks Al, 1 pearl; variant issue of Bl;
some cancel leaves at end; 0.
Paris, Destombes Collection
Apianus binding, most missing pieces
supplied from the next copy; 0.
Paris, Destombes Collection
Lacking several pages and many pieces; 0.
*Paris, Alain Moatti
Deluxe copy [not seen], present location
unknown, III.
Paris, Pierre Beres
8 pearls and traces of 3;
cancel of B4 glued in back;
ex libris Harrison Horblit;
original Apianus binding; I.
Paris, Private Collection
Some pearls black, substitutes?; I.

GERMANY

Augsburg, Staats- und Stadtbibliothek, 2° Math 7.
2 Lacks GIIIv volvelles;

cancel Gl-G4 signature at end;
German instructions bound in; I.
Augsburg, Staats- und Stadtbibliothek, 2° Ink 937
Bound with Schedel's *Nürnberg Chronik*;
lacks D1 and F4 and volvelle on GIIIv,
and has a wrong volvelle on MIII; I.
Bamberg, Staatsbibliothek
Initials colored throughout but not deluxe,
no pearls; II.
[further copy in Bamberg not examined]
Bonn, Universitäts- und Landesbibliothek, O 381
Ex libris M. Maestlin from Philipp Apian in
1594, with several additional leaves of arms
including I from Apian's widow; on deluxe
paper, but not specially colored; III modified
with PP paste-ons.
Bonn, Sternwarte, 2° 9/1540.1
Deluxe paper, but not specially colored; I.
Donaueschingen, Fürstlich Fürstenbergische Hofbi-
bliothek, IV R27
4 pearls; original Apianus binding; I.
Dresden, Sächsische Landesbibliothek,
(2.Astronom.8) S.B. 247
11 pearls; Ernst-August to Heinrich
Rantzovius (1551) to Frederick II of
Denmark (1576); II.
Freiburg i. Br., Universitätsbibliothek, Rara T53, b
Planisphere missing; I, PP.
Gotha, Forschungsbibliothek, Math 2° 38/2
Caspar Peucer's copy inscribed by Tycho
Brahe; rebound with the volvelles misplaced
and misassembled after the facsimile was
made by Edition Leipzig; II.
Halle, Marienbibliothek, 0 3.31 Fol.
Bound with a large copy of the German
instructions; I.
*Hamburg, Hauswedell Auction, May, 1972
Deluxe copy [not seen], present location
unknown; III.
Ingolstadt, Wiss. Stadtbibliothek, Gi 885
1 pearl; I. [examined by E. Hausfelder and
K. Röttel]
Jena, Universitätsbibliothek, 2 Math. VII, 6.
[lost in World War II]
Kassel, Landesbibliothek und Murhardsche Biblio-
thek, 2° Ms. astron. 16
Unbound, heavily recolored, lacks regular GIIIv
volvelles and a few other pieces, no pearls; II.
Kiel, Universitäts-Sternwarte, Nr. 2065
Most pearls; I.

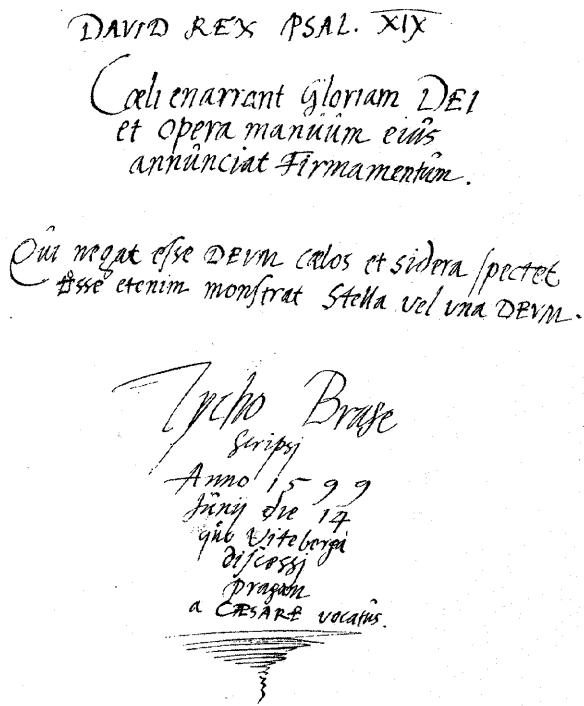


Fig. 8: Signature of Tycho Brahe in the copy of the Forschungs- und Landesbibliothek Gotha in Germany.

- Leipzig, Universitätsbibliothek, Libri sep 12
No pearls; purchased for the University in 1542; 0.
- *Mainz, Gutenberg-Museum
Deluxe copy but planisphere not gilded; III.
- Munich, Bayerisches Nationalmuseum, 13282
Lacks GS volvelles; I.
- Munich, Deutsches Museum, 1927 c4
Cancel Bl at end, no pearls; I.
- Munich, Bayer. Staatsbibliothek, Rar. 818
Uncolored; has astrolabe instead of planisphere;
GII and GIII are smaller sheets; small Apianus arms pasted in from another source.
- *Munich, Bayer. Staatsbibliothek, Rar. 819
Deluxe copy, presentation from Apianus, full coloring, 9 pearls; III.
- Munich, Bayer. Staatsbibliothek, Rar. 821
4 pearls, lacks 4 small pieces, all initials colored; II.
- Munich, Bayer. Staatsbibliothek, Rar. 821a
3 pearls; GII and GIII are smaller sheets; I, PP.

- Munich, Universitätsbibliothek, 0014/W2 Math.32a
Planisphere missing, 5 pearls; I, PP.
- Munich, Universitätsbibliothek, 0014/W2 Math.32
Lacks FII volvelles, cancel GIII at end, ex libris Sebalt Müller (a former prominent Ingolstadt family); I.
- Neuburg a.d. Donau, Staatliche Bibliothek, 2° Math 2
8 pearls; insignia leaf lacking, but formerly II.
- *Nuremberg, Germanisches Nationalmuseum, 2° Nw. 2139
Lacks planisphere and various volvelles including C3, D1, DIII, E1, EII, GIIIv, LI; cancel B4 in back; III.
- Schweinfurt, Bibliothek Otto Schäfer
12 pearls (full set); provenance:
Munich, Bayer. Staatsbibliothek 990; I.
- Stuttgart, Württembergische Landesbibliothek, Ra 16 Api 2
1 pearl; I.
- Stuttgart, Württembergische Landesbibliothek, Ra 16 Api 3
7 pearls, not deluxe paper but III.
- Tübingen, Universitätsbibliothek, Bd 1. Fol
2 pearls; 0, PP.
- Ulm, Stadtbibliothek, Tresor 4035.
No pearls, colored as in deluxe copies, but on ordinary paper; II.
- Weimar, Zentralbibliothek, 2° 15, 2:17^b
Lacks B2-B3 and one volvelle on FII; Bl cancel at nd; I.
- Wolfenbüttel, Herzog August Bibliothek, Ne 2° 11
No pearls, ex libris Duke of Braunschweig and Lüneburg; I.
- ### ITALY AND VATICAN CITY
- Bologna, Biblioteca Universitaria, A.IV.M.III.2
Lacks B2-Cl; I.
- Bologna, Biblioteca Universitaria, A.V.R.III.9; I
- Brescia, Biblioteca Queriniana, Cinq A.8.
No pearls; leaves reinforced with thin cloth, but part of each page missing; I.
- Mantova, Palazzo-D'Arco, Inv. #557
10 pearls, II.
- Milan, Biblioteca Nazionale Braidense, AB XVIII 38
Lacks volvelles on DIII; FII volvelles misplaced on LII;
cancels of GII and GIII at the end; I.
- Naples, Biblioteca Nazionale, S.Q.XXXI.C.33
Cancel GIII in back; I.



*Fig. 9: Initial A
in the Astronomicum
Caesareum.*

- Padua, Biblioteca Universitaria, 67.b.4
6 pearls; II.
- Turin, Biblioteca Nazionale Universitaria, Ris.21.2
Lacks all signatures after J.
- Vatican City, Biblioteca Apostolica Vaticana,
Palatina S 30
No pearls; ex libris Achilles Gasser, 1544;
bound with Schöner's *Aequatorium
astronomicum*; I, PP.
- Vatican City, Biblioteca Apostolica Vaticana,
Rossiana 2647
Lacks planisphere and volvelles on C4,
GIIIv, G4, MI, some misplaced;
partly uncolored; II.
- *Vatican City, Biblioteca Apostolica Vaticana,
Barberini X I 66
Deluxe edition, ex libris Otto Heinrich, Count
of Palatinate; a few volvelles misplaed; III.
- Venice, Biblioteca Nazionale Marciana San Marco
240. C. 30
11 pearls; bound at Apianus' press,
Blv cancel glued in back; I.
- Vicenza, Giancarlo Beltrame,
G III cancel at end, 8 pearls; I.

NETHERLANDS

- Amsterdam, Nico Israel
1 pearl, GIIIv lacks 4 volvelles,
ex libris Honeyman; I.
- Leiden, Bibliotheca Thysiana, THYSIA 1625
Clumsily repaired,
some volvelles lost or misplaced; I.

RUSSIA

- Moscow, Lenin State Library, Ingolstadt, P. Apianus,
1540, 2° (Inv. 78)
Lacks B3; 11 pearls; I, PP.

St. Petersburg, Pulkovo Observatory, I 441
Complete except for a few lost caps; I, PP.

SPAIN

- El Escorial, Biblioteca de San Lorenzo, 14.III.1
10 pearls; Phillip II arms on binding; I.
- *Madrid, Biblioteca Nacional, R1608
Spectacular deluxe copy, perhaps the one for
Charles V; III.
- Madrid, Biblioteca Nacional, R1617
1 pearl, a few pieces lost (Dl) or misplaced; II.
- Madrid, Museo Naval, C.F.140
GII and GIII cancels at end; I.
- *San Fernando, Observatorio de Marina.
Deluxe copy; lacks some parts from C3, Dl,
DIII, EII and E4; III.

SWEDEN

- Stockholm, Vetenskapsakademiens Bibliotek
Some volvelles misplaced; II.
- Uppsala, Universitetsbibliotek, St. fol. 656
Many volvelles misplaced,
but perhaps now restored; I.

SWITZERLAND

- Basel, Universitätsbibliothek, K. I. I 3 fol
10 pearls, lacks GII and GIII;
has all pearls except M4; not deluxe but III.
- Zurich, Eidgenössische Technische Hochschule,
1883 (Rar)
No pearls; Electoral Library of Duke of
Bavaria, duplicate from Gotha; I.
- Zurich, Zentralbibliothek, T 35
A few pearls; lacks some volvelles on C3, Dl,
FII, GIIIv; volvelles for KIII on GIIIv;

UKRAINE

- Kiev, Centralna Naukova Biblioteka, Pal 1097
Lacks planisphere, most epicycle volvelles,
and some volvelles on KIII and LIII; 0.

UNITED KINGDOM

- *Cambridge, Fitzwilliam Museum
Deluxe copy; III.
- Cambridge, Peterhouse
Loose parts replaced in 1971;
a few epicycles missing; I.
- Edinburgh, Royal Observatory, Crawford Library; I.
- Edinburgh, National Library, Newbattle Abbey 4968
Ordinary paper, but deluxe colors including



Fig. 10: Extra leaf with Apian's two arms, a poem of Marcus Tatus, and the decree nominating Apian „Mathematico seu Astronomo & Familiari nostro“ by Charles V, sometimes accompanying variant I of the *Astronomicum Caesareum*.



*Fig. 11: Initial C
in the Astronomicum
Caesareum.*

initials and planisphere;
ex libris Duke Albert of Bavaria; 9 pearls; I.
London, Royal Astronomical Society; I.
London, British Library, Maps C.7.c.15
Volvelles misplaced in an early 20th-century
rebinding, restored in 1972; I.
London (Greenwich), National Maritime Museum,
Rosenheim Collection A2. I, PP.
London, R. Crawley Collection
GIII cancel; formerly Harry A. Levinson; I.
London, W.P. Watson (now in private collection)
Ex libris Windberg Monastery, missing parts
supplied from another copy; II.
Oxford, Bodleian Library, Arch Bb.7
6 pearls; I.
Oxford, Magdalen College, C.I.5.8
No pearls; I, PP.
*Oxford, St. Johns, Arch A Subt 21
Deluxe copy, 6 pearls, gift of John Laud,
Archbishop of Canterbury and Chancellor
of Oxford; III.

U.S.A.

Ann Arbor, Michigan, University of Michigan, W.L.
Clements Library
No pearls; I, PP.
Bloomington, Indiana, Indiana University, Lilly
Library, QB41 A64
Misplaced volvelles corrected;
cancel Bl at and; I.
Cambridge, Massachusetts, Harvard University,
The Houghton Library, Typ 520.40.150P
No pearls; I.
Cambridge, Massachusetts, Harvard University,
The Houghton Library, *FGC5.Ap34.540a
Lacks Al, AII, A4; lacks volvelles on GIIIv,
etc.; additional later coloring; 0.

Chicago, Illinois, University of Chicago, Schaffner
Collection

Presentation copy from Tycho Brahe to his
acquaintance Paul Wittich, formerly in
Newberry Library; randomly placed beads in
place of pearls; II.

Chicago, Illinois, K. Nebenzahl.

33 pearls (!); provenance Bayerisches
Nationalmuseum; 1.

New Haven, Connecticut, Yale Historical Medical
Library Cancel of GIII at end; I, PP.

New York, New York, Public Library, KB***1540
9 proper and 2 redundant pearls;
a few small original pieces are missing; II.

New York, New York, Metropolitan Museum of Art
Large paper astrolabe added at end,
two small pieces missing; I.

Princeton, New Jersey, Scheide Collection

No pearls, deluxe paper, some pieces missing
(including planisphere) or misplaced; II.

Providence, Rhode Island, John Carter Brown Library
GII cancel bound after GII; I, PP.

Rockford, Illinois, Time Museum

10 small pieces in facsimile, esp. on DIII;
provenance Count Schaffgotsch of Silesia and
J.R. Abbey; II.

San Diego, California, Clay Perkins Collection
7 pearls; lacks FII-GI; I.

San Marino, California, Henry Huntington Library
Deluxe planisphere, but not deluxe paper;
pieces missing on C3, DI, FII;
volvelles from the Schöner *Aequatorium* on
Cl; III.

Swarthmore, Pennsylvania, Swarthmore College
Library

No pearls, GII cancel, ex libris Stephen A.
Ionides; I.

Washington, D.C., Library of Congress, QB41 A64
Some volvelles misplaced;
GII and GIII cancels at end; I.

Washington, D.C., Library of Congress, Rosenwald
Collection GII and GIII cancels at end; I.

Annotations:

1 The facsimile includes a separate book by Diedrich Wattenberg „Peter Apianus und sein Astronomicum Caesareum“ with the facsimile of „Eine Gründliche außlegung...“

2 See Gingerich 1971.