

Boulogne-sur-Mer
Bibliothèque municipale

Manuscript 188

Germanicus, *Aratea* without *scholia*, but with inserted lines from Avienus *Aratea*

Abbey of St Bertin?
 after 905 (mid-10th century ?)

The manuscript is a 10th-century copy of the Leiden *Aratea*, in which the pictures and text have been arranged in a two-column format, with the illuminations running down the outer margins. Historically, there has been scholarly disagreement as to whether the Boulogne manuscript is a direct copy of the Leiden *Aratea*, or if it shares a parent, the general consensus is that it is a direct copy.

For a fuller discussion of this manuscript and its relationship to the Leiden *Aratea* and BERN 88, see the pertinent text in the Commentary.

- fol. 1r Calendar (in red and green capitals); inc.: IAN. AUG ET DECB IIII NO HABENT XVIII
 KL POST TOUS ET DJES XXXI. MAR MAIUS ...
- fol. 1v CURSUS LUNAE PER DUODECIM SIGNA (with table of Golden letters)
- ff. 2r-7v Calendar beginning with January (note that on fl. 3r has against XV kal. March: SOL
 IN ARTITIE DIES PRIMUS SCLI ITALIAE MILVUS OSTENDITUR ; and on 7v expl is:
 EXPLICIUNI. IIII. TEMPORA ANNI. XII MENSIS . EBD. LII. & UNUS DIES. DIES. CCCLXI.
 ET SEX HORAE HOREꝝ VIII DCCLX MOMENTA. CCCL DC LX
- ff. 8r-10v Calendrical tables
- ff. 11r-19r (in red) ARG DE REGULARIBUS CYCLI DECENNOVENALIS. Si vis invenire unde
 principalitais origem sumant – Unum ergo subtraht deduo decim. remanent
 undecim multiplica per indecies . xi. annuas epactas fiunt cxxi hos divide per
 tricenos dimitie cxxx. quia quartes triceni sunt remanet unus. una est epacta anno
 present.

- fol. 19v blank
- ff. 20v-29v Germanicus, *Aratea* (without *scholia*)
- fol. 20v (in red) AB IOVE PRINCIPIUM MAGNO DEDUXIT ARATUS.
(with red first initial and the rest in sepia ink)
CARMINIS AT NOBIS GENITOR TU MAXIMUS AUCTOR ...
(= Germanicus, *Aratea*; cf. Breysig 1867, p. 1)
- ff. 22r-22v has the section of Germanicus lines with insertions from Avienus's *Prognosticorum*. Breysig 1867, offers a corrected version of this text on p. 10 (apparatus). See also Avienus, *Les Phénomènes...*, ed. Soubiran 1981, pp. . The actual text reads as follows (with square brackets indicating places where a later hand has scraped away the original letters and added corrected readings in black ink):

(fol. 22r:)

VIRGINIS AT PLACIDE PRESTANTIS LUMINE SIGNAT
STELLA HUMEROS HELICEN IGNIS NON CLARIOR AMBIT
QU[O]DQUE MICAT CAUDA QU[O]DQUE ARMUM FULGET AD IPSUM
CLUNIBUS HIRSUTIS ET QUA SUA SIDERA REDDIT
NAMQUE ALIAE QUIBUS EXPLETU CERVIXQUE CAPUTQUE
VATIBUS IGNOTI PRISCIS SINE HONORE FERUNTUR.

(= Germanicus, *Aratea*, vv. 140-146 (with v. 143 missing))

(in red) AD CAPITIS SUBERUNT GEMINI PROLEMQUE TONANTIS

(= Germanicus, *Aratea*, v. 148 and Avienus, *Prognosticorum*, v. 370)

AEGREGIAM ET PROPRIO POST REDDITA NUMINA CĒLO
NAM LACHEDEMONIIS CUM MARS CALVISSET APHIDNIS
CASTOR ACECROPI TULIT INCREMENTIA BELLII
AT FRATER LUCEMQUE ET FATA SUPERSTITIT Aevi.
PROTINUS AL TERNAE GERMANOS TEM PORA VITĒ
IUPPITER ATTOLLIT CAELIQUE INCELSA RECEPTANS
AETERNAE FLAGRARE FACIS HIBET IGNIBUS AMBOS //

(fol. 22v:)

QUAMEDIA HELICENS SUBJECTU RESPICE CANCRUM

(=Germanicus, *Aratea, Prognosticorum*, v. 147)

QUAM POSTERIOR PES ET DURO CONCAVA DORSO

(= Germanicus, *Aratea*, v. 148 and Avienus, *Prognosticorum*, v. 383)

TEGMINA CURVANTUR GEMINUS MICAT ARDOR IN AURAS

FORMA SO[] DISPAR CHELARUM FLAMMA CORUSCAT

NAMQUE TRIBUS STELLIS ADOLETUR DEXTERA CANCRO

LEVA DUAS PIGRO SUCCEDIT FOMITE FLAMMAS

(= Avienus, *Prognosticorum*, 384, 388-90)

(space)

[O]RA FREMENTIS AB HINC TU RESPICE FORTE VIATOR.

[H]ORRENTISQUE IUBAS ET FULVUM CERNE LEONEM

HUNC UBI CONTIGERIT POEBI VIOLENTIOR AXIS –

(=Germanicus, *Aratea*, ll. 149 ff.)

fol. 29v

– HOC OPUS ARCANIS SICREDAM POST MODO MUSIS

TEMPUS ET IPSE LABOR PATIATUR FATA DOCEBIT.

(= Germanicus, *Aratea*, vv. 444-45; cf. Breysig 1867, p. 26)

ff. 30v-32r

(beginning of 2-column text with alternating red and green at the beginning of each line)

SIGNORUM PARTES QUORUM PRAEDICTA FIGURA

ANNUM EXPLETURI PREDICUNT QUATTUOR ORBES –

ORION HABET ILLE NOTAS QUÆ TEMPORA NOCTES

SIGNIFICET VENTOSUE TRUCES FIDAMQUE QUIETEM

(=Germanicus, *Aratea*; vv, 446- 725; cf. Breysig 1867, pp. 27-40)

ff. 32r-32v

GRADINE PER MIXTUS ARIES NIVIBUSQUE CADUCIS

SPARGUNT VICINA TRISTIS SUPRA IUGA PISCIS

TAURUS PORTAT AQUAS ET VENTOS EXCITAT ARIES

FULMINA TUM CREBO IACULATUR IUPPITER ET TUNC //

INTONAT EMISSUS VIOLENTIOR IGNIBUS AETHER –

ET ROGOR (corrected to RIGOR) ACCEDIT VENTIS MITISSIMUS ILLE

(cf. Breysig 1867, fragm ii, ll. 1-28, pp. 43-4)

ff. 32v-33r

(in red) UNA VIA EST SOLIS BISSENI LUCIDA SIGNIS

A CRAPITUR PHOEBEE PER IDEM CŸTHERJUS IGNIS –

ANNUS EST VENERI CURSUS NEQUE TARDIOR ILLA

MERCURIUS BINOS GRADIUS PERFICIT ORBIS

(cf. Breysig 1867, fragm. i, ll. 40-55, p. 42)

fol. 33r

TEMPORE TUM PROPRIO MODULATUR NOCTUA CARM
 TUM VESPERTINUS CORNIX LONGEVA RESULTAT –
 PLURIBUS INDICIIS SOLLERS FULCIRE MEMENTO
 VALE FIDENS IN DOMINO XPI VESTITUS AMORE

(=Avienus, *Prognosticorum*, ll. 415-46, 443-44, 447, 544 and 551-52; cf.
 Breysig 1867, p. 42 (apparatus) and Soubiran 1981, pp. (ll. 1741-62,
 1769-70; 1773, 1870 and 1877,78).

fol. 33v

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illustrations

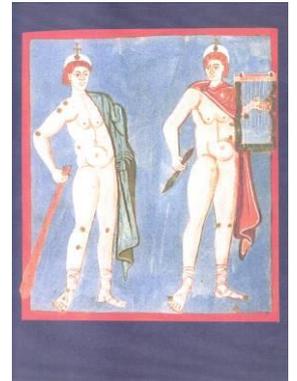
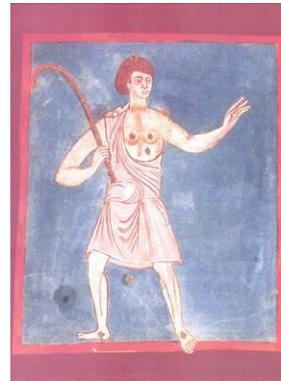
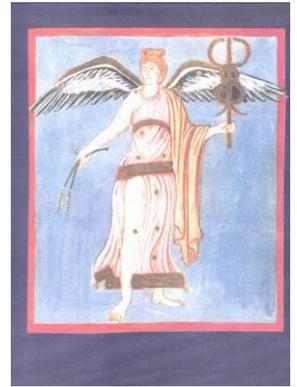
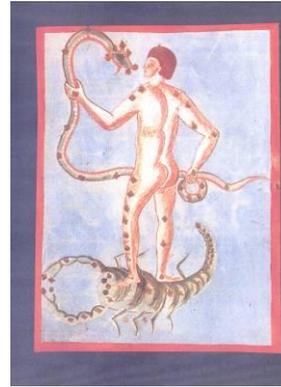


fol. 20r



fol. 20r

note: the pictures have been placed to mimic the orientation on the bi-folii

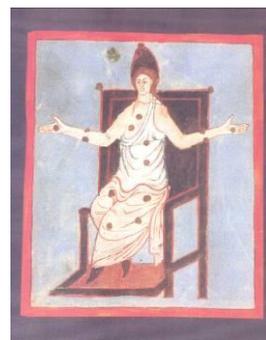
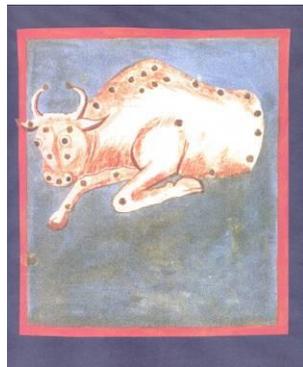
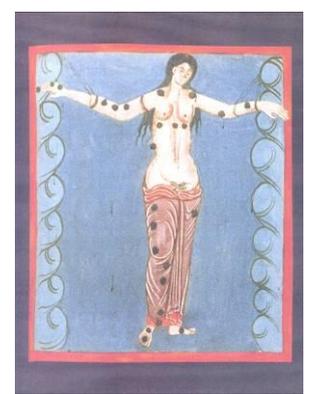


fol. 20v

fol. 21r

fol. 21v

fol. 22r

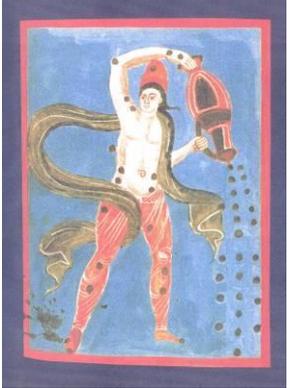
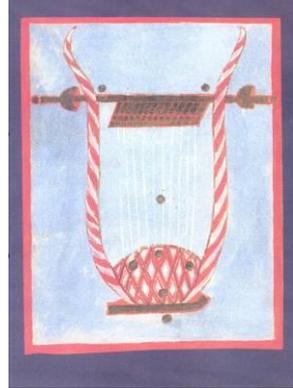
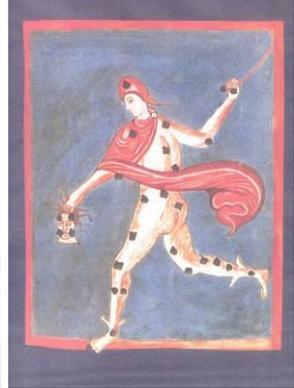
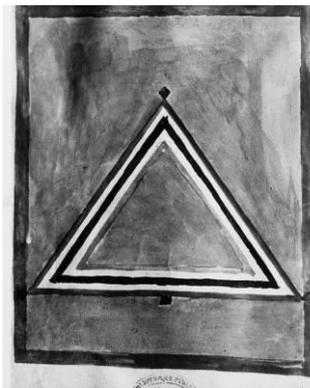
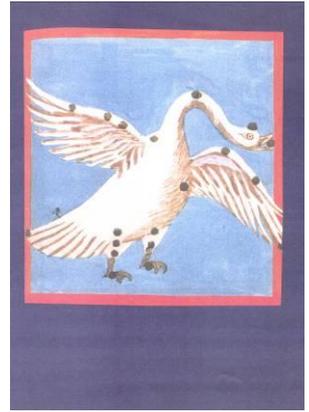
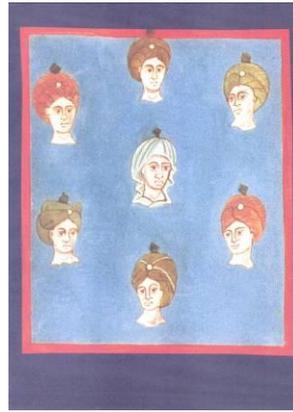
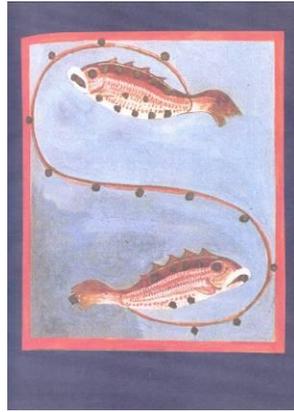


fol. 22v

fol. 23r

fol. 23v

fol. 24r

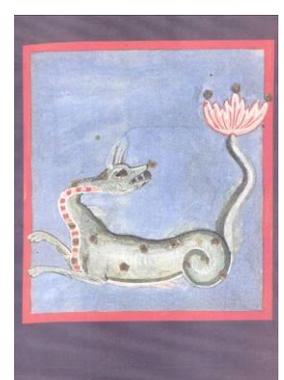
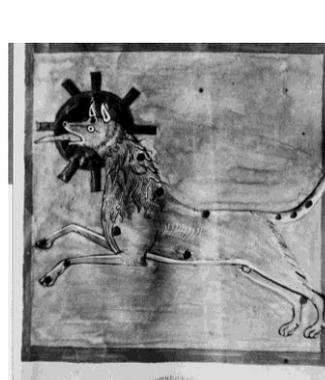
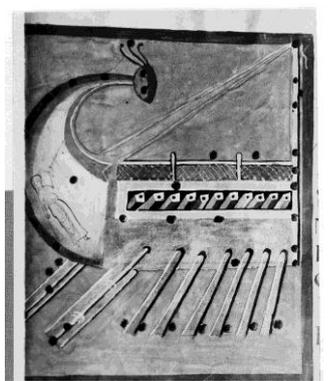
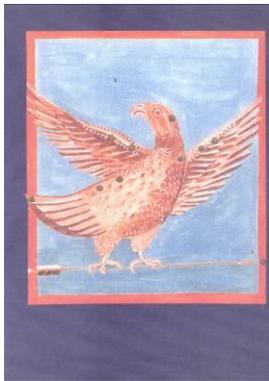


fol. 24v

fol. 25r

fol. 25v

fol. 26r

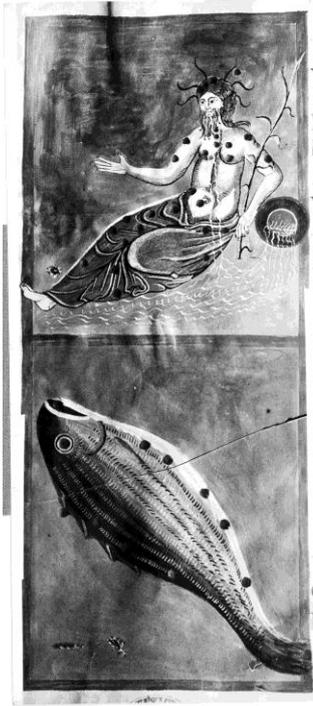


fol. 26v

fol. 27r

fol. 27v

fol. 28r



fol. 28v



fol. 29r



fol. 29v



fol. 30r



fol. 32v

fol. 20r

celestial planisphere

This preliminary study was made jointly with Elly DEKKER. An updated and corrected version will be published in her book in 2012.

folio size: 36 x 30.5 cm; diam image 24.5 cm

A full-colour map, with grey-blue, red-orange, pale brown and pale green predominating. The background of the zodiacal band is orange and its northern and southern contours are marked in darker red-orange and gilded. All the other concentric circles are drawn in black line; but they all have a sheen to them, which suggests that they were originally silvered. This observation is supported by the fact that, at some point in the map's history, it seems as though the fixative for the silver leaf on these lines flooded over their contours and also permeated through the page, leaving a stain on the reverse side of the page. Inspecting the application of silver on other areas of the planisphere (as well as in other illustrations within the manuscript), the fixative seems to have bled through each page where it was applied. The cartographic lines on the planisphere are the only instance where there is evidence of 'flooding'. It may have been occurred when the fixative was still damp and the book was prematurely closed, with the weight of the other pages pressing when the book was closed. The line marking the Milky Way is painted in red and has been gilded.

measurement marks: There is a black dot at the bottom of the planisphere, outside the boundary of the map, which coincides with the line of the solstitial colure.

compass holes: There is a hole in the centre of Ursa Minor's belly, indicating the centre of the map. There is also a faint black dot in the centre of the circle defining the Milky Way near the arm of Bootes and a small black dot and some smudges above the right calf of Hercules.

Constellations:

The constellations are in sky view.

Of the 48 Ptolemaic constellations, 43 are present. Missing are Corona Austrinus, if it is there, is hardly visible), Equuleus, Lyra, Sagitta and Triangulum. The constellations drawn conform to Hipparchus rule are Andromeda, Aquarius, Auriga, Boötes, Cassiopeia, Centaurus, Cepheus, Eridanus, Gemini, Hercules, Ophiuchus, Orion, Sagittarius, Virgo, and the figure holding a pair of scales. The only constellation violating Hipparchus rule is Perseus.

Cartography:

The planisphere has a grid consisting of five concentric circles centred on the celestial pole. From inside to outside they represent the ever-visible circle, the

Tropic of Cancer, the equator, the Tropic of Capricorn, and the ever-invisible circle. When expressed as a fraction of the radius of the equator, the radii of the Tropics of Cancer and of Capricorn are 0.71 and 1.47, respectively. The radii of the ever-visible and ever-invisible circles are 0.34 and 1.92, respectively. In addition, there are three other circles. Two of them are concentric and represent the northern and southern boundaries of the zodiacal band. The third one represents the Milky Way. This final circle is labelled in black: LACTEUS CIRCULIS. The centre of the concentric circles, that is the ecliptic pole, is located inside the ever-visible circle, in the head of Draco. The Tropic of Capricorn touches the southern boundary circle of the zodiacal band. The Tropic of Cancer intersects the band. When expressed as fractions of the radius of the Equator, the distance between the ecliptic pole and the centre of the map amounts to 0.24. The radii of the boundaries of the zodiac are 0.88 and 1.19 and the radius of the Milky Way turns out to be 1.16.

Locations with respect to the main circles:

- a.) Inside the ever-visible circle: Ursa Maior, Ursa Minor, Draco, the right foot of Hercules and the legs of Cepheus.
- b.) Between the ever-visible circle and Tropic of Cancer: Auriga (except for his feet), Cygnus, Cepheus from his head to his knees, Hercules (except the right foot), the northern half of Corona Borealis, the head of the Serpent carried by Ophiuchus, Bootes from his head to his hips, Auriga from his head to his shins; the left leg and arm and Medusa head of Perseus, and Cassiopeia (save her left hand).
- c.) Between the Tropic of Cancer and the equator: the feet of Auriga, Perseus (save his left leg and hand), Andromeda, Pegasus (except for his ears and the tip of his wing), Delphinus, the legs of Aquila, Ophiuchus from his head to his waist and the upper part of the snake, Bootes from his waist to his feet, the head of the figure carrying the scales, Virgo, Leo, Cancer, Gemini, Taurus and the head of Aries.
- d.) Between the equator and the Tropic of Capricorn: the head of Cetus, Orion from his head to his hips, Canis Minor, Canis Maior, the cross bar of the mast and stern of Navis, Hydra, Corvus, Crater, the figure that holds the Scales (except his head), the head and shoulders of Centaurus, Ophiuchus from his waist to his feet, Scorpio, Sagittarius, the tip of Delphinus's tail, the upper part

of Aquila's body, Capricorn the tip of Pegasus's ears and wing, Aquarius, Pisces and the body of Aries.

e.) Between the Tropic of Capricorn and the ever-invisible circle: the body of Cetus, Piscis Austrinus and the stream of Aquarius, Ara, Lupus, Centaurus from the neck downwards, Navis (save the cross-bar of the mast) Lepus, Orion from his hips to his feet and Eridanus.

In the zodiacal band: Aries, Taurus, Gemini, Cancer, Leo, Virgo, the male figure with a pair of scales from his head to his knees, Scorpio with Ophiuchus from his hips to feet, Sagittarius except his head and shoulders, Capricorn, Aquarius and Pisces.

The **ever-visible circle** passes through the thighs of Cepheus and through the feet of Hercules and Ursa Maior.

The **Tropic of Cancer** passes through the left arm of Cassiopeia, the right arm and leg of Perseus, the feet of Auriga, the hips of Boötes, the neck of Serpens, the middle of Corona Borealis and the head of Hercules.

The **equator** passes through the neck of Aries, staff of Orion, the rear legs of Leo, the left hand and foot of Virgo, the neck of the figure holding the pair of scales, the chest of Ophiuchus, the tail of Delphinus, Aquila's feet and the ears and wing of Pegasus.

The **Tropic of Capricorn** passes through the neck of Cetus, the hips of Orion, the sail and stern of Argo, the feet of the figure holding the pair of scales, the shoulders and the long skin flowing out behind of Centaurus, the hind feet of Lupus, Aquarius's stream and the hind feet of Sagittarius rest upon it.

The **ever-invisible circle** passes through Eridanus, the hind feet of Centaurus and Ara rest upon it.

The **Milky Way** passes through the right arm of Cassiopeia and the hips of Auriga. It touches the head of the right Twin and continues through the horse part of Centaurus, the hind legs of Lupus, the middle of Sagittarius, and the feet of Aquila.

The colures are not drawn, but their position can be determined from the position of the ecliptic pole. The equinoctial colures pass through the feet of Virgo, the

third bend of Draco, the equatorial pole in the body of Ursa Minor, the Medusa's head and the hips of Perseus, the tail of Aries and the body of Cetus.

The solstitial colures pass through the tail of Piscis Austrinus, the tail of Sagittarius, the right wing of Aquila, the body of Delphinus, the right arm of Hercules, the ecliptic pole in the head of Draco, through the various parts of Draco, the equatorial pole in the body of Ursa Minor, the head of Ursa Maior. They touch the hind legs of Cancer and pass through the middle part of Canis Maior.

The 'first circle of latitude' passes through of the figure holding the pair of scales, the left arm and head of Boötes, the ecliptic pole in the head of Draco, the hips of Cepheus and of Cassiopeia, the head of Perseus, the head of Aries and the tail of Cetus.

Significant features of the constellation images:

(note: Some of the constellation figures have flashes of gilding on them, which may indicate gold stars that have since, for the most part, flaked off.)

- **Ursa Minor** [-] is a brown bear with a short tail, placed inside the third bend of Draco and it is looking into it, with its mouth open. It is facing towards the autumnal equinox (opposite to the direction of the zodiac).
- **Ursa Maior** [-] is a brown bear with a short tail, placed inside the fourth bend of Draco, and it is looking into it with its mouth open. It is facing towards the vernal equinox (opposite to the direction of the zodiac) and has 3 or 4 flashes of gold on its body.
- **Draco** [-] has a green body with white and gilt dots, which has four bends in it. It has a horn on its head and its tail passes below the feet of Ursa Maior and the end of the tail hugs the contour of the ever-visible circle. His head is directly north of the feet of Hercules. There are 4 stars in the head and 5 in the body.
- **Cepheus** [+/-] stands 'upside-down', with his head towards the south. He is dressed in a short, mauve tunic with one mauve and one tan tight on his leg. He raises both his hands. His thighs are cut by the ever-visible circle. (The postures of the figures are similar, but the one in the planisphere does not have a cloak or a Phrygian cap.)
- **Cygnus** is placed above the head of Cepheus and flies towards the cloak of Hercules. Its wings are spread and its back to the viewer. It is coloured pale yellow.
- **Boötes** [+] is stands directly north of the pair of scales, facing the viewer. He

wears a short blue *exomis* that exposes his right shoulder. He raises both arms and holds a blue crook in his right hand. The crook seems to end in an animal's (snake's?) head. He wears re-organge shoes and has 1 gold star on his head. His hips are intersected by the Tropic of Capricorn and his feet rest upon the intersection of the equator and the northern boundary of the zodiacal band.

- **Corona Borealis** [+] consists of a red-orange wreath with orange ribbons and a dark green (perhaps originally silvered) interior marked by small dots. It is placed between Boötes's staff and Hercules's right shoulder. In the centre of the wreath, there are 12 gold dots.
- **Hercules** [-] stands 'upside-down', with his head facing south and his feet towards the north. His right ankle and left heel are intersected by the edge of the ever-visible circle. His feet nearly frame the head of Draco and Corona is placed behind his shoulder. He faces towards the vernal equinox (in the direction of the zodiac). He is nude, faces the viewer and a dark blue lion's skin with brown dots covers his left arm. He holds a curved brown staff/club in his right hand, resting it on his shoulder. He has brown hair and 1 star on his head and 3 on his left thigh. His head is cut by the Tropic of Cancer.
- **Cassiopeia** [-] is placed parallel to the Tropic of Cancer, which runs down the southern side of her body and through her left arm. She appears to be sitting between Cepheus and Andromeda, but no chair is visible. She is dressed in a long blue robe that exposes her shoulders and has black hair and brown shoes. She stretches her arms to either side. Her right shoulder is cut by the Milky Way.
- **Perseus** [-] is parallel to the zodiac, with his leg and cloak running along its northern border. He faces away from the viewer and his buttocks are visible. He is nude, but wears a red cape with white highlights over his shoulders and a black Phrygian hat. He holds the Medusa's head by its brown hair in his left hand in front of him and a raised a straight black (silvered?) stick vertically above his head with his right hand. The Tropic of Cancer runs through his right shoulder and right thigh.
- **Auriga** [-] is depicted facing the viewer and standing to the north of the Taurus's head. He holds a stick in his raised left hand and has two pale blue goats standing on his outstretched right arm. He wears a pale blue shift with long sleeves. His head nearly touches the ever-visible circle; his hips are cut by the Milky Way; both shin are cut by the Tropic of Cancer and his feet rest upon the northern boundary of the zodiacal band
- **Ophiuchus** [-] is nude, faces the viewer and slightly towards the man who carries the scales (opposite to the direction of the zodiac), while standing on the back of a brown Scorpio. The pale blue and green snake with white dots snake held by Ophiuchus encircles his body with the Snake's head facing away from

him. The head of the Snake is placed on the tropic of Cancer, and his tail curves round so that it touches the equator. Ophiuchus has the equator passing through his chest and the northern boundary of the zodiacal band passes through his hips.

- **Aquila [-]** is directly north of Capricorn, with his body facing towards Sagittarius and his wings stretched out behind him. His back faces to the south and he is coloured red-orange. His feet are cut by the Milky Way and his body is bisected by the equator.
- **Delphinus [-]** is a two-toned blue fish with an orange trefoil tail, placed with his back towards the south, north of Sagittarius and Capricorn. He faces towards Pegasus (in the direction of the zodiac) and the equator passes through the end of his tail.
- **Pegasus [n/a]** is depicted as half a pinkish winged horse. He is positioned 'upside-down', with his back to the south and facing towards Aquila and Delphinus (opposite to the direction of the zodiac), directly north of the head of Aquarius. He has a decorative band on his shoulder. The top of his head and the tip of his wing are cut by the equator and both hooves are cut by the boundary of the Milky Way.
- **Andromeda [-]** is in advance of Pegasus and to the north of Aquarius's feet and of the Pisces, with her head close to the severed belly of Pegasus. She is nude, with short-cropped black (silvered?) hair, facing the viewer and both her arms are held down by her sides, but there is neither rope nor accompanying rocks. Her right hand touches the Tropic of Cancer and her left foot touches Perseus's cap.
- **Aries [-]** is pinkish and leaping opposite towards Pisces (the direction of the zodiac), while looking back over his shoulder towards Taurus (following the direction of the zodiac). He is pinkish with a long tail and there is no ring around the body.
- **Taurus [-]** is a complete, pinkish bull, lying down with both front legs stretched out in front of him. He faces towards the Gemini (in the direction of the zodiac).
- The **Gemini [-]** are nude and stands facing each other, each holding the elbow of the other's inner arm in such a way that they seem co-joined like Siamese twins. They are set parallel to the zodiacal band, with their heads pointing towards Cancer. The southern Twin has a slightly curved, brown staff in his right hand, so that its curved end rests near his feet. The intersection between the Tropic of Cancer and the Milky Way occurs at the northern twin's left shoulder. The southern Twin's right hand and club run along the intersection between the southern boundary of the zodiacal band and the equator.

- **Cancer** [-] has two claws and six (?) legs (the bleeding from the Tropic of Cancer obscures most of the northern part of this figure. It is brown and faces towards Leo (in the direction of the zodiac).
- **Leo** [-] is dark blue and leaps towards Cancer (opposite to the direction of the zodiac), with his head held high. His hind feet on the intersection between the southern boundary of the zodiacal band and the equator and his nose touches the tropic of Cancer.
- **Virgo** [-] is a female figure, dressed in a long orange dress covered by light grey cloak. She has no wings, but holds a drooping, 2-frond plant in her right hand and seems to raise her left hand. Except for her right hand, she is within the zodiacal band and aligns with it. Her left hand and left foot lies on the equator
- In the compartment for Libra, there is a **male figure holding a pair of scales** [n/a]. He wears a short grey tunic and leggings and an orange cape over his left shoulder. He faces the viewer, but walks to looks Scorpio (in the direction of the zodiac). In his right hand, he holds a pair of red-orange scales, that swing away from his body so that they nearly fall in line with the position of Scorpio's claws. He is standing with his feet on the Tropic of Capricorn with the southern boundary of the zodiacal band running through his thighs and the northern one clipping the top of his head. The equator cuts through his neck.
- **Scorpio** [+/-] is brown and he faces towards the man holding the scales (opposite to the direction of the zodiac) He has two long front claws, very thin legs, but a curved a tail, whose tip curves upwards so that it nearly touches the buttocks of Ophiuchus. Ophiuchus stands on the back of Scorpio, obscuring much of it with his naked legs. His southern side of Scorpio hugs the southern boundary of the zodiacal band.
- **Sagittarius** [+/-] is a centaur with a pale blue horse's body , holding a red bow and red arrow with his left hand outstretched in front of him, pulling back the string of the bow with his right hand. He faces towards Scorpio (opposite to the direction of the zodiac). His hind hooves rest on the intersection between the southern boundary of the zodiac and the Tropic of Capricorn. The Milky Way runs from his right shoulder through his belly. (The two depictions of Sagittarius are generically similar, save that they are mirror images of each other and the one in the planisphere has no cloak.)
- **Capricorn** [-] has two long horns and two curls in his brown body. His front legs stretch in front of him towards Sagittarius (opposite to the direction fo the zodiac) and touch the intersection between the Tropic of Capricorn and the southern boundary of the zodiac.
- **Aquarius** [-] is a nude male facing the viewer, who wears a brown Phrygian hat and a red cape with white highlight draped over his left shoulder. He holds an

upturned pale blue urn that pours water into a black (silvered?) stream flowing towards the mouth of Piscis Austrinus. He is within the zodiacal band and runs parallel to it.

- **Pisces [-]** are two blue and green fish, swimming in opposite directions, with both their backs to the north. Their mouths were tied by a dark red and green cord. The equator skims the back of the northern fish
- **Cetus [-]** is a large blue sea monster, with a black backbone, marked with gold dots and a pink acanthus-like tail. He has a dog's face and breathes orange-red flames. He has flippers on his front legs and two coils in his body. The figure stretches across the area directly south of Taurus, Aries and Pisces. He faces towards Eridanus (in the direction of the zodiac), with his front flippers just touching the edge of the stream. His neck is cut by the Tropic of Capricorn.
- **Orion [-]** is standing facing the viewer, wearing a short, pale blue tunic and with a red-orange cape hanging over his left shoulder. He has blue hair. He is placed to the south of Gemini. He holds a straight brown stick aloft in his right hand and there is a brown sword hanging at his waist. His left foot rests on Eridanus's urn and his waist is cut by the Tropic of Capricorn, while the tip of his stick intersects the equator.
- **Eridanus [-]** is depicted a nude, pale green and blue sea god, with long hair and visible from the waist upwards as if emerging from his stream. He holds his mauve urn out in front of him (towards Orion) so that the stream pours back towards his body.
- **Lepus [-]** is orange and placed in advance of Orion, leaping towards his right leg
- **Canis Minor[-]** is blue and placed between Canis Maior and Orion, leaping towards Orion's staff (opposite to the direction of the zodiac). He has a long tail and his mouth is open.
- **Canis Maior [-]** is red-orange and leaps towards the hind quarters of Canis Minor (opposite to the direction of the zodiac). His hind feet touch the mast of Argo.
- **Navis [-]** is a partly visible dark green and blue ship with pale blue sails attached to an red-orange mast. It appears to the south of Cancer and Leo and its mast touch the hind feet of Canis Maior. There are no oars (note: its position on the map is reversed from the norm; the stern should be at the side of Canis Maior). The Tropic of Capricorn passes through the sails and the tip of the stern.
- **Hydra [-]** is has a snaky, blue and green and body with horns on its head. The head is south of the front feet of Leo and its tail below the feet of Virgo.
- **Crater [-]** is a grey vase, placed in front of the first bend of Hydra.
- **Corvus [+]** is brown and stand near the tail of Hydra facing backwards and pecking at its body.

- **Centaurus [-]** is south of the figure that holds the scales. He is nude to the waist, but he has a light brown animal's skin draped over his left shoulder in such a way that it seems more an extension than covering his arm. His horse parts are pale blue. He faces towards Ara (in the direction of the zodiac). He holds a dead brown animal with a short tail (note the closeness in form to Lepus) by its heels in his right hand in front of him. The Tropic of Capricorn cuts through his skin and shoulders and the tip of Lupus's feet, while the Milky Way runs through the length of the horse part of his body and the southern boundary of the zodiacal band runs through his head.
- **Lupus [+]** is a brown animal held by Centaurus upside down, which is closest in form to Lepus.
- **Ara [-]** is stepped, dark blue, three-story structure (each step is highlighted in yellow) with red flames on top and red highlights in the base. It is placed to the south of the tail of Scorpio. It touches the Tropic of Capricorn with its flames and its base rests upon the ever-invisible circle.
- **Piscis Austrinus [-]** swims towards the tail of Cetus (in the direction of the zodiac), with his back facing north and his mouth connected to the stream of Aquarius. His body is green and pale blue with red-orange fins and highlights.

Comments

The present planisphere is related to those in HARLEY 647 and BERN. The cartographic parameters show the same sort of deviations, but the present copy is the least accurate of them.

The radii of the various circles indicate that a linear scale underlies in the construction of the map. Assuming the distance of the Equator of 90° , one finds that the angular distances between the Tropics of Cancer and of Capricorn and the centre of the map correspond to 64° and 132° , respectively. These values show that these circles are not symmetrical with respect to the equator. In order to interpret these values correctly, one notes that the Tropic of Capricorn is set tangentially to the southern boundary of the zodiac and not to the ecliptic in the centre of the band. With an obliquity of the ecliptic of 24° and a width of the zodiacal band of 12° this model dictates that the angular distances between the Tropic of Capricorn and the centre of the map would correspond to 120° . The measured value of 132° is considerably more than expected, which may be the result of bad copying. The Tropic of Cancer is neither tangential to the ecliptic, nor to the northern boundary. With an obliquity of the ecliptic of 24° and a width of the zodiacal band of 12° , one expects values of 66° and 60° for a tropic tangential to the ecliptic and to its

northern boundary, respectively. The measured value of 64° agrees with the fact that the Tropic of Cancer is closer to the ecliptic than its northern boundary.

Assuming the distance of the Equator of 90° , the ecliptic pole appears to be located at an angular distance of 22° from the centre of the map, which is close to the expected 24° . Using the same linear scale factor, the radii of the boundary circles centred on the ecliptic pole correspond to angular distances of about 79° and 107° , respectively. This indicates a size of the ecliptic of about 93° (mean value of the sizes of the upper and lower boundaries) and a width of the zodiacal band of about 14° on both sides of the ecliptic. The angular distances of the ever-visible and the ever-invisible circles from the centre of the map correspond to 31° and 173° , respectively. These values, which are the equivalent to the geographical latitude of $31^\circ / 7^\circ$, and show that these circles are not symmetrical with respect to the equator, which may be the result of inaccurate copying. Finally, the radius of the Milky Way turns out to be 104° , which is considerable more than the expected value for a great circle of 90° .

From the location of the colures, one can conclude that at least some of the zodiacal constellations are in a curious position. The vernal equinoctial colure should pass roughly between Aries and Pisces instead between Aries and Taurus. Another deviation is that the bears are not on both sides of the North Pole, but that the latter is in the body of Ursa Minor.

- fol. 20v Jupiter on his eagle holding a golden stick in his left hand and resting it on his left shoulder and a silver globe with 2 crossed lines (one gold and one blue, both with red outlines) in his right hand. He has a silver halo around his head with 7 gold baubles on it from which 7 rays of light emanate. He wears a gold and red headdress and has darkened skin that is outlined in white. His torso is bare, but he wears a mauve toga-like drape around his waist and over his left arm with white and gold highlights. The eagle stands on an arrow.
- ff. 20v- 29v illustrations of 44 constellations in full colour, with red-orange, pale blue, mauve and green predominating, and the stars marked by gold dots. This number includes Corona Austrinus, which is included as part of the depiction of Centaurus. There is also an illustration of the Pleiades. All of the illustrations are set within a square panel of pale blue, bounded by a simple red frame (except for the first few - Draco and the Bears, Hercules and Corona Borealis - in which the red frame has a black inner frame along 3 or 4 of the inner sides). These panels are arranged vertically along the inner margins of

each page, with two panels per page (except for fol. 29v, where there are three panels on the page).

fol. 20v

DRACO with the two bears is set within a frame (red on the outside and black on 3 of the inner sides). Draco has three bends in his body, with his head facing to the right.

URSA MINOR is enclosed within the second bend and **URSA MAIOR** within the third. The Snake has a red-brown crest and a red-orange beard on his head. His body is striped along its length with white and dark-brown dots. He has 1 star in his nose, 1 on his tongue, 2 in his eye, 1 in his beard, 1 in his crest and 20 stars in his body or 26 all together. Both bears are leaping upwards, with their mouths open. They both face away from the snake, towards the open space and are placed foot-to-foot so that Ursa Minor is placed with his back towards the top of the page and Ursa Maior has its back towards the bottom of the page. They are both green. Ursa Minor has 1 star in the nose, 1 in the mouth, 1 in the cheek, 1 in the left forefoot, 1 in the left shoulder, 1 in the belly, 3 on the back, 1 in the tail and 1 in the left hind leg or 11 stars in all. Ursa Maior has 6 stars along the back of the head, 2 in the face, 2 in the chest, 2 in each forefoot, 1 on the left fore-elbow, 4 in the rump, 2 in the groin and 2 in each foot, or 25 stars in all.

fol. 21r

HERCULES is set in a frame (red on the outside and black on all four of the inner sides). He is standing facing the viewer, leaning slightly to the right and wearing a mauve *exomis* that is decorated with silver stripes along the upper edge and the hem of the skirt and gold vertical stripes. He looks to the left, and holds a curved red and brown staff in his right hand and a dark blue lion-skin with brown spots (complete with face and tail) over his outstretched left arm. The flaps at the tops of his boots have been misunderstood, so that he seems to be wearing green wings on his ankles. There are some small circles on his bare ankles, however, that recall the buttons originally included on the feet of the Leiden Hercules. These dots also appear in the Bern manuscript. His right foot extends into the black border of the double frame. He is marked by 1 star on his head, 1 on his right shoulder, 4 in the lion's skin, 2 in his right arm, 2 in his right hand, 1 at the tip of his staff, 2 in his waist, 2 in the right leg, 3 in the left leg, 1 on each foot and 1 star between the legs, or 21 stars in all.

CORONA BOREALIS is set in a frame (red on the outside and black on 3 of the inner sides). It is a gold wreath with red details and silver ribbons at the bottom. The

three 'jewels' are also silvered. The ribbons extend into the lower corners of the frame. Inside the wreath, there are 8 stars.

fol. 21v

OPHIUCHUS is nude with brown and mauve hair, standing with his back to the viewer and facing to the left with both feet on the back of Scorpio, with the **SERPENS** running horizontally behind (that is, in front of) Ophiuchus' body. In his left hand he holds the Serpent's neck and in his right hand its tail at the coil, which forms a loop around the hand. The Serpent's body is striped with gold, blue, mauve, pink and with white dots and he turns his face towards the man. Ophiuchus is marked by 1 star in the head, 2 on each shoulder, 2 in the right arm, 1 on each hand, 2 on his right leg, 1 on his right foot, 7 on his left leg and 2 in his left foot, in all 21 stars. Serpens has 6 stars in its head and 12 in its body, with 4 in the coil, making a total of 18 stars. The star at the end of the tail is in the red border of the frame. **Scorpio** is pale blue with dark green stripes. He faces towards the left and has two front claws set on segmented arm held in a circle and 8 pointy legs. He is marked by 4 stars in the right claw, 5 in the left claw, 2 between the left feet, 3 in the head and 16 stars in the segments that make up the body and the tail, making 30 stars in all.

BOOTES stands facing the viewer leaning slightly to the left, wearing a pink *exomis* and has a white button on his right shoulder. He has brown hair and carries a red and brown crook in his right hand. His left hand is raised in a sort of salute. His left foot extends into the red border of the frame. He is marked by 1 star in the head, 1 on each shoulder, 3 on his breast, 1 on each foot and 1 between his knees, in all 9 stars.

fol. 22r

VIRGO is standing facing the viewer, dressed in a long pink dress with gold stripes beneath the breast, and at the hips and along the lower hem. Around her neck, there is a darker pink band with white dots that may be a necklace and she wears diamond-shaped white earrings. A pale red-orange wash shawl is draped over her left shoulder and arm. She is winged (whereas she is not in the Bern manuscript); her wings are gold, with blue and white feathers. Her skirt falls open so that her right leg is exposed from the hip to the foot (it seems covered as in Bern 88, but one can clearly see the outline of the leg). She holds two blades of wheat down by her side in her right hand and holds a gold caduceus upright in her left hand. The tips of her wings extend into the border of the frame. She has 2 stars set into her headdress, 1 on her right shoulder, 4 in each wing, 4 in the middle of her dress, 3 on the skirt and 2 below the hem of her dress, 1 in her right knee, 1 in each foot, in all 23 stars.

The **GEMINI** are nude, save the long *chamlys* they each wear falling over their left shoulders. The one worn by the left Twin is green and the right Twin wears a red one. The green of the left twin's cape has also been used to colour-in his hand. The left twin holds a straight pink club in his right hand. The right Twin holds a green lyre with a pink crossbar and white strings in his left hand (the position of his hand is the same as in Leiden Voss. Q. 79, but is reversed in comparison to the Bern Manuscript 88) and a green object in his right hand that looks like stylised 'lightning', but may be a plectrum, in his right hand near his right hip. They both have brown hair and their white caps seem almost like haloes, each of which is surmounted by a cross. The club and lyre extend into the border of the frame. They also have strapped sandals, the contours of which are defined by red outlines, on their feet. The left Twin is marked by 1 star in the head, 2 on the right shoulder, 1 in the right elbow, 1 on his right side, 2 in his right leg, 4 in his right foot, and 1 in his left knee, or 12 stars in all. The right Twin is marked by 1 star in the head, 1 on each shoulder, 1 in his left hand, 1 on his left arm, 3 on his left side, 2 in his left knee, 2 in his left foot, and 1 in his right foot, or 13 stars in all.

fol. 22v

CANCER has a trapezoidal body, wider at the top, long front claws and 8 long, pointy legs. His body is grey with lighter patches and highlights in pink. He is placed vertically on the page, with his head towards the top, and his right legs extend into the border of the frame. He has 2 stars in the left claw, 3 in the right claw, 1 in the nose, 5 in the body, 5 in the left set of legs and 2 in the right set of legs, or 18 stars in all.

LEO leaps to the left with his mouth open and his tail raised. His body is pink and his red-brown curls have become quite stylised. He is marked by 3 stars on his head, 1 on his nose and 1 on his mouth, 3 behind his mane, 3 on his chest, 1 on each foreleg, 1 on each forepaw, 3 on his belly, 4 on his haunch, 1 in his right hind leg, 2 on each hind ankle and 1 or 2 on his left hind foot and 1 in the middle of the tail and 1 at the end of the tail. There are 30 or 31 stars in the constellation. In addition, there is a star outside the constellation below his belly, making a total of 31 or 32.

23r

AURIGA is standing frontally leaning slightly to the right. He is dressed in a long, pink robe with gold bands that are decorated with red patterns under the breast, at the waist and along the hem. He wears a long red cloak, which is held by a red button at his neck and billows out to the left. His shoes are also red. He holds a long straight gold stick vertically in his right hand, which has a single pink flail

attached to its upper end. He also has a gold crown on his head with 6 spikes. There is a green goat on his left shoulder and two further green goats in his extended right hand, which extends into the border of the frame. His hair is gold and he may have 2 stars nestled in his curls (there are irregularities in the paint surface, but whether or not they are stars is difficult to determine). Beyond this, he has 2 stars on the right shoulder, 1 on the goat on the left shoulder, 1 on the right lower arm, 2 on the left elbow, 2 stars in the goats in the left hand, 1 on the left knee, 3 on the robe close to his right leg, 1 on each foot, with either 14 or 16 stars in all.

TAURUS is depicted as half a pinkish bull facing to the left with his right leg extended and his left leg tucked under his body. He has a large hump in his back and short curved horns. He is marked by 2 stars at the tip of his horns, 4 in his face, 2 on his right ear, 1 on his nose, 8 in the hump on his back, 3 more on his back, 3 at the point where his body is cut-off, 1 in his shoulder, 1 in his belly, 3 on his right leg and 1 on his left knee, or 29 stars in all.

fol. 23v

CEPHEUS is bearded, stands frontally with his left knee bent and is dressed in oriental garb, consisting of a short grey tunic with long tight sleeves, red hose and a long mauve cape that covers his chest and then flows out to the left behind him. The tunic has gold bands with blue decoration at the chest, lower hem and cuffs. He has a pointed red hat with a golden band along the edge and running down the middle. He holds his hands out to either side. His cape and left hand extend into the frame and his right foot touches it. He has 1 star on his right shoulder, 3 on his right arm, 1 on his left elbow, 1 in each hand, 1 at his hip, 3 at his waist, 2 on his left knee, 1 on each foot and 3 on his hat (one of these may be a bauble at the pointed tip of that, but it is gold). In all, there are 18 stars. (There is a golden dot on his hat which seems to be a decorative bobble and not a star.)

CASSIOPEIA is seated on a square, gold throne, marked by red lines. The chair has a pink footrest and faces slightly to the left. She is dressed in a long garment that exposes her right breast and shoulder. The garment is white with blue lines for the upper, blouson part of the gown and pink with darker pink lines in the skirt. She has brown hair and wears a tall gold hat and pointed gold shoes. Her arms are stretched out to the sides. She has 1 star on the head, 1 in the middle of her chest, 1 on her right breast, 2 on her stomach, 2 on each lower arm, 1 in each hand, 1 on her right thigh, 3 on her left leg, 1 star on each corner of the back of the chair. In all, there are 17 stars.

fol. 24r

ANDROMEDA is standing frontally with her arm outstretched and tied by brown cords to columns of lumpy light blue rocks at either side. She wears a mauve wrap with a red waistband and a red hem around her hips that exposes her pudenda. Her torso and arms are bare, save a gold bracelet she wears on her upper right arm. She has long blue hair, tips her head slightly to the right. She is marked by 1 star on the head, 1 at each shoulder, 3 are the right upper arm, 3 at the right hand, 2 the left lower arm, 3 on her chest, one at her right side almost outside her body, 1 on the left thigh, 3 on the right thigh, 4 in the middle of the lower part of the dress, 1 on the right foot and 2 on the left foot, or 26 stars in all.

PEGASUS is depicted as half a white winged horse flying to the right with his forefeet stretched out in front of him. The wings are green with a gold border on top. He has 2 stars in his mouth, 3 on his head, 1 on each ear, 2 above the head almost outside the constellation, 3 in his mane, 2 on his chest, 1 on his shoulder, 2 at the cut-off, 3 in his right wing, one on his left knee, 2 on his right knee and in each front foot, or 25 stars in all. In addition, there are 4 stars forming a vague arc in front of his head. These may represent the stars of Equuleus.

fol. 24v

ARIES leaps to the right, while looking over his left shoulder. He has a long tail, curly horns and large testicles. He is pink and has a gold brown ring around his middle. His tail, right hind leg and right front foot extend into the frame. He is marked by 2 stars on the right horn, 3 on his nose, 1 below his nose in the ring, 1 on his neck, 1 in his shoulder, 1 on his left front foot, 1 on his right front knee, 1 on the back, 3 on the belly, 1 on his haunch, 4 in his tail and 2 on his right hind leg, or 21 stars in all.

TRIANGULUM is an equilateral triangle made of five bands of colour (red-orange, pink, gold, pink and darker pink). It is marked by a star in each corner and one in the middle of the base, or 4 stars in all.

fol. 25r

PISCES are pink and white fish, swimming in opposite directions, with both their backs to the top of the page. They are connected at their tails to a red and gold cord that forms a large 'S' shape. Their mouths are open. The upper fish has 2 stars in its mouth, 1 on his eye, 6 on its back, 2 in the middle of his body and 5 along his belly, or 16 stars in all. There are 12 stars in the cord and the bottom fish has 1 star in its mouth, 2 along its belly, 1 in its eye, 4 along the top and 1 in the tail, or 9 stars in all. In all there are 36 stars.

PERSEUS appears flying to the left, with his back to the viewer. He is nude except for a red *chamlys* that he wears, fastened with a white button at his right shoulder. The cloak flows down his left arm and then crosses his back, above his exposed buttocks, ending in a flourish behind him. He wears a red-orange Phrygian cap with two ties trailing from its edge and holds a red stick in his upraised right hand and the severed Medusa's head by the hair in his left hand in front of his left thigh. The Gorgon's head has brown twisting (snaky) hair. The tip of his stick and his left foot extend into the frame.

PERSEUS is marked by 1 star on the head, 1 on each shoulder, 2 on his back, 1 on each elbow, 2 in his right hand, 3 on his hips, 2 in his left thigh, 2 on his left shin, 2 in his left foot, 1 in his right leg, 1 in his right thigh, 3 in his right calf and 1 on his right foot with 4 in the head of Medusa, in all 28 stars.

fol. 25v The **PLEIADES** are represented as 7 busts of women. They are cut by wavy lines at the neck. The middle one has a light green headdress. The others are bare headed, with brown or red hair adorned with a white jewel. Each of their heads bears a square star.

LYRA is a harp with two red, white and mauve striped oxen horns at either side. The sounding board at the bottom is decorated with red, white and mauve diamond patterns and the gold cross bars hold 10 white strings. The tip of the top cross bar extends on the right side into the frame. There are 4 stars on the top cross bar, 4 on the sounding board, one on the strings above the sounding board and one below it outside the constellation figure, in all 10 stars.

fol. 26r **CYGNUS** stands to the right with its neck bent in a 'U'-shape and its mouth open. He is pinkish with mauve stripes and his wings are outstretched to either side. He has 1 star in his beak, 1 on his head, 1 on his neck, 2 in his body, 1 on his tail, 3 on his left wing, 3 on his right wing, 3 on his right leg, 2 on his left leg, one on each foot, in all 19 stars.

AQUARIUS stands frontally, leaning slightly to the right. He wears a red-orange hose and has a grey scarf that runs from his left knee over his left shoulder, around his back and then through his right leg, with its end trailing behind him by his feet. He is nude from the waist up and has a tall red-orange Phrygian cap. He holds the urn in an awkward manner, with his right arm crooked over the top of his head holding the base, and his left arm bend upwards to shoulder height holding the handle. The urn itself is coloured red and gold. A stream of stars (water) flows from the urn to

the ground. Aquarius himself has 1 star on his hat, 2 in his right shoulder, 1 in his right elbow, 2 in his right hand, 1 outside his right hand, 4 at his waist, 1 outside his body near his waist, 3 in each leg, 2 in his right foot and 1 in his left foot, 4 on his cape (25 stars in all) and 25 in the water. In all there are 50 stars.

fol. 26v **CAPRICORN** faces towards the right, with his right leg tucked under his body and his left leg extended. His forepart is white and his fish-tail is blue, with his beard brown and his long curved horns dark grey. The slim end of his tail is grey, with a red/brown circle and a white trefoil fin. He has 1 star in his face, 1 in his beard, 3 in his left horn, 1 on the right horn, 3 on his neck, 3 on his chest, 1 in each knee, 1 in each front foot, 7 stars in his body and 9 in his tail. In all, there are 32 stars.

SAGITTARIUS is depicted leaping to the right, with his forelegs raised. He wears a tan, spotted animal's skin from his right shoulder and the horse-part of his body is red-brown. He holds the bow extended in front of him with his left hand, pulling back the string with his right hand. The bow and arrow are brown, but the string is yellow. He has 3 stars on his head, 1 in each shoulder, 1 in the chest, 1 in the right elbow, 1 in the left upper arm, 1 in the left hand, 3 in the body of the horse, 3 in the left lower leg, 1 in the right front foot, 1 in each of the hind legs, 3 in the tail, 2 in the animal skin and 2 on the bow, in all 25 stars.

fol. 27r **AQUILA** stands with his body to the right, but his head looking back over his shoulder to the left. Both of his wings are outstretched and raised. His body is brown with dark-brown feathers, and he has grey-white talons with white spots and a dark brown beak. He stands on a light brown **SAGITTA**. The tips of his wings and of his tail extend into the frame, as does the tip and the end of **Sagitta**. **Aquila** has 1 star on his head, 1 in his neck, 2 on each wing, 2 in his back and 1 in his tail, in all 9 stars.

SAGITTA has one star at the tip of the arrow and 3 at the end, or 4 stars in all.

DELPHINUS is a classical dolphin swimming to the left. He has the integral dorsal fin-beak-bottom fin so common to these images. He has a pink-grey body and the dot on his pink tail is gold. He has 1 star in his mouth, 1 in his eye, 1 in his head, 1 on his back, 2 on the bottom fin, 2 in the tail and 5 in the trefoil at the end of the tail. In all, there are 13 stars.

fol. 27v **ORION** stands with his back to the viewer, lunging to the right. His head is in left *profil perdu*. He is dressed in a short mauve *exomis*, which is caught at the waist by

a wide red-orange belt. He wears a red scabbard and sword on his left hip and holds a curved red club upraised above his head in his right hand. The brown skin he wears is draped over his extended left arm and has no markings in it. He wears light brown boots. He has 1 star on his head, 2 in his left shoulder, 2 in his right shoulder, 1 in his right elbow, 1 in his right hand, 3 in the middle of his back, 3 in his belt, 3 in his scabbard, 1 in his right knee, 1 in his right foot, 1 in his left calf, 2 in his left foot, 1 in the middle and 1 on the tip of his staff and 10 in the animal skin, or 33 stars in all.

LEPUS appears as part of the Orion set, placed between the legs of Orion. It leaps to the right, while turning his head backwards to the left. It has a brown body and long straight ears. He has 1 star on his mouth, 1 in his right forefoot, 6 in the main body, 1 in the tail, and 1 in each hind foot, in all 11 stars.

CANIS MAIOR leaps to the left with both forepaws and his tail raised. His mouth is open and he has a pink tongue sticking out. His body is dark pink, with white and brown markings. The 7-rayed starry disk that surrounds his head is gold with red outlines. He has 1 star on his head, 2 in his manes, 1 on his chest, 1 in his back, 1 in his belly, 3 in his tail, 1 in his right hind leg, 1 in his right forefoot, and 2 in his left forefoot, in all 13 stars.

fol. 28r

NAVIS is a half ship with the stern at the left. The ship has a pink and grey body with green netting along the deck and multi-coloured illusionistic panels on the side. The mast is pink, and is connected to the deck by 2 pink lines and bearing a pink flag. It has two long steering oars and 6 shorter pulling oars. The stern is pink and there is a red-line figure of a female wearing a long dress and a cloak over her head. Her right hand raised and her left hand is down by her side. Her attributes are difficult to determine. Iconographically, it would make most sense if she were holding a stick or sword in her right hand and some kind of frond or plant in her left as this would be reminiscent of figures of Virgo and would make sense with regard to the mythological context of a figure of Minerva being placed at the bow of the Argonaut's vessel. Equally, in the Boulogne manuscript, the objects actually seem to represent links of chain, suggesting that this figure may be intended to be Andromeda. The stern and the left steering oar extend into the frame. The mast of Argois marked by 10 stars, here are 2 along the deck, 3 at mid-level and 1 on the keel, 7 in the pulling oars and 2 and 4 in each of the steering oars. The curved end has 10 stars, making 39 stars in all.

CETUS is a classical sea monster who faces to the left, but turns his head back to the right and stretches his neck backwards towards his raised tail. He has tufted ears and the end of his tail is shaped like an acanthus leaf. He has paws on his forefeet. His body is green, with a pink, acanthus-leaf tail. His chest is striped pink and red. The trefoil tail extends into the frame. He has 1 star on his nose, 3 in his mouth, 2 in his face, 1 in his neck, 3 on his chest, 3 in the main body, 5 in his coil and 3 in the trefoil end of his tail, in all 21 stars.

fol. 28v **ERIDANUS** is depicted as a classical river god facing the viewer seated with his legs running towards the left and leaning on an upturned red and gold urn with his left forearm. He holds out his right hand. A stream of white water pours from the urn. The god has a brown and white beard and brown hair with a number of straggling tendrils. His chest is bare, and he wears a long green skirt with white and black folds. He holds a pink and black plant in the crook of his left arm. He has 6 stars around his head, 2 on each upper arm, 6 on his chest, 2 on his belly, 13 on his skirt, and the end of his right foot; or 32 stars in all.

PISCIS AUSTRINUS is placed upside-down, at an angle of 45° off the vertical with his open mouth uppermost. He has a blue body with a lighter blue belly, pink gills, gold eyes and a black mouth. He has 1 star in his mouth, 4 on his back, 5 on his belly and 1 in the tail, in all 11 stars (though one might question whether or not the gold dot on its eye is intended as a star).

fol. 29r **ARA** is shaped a bit like an hour-glass, with two triangular shapes meeting at a restricted middle point, which is marked by a pink and mauve band. It stands on three pink (animal) feet and has red flames coming out of the top. There are 2 stars at the base and 4 in the flames, in all 6 stars.

CENTAURUS is shown walking to the left with his right forefoot raised. His human part is white and his equine part is mauve. He is bearded with long hair. He appears to hold a mauve club in his left hand near his waist, but the contours of his arm and hand are obscured by the spotted, mauve animal skin that flows backwards from his waist (as if his arm has been transformed into the skin). The end of the tail of the skin extends into the frame. He has 4 stars in his head, 1 on each shoulder, 1 in the club, 3 in his belly, 1 on the right elbow, 1 on the right forearm, 1 on the right hand, 1 on the skin, 10 along the back of the horse, 1 on his equine shoulder, 7 on his haunch, 2 in his left front leg, 1 on his left hind thigh, 1 in his tail, or 35 stars in all. He holds **LUPUS** by its heels in his extended right arm. It has 1 star in its

mouth, 4 in the neck, 2 in the back, 2 on the tail and 6 along the underside, or 15 stars in all.

CORONA AUSTRINUS is depicted as a silver and red wreath with ribbons attached to the bottom. It is placed beneath and slightly in front of the forefeet of Centaurus. The tips of the ribbon extend into the frame. It is marked on the inside by 11 stars.

fol. 29v **HYDRA, CORVUS** and **CRATER** are contained within one frame. Hydra is a long snake, with a red beard and a red comb that slithers to the right with his head held at right angles to his body. He is coloured black, blue and pink with white dots. He has 5 stars in his head and 22 along his body, totalling 27 stars in all. The Crater sits on his back, having an urn-like shape and is marked by 9 stars. Corvus stands near the Snake's tail, facing towards the tip of the tail and is pecking at it. He is marked by 8 stars.

CANIS MINOR is a sharp-nosed hound that leaps to the left with his forepaws raised. He is mauve and wears a mauve collar. He is marked by 3 stars, of which one is in the collar.

fol. 29v The five planets each with haloes and the top of their heads marked by gold star against a light blue background. Mercury with a red caduceus and pink wings on his head and wearing a red robe; Saturn covered with a pink mantle and holding a white plant; Venus with a peacock feather and Mars with a red helmet with a gold face-guard and a red mantle.

fol. 30r Planetary diagram with zodiacal signs set against a red-orange background between personifications of the months that are set against gold backgrounds within circular frames (full Taurus lying down; Gemini nude with a club and a spear; Virgo holds a chain in her right hand that passes behind the month and is attached to the bar of Libra below her; and Aquarius as Ganymede with a blue Phrygian hat and trousers holds the urn upside-down in his right hand; otherwise quite similar to illustrations in the text). For the depictions of the planets, Terra is set within a blue-grey circle wearing a light blue mantle and lying on dark grey and red-spotted soil; all of the planets have a gold background and the diagrams at the corners are in red, tan and green. Sol has pink horses and a red cape and red rays coming from his head; Luna has a white and blue mantle with pink cows; Venus has a white cloak; Mercury is in blue and white with wings on his head; Mars has a pink horse, a blue tunic and hat and a red mantle; Jupiter is seated on a bird and wears a blue mantle; Saturn has black hair and wears a blue mantle.

fol. 32v Sol is set against a circular shape that is set within the usual red frame, standing in his *quadriga* with the horses splayed in two pairs and with verses above their heads. He has a gold halo around his head and holds a golden orb in his left hand and raises his right hand in salutation. He has a mantle clasped at his neck with a gold pin that billows out to the left. Luna stands in her oxen-drawn, gold and wooden cart leaning to the right. She has a golden halo around her head into which there is set a crescent moon at a somewhat jaunty angle. Her mantle billows out behind her in a curve and also falls in front of her in a series of folds. She carries a gold torch in front of her body with both hands. Her clothing is all pink.

notes

i (paper) + 33 (vellum) + i (paper); on inner cover: 10^e siècle N 188- 10^e S, with a tipped-in letter in French describing the contents of the ms; on fol. 1r: Germanicus Caesaris Aratea Phaenomena; When considering the somewhat problematic relationship between the three 'Z' or 'Vossianus' Germanicus manuscripts, it is interesting to look more closely at the illustrations for the light they might shed.

bibliography

BREYSIG 1867, p. xi.

BECKER 1885.

CAT GÉNÉRALE ...BIBLS PUBLIQUES 1872, IV, pp. 687-88.

11th century; vellum quarto; uncial capitals; copied without doubt from antique mss re: costumes and hairstyles; supposedly from St Bertin

RIEGL 1889, pp. 62-63.

BETHE 1893, pp. 94 and 102.

THIELE 1898, pp. 82-83.

BREYSIG 1899, p. xi.

WILMART 1924, pp. 166-86, esp. p. 181.
on Odbert

BOECKLER 1930, p. 58.

HELIOT 1934, pp. 7-8 and 32-33.

LESNE 1938, IV, pp. 236-41 and 265.
on Odbert

BOUTEMY 1946, p. 337.

WEITZMANN 1947 (1970) p. 112.

re: reduction of images, one can see the superimposition of one or more images which originally occupied a full page of their own, such as in **Boulogne 188**, where there are usually two miniatures per page, whereas its model had on per page, where Engonasin and Corona are superimposed each picture is preserved in its original proportions and even its own frame (cites Thiele), but in most cases, the pictures lose their inner frame, this then creates a very elongated picture area, which roughly equals the width of one column of a two-column format 'Consequently, the explanatory text, which in the Leyden manuscript was on a separate page opposite the picture, in the Boulogne codex is written on the same page like a second column. In this economizing way no less than four pages of the Leyden manuscript, two with pictures and two with text, were condensed on a single page'. Only when 3 pictures are superimposed, does the miniaturist have to change his proportions.

p. 161: kind of error when scribe writes a whole text and leaves pictures to be illustrated later, sometimes illuminator puts pictures in the wrongs place: **Boulogne 188** from the 10th c depicts youth clad in an *exomis* and holding a skin and a *lagobolon*, so this is not the figure of Hercules described in the text as a kneeling figure; also in **Madrid 19** from the 12th century, represents Hercules as a nude kneeling figure in the Garden of Hesperides '... and this is undoubtedly the original constellation type'. The picture in the Boulogne ms cannot be described as a disguised or corrupted type of Hercules, but must have originally represented another constellation type, which by mistake has been inserted here. Thiele has convincingly shown that this is really a representation of Boötes, for whom *exomis*, *lagobolon* and striding position are more characteristic (Thiele, pp. 92-93, fig. 19). A special group of mss all share this mistake, showing them to be of the same recension (**Leiden, Boulogne and Bern** - from the 11th c)

p. 190: manner of discovering a genealogy: identical alterations in corresponding miniatures are hardly ever made independently of each other (i.e. **Leiden**, **Bern** and **Boulogne**); also, it is essential to recognise that often people use more than one model for a copy, the scribe or illuminator choose variants from two sources and combine them into a third version;(p. 191) in making a stemma, must separate iconography from style;(p. 192) ‘a miniature stemma should be based exclusively on iconographic and not on stylistic evidence, which is only of subsidiary help for the dating of single documents and cannot be used for questions of descent’. The transmission of style and iconography often follow very different paths;

BYVANCK 1949, pp. 169-235, esp. pp. 214-15 (no. 38).

with a map of the sky planispherium and figures of the constellations, copy of Leiden *Aratea* and written in 905 from the church of Reims and the Abbey of St Bertin

HOMBURGER 1953, pp. 116-18.

STERN 1953, *passim*.

PARIS CATALOGUE 1954, p. 53.

MARTIN 1956, p. 40.

beginning 11th century

BOUTEMY 1957, pp. 427-433 with literature.

McGURK IV 1966, p. xxiv, n. 39.

earliest example of arranging several pictures within one frame

McGURK 1973, p. 200, iv.

the planisphere appears before Zeus and the eagle in this manuscript.

LeBOEUFFLE 1975, pp. xlii-xliii, xxxvi and xlvii-xlviii.

parchment in quarto; lacks the incipit and the *scholia*; has vv 1-725 with fragments III and II); says pictures are on blue backgrounds and are analogous to LEIDEN; From the monastery of St Bertin and dates from the 10th century, and was copied from a ms from the Church of Reims, which itself was copied from a 4th or 5th century model; a corrector from the same era rectified the errors that are evident in the hand of the first scribe, but also cleared the text (up to v. 488) of conjectures that were more or less preposterous. This manuscript thus corrected, served as the model for BERN 88.

KOEHLER and MÜTHERICH 1971, pp. 81 and 108-16.

GUNDEL and BOKER, 1972, pp. 681-82, nr 227.

McGURK 1973, p. 200.

GAIN 1976, pp. 2-8.

REEVE 1980, pp. 508-18, esp. p. 518.

not before 905 (THIELE, p. 82) supposedly comes from St Bertin; copied from Leiden Q. 79 and model for Bern 88; scholars cannot help deriving Boulogne 188 and Bern 88 from Leiden ms. Some have believed that lines 142 and 144b were omitted, therefore *not* source for Bern 88 and Boulogne 188; but, according to Reeve, these people are unaware that there are traces that show that these lines were erased by the later author who added his more readable version to the text to manuscripts. (See also the scheme by OBBEMA, 1979, p. 20).

VERKERCK 1980, pp. 245-87, esp. 270-75.

LOTT 1981, II, pp. 147-58.

SOUBIRAN 1981, pp. 85-86.

MUNK OLSEN 1982, I, pp. 406-07

EASTWOOD 1983, pp. 7-9.

REEVE 1983, p. 20.

BISCHOFF; EASTWOOD; KLEIN; MÜTTERLICH and OBBEMA 1989.

[Obbema, pp. 11-13, fig. 7; Bischoff, p. 90; Mütterlich, pp. 31-58]

vellum, 33ff, 36 x 30 cm

contents: calendar
 Easter tables
 Catalogue of unlucky days
 20r: planisphere
 20v-33r: Germanicus *Aratea*, with pictures in the outer margins

the *presens annus* of the Easter tables is 905, so would date from then, but some think it is younger; paleographically and stylistically, there are

associations with the northern French cloister of Saint-Bertin, during the abbacy of Odberts of Saint-Omer (986-1008); also the majority of the earliest mss in Boulogne come from this provenance; inscriptions confirm that the ms was in Saint-Bertin in 1104; relationship with **LEIDEN *Aratea*** has been repeatedly discussed; would seem to be a direct copy of the Leiden ms, but the arguments are not as sound as they seem; GAIN, LE BOEUFFLE and editor of Avienus text have defended that the mss have a common model, but OBBEMA thinks there is not yet convincing proof for this. His studies suggest that the corrections by a second hand in the Boulogne ms is not always clearly different from the major hand of the ms; it is clear, however, that the author of the corrections saw a direct derivative of the Leiden ms; one can only establish that that the problem of the connection of the two mss is not conclusively settled

JEUDY and RIOU 1989, I, pp. 308-09.

UTRECHT CATALOGUE 1996, p. 200.

HAFFNER 1997, *passim* and p. 24.

closely related to Leiden *Aratea*; she says end of 10th century

STÜCKELBERGER 1990, p. 77

GUNDEL 1992, pp. 93, 312 and fig. 309.

STÜCKELBERGER 1994, pp. 41.

BLUME 2000, p. 237.

KÜNZL 2000 [2003], pp. 495-594, esp. pp. 550.

10/11th century, daughter ms of the Leiden Aratus

GARCIA-AVILÉS 2007, fig. 23bis

BLUME 2009, p. 548.

DEKKER 2010, pp. 2.

10th century; copy of Leiden *Aratea*; she agrees with OBBEMA 1989, pp. 11-13 that is a direct copy vs. GARIN 1976 who says they have a common parent

BLUME, HAFFNER and METZGER 2012, pp. 112-13 and 219-222.

pp. 112-13: a direct copy of the star-map in Harley 647; copy of the Leiden Aratus, second half 10th century in northern French monastery of St Bertin at Saint Omer; possibly by Abbot Odbert; interest in classical manuscripts seem restricted to locales where these aristocratic manuscripts were housed; selected because associated with the Comouts; the courtly model of large illustration flanking text is preserved; stars are transferred with great care, even though they are not mentioned in the text; 'pictorial representations of the constellations apparently considered as an essential condition of calendar reckoning' ; resulted to the aristocratic manuscript because, presumably the more authoritative Computus manuscripts were missing from the library

pp. 219-222: locates it to the Abbey of Saint-Bertin in St Omer (northern French) and date it 10th century; notes that the calendar is the Filocalus calendar of 354; mention 'problems' with vv. 142 and 145-6, and say issue of parent still unresolved, though probably a direct copy of the Leiden manuscript. The illustrations confirm this. Note that BOUTEMY suggests the possibility that Abbot Odbert from St Bertin was the illuminator and lists comparable manuscripts.

DEKKER 2012, pp. 145; 173-75 and 235-37.

p. 145: Leiden *Aratea* appears to have been in St Bertin and was copied into the Boulogne manuscript belongs to Z-branch of Gemanicus tradition; question of whether the Leiden *Aratea* also originally had a planispheric map.

pp. 173-5: sky-view and showing Libra held by a figure; Boulogne ms is more detailed than Bern 88; suggests an exemplar from which both they and Harley 647 were copied

pp. 235-37: St Bertin, during abbacy of Odbert; shows signs of 'flooding' (probably from fixative for silver) and the sheen on concentric circles suggests was originally silvered; presented face-on and observe Hipparchan rule (except Perseus); Navis and Corvus are reversed;

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