

# Historic Glass Sundials

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## Preface

*The jewels glittering luster  
Shines gleaming in the colors wreath  
The pointers shadow soundless turns in it  
Hour and hour so passes in fabulous magic light*

### Rediscovery, Importance and historical development

My lecture at the CIC 74 [Congress International de la Chronometry 1974] on this subject and further publications [5, 6] have found large acknowledgment and caused much interest. I do see an appreciation of my work and at the same time the obligation to continuously follow this path. I have received valuable hints and images and so I could gather documents on 19 of these precious works of art.

My studies are mainly concerned with the interpretation of the dials. As some panes have changed their places several times, it is important to find out, from the arrangement of hour lines and the drawing of the zodiacal lines which show true local time their original location in order to know more precisely the provenance of the panes or their manufacture. Because of uncertainties of the measurements taken from the panes or their images the latitude – the most important item for the construction of the dial for a given location – is unfortunately not always to determine precisely.

Sometimes the solution seems mysterious when recalculation and a drawing attempt contradict. A determination of longitude to determine the right location is not possible, because on the historic panes the hour lines for the new zone time did not yet exist. These investigations are not yet finished, so that values for some panes are still missing. Some sundial friends have strongly supported this project [10,11,20]. Their help is gratefully acknowledged here.

Now, let us turn to history: For the first time glass sundials - also called window clocks(dials) in the older literature – have been mentioned in 1518, when Benedictine father Veit Bild from Augsburg (1481-1521) manufactured 16 such panes for the electoral duke of Saxony, among them also 4 dials for his castle at Altenburg [3,8,21]. Probably Veit Bilds knowledge originated from the works of the mathematician and astronomer Regiomontanus (1463-1476). It was also already possible to design sundials deviating from the south direction. Difficulties arose at that time from drilling the glass for the gnomons. In 1539 at Vogtherr in Strassburg the edition of a small booklet with directions to fabricate sundials "also on glass" appeared.

In the beginning the hour lines were drawn on oiled paper and this dial was mounted in the window or simply scratched in (on) the pane. Whith the flourishing of the art of cabinet glass painting the dials have been decorated with artistic motives, applied to the glass pieces with melting colours and assembled by lead sets. This was still painting with glass: glass mosaic disc of Ulm (No. 14). Later on the drawing of the dial face was executed on monolithic panes.

The luminosity of the colored glass gives the pane a character, which performs a lively but soundless gliding of the shadow hand over the hour lines and gives it a marvelous gleam. So the glass sundials can be called the jewels among the vertical sundials. Each item is a masterwork and is a testimony of the spirit of the time in which it has been created. Because of the fragility of the material only very few of these works of art have been preserved.

By the drawing of the zodiacal lines additionally to the hour lines and by mounting a sphere on the gnomon or of a disc with a hole on the window frame to indicate a point on the dial it has been enlarged into a Calendar which allows to read the daily changing height of the sun in the course of the year. This is shown already on the 1550 glass sundial from Ambras castle.

These panes for the measuring of time have been needed for the astronomical checking of the still poor precision in the performance of wheel clocks.

So in the following I am going to compile in lexical short form a documentation of the reports, which can be found very scattered in literature and archives before the knowledge of these wonderful creations will be totally lost. Information on the technique of glass painting is not within the scope of this work. Those interested are directed to the respective literature. All of the known glass sundials shall be shown in picture here. They appear in alphabetical order of countries and locations.

Shall this documentation of 1979 animate many of the readers to accomplish my work by additions and hints to other sundials. Surely, particularly in England there are still undiscovered sundial panes.

## Inventory 1979

A-Austria

### 1. Vienna

Pane from Castle Ambras/Innsbruck, now in the Museum for applied Art (Inv.No. GL 2808) Fig.1

Chapter ring with hours VIII-XII-VI / 10-12-4

Half hour markings and quarter hour division on ribbons, zodiacal curves with names and hour lines, and Horae planetarum (planetary hours) III-XI and horae bohemicae ab occasu soli (Bohemian hours from sunset) XVI-XXIII

Day and night lengths 8-16 beneath the noon line.

Direction of window 17° west of south.

Latitude 47,2°

Inscription for directions for use:

"The black number in the yellow ring makes known at any time general German hour *Nuremberg hours*

red and white they indicate also

the quarter and half hours

white black curved lines show

in which sign (of the zodiac) the sun will go

In the outer ring follows further...

The straight white lines show

Unequal planetary hours

Bohemian hours and Italian

This all shows the shadow of the button pointer

MDL...known"

Ornaments: Angels head and putto with heavens sphere, astronomical instruments and small block dial.

Fly in the chapter ring at 9:45 ( legs and body on outside and wings on the inside – depth effect)

Colors: silver-yellow on blue background, chaptering ribbons grey ornament on orange margin

Material: glass pane parts with melting colors in lead frame

Round pane 38cm Diameter

Gnomon with sphere is missing

Provenance: Swabian origin (Prof. Finsterwalder) "Schwaben" is in the region between Stuttgart and Augsburg

Photo: Museum for applied arts, Vienna

Literatur (5,13)

**CH Suisse**

## 2. Basle Pane in the archive of the Historic Museum (Inv. No.: HMB 18888.95)

Fig.2

Hour numbers with short lines 12-1-9 and half hour points (Basle time until 1799: noon at 1 o'clock)

Inscription: "As time goes by/then comes death/oh man regard/ and fear god 1731"

Ornament: In Octagon winged god chronos with scythe, floating on clouds, holding a cloth which death folds back

Colors: cloth in white, fringes in orange, back of cloth and corners ruby red, background of heaven in blue, death and clouds gray, chapter ribbon yellow

Monolithic octagon pane totally 14x14 cm

Artist: Johann Rudolf Huber (1668-1748)

Photo: Historic Museum Basle)

Literature: (5,6)

Remark: probably not a time piece, but only symbolic representation of a sundial as reminder of the end of human life

## 3. Swiss glass sundial

pane now in Illinois/USA

Fig. 3

Chapter beam with hours IIII-VIII-X with hour lines and quarter division

Window direction: East

Ornament: robin (redbreast), rocaille framework

Colors: greenish, breast of the bird and frame yellow to rust

Oval monolithic pane, lead framed 27,5x21 cm

Holes for gnomon and mounting

Provenance: Swiss ca. 1640

Photo: S.G. Atwood, Rockford/Illinois

Literature: (5)

Remark: Auction catalogue VIII Galerie am Neumarkt, Zurich, 3.10.1969, No. 338 Table 40 (image side reversed)

## 4. Zurich

pane of the Swiss observatory (Inv. No. 3154)

Fig.4

Chapter ring with Nuremberg hours 6-12-6

On table with zodiacal line, hour lines, add. Italic hours 14-23, Greek hours 1-10 and planetary hours 2-10

On outer ring: world time dial of Calecut-caput bonae spei-Peru prou

In lower part: Map of Europe with Asia minor and North Africa with noon of the locations shown by the shadow

Zodiacal lines: Tropicus capricornus – cancer with month division in decades according to Julian calendar and seasons

names: Aestas, Autum, Hymes, Ver

Day lengths 8-16 beneath meridian line and at the 2 o'clock line horae solstitii aestiu 14-18 with latitude division from 35 –55° for the map

South facing dial

Latitude Altitu poli 47° Pole: Arcticus (Zurich)

Inscription: "Johan Murer Pfarrer zu Rickenb." Johan Murer rector (parson) at Rickenbach

"Vt hora sic fugit uita" / (So as the hour flies the life)

Ornament: Arms of the Murer family with helmet and lion, Zodiacal signs

Colors yellow green to blue, Map brown to green, Sea blue, italic and Greek hour lines green respect. yellow underlined

Round monolithic pane Diameter 23,5 cm, numerous cracks, hole for gnomon

Artist: Brother Josias Murer ca. 1620 from instructions of Johann Murer (1556-1641)?, parson at Rickenbach/Zurich

Photo W.Brunner-Bosshard, Kloten/Zurich

Literature: (5,6,9,13,21)

Reproductions by: Clock Museum Abeler, Wuppertal, (Error: Zu Zürich instead of Rickenb.), equally: Museum der Zeitmessung Beyer, Zurich, Editors J. Hanneschlager, D-8900 Augsburg 32 (Diameter 30 cm)

## 5. Zurich

Pane like N04 but Inscription reads "Josias MURER Amptmann in CaperHOF 1622" (1564-1630), (Amptmann equivalent to mayor)

Fig. 5

Present location unknown

Cited from: Catalogue of old windows, Collection Engel-Gros Paris 7.12.1922

Photo: Reproduction- Corpus Vitrarum Medii Aevi Deutschland, Stuttgart (R 166/34

Literature:[2]

## 6. Zurich

Pinhole sundial in Museum of Time measurement Beyer

Fig.6

Dial: Italic hour lines 15-23

Zodiacal symbols Capricorn and Cancer

Window direction South-southwest

Latitude 46°

Frosted glass pane 13,3 x 8,7 cm with dark brown lines

Small wooden box (walnut) 18X13,5 x 3 cm with hole in Bottom to direct the rays

On the right side 2 mountings to fasten it to the window frame

Provenance: Tessin (Swiss canton) 2.half of 18<sup>th</sup> century

Photo: Museum of time measurement Beyer, Zurich

Literature: [5,10]

## 7. Zurich

Pane in house "Zum Ellstecken", Trittlingsasse

Fig.7

Dial with zodiacal signs and hour lines 6-12-6 quarter and ten minutes division

Horizon and substyle line

Inscription: "Vertical dial for latitude 47°22' and east deviation 35°39' H. Pestalozzi 1810"

Dial cut into the clear windowpane 22x22 cm

Gnomon with perforated disc

Artist: engineer Major Heinrich Pestalozzi II. (1790)-1857)

Photo: Municipal Building history archive of Zurich

Remark: The sundial is protected as public monument

A nearly identical pane by Pestalozzi from 1809 is in the Archive of the Swiss observatory Zurich, Latitude 47°22', east deviation 36°56'

## D Germany

### 8 Altshausen

Pane from castle Friedrichshafen, later monastery Bebenhausen/ Tübingen, now in the archive of castle ALTSHAUSEN/ Saulgau

Fig. 8

Chapter ring with hours 8-12-5, below: table with hour and zodiacal lines,

Italic hour lines ab occasu solis(from sunset) XV-XXIII

Day and night lengths 8-15- and 9-16 beneath meridian line

On the left ribbon of lines for Occasus soli (sun set) Numbers covered by lead

Facing south, Latitude 47,7° (Friedrichshafen?)

Inscription: Isaac...Fiessen, pict: Spire: fec...

In the ribbon: MDLXXVI (1576)

Ornament: shining sun and zodiacal signs, right and upper part missing

Colors: Sun and ribbons silver-yellow, Background blue, Table of hour lines and zodiacal signs clear

Numerous leaded cracks

Remaining size: 22x20 cm, Gnomon broken out

Artist: Isaac Kiening, Füssen

Photo: H. Berendt

Literature: [3,5,7,10,13,21]

Remark: Renovation of fragment 1915 by Prof. J.L.Fischer, Munich

Reproduction: Uhrenmuseum Abeler, Wuppertal with deliberate supplement

### **9 Berlin**

Fig. 9

Pane was in Kunstgewerbemuseum (Museum of applied art), now missing

Chapter ribbon with hour lines 6-12-4 and half hour points

Direction south-southeast

Inscription: "Sic vmbra ducimur umbra"

(Like the shadow we will be guided by(through) the shadow)

Ornament: Shining sun, inscription table pending from ribbon

Laurel wreath framing

Hole for gnomon

Artist: Jörg Breus the younger ca 1530-1540

Photo reproduction H. Kühnelt, Innsbruck

Literature: [5,11,13,17]

Remark. Oldest sundial known with picture

### **10. Darmstadt**

Pane in Hassia State Musum Inv.Nr. Kg 37:19

Fig.10

Hour lines and zodiacal curves in Hexagon, Numbers faded away (4-9-12?) in twisted ribbon

Ornament: framework with floral tendrils

Colors: sun spot, Chapter ribbon and margin pattern brown-yellowish, Zodiacal curve zone dark blue, background light blue

Glass pieces in lead frame, cracks, glass with melting colors

Dimensions 23x18 cm

Holes for gnomon and mounting

Provenance: Lutherhaus in Grünberg/upper Hassia

Artist: Middel rhine area, secon half of 18th century

Photo Hassia state museum, Darmstadt

Literature:[4,11]

### **11. Ludwigsburg**

Pane in local museum

Fig. 11

Chapter beam with hours 6-12-5 and short half hour lines on the margin

Meridian line and substyle dotted

Direction of window: South-southeast

Latitude: 50° (Mainz, Bamberg?)

Inscription: 1781, arms with deer (stag?) and rococo monogram J.J.J:

Colors: mono-colored rust brown, numbers and lines incised

Dimension 24x21 cm Monolithic pane cracked, hole for gnomon

Photo H. Berendt

Literature: [5,7,11]

### **12. Rottweil**

Pane in Rottweil town hall (Inv. Nr. 409)

Fig. 12

"die Zit" (The Time)

Chapter beam with hour lines 5-12-5 and half hour division

Zodiacal lines only symbolic, parallel to depth direction

Day and night lengths 8-16 beneath meridian line

Window direction southeast

Inscription 1553

Ornament: Architectural arch, in the pillars figures making music

Over the arch: apple shooting scene from the theatre play Wilhelm Tell by Friedrich Schiller, angel and lion's head

Below: shining sun over arms with eagle of the imperial town Rottweil with trombone blowing angels, at night length 10 tied up dog  
Colors: very dark, from pale yellow to golden brown, inside of arch dark red ,equally bottom part of pillar, plinth green, background blue  
Pane with lead frames and leaded cracks  
Dimensions 44,5 x 34,5 cm Gnomon broken out  
Artist Signum MP (Martin Pfender – Rottweil municipal glasser)  
Photo H.Berendt  
Literature: [1,3,5,7,11,18,19]  
Reproductions: Uhrenmuseum Abeler, Wuppertal (Error: p of signum missing, also the leaded cracks)  
Museum of time measurement Beyer, Zurich, Local museum Schwenningen (the colors are lighter than the original)  
Telenorma Uhren GmbH, Frankfurt/M. (Plastic 30x22 cm)  
Restaurant „Katrin“, Zurich-Oerlikon (52x36 cm)  
Remark: Hour lines apparently not calculated but applied according to observations during different seasons, because the lines 5-5 are not in line

### 13. Stuttgart

Fig. 13

Pane in Württembergisches Landesmuseum (Inv.No.1968/321)

Chapter beam with hour numbers VI-XII-VI and half hour markings, Zodiacal lines (imprecise) with symbols and Images, day and night lengths 8-16 and initials of the month, Sunrise and set 4-8, hour lines directed to sun, south facing dial

Latitude 48°

Inscription: name calendar with ecclesiastical feasts, A.D. 1762

Ornament: Angel with heavens sphere and compass

Colors: dark yellow to brown, calendar black with incised lettering

Monolithic pane with several cracks, Dim.24x20 cm

Provenance: southern Germany

Photo Württembergisches Landesmuseum, Stuttgart

Lit. (5,7,11)

### 14 Ulm

pane in the chamber of the town hall

Fig. 14

Chapter table with hour lines IIII-Xi/4-11

Polar east dial, latitude 49° (Ulm)

Inscription

"The lord will die and equally the servant

the good as well as the evil

and nobody will know in the morning

whether he is still alive in evening

and before men realize this

hour day and year have passed by,"

Ornament: gable architecture with 2 standard bearers, in the upper corners round medallions with heads

Colors: Clothes ruby red respect. violet; blue damask cloth background with floral ornaments, yellow banner with double eagle and white banner with black stripes, capital on pillar and foot blue, pillar and gable brickwork as well as medallion heads greenish, gable yellow and floor tiles brown, table with chapters grey with white leaf ornaments, inscription ribbon: white background with black lettering, very harmonic coloring

Colored pane framed in lead, cracks also leaded (lass mosaic)

Dimensions 62x42,5 cm

Gnomon on outside renewed

Artist: probably the Ulm town glasser Hans Harderbeck 1560

Photo: H. Berendt (author)

Lit. (3,5,7,11,13,14,18)

### GB England

### 15. English sundial 17<sup>th</sup> century

Location and whereabouts unknown

Chapter beam with hour lines V-+(12)-III and half hour points

Window direction southeast

Inscription: "Dum spectas fugio" (While you look I flee)

Ornament: Inner field: Bird on branch and fly (the latter like No. 1), winged hour glass, decoration on margin

Colors: dial with motto grey, bird and hourglass yellow, Branch green, body of fly and tendril's background red

Oval monolithic pane with hole for gnomon

Dimension of reproduction: 22.5x17.4 cm

Artist: Henry Gyles /York (1640-1709)

Photo of reproduction: H. Berendt

Reproduction: Glass Masters, New York

### 16. London

pane in British Museum, SI 4-14 formerly Ilbert Collection (Inv. Nr. CAI 2469)

Fig. 16

Chapter beam and hour lines VI-/(12)-V with half hour division

Direction of window south-southeast, Latitude 53°

Inscription "Forsan peritus certe periturus » (Although you may be that clever, you have to die as well)

Ornament. Inner dial Skull, above the dial table with artistic and scientific tools among them winged hour glasses

Colors: chapter beam yellow, skull brown, background of hour lines and table grey, tools brown, globe blue, inscription black on white background,

Monolithic pane 31.5x20.5 cm Gnomon existing

Artist late 18<sup>th</sup> century

Photo British Museum, London

Lit. (5)

### 17 Marlborough/ Wiltshire,

17<sup>th</sup> century

Fig. 17

Chapter beam and hour lines IV-+(12)-III with quarter division

Window direction Southeast

Inscription: "Dum spectas fugio" (While you look I flee), Sic vita (Such is life)

Ornament: Fly in empty inner field, which left side margin is the meridian line, tendrils on margin, angel' heads on left and right, below horned face mask

Colors : Chapter and motto beam yellow, Hour lines field grey-green, Inner field with fly a bit lighter, margin yellow as well, tendrils and heads grey, background red remains, pieces of pane in lead, gnomon and mounting bar broken out (holes) and several cracks

Photo: P.R. Hamilton, Legget, Lambrook/Berkshire

Literature:[8]

Remark: very similar to No. 15

### 18 Nun-Appleton/York

Fig. 18

Pane in top window over door of the stair hall to the park of the castle

Chapter beam and hour lines VI-XII-V with quarter divisions

Window direction South-southeast, Latitude 54°

Inscription: "Qui non est Hodie" (Ovid: Remedia amoris Vers 94...cras minus aptus erit – (Who is welcome today, will be less welcome tomorrow)

Ornament in inner field: landscape park, small Amor (from a drawing of Tizian) embracing stone sundial of 1670, in the foreground on the ground hourglass with arrow (pointer for the time?) surrounded by a snake, beneath myrtle wreath. In the corners of the window pictorial description of the four seasons with puttos, additionally the verses from Ovid "Rem.Amor," 187-188): Poma dat Autumnus, Formosa et messibus Aestas – Ver prebet flores, igne levatur Hyems" (autumn brings fruits, nice is the summer with fields of ears – spring gives flowers, winter is made standable by fire)

Colors: Chapter and motto beam yellow, Amor and puttos sienna

Pane divided by wind girders, some cracks

Artists: Henry Gyles, York (1640-1709)  
Photo J. Fawson, Nun-Appleton  
Literature:[12,14]

## Timetable

### Intellectual life – Environment

Ca 1450 Polos (parallel to earth's axis (Orient 1370))  
1471 Regiomontanus, Nürnberg (1436-76) calculates sundials with polos for each projection  
1516 Nikolaus Kopernikus, Allenstein/Ostpreussen (Baltic) (1473-1543) constructs reflection sundial  
1518 Oldest knowledge of window sundial, Veit Bild, Benedictine monk, Augsburg (1481-1521)  
1538 Summary booklet at Vogtsherr, Strassburg, " Aller Sonnen Ur,...auch uff glass" (all sundials,...also on glass)  
Glass sundials: provenance Location (direction- Pane-No.)  
Ca. 1535 Jörg Breus the younger – Berlin (South-southeast -9)  
1550 Swabian- Ambras-Vienna (South-southwest-1 ) oldest with zodiacal curves  
1553 Martin Pfender – Rottweil (southeast – 12)  
1560 Hans HArderbeck – Ulm(East -14) – glass mosaic  
1576 Isaac Kiening, Füssen-Altshausen (South – 8)  
1620 Johan Murer, Rickenbach-Zurich (South – 4)  
1622 Josias Murer, Caperhof – Zurich (South – 5)  
1640 Swiss – Illinois (East – 3)  
17<sup>th</sup> cent. English Marlborough (Southeast – 17)  
1670 Henry Gyles/York (1640-1709) – Nun-Appleton (South-southeast -18)  
1680 English: Gyles – New York (Southeast -15)  
1731 Joh. Rudolf Huber – Basle (Southwest – 2)  
1762 Southern Germany – Stuttgart (South – 13)  
1770 Hassian – Darmstadt (Southeast – 10)  
1780 Pin hole dial/Tessin – Zurich (South-southwest-6 )  
1781 J.J.J. – Ludwigsburg (South-southeast – 11)  
1790 English – London (Southeast -16)  
1809 Heinrich Pestalozzi II. – Zurich (Southeast – 7 Remark)  
1810 Heinrich Pestalozzi II. (Southeast – 7)