This CD accompanies the book
Astrolabes and Angels,
Epigrams and Enigmas,
by David A. King.
The presentation is based on a
lecture delivered by him at
the University of Urbino
on June 14th, 2006.

(For photo credits see pp. 337-338 of the book.)
From Regiomontanus’ acrostic for Cardinal Bessarion to Piero della Francesca’s “Flagellation of Christ”

David A. King, inspired by two remarkable discoveries by Berthold Holzschuh

May 2007 version
This is a story about three men, their beliefs, their emotions, and their masterpieces. It is also about their names and their intellectual games. In the latter, their mutual interest in language, poetry, and mathematics played a leading role, as did, inevitably, luck and coincidence.
We shall show the way in which (we think) an astrolabe inspired a painting.
Both the astrolabe and the painting are monuments in the history of mathematics as well as in the history of art.
The main events that we shall relate – from the construction of the astrolabe in Vienna to the commissioning of the painting in Italy – appear to have taken place between 1461 and 1463.
We begin with the man who was the leading astronomer of Europe in his day.
Johannes Müller / IOANNES DE REGIO MONTE / REGIOMONTANUS

b. Königsberg in Franconia, 1436

Astronomer, mathematician and poet
An astronomical calendar with ephemerides by Regiomontanus

Vienna 1461
Note the angels near the hinges ...

*cardo* = hinge

*cardo, pl. cardines*
The Latin word *cardo*, pl. *cardines*, is polysemous, that is, it has many meanings: “hinge, pole, axis, north-south axis”, and more ...
The **Cardinals** are the *cardines* of the Church.

A certain **cardinal** saw this calendar in Vienna.
BASILEIOS
“IOANNES”
BESEARION
b. Trebizond, 1407
Basileios “Ioannes” Bessarion

1407  born in Trebizond
1423  becomes a monk
1437  appointed Metropolitan of Nicaea
1438-39 attends Council of Ferrara/Florence
1439  appointed **Cardinal**, returns to Italy
1460-61 in Vienna as papal legate
late 1461 returns to Rome with the young Regiomontanus
1472  dies in Ravenna; buried in Rome
In 1423, the young Basileios had adopted the name of a 5th-century Egyptian saint, Bessarion, who was revered as an angel in the Byzantine liturgy.
The young monk Βασιλείος wrote a panegyric on the αγγελικος Βησσαριων.
“... the great Bessarion, another angel, living an angel-like life, ...”

From the *Triodion, Canon* of Theodoros Studites (759-826), for the morning of the Saturday before the 4th Sunday of Lent
A Byzantine angel on an imperial banner brought to Italy by Bessarion.
Bessarion also brought to Italy this reliquary with fragments of the “True Cross” and of Christ’s robe.
Both Bessarion and Regiomontanus loved poetry and word games, ...
... and they would have loved “Cappelli”, a dictionary of the abbreviations that were a key element in medieval and Renaissance Latin.
Dizionario di Abbrevisature latine ed italiane
Sesta edizione

Benedictus
Ioannes
Vienna
convenire
INRI
Mater Dei
Basileios Bessarion sometimes used the name “Ioannes”. The reason for this seems to be that the abbreviation IO is embedded in both of his names, and that the letters I-O-A-N-E-S are embedded in the second of them.
BasileIOS BEssarION
“IOannes”
< b-E-S-A-r-IO-N
BASILEIOS < BASILEUS
= emperor, king
Another coincidence ...
I0annes
de RegI0 Monte

REGIO < REGIUS < REX
= king
Perhaps the greatest coincidence of all was ...
Feastday of St Bessarion
June 6
Birthday of Regiomontanus
But Bessarion was a sad man ...
In spite of all his efforts to encourage Western leaders to launch a crusade to halt the advances of the Ottoman Turks, Byzantium had fallen ...
Sultan Mehmet II
“The Conqueror”
The Byzantine Emperor Ioannes VIII (d. 1448) failed to implement the union of the Eastern and Western Churches that had been agreed upon at the Council of Ferrara and Florence in 1438-39. The union might have saved Byzantium.
Ioannis VIII Palaiologos
It was as if the Byzantine Emperor and the Ottoman Sultan had come together* against the Eastern Church.

Also, three young men close to Bessarion had died recently ...
(1) BUONCONTE † 1459
son of FEDERIGO DA MONTEFELTRO,
godson of BESSARION

(2) BERNARDINO † 1459
son of OTTAVIANO UBALDINI D. CARDA

(3) VANGELISTA † ~1460
son of LUDOVIGO GONZAGA
We have no paintings of any of them, but here are their fathers ...
FEDERIGO DA MONTEFELTRO
(BVONCONTE)

OTTAVIANO UBALDINI DALLA CARDA
(BERNARDINO)

LUDOVIGO GONZAGA
(VANGELISTA)
We should keep in mind the situation in Urbino. After the murder of Oddantonio da Montefeltro in 1444, the city-state was ruled by his brother Federigo. His second-in-command was Ottaviano Ubaldini dalla Carda. Another friend was Ludovigo Gonzaga, Marquis of Mantua.
Also we should not forget Bessarion’s main academic rival, George of Trebizond. The former, after 1462 with the help of Regiomontanus, took many measures to criticize what the latter had written on the Greek classics, particularly, Plato, Ptolemy and Theon.
George of Trebizond, “calumniator” of Plato, “misinterpreter” of Ptolemy.
The two astrolabes of Cardinal Bessarion ...
Now whilst in Vienna during 1460-61 Bessarion showed Regiomontanus an old Byzantine astrolabe that he had brought from Constantinople. It was made there in 1062 for an official named Sergios.
And it was inscribed with Greek verses by Sergios describing the astrolabe as “an icon of the universe”.
Sergios
Constantinople
1062

Diameter 37.5 cm
Santa Giulia Museo della Città, Brescia
Poem in iambic meter

ΕΙΚΩΝ

The colon and tilde indicate that the text continues on the back of the astrolabe.
The old astrolabe was useless for practical purposes because its star positions were 400 years out-of-date.
The young astronomer-poet was the new protégé of the Cardinal (cardo). Both had seen angels near hinges (cardo), and both were about to travel from north to south (cardo).
Regiomontanus was to help Bessarion in his programme to make Greek scientific works available in Latin, especially the *Almagest* of Ptolemy.
Regiomontanus, who would be 26 in 1462, had an idea ...
Bessarion’s old astrolabe was made in 1062 ...
... he would make a new astrolabe for the Cardinal to make him happy ...
Fortunately, this beautiful little astrolabe survives.
Diameter 11.5 cm

England, private collection
Note the 5-petalled rosettes and lily, symbols of the Virgin Mary.
It is one of over 40 authenticated instruments that survive from 15th-century Vienna,* ... 

* A list was published by the author with the Austrian Academy of Sciences in Vienna in 1994.
Of these 40-odd instruments, some ten astrolabes have the same basic design as this one.**

** A comparative study was published by the author with Gerard Turner in Florence in 1994.
One of these, datable *ca.* 1460 and now preserved in Paris, has identical engraving.
The 1462 piece is the only one that bears the signature of IOANNES RGO and the only one that has an image of an angel on the back.
N-S celestial axis

cardo
$4 = (5+3) \div 2$

$8 = 5+3$
Keep in mind the numbers 4 and 8 (= 5 + 3) ...
Elegaic couplet in four lines

Regiomontanus was renowned as a poet; he cancelled a course of lectures on Vergil’s *Georgics* in order to accompany Bessarion to Italy.
The meter is not quite perfect. (The problem is with the word *divi.*) Now why would an established poet allow for a slight mistake in his couplet? At least the Latin makes sense ...
“Under the protection of the divine Bessarion, said to come from the cardo, I arise as the work of Ioannes in Rome in 1462.”
IOANNIS OPVS:~ 1462

Note the colon and tilde at the end of the poem, as on the Byzantine astrolabe.
The angel is the angelic St Bessarion, situated at the *cardo* of the astronomical markings.
The use of *divus* is a play on words. *Divus* Bessarion refers to both the angelic St Bessarion and to Cardinal Bessarion, whom Regiomontanus in his letters also called *divus* Bessarion.
The use of *cardo* is a word-play on Bessarion’s rank and on the angel at the *cardo* (*de cardine dictus*).
Some key words can be rearranged to correspond to the poem on the Byzantine astrolabe ...
“A work explaining the axis (cardo) of the sky (divum), i.e., the rotation of the heavens.”
Now some of the letters and words are squeezed together, others pulled apart ...
In February 2005 Berthold Holzschuh realized that the epigram was an acrostic.
We can identify eight vertical axes with “hidden” messages that would have been of interest to Bessarion.
In all but the last of these axes, one letter on the first line is directly above one or more letters below.

(We should not lose sight of the fact that the width of the epigram is only ~3.8 cm.)
The hidden messages relate to (1) SERGIOS, (2) BESSARION, and (3) REGIOMONTANUS.
The references to Sergios and his 1062 astrolabe include the words **SVB CD ANNIS**, “at 400 years”, referring to the 400th anniversary of the old astrolabe.
There is a chronogram yielding the date 1062.

(The letters “I” and “O” are used for one and zero in all inscriptions on the astrolabe.)
SERGIOS AXES

I:  SVB CD ANNIS  VIII:  1062
VI:  S(E)RGIOIOS
The references to Bessarion include hints at his two names and his year of birth, 1407.*

(* This is nowhere explicitly mentioned, and recently 1408 has been suggested. Regiomontanus appears to be telling us that the date is 1407.)
BESSARION AXES

I: BASI(LE)IOS IOANNIS
IV: BENEDICTI ROMAE
VI: I+I+V+1400 = 1407
Mixed numerals from the 15th-16th centuries

VII:~14(00)  1407

mccccc8  1408
1•4•Lxiii  1463
14XCIIII  1494
1•Vc•V    1505
1•Vc•6    1506
15X5      1515
MD.25     1525
M.5.34    1534
D.LX4     [1]564
V: Straight line (*rectvs*) down the R of AR, calling to mind Archimedes, of whose works Bessarion had Greek and Latin manuscripts that were used by Regiomontanu.
Regiomontanus is identified by the letters RGO and IO, and a boustrophedon in which his name IO is associated with the number 26 (reading 62 backwards), which was his age in 1462.
There is also a reference to the journey from Vienna to Rome roughly along a north-south axis (*cardo*).
**III:** VIENNA / CARDO / ROMA

**VII:** R(E)GIO

**VI:** IO 26 → RGO aged 26 in 1462
CONVENERVNT IN VNVM

TWO ASTROLABES
TWO POEMS
TWO LANGUAGES
TWO BESSARIONS
TWO IOANNES
BESSARION & REGIO
REGIO & SERGIOS (*VARGO IO*)
THREE PLACES – C’NOPLE, VIENNA, ROME
TWO DATES – 1062 & 1462
But there was far more to the epigram than Regiomontanus could ever have realized.
He had created a scenario in which BAsileus IOannes, the Church, Bessarion and himself, Regiomontanus, ...
... and even a sponsor with the name IOannes or gIOvanni, were built in.
REGIOMONTANUS

L-axis

B  BE-

A  NE-DICTI

ROMAE

IO

R-axis

B  R  IO

“IO”IO  IO

S  V  B

C  D

A  N  N  I  S
From an acrostic to the programme for a painting ...
We now introduce the third of the three players, a renowned mathematician-artist of Italy, a man well known to Bessarion.
Piero della Francesca, mathematician and artist
Sansepolcro, ~1412-1492
PETRVS DE FRANCISCA
EX NOBILI FRANCISCO R FAMILIA
PICTVRAE ARITMEITICA GEOMETRIA
AMPLIFICATOR.
1457-1466
PdF mainly in Arezzo/Sansepolcro

late 1461
B & R
Vienna → Rome

mid 1463
B & R
Rome → Venice

J. Furttenbach, 1607
Bessarion, Regiomontanus and Piero ~

common interests ??

Regio copied ARchimedes.
Piero copied ARchimedes.

BessARion was in the middle, with his own Greek and Latin ARchimedes manuscripts.
Also, Bessarion had brought a reliquary containing fragments of the “True Cross” to Italy....

Further, a “Bessarion figure” features nine times in Piero’s Arezzo frescoes “The Legend of the True Cross”.
The magnificent frescoes in Arezzo were financed by members of the Bacci family, some of whom are also depicted in the frescoes as historical figures.
Piero’s most enigmatic and controversial painting is now known as “The Flagellation of Christ”. It is preserved in Urbino.
In the early 19th century, the painting bore an inscription: *Convenerunt in unum*. 
What is the significance of this title?

Why is the Flagellation scene in the background?
Why is there a classical god on the column behind Christ, bathed in light?
Why are the Byzantine Emperor and the Ottoman Sultan present at a symbolic flagellation of Christ?

Surely, because His image embodies the Church, and the Eastern Church had suffered when Byzantium had fallen.
Why is one of the men brandishing a whip actually touching Christ, and why can we see his face?
Who are the three “moderns” on the right? In particular, who is the young man in cardinal red? Why is he barefoot? It has been suggested that he is actually dead.
Why is the man on the extreme right wearing a gown decorated with thistles and carrying a cardinal red head-dress (*becchetto*) draped over his shoulder?
We can be confident that Piero was commissioned to paint this remarkable work. The extent to which he contributed to its conception is unclear.
The painting is a masterpiece of mathematical planning. Only Piero’s brilliant use of perspective has been discussed before.
The basic geometrical features in the following images* have never been mentioned by anybody who has published on the picture ...
height is 58.4 cm, one Florentine braccio

width of painting ≈ diagonal of square
There are two major vertical axes constructed from the left and right squares. They pass through the eyes of Christ and through the eyes of the bearded man.
The painting is symmetrical with respect to these two axes.
Also, the Flagellation scene and the scene of the three “moderns” both occupy one-half of the painting.
The next two images show the reconstruction of the floor-plan and the side-view by Sam Carter (1953).
three "moderns"

plane of painting

height of eye is one-third the height of Christ

Christ-figure whose height is three times the height of the eye
We shall not discuss Piero’s use of perspective further, save to note that his choice of his centre of perspective and its “vanishing point”, was deliberate ...
There is something very special about the way in which the vertical axis through the eyes of Christ* divides the space between the central axes of the left and right columns defining the Flagellation scene.

* Clearly this can be only roughly defined.
It appears that the centre of perspective has been chosen so that the vertical axis between the eyes of Christ divides the flagellation scene in the “divine proportion”, now known as the “golden ratio”.
The practical solution to the perceived “problem” of representing mathematical incommensurability is “as good an approximation as possible”. To use the words of Piero’s successor Luca Pacioli: “non potalmente la verità : ma ... molto presso”, “not exactly the real value, but ... pretty close”.

Perhaps the first layout for the painting was with eight personal images at the same distance from the viewer.
8 persons at roughly the same distance
The most tantalizing question remains:

Who are the three “moderns” on the right?
Some 40 different hypotheses have been proposed over the past 150 years ...
Previous identifications of the three “moderns” in Piero’s “Flagellation”

<table>
<thead>
<tr>
<th>Source</th>
<th>Date</th>
<th>Bearded man</th>
<th>Youth</th>
<th>Man on right</th>
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<tbody>
<tr>
<td>Inventory</td>
<td>1744</td>
<td>Guidantonio</td>
<td>Oddantonio</td>
<td>Federigo</td>
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<td>Passavant</td>
<td>1839</td>
<td>three enemies of Federigo</td>
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<td>Dennistoun</td>
<td>1851</td>
<td>Manfredo de’ Pii</td>
<td>Oddantonio</td>
<td>Tommaso dell’Agnello</td>
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<td>Ugolini</td>
<td>1859</td>
<td>&lt;</td>
<td>ditto</td>
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<td>Pichi</td>
<td>1892</td>
<td>Serafini</td>
<td>Oddantonio</td>
<td>Ricciarelli</td>
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<td>Witting</td>
<td>1898</td>
<td>Caterino Zeno</td>
<td>missionary / Christ</td>
<td>Federigo</td>
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<td>Graber</td>
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<td>Oddantonio</td>
<td>evil councillor</td>
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<td>1927</td>
<td>&lt;</td>
<td>ditto</td>
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<td>Clark</td>
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<td>allegory</td>
<td>Guidantonio</td>
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<td>anonymous bystanders</td>
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<td>Gilbert</td>
<td>1952</td>
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<td>1953</td>
<td>Gentile</td>
<td>soldier</td>
<td>Joseph of Arimathea</td>
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<td>Oddantonio</td>
<td>Guidantonio</td>
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<td>Judas</td>
<td>Christ</td>
<td>Sanhedrin</td>
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<td>De Tolnay</td>
<td>1963</td>
<td>Jew</td>
<td>pagan Greek</td>
<td>Aryan</td>
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<td>1968</td>
<td>Jew (?)</td>
<td>angel</td>
<td>Western layman</td>
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<td>Lavin</td>
<td>1968</td>
<td>Ottaviano Ubaldini,</td>
<td>allegory of beloved son;</td>
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<td>theme is consolation</td>
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<td>western prince</td>
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<td>Role</td>
<td>Gender</td>
<td>Location</td>
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<td>Agnolo Bacci</td>
<td>Andrea Bacci</td>
<td>Francesco Bacci</td>
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<td>Bessarion Buonconte</td>
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<td>1981</td>
<td>Jew youth</td>
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<td>1991</td>
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<td>1992</td>
<td>Ioannis VIII</td>
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<td>Guidantonio, father of Oddantonio and Federigo</td>
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<td>van Waadenoijen</td>
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<td>prophet Isaiah</td>
<td>St John Evangelist</td>
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<td>1997</td>
<td>high-ranking Byzantine angel</td>
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</table>
| Ronchey               | 2000 | Bessarion                     | Thomas Palaiologos | connection with the controversy between Bessarion and George of Trebizond | as in Lavin 1968
| Shank                 | 2000 |                              |            |                          |                                                                      |
| Lavin                 | 2002 |                              |            |                           |                                                                      |
| Field                 | 2005 | scholar                       | generic saint / angel | merchant | Reuben, father of Judas (Federico’s father) |
| Roeck & Tönnesmann    | 2005 | Judas (Federico)              | Oddantonio |                          |                                                                      |
| Holzschuh             | 2005 | Bessarion                     | Regiomontanus | Ottaviano Ubaldini       | Francesco Accolli                                                     |
| de Rycke              | 2005 | Io. Argiroupulos              | David / Oddantonio |                          | Niccolò III d’Este                                                   |
| Ronchey               | 2006 | Bessarion                     | Thomas Palaiologos |                          |                                                                      |
| Roeck                 | 2006 | Judas (Federico)              | Oddantonio  | Reuben (Federico’s father) |                                                                      |
Two new books appeared in 2006...

**Silvia Ronchey**
*L'Enigma di Piero*
L'ultimo bizantino e la crociata fantasma nella rivelazione di un grande quadro
*Rizzoli*

**Bernd Roeck**
*Mörder, Maler und Mäzene*
Piero della Francescas «Geißelung»
Eine kunsthistorische Kriminalgeschichte
*C.H. Beck*
Amongst the 40 different proposals during the past 150 years:

- 16 for the bearded man;
- 10 for the young man in red;
- 15 for the man on the right.

(We are not dealing with portraits.)
Some of the most convincing* hypotheses ...

(* at least in the opinion of the author)
An inventory of 1744 identified the young man in red as Oddantonio da Montefeltro (brother of Federigo), who was murdered in 1444.


Michael Shank (2000): Painting reflects the controversy between Bessarion and George of Trebizond.
None of the 40-odd previous attempts to identify the three persons on the right or to explain the painting has been based on any textual evidence whatsoever.
In May 2005 Berthold Holzschuh realized that the geometry of the painting is related to that of the epigram.
The two principal axes

\[
\frac{3}{8} \quad \frac{5}{8}
\]
Finally, we may have a text that relates to the painting. If this is so, what is the relationship between the epigram and the painting?
What clues can the epigram provide?
DAK hypothesis:~
The key to the multiple identities of all of the eight persons and one classical god is in the epigram.
If this is so, then several of the previous proposals may be correct because the painting is *polysemous*, ...
and each of the nine (8+1) images is polysemous.
as a control because we know more or less who to expect ...

We can use this part of the painting
Suppose we could identify the Byzantine Emperor (as Pontius Pilate), the Ottoman sultan (as King Herod), Jesus Christ, and two men involved in His Passion.
We shall look for names in the form of monograms, as were well-known in Christian Latin and Byzantine Greek.
Here is just one example:

T
S–A–N
C
M
R–A–I
A

SANCTA MARIA

A given letter need be featured only once. There are no rules concerning the arrangement of the letters.
We shall use clusters of letters to identify names

ACIMNRST → SANCSTA MARIA
IESV → IEVSVS
AGONS → GONSAGA
We only need one occurrence of a letter. If a letter is missing in the space we denote it in parentheses. Note that there is no “H” and no “L” in the epigram.

**ABEIOS ➔ BASI(L)EIOS**
We should bear in mind that a few letters of a name would have been adequate for Renaissance scholars to identify them. For example, BA suggests BAsileios, IVD IVDaevs (Judas), and IO IOannes. We shall nevertheless seek as many letters for a given name as are available in or near the appropriate space.
CAVEAT

One can find all sorts of letter combinations in the entire epigram. For example:

IN VINO VERITAS
CONVENERVNT IN VNVMI
OMNI SANCTI ORATE PRO NOBIS
We shall divide the epigram into eight “personal spaces” and look for possibly relevant letter clusters in each one. We should not take the borders of the spaces too seriously; they are there only for our convenience.
We loosely define eight “personal spaces” 1a to 8a across the epigram, from left to right ...
1: Byzantine emperor-figure

1: **BASI(LE)VS IOANNIS**
2: Oriental figure

2: IDRIS // OSMAN → SULTAN
3: Man touching Christ

3: IVDAEVS ISCARIO(T)
4: Christ-figure

4: IEVSVS
4: Christ-figure

4: INRI → CHRIST
3/4: Classical god
5: Faceless soldier

5: CENTVRIONVS
Encouraged by the fact that we have been able to identify the five persons in the Flagellation scene, we now apply the same procedures to identify the three persons on the right ...
6: Bearded figure

6: BESSARION TRAPESVNTIVS
7: Young man in red

7: IOANNES REGIO
7: Young man in red

7: VANGE(L)ISTA GONSAGA
8: Man on the right

8: IO(ANNES) [BACCI?]
We have identified at least eight persons and one classical god who could be in the painting.
But there is more that we can extract from the epigram. The painting is symmetrical about the axes at roughly 3/8 and 5/8, and so is the epigram.
We now label the eight “personal spaces” 1b to 8b from right to left ...
Here are some samples of what we can find ...
1: SEDES (throne)
2: Oriental figure

2: (H)ERODES
4: Christ-figure

4: C(H)RISTVS
4: Christ-figure

4: SANCTVS PETRVS
7: Young man in red

7: DIVVS
7: Young man in red

7: BERNARDINO
7: Young man in red

7: BVONCON(TE)
8: The man on the right

8: (G)IOVANNI BACCI
8: The man on the right

8: VBA(L)DINI DA(LL)A CARDA
8: The man on the right

8: (L)VDOVICVS (GONSAGA)
What is surprising is not that we can find some 70 relevant names and words in the epigram ... ...
what is surprising is that we find these names more or less in the spaces where we find the corresponding images in the painting!
INDIVIDUALS FOR THE PAINTING IDENTIFIED IN THE EPIGRAM
(PARTIAL)

<table>
<thead>
<tr>
<th>EPIGRAM SPACE</th>
<th>PERSON</th>
<th>PAINTING SPACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>(The bold numbers 1-8 on the left refer to the spaces from left to right across the epigram; the numbers 1-8 on the right refer to the spaces from left to right of the painting)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>BASI(LE)VS IOANNIS</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>(G)IOVANNI BACCI</td>
<td>8</td>
</tr>
<tr>
<td>1</td>
<td>O(TT)AVIANO VBA(L)DINI DA(LL)A CARDA</td>
<td>8</td>
</tr>
<tr>
<td>1</td>
<td>(L)ODOVICVS (Gonzaga)</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>IDRIS, OSMAN, (H)ERODES</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>BVONCON(T)E, BERNARDINO</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>IVDAEVS, IVDAS</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>“IOANNES” BESSARION</td>
<td>6</td>
</tr>
<tr>
<td>3/4</td>
<td>(H)ERMES, SO(L) INVICTVS</td>
<td>3/4</td>
</tr>
<tr>
<td>3/4</td>
<td>CONSTANTINOPO(L)I5, BISANTIVM</td>
<td>3/4</td>
</tr>
<tr>
<td>4</td>
<td>IESVS, INRI, PASSIO C(H)RISTI</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>BENEDICTI ROMAE</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>CENTVRIONVS, (H)ERODES, SATRAPES, CA(E)SAR</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>C(H)RISTVS, RI (Rex Iudaorum), CARITAS</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>SANCTVS PETRVS</td>
<td>4</td>
</tr>
<tr>
<td>5/6</td>
<td>IVPPITER, IOVIS, TRIS(NE)EGISTVS</td>
<td>3/4</td>
</tr>
<tr>
<td>5/6</td>
<td>CONSTANTINIVS, CONSTANTINOPO(L)I5</td>
<td>3/4</td>
</tr>
<tr>
<td>6</td>
<td>BESSARION TRAPESVNTVS</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>IOANNES (de) REGIO (monte)</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>VANGE(L)ISTA GONASA</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>ANGE(L)VS, ADONIS, DIVVS</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>ODDO AN(T)ONIO (?)</td>
<td>7 (?)</td>
</tr>
<tr>
<td>7+8</td>
<td>(H)ERODES</td>
<td>1+2</td>
</tr>
<tr>
<td>8</td>
<td>IOA(NN)ES</td>
<td>8</td>
</tr>
<tr>
<td>8</td>
<td>(H)ERODES</td>
<td>1</td>
</tr>
</tbody>
</table>

In addition we list the following features that will appear in the painting:

<table>
<thead>
<tr>
<th>EPIGRAM SPACE</th>
<th>PAINTING SPACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SCA(L)A</td>
</tr>
<tr>
<td>1</td>
<td>CO(L)ONNA (It.)</td>
</tr>
<tr>
<td>1</td>
<td>CASA, BORSA, CARDO (It.), CARDVVS (Lat.)</td>
</tr>
<tr>
<td>2</td>
<td>ARBOR</td>
</tr>
<tr>
<td>4-5</td>
<td>PORTA</td>
</tr>
<tr>
<td>5</td>
<td>STATVA</td>
</tr>
<tr>
<td>7</td>
<td>ROSAE [VIRGO (M)ARIA]</td>
</tr>
<tr>
<td>8</td>
<td>SEDES</td>
</tr>
</tbody>
</table>
## IMAGES FOR THE PAINTING IDENTIFIED IN THE EPIGRAM (PARTIAL)

(The bold numbers 1-8 on the left refer to the spaces from left to right across the painting; the numbers 1-8 on the right refer to the spaces from left to right of the epigram in which the name or title is found.)

<table>
<thead>
<tr>
<th>PAINTING SPACE</th>
<th>IMAGES</th>
<th>EPIGRAM SPACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BASI(LE)VS IOANNIS</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>SEDES, ERODES</td>
<td>8</td>
</tr>
<tr>
<td>1</td>
<td>SCA(L)A</td>
<td>1</td>
</tr>
<tr>
<td>1-5</td>
<td>CO(L)ONNA (It.)</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>IDRIS, OSMAN, (H)ERODES</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>(H)ERODES</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>IVDAEV, IVDA</td>
<td>3</td>
</tr>
<tr>
<td>3/4</td>
<td>STATVA, (H)ERMES, SO(L) INVICTVS</td>
<td>3/4</td>
</tr>
<tr>
<td>3/4</td>
<td>IVPPITER, IOVIS, CONSTANTINIVS</td>
<td>5/6</td>
</tr>
<tr>
<td>3/4</td>
<td>CONSTANTINOPO(L)IS, BISANTIVM</td>
<td>3/4</td>
</tr>
<tr>
<td>3/4</td>
<td>CONSTANTINOPO(L)IS, TRIS(M)EGISTVS</td>
<td>5/6</td>
</tr>
<tr>
<td>4</td>
<td>IESVS, INRI, PASSIO C(H)RISTI</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>C(H)RISTVS, RI (Rex Iudaeorum), CARITAS</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>SANCTVS PETRVS</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>BENEDICTI ROMAE</td>
<td>4</td>
</tr>
<tr>
<td>4-5</td>
<td>PORTA</td>
<td>4-5</td>
</tr>
<tr>
<td>5</td>
<td>STATVA</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>CENTVRIONVS, (H)ERODES, SATRAPES, CA(E)SAR</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>“IOANNES” BESSARION</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>BESSARION TRAPESVNTIVS</td>
<td>6</td>
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<td>7</td>
<td>IOANNESS (de) REGIO (monte)</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>BVONCON(T)E, BERNARDINO</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>VANGE(L)ISTA GONSAGA</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>ANGE(L)VS, ADONIS, DIVVS</td>
<td>7</td>
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<tr>
<td>7</td>
<td>ODDO AN(T)ONIO (?)</td>
<td>7 (?)</td>
</tr>
<tr>
<td>7</td>
<td>ROSAE [VIRGO (M)ARIA]</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>ARBOR</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>IOA(NN)ES</td>
<td>8</td>
</tr>
<tr>
<td>8</td>
<td>(G)IOVANNI BACCI, BORSA</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>O(TT)AVIANO VBA(L)DINI DA(LL)A CARDA</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>CARDO (It.), CARDVVS (Lat.)</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>(L)ODOVICVS (Gonzaga), CASA</td>
<td>1</td>
</tr>
</tbody>
</table>
We have identified double or multiple identities for the nine images (8+1) in the painting.
IEVSVS
C(H)RISTVS
INRI
PASSIO C(H)RISTI
SANCTVS PETRVS
BENEDICTI
ROMAE
IVPPITER, IOVIS
(H)ERMES
SO(L) INVICTVS
CONSTANTINIVS
C...TINOPO(L)IS
BISANTIVM
TRIS(M)EGISTVS
The scala Pilati or scala santa from Jerusalem is still preserved in Rome.
The two Muslim names IDRIS and OSMAN suggest a Muslim for this space. The Ottoman dynasty was named after OSMAN.

In this space we shall find the Ottoman Sultan MEHMET II. The image also embodies King Herod.
IVDAEVVS

and

who else??
CENTVRIONVS

(H)ERODES SATRAPES
= Governor
(Pilate)
CA(E)SAR
IOANNES BESSARION TRAPESVNTIVS
~ 1439
also ~1462
IOANNES REGIO
BUONCONTE
BERNARDINO
VANGE(L)ISTA
GONSAGA
ODDANTONIO (?)
SERGIOS
DIVVS ANGE(L)VS
(ST BESSARION)
Laurel tree symbolizing poetical prowess

Cardinal red for protégé (and also godson) of a cardinal

Five-petalled Marian rosettes as on the 1462 astrolabe
These findings confirm what some earlier scholars have hypothesized about the young man in red.
BERNARDINO & VANGELISTA
(LAVIN suggested an association with their recent deaths)

BUONCONTE
(GINZBURG)

IOANNES REGIO
(HOLZSCHUH)
ODDANTONIO (DA MONTEFELTRO) murdered 1444 (proposed by SEVERAL AUTHORS)
(G)IOVANNI BACCI

(L)ODOVICVS
(GONSAGA)

OTTAVIANO
VBA(L)DINI
DA(LL)A CARDA

CARDO (Italian)
CARDVVS (Latin)
“thistle”
These findings confirm what some earlier scholars have hypothesized about the man on the right.
LODOVICVS GONZAGA (LAVIN)
GIOVANNI BACCI (GINZBURG)
OTTAVIANO VBALDINI DALLA CARDA (TURCHINI)
Piero seems to have somehow incorporated each of the three men through (a) a profile that looks very much like Gonzaga but also a Bacci family member; (b) a hint of a purse (for Bacci?); (c) a red becchetto over the right shoulder (as in Piero’s *St. Jerome and a Penitent*); and (d) the thistles on the blue gown (thistle = Italian *cardo*, hint of dalla Carda).
BESSARION
~1439
~1462 (WITH RGO)

IOANNES REGIO
BUONCON(TE)
BERNARDINO
VANGE(L)ISTA
GONSAGA
ODDANTONIO (?)
SERGIOS DIVVS
(ST BESSARION)

GIOVANNI BACCI
OTTAVIANO
UBA(L)DINI
DALLA CARDA
(L)ODOVIGO
GONSAGA
These identifications enable us to hypothesize a programme for a polysemous painting with nine polysemous images.
<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>IOANNIS VIII HEROD (PILATE)</td>
<td>SULTAN HEROD</td>
<td>JUDAS and who else?</td>
<td>CHRIST ST PETER (CHURCH)</td>
<td>CENTURION HEROD PILATE CAESAR</td>
</tr>
</tbody>
</table>

**STATUE AT 3/4**

JOVE / ROME
HERMES / GREEK LEARNING
SUN / CONSTANTINE / BYZANTIUM
HERMES TRISMEGISTOS / GNOSIS

<table>
<thead>
<tr>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>BESSARION ~1439</td>
<td>REGIOROMONTANUS BUONCONTE (dead)</td>
<td>GIOVANNI BACCI ~1439 (?)</td>
</tr>
<tr>
<td>BESSARION ~1462 (with REGIO)</td>
<td>BERNARDINO UBALDINI (dead)</td>
<td>OTTAVIANO UBALDINI dalla CARDA</td>
</tr>
<tr>
<td></td>
<td>VANGELISTA GONZAGA (dead)</td>
<td>LUDOVIGO GONZAGA ~1462</td>
</tr>
<tr>
<td></td>
<td>SERGIOs (dead)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ANGELIC ST BESSARION (long dead)</td>
<td></td>
</tr>
</tbody>
</table>
Even various physical features in Piero’s painting are in positions corresponding to their names in the epigram (read both ways) ...
For example, ROSAE for the roses we find in the same position (7) in the painting ...
How much information of this sort was communicated to Piero in the commission given to him for the painting? How much did he suggest himself? We shall never know.
Obviously we cannot claim that Bessarion and Regiomontanus, with or without help from their friends, must have found precisely what we have found in the epigram.
What we are presenting here is a hypothesis, to supplement the over 40 hypotheses that have been proposed over the past 150 years.
Our hypothesis does have the advantage of explaining why there are eight persons and one classical god in the painting ...
... and why the man in red has a *divus* aspect, and why the man with the purse strings on the right wears a gown decorated with thistles ...
Also our hypothesis explains how previous researchers could come to mutually exclusive conclusions about the identity of the three “moderns” ...
The only new principal player that we have introduced is the poet Regiomontanus. But his image also embodies the three dead youths.
Now that the eight images with equal spaces have been identified, the five on the left are moved backwards, and the three on the right are moved forwards, the two scenes united by perspective.
CONVENERVNT IN VNVM

FOUR SCENES:
JERUSALEM, CONSTANTINOPLE, ROME
† 1439 & 1453 ~1462

FOUR IOs:~ IO VIII, BESS, REGIO, BACCI

TWO OR MORE PERSONS IN EACH IMAGE
CHRIST & CHURCH & BYZANTIUM
BESSARION 1439 & ~1462 (with RGO)

REGIO & DEAD YOUTHS & ANGELIC SAINT
REGIOMONTANUS

L-axis   R-axis

B   BE-   B   R   IO
A   NE-DICTI
ROMAE

IO   "IO" IO IO
## COMMON FEATURES OF THE ASTROLABE AND THE PAINTING

<table>
<thead>
<tr>
<th>Astrolabe</th>
<th>Shared</th>
<th>Painting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stereographic projection</td>
<td></td>
<td>Perspective</td>
</tr>
<tr>
<td>Eight axes in epigram and eight images in painting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eight “hidden” vertical axes in epigram</td>
<td></td>
<td>Eight “hidden” persons depicted</td>
</tr>
<tr>
<td>Divine proportion behind the conception</td>
<td></td>
<td>Divine proportion used for Christ</td>
</tr>
<tr>
<td>Two principal axes, one on the left and one on the right</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bessarion not explicitly identified as a cardinal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regiomontanus not explicitly identified as inspiration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two astrolabes in one</td>
<td></td>
<td>Three principal scenes in one</td>
</tr>
<tr>
<td>Time scale at left (SVB CD ANNIS)</td>
<td></td>
<td>Left column as time scale (SVB MCD ANNIS)</td>
</tr>
<tr>
<td>Two concepts in one</td>
<td></td>
<td>Two or more people in one image</td>
</tr>
<tr>
<td>Two concepts in one</td>
<td></td>
<td>Three classical gods in one</td>
</tr>
<tr>
<td>Benedicti (Romae) / INRI at left</td>
<td></td>
<td>INRI at focus of left scene</td>
</tr>
<tr>
<td>Bessarion and Regiomontanus at right</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two Bessarions in one</td>
<td></td>
<td>Bessarion and who else?</td>
</tr>
<tr>
<td>Two Ioannes in one epigram</td>
<td></td>
<td>Four Ioannes in one painting</td>
</tr>
<tr>
<td>Astrolabe</td>
<td>Shared</td>
<td>Painting</td>
</tr>
<tr>
<td>-----------</td>
<td>--------</td>
<td>----------</td>
</tr>
<tr>
<td>Sergios and Regiomontanus in one</td>
<td>Dead youths and Regiomontanus in one</td>
<td>Jerusalem, Constantinople and Rome in one</td>
</tr>
<tr>
<td>Jerusalem, Constantinople and Rome in one</td>
<td>Three dates in one</td>
<td></td>
</tr>
<tr>
<td>One person from Trebizond</td>
<td>Two persons associated with Trebizond</td>
<td>Ottoman Sultan</td>
</tr>
<tr>
<td>Fall of Trebizond in 1461</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN + RI</td>
<td>Jerusalem</td>
<td>INRI</td>
</tr>
<tr>
<td>1062</td>
<td>Constantinople</td>
<td>1440</td>
</tr>
<tr>
<td>1462</td>
<td>Rome</td>
<td>~1462</td>
</tr>
<tr>
<td>Divus angel image</td>
<td>Regiomontanus and divus angel in one</td>
<td></td>
</tr>
<tr>
<td>Bessarion and divus angel in one</td>
<td>Regiomontanus and divus angel in one</td>
<td></td>
</tr>
<tr>
<td>Regiomontanus and divus angel in one</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Word-play on cardo (Latin)</td>
<td>Image-play on cardo and carda (Italian)</td>
<td>Marian rosettes around death shroud</td>
</tr>
<tr>
<td>Marian rosettes on throne</td>
<td></td>
<td>Laurel tree</td>
</tr>
<tr>
<td>Elegaic couplet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angel and epigram in one</td>
<td>“Flagellation” and three “moderns” in one</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The common theme in both is <em>Convenerunt in unum</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PIERO

L-axis  R-axis

B +  B  R  IO
A
IO  “IO” IO  IO
Some of the purposes of the polysemous painting:

- to call to mind the betrayal and Passion of Christ;
- to call to mind the suffering of the Eastern Church and Byzantium;
- to serve as consolation for three dead teenagers;
- to celebrate the arrival of the eager young Regiomontanus on Bessarion’s scene.
(Bessarion was not disappointed in the young German, who presented him with an *Epitome* of the *Almagest* in 1463, and two other new works in 1464 and 1465.)
(However, considerable mystery surrounds the death of Regiomontanus in Rome in January 1476, when the Tiber overflowed and there was an outbreak of the Plague. A rumour reported in 1482 was that he died of “unnatural causes”. By 1512 this had been elaborated to the claim that he was poisoned by the two sons of George of Trebizond.)
Apart from the painting, we do not have any concrete evidence of an encounter between Bessarion and Regiomontanus on the one hand and Piero on the other. However, two possible occasions present themselves ...
1457-1466
PdF mainly in Arezzo/Sansepolcro

late 1461
B & R
Vienna → Rome

mid 1463
B & R
Rome → Venice

J. Furttenbach, 1607
The painting was first documented in Urbino in 1744. The 1062 astrolabe resurfaced in Brescia in 1844. The 1462 astrolabe resurfaced in Rome in 1848.
The story of the astrolabe and the painting that we have told took place “under the protection of the divine Bessarion” ...
SUB DIVI BESSARIONIS DE CARDINE DICTI PRAESI
DIO ROMAE SVRGO 10
ANNIS OPVS: 1262
END