# Prague Astronomical Clock

## Guide to the oldest working astronomical clock in the world

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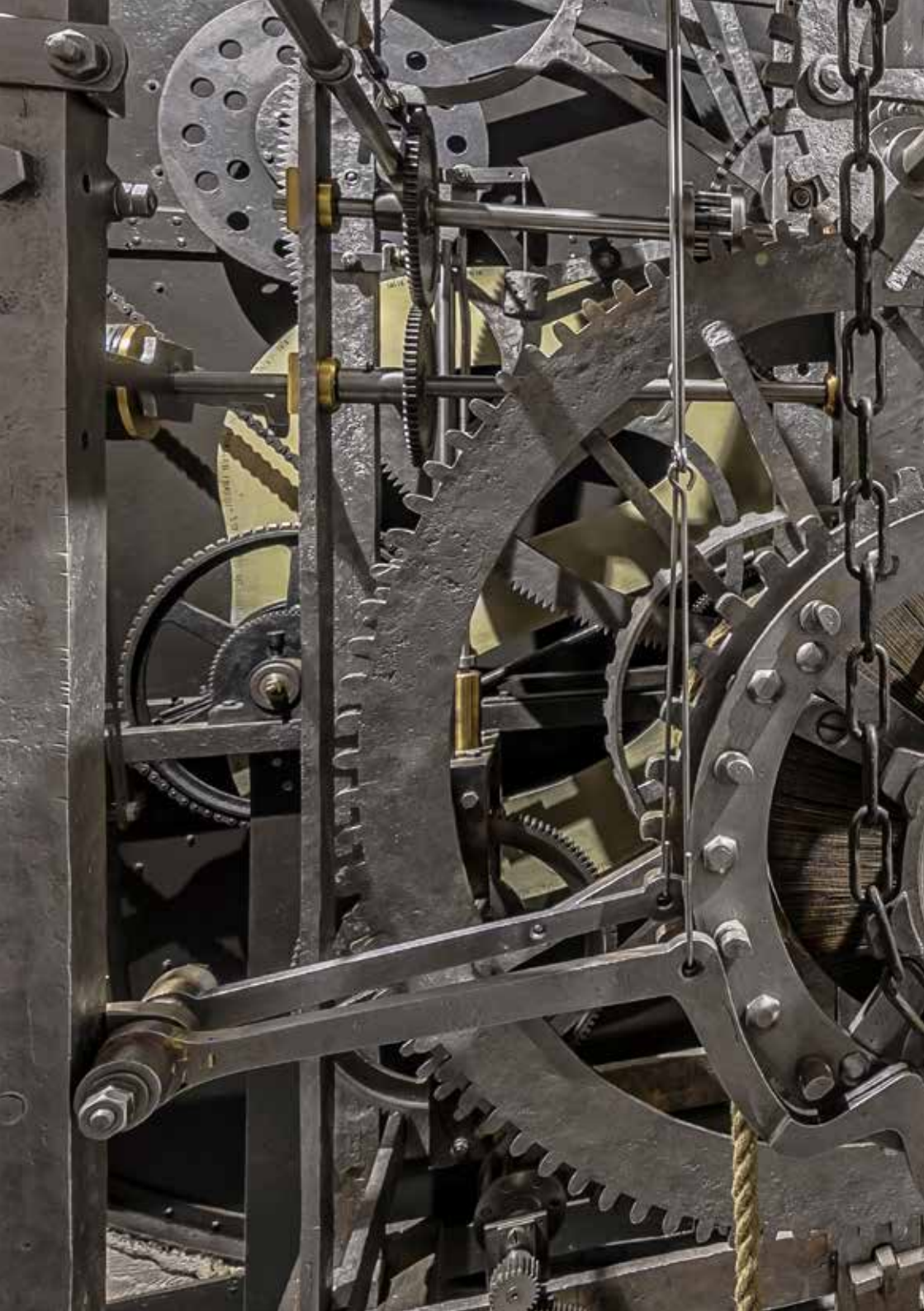


## SIGNIFICANCE OF THE ASTRONOMICAL CLOCK

The Prague Astronomical Clock is a unique medieval monument. It was built during the last breaths of the cultural boom in the Bohemian lands that began under the reign of Charles IV, Bohemian king and Holy Roman Emperor, who transformed Prague into a European centre of learning, culture and power. The Old Town Astronomical Clock was built as one of the last **medieval archaic astronomical clocks**. These served a different purpose and were of a different character than the modern astronomical clocks that emerged in Europe with the onset of the Renaissance. Its main dials – astrolabes – were not designed to work like accurate astronomical instruments, but were to be used above all for astrological purposes. Their design is also fundamentally opposite to the construction of astronomical astrolabes.

Unlike most astronomical clocks of the time, which were made particularly for the interior of churches, the Prague Astronomical Clock was built in between the buttresses of the Old Town Hall tower with great sensitivity. It faced the outer area of the square in order to become a part of life in the centre of Prague. Prague is often called the "heart of Europe", as with some exaggeration it can be said that the astronomical clock is located in the very centre of Europe.

The Old Town Astronomical Clock is a complicated and multilayered work. The richly sculptured ornamentation and painted pictorial calendar plate enhance the central motif of the astronomical clock which is its top dial – **astrolabe**. The astrolabe of the medieval clock is a rotating image of the heavens – the heavens showing the movement of the Sun, Moon and stars, as well as the heavens that are the seat of the God. To the medieval man, the astronomical clock seemed like a true miracle. He admired the fact that its creator had managed not only to understand the movement of the Sun and Moon across the sky, but also to imitate it. Everyone could read the details from its astrolabe – the actual time, day in the year or how favourable the constellation of the heavens with the stars, Sun and Moon is in the life of the individual. The astronomical clock also indicates the astrological signs. Astrology and the faith that earthly things were ruled by the heavens were very important and commonplace for life at the time. It was not only used to predict the future or determine the right moments for making binding decisions, but also for correctly timing the performance of medical treatment.

## WHAT THE ASTROLABE SHOWS

### The movement of the celestial bodies

The plate of the astrolabe represents a view of the southern sky. The bottom is marked by a golden line of the arch of the horizon and above it is the blue sky showing the movement of the Sun, Moon and stars from left to right, just as in nature. The stars are represented as constellations marked out in an excentric circle.

Just as the Sun moves high on the horizon in late spring and early summer, it orbits the astrolabe in the same big arch from left to right along its circumference. The opposite is the case in winter – the path of the Sun in the sky and on the astrolabe plate is very low.

The starry sky is depicted only in part – it shows the constellations of the zodiac through which the Sun and Moon gradually move throughout the year. The Sun travels across the entire circumference of the zodiac just as it does across the sky in one year, the Moon in just under 27.5 days. The Sun and Moon also move very slowly along the zodiacal ring anti-clockwise, then together with the Sun and Moon, the zodiac rotates along the astrolabe every day by one clockwise rotation.








## DETAILS OF THE CLOCK'S STONE SCULPTURED ORNAMENTATION

*The face of the mechanical part of the clock is also enhanced by intricately worked stone ornamentation. It particularly dates from the Late Gothic changes to the monument and depicts a number of contemporary and typical building motifs – fabulous masks, remarkable figures or mythical and real members of the animal kingdom (the monkey, cat, dog, frog, owl and other animals).*

At the bottom of the astrolabe below the line of the horizon is the terrestrial surface around us. The red colour below the horizon depicts the red sky (aurora) – the colour of the sky before the rising of the Sun and after its setting. This colour then passes in the dark night and is depicted by a black ring.

## Four different times

The clock's astrolabe dial has always illustrated not just the movements of the Sun, Moon and stars across the sky, but also time. During the day, i.e. from sunrise to sunset, the golden symbol of the Sun together with the golden hand, indicates the time by unequal, so-called planetary hours while moving across the astrolabe. Then, throughout the day and night, the golden hand also indicates **Old Czech Time** counted from the moment that the Sun sets. It is marked on the rotating ring on the circumference of the astrolabe by the golden Gothic numerals 1-24. This special time, which has twenty-four equally long hours, was introduced to Czech lands from Italy by emperor Charles IV half a century before the astronomical clock was built. This natural division of the day, originally called Italian time, later in Czech lands also Old Czech Time, was first indicated by the clock not just by the Sun raffia, but also by striking out the number of these hours every hour on a cimbalom. It sent out the message of the actual time into the Old Town streets in this manner.

The Old Czech Time is indicated by the clock to this day. Up until the clock's fire in May 1945, the clock also chimed out the number of hours of Old Czech Time. Based on this, it also triggered the walking of the apostles every Old Czech hour until sunset. Today, the walking of the apostles passes through the open doorway at the current hour, civic time, Central European Time and, according to this time, the chiming machine also strikes the number of hours. Given that it then strikes using the original chiming machine of the Old Czech Time, the Old Town Astronomical Clock is the only outdoor clock in Prague that strikes midnight twenty-four times instead of twelve times. But the apostles do not leave the doorways, their final walk takes place at the eleventh evening hour and then they have their well-earned rest until nine o'clock in the morning.

Besides the Old Czech Time counted from sunset, the symbol of the Sun also shows the already mentioned time counted from sunrise to the moment of sunset. There are twelve such hours. They are marked in black Arabic numerals from 1 to 12 and divide the light day into twelve equal parts. These are called the **planetary hours**, or temporal, Babylonian or Jewish hours, but also not the same or unequal hours; unequal because the light day is different in length in winter and different in length in summer. In winter, at around the time of the solstice, the Sun rises at about today's eight o'clock in the morning of Central European Time and sets at four o'clock in the afternoon. The light day is therefore only eight hours long and one twelfth from sunrise to sunset, therefore one planetary hour has a mere forty minutes in the winter. In summer one such unequal or planetary hour lasts twice as long, i.e. eighty minutes. In other words, the Sun already rises at four o'clock in the morning and does not set till eight o'clock in the evening.

The planetary hours were also used for the purpose of astrology. Each planetary hour was dedicated to a different ruling planet, but this dedication changed regularly every day in the week and a table was written up above the doorways of the apostles to correctly determine the currently ruling planets. Depending on the position of the Sun on the clock, it was possible to make astrological predictions of earthly events or determine the best time for receiving medical treatment, perhaps even for the very popular and widely practised bloodletting. Astrology was part of life, and although it principally contradicted Christian theology, it was more or less tolerated by the Church. Sometimes it was even recognised and practised by some Catholic dignitaries.

Since the mid-16$^{th}$ century, the clock has been showing currently used hours – these are the 12 hours counted from midnight and 12 hours commencing at midday. They are marked with golden Roman numerals along the circumfer-

ence of the astrolabe. These hours have been called "German" or "**semi-astronomical**" since being introduced to the clock.

In 1865, the **sidereal time** indicator was added to the clock. This sidereal time is used in astronomy. The small golden star fixed to the zodiac not altogether understandably indicates this time. Its rotation around the astrolabe lasts one sidereal day – i.e. 23 hours and 56 minutes. The sidereal time is then shown in hours that passed from the time when the small star was at the top position on the dial – i.e. at numeral XII. During its rotation, the small star gradually first indicates the first 12 hours by twelve golden Roman numerals on the right side of the astrolabe, just as the golden hand shows the "semi-astronomical" time, but the value of twelve, i.e. the number of all hours of the first half of the sidereal day, must always be added to the next numerals on the left side.

The small golden star represents the position where the Sun is in the sky when moving across the starry sky precisely at the moment of the vernal equinox, i.e. around 20 March. The sidereal time therefore indicates the position of the starry sky with respect to the observer at the location concerned on Earth, in this case in Prague.

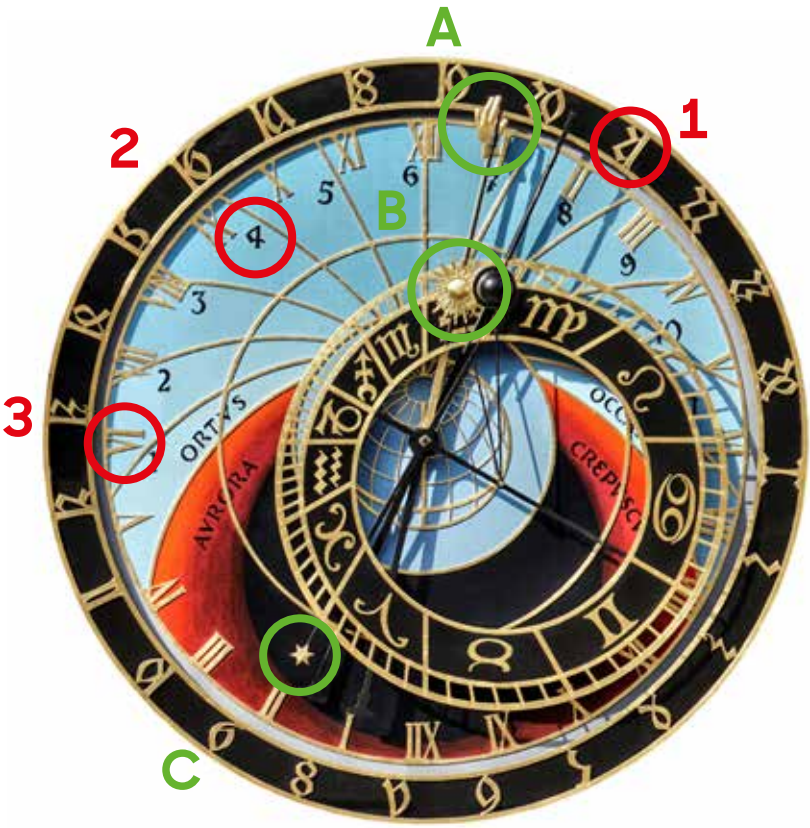
| | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dnc. | ☉ | ♀ | ☿ | ☾ | ♄ | ♃ | ♂ | ☉ | ♀ | ☿ | ☾ | ♄ |
| F. II | ☾ | ♄ | ♃ | ♂ | ☉ | ♀ | ☿ | ☾ | ♄ | ♃ | ♂ | ☉ |
| F. III | ♂ | ☉ | ♀ | ☿ | ☾ | ♄ | ♃ | ♂ | ☉ | ♀ | ☿ | ☾ |
| F. IV | ☿ | ☾ | ♄ | ♃ | ♂ | ☉ | ♀ | ☿ | ☾ | ♄ | ♃ | ♂ |
| F. V | ♃ | ♂ | ☉ | ♀ | ☿ | ☾ | ♄ | ♃ | ♂ | ☉ | ♀ | ☿ |
| F. VI | ♀ | ♀ | ☾ | ♄ | ♃ | ♂ | ☉ | ♀ | ☿ | ☾ | ♄ | ♃ |
| Sabb. | ♄ | ♃ | ♂ | ☉ | ♀ | ☿ | ☾ | ♄ | ♃ | ♂ | ☉ | ♀ |

**TABLE WITH SYMBOLS OF CELESTIAL BODIES**

*An auxiliary table used to be part of the clock. It determined which planet ruled at what hour and was used for astrological purposes.* ☉ *Sun* ♀ *Venus* ☿ *Mercury* ☾ *Moon* ♄ *Saturn* ♃ *Jupiter* ♂ *Mars*

## CALENDAR

Besides the big circular astrolabe with an outer diameter of 306 cm, the clock also contains a smaller circular calendar with a diameter of almost 270 cm located below. The calendar plate is a moving, rotating calendar. From the start it has shown what particular day was dedicated to what saint. **The names of saints** are written out along the circumference of the plate where there is also **the serial number of the day in the month**, Sunday letter and the syllable of the "cisiojanus". The **Sunday letter** shows which of the seven days of the week it is. Individual days are marked on the calendar with the phones *a* to *g*. All that was needed to be determined was which




## DESCRIPTION OF THE CLOCK'S ASTROLABE

*The astronomical dial of the Prague Astronomical Clock shows four different times. The Gothic numerals on its circumference (**1**) are used to subtract the Old Czech Time which is shown by the golden hand (**A**). The Arabic numerals on the blue part (**2**) represent planetary time which is determined by the position of the Sun's intersection (**B**) and the outer circumference of the zodiac. Using the Roman numerals (**3**), we then subtract "semi-astronomical" and sidereal hours – while the "semi-astronomical" time is indicated by the golden hand (**A**), the indicator of the sidereal time is the golden star (**C**).*

date was the first Sunday after the New Year and the letter that was shown on this January date, and such a letter then marked all the Sundays on the calendar plate throughout the year. The **cisiojanus** means a rhymed text from which, when memorised, it was easy to determine the names and feast dates of the most significant saints and important days of the year. The calendar plate did not come to exist in this form until after 1866. The original calendar plate above all contained the names of saints, so the date was noted according to the feasts of the most important of them.

Even the burgomaster's charter declaring the construction of the astronomical clock by clockmaker Mikuláš of Kadaň in 1410 is dated *"Thursday before Saint Havel"*.

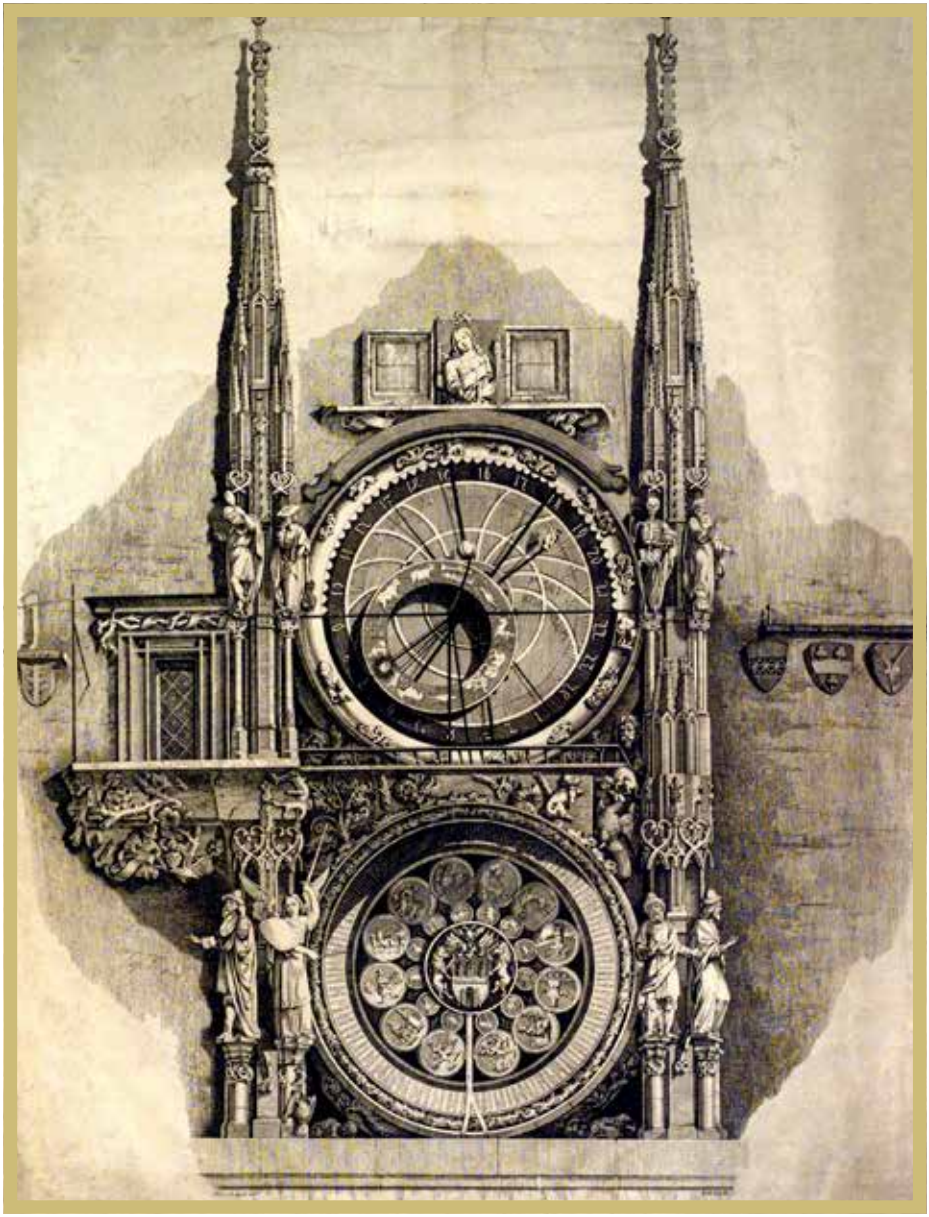
Today the calendar plate mounted on the clock is the one painted in 1866 by Josef Mánes, more precisely – it is its copy. **Josef Mánes** was a prominent Czech painter, born directly in Prague's Old Town in 1820. He was a representative of Czech Romanticism, but above all the founder of Czech national art which soon became a model for painters of

the National Theatre generation. The original calendar plate was later moved to the Prague City Museum. Mánes' calendar plate replaced the previous plate whose approximate copy has been preserved on an engraving by painter Wilhelm Kandler based on a drawing by Alois Czermak of 1836.

It is interesting to note that Josef Mánes painted the calendar plate despite being offered half the fee he had requested, and his friend, sculptor Josef Worlíček, warned him of a superstition that according to an old legend *"he who works on the astronomical clock will go mad or die in a short time"*. This is how an important work appeared which later influenced the work of many other Czech painters. However, the old legend which Mánes' old friend had warned him about really did come true a short time later. In December of 1871, Mánes succumbed to a progressive mental illness which was evidently the result of an untreated inflammation in the head of this ingenious painter.


## MÁNES' ORIGINAL CALENDAR PLATE

*In its present appearance, the calendar has formed a part of the Prague Astronomical Clock since 1866. It bears the names of the saints (1) for each day of the year, states the serial number of the days of the month and the Sunday letter (2), then written along its circumference are the syllables of the cisiojanus (3) – a rhyme as an aid to help remember important days of the year. The plate illustrates scenes of rural life typical for each month of the year (4) and the figural motifs depict the signs of the zodiac (5). The historical emblem of Prague's Old Town (6) is placed in the centre of the plate.*



## HISTORICAL DEPICTION OF THE ASTRONOMICAL CLOCK

*The picture from the Prague City Archives shows the engraving by Wilhelm Kandler of the astronomical clock as it appeared in 1836. The older version of the calendar plate is apparent here which was replaced by the calendar by Josef Mánes in 1866 or the zodiac of the astrolabe still in its figural form.*

# DEVELOPMENT OF THE ASTRONOMICAL CLOCK AND ITS COMPONENTS

## Stone ornamentation

The Old Town Astronomical Clock is literally covered in stone ornamentation, not just in the form of typical Gothic pinnacles, but also other architectural details or richly figural ornamentation. These were originally executed by the stonemasons of Parléř's workshop. **Petr Parléř** was one of the most prominent European architects, sculptors and builders of the High Gothic period. He came to Bohemia as a very young man in the early 1350s at the invitation of king Charles IV. His building workshop subsequently created monumental works there. Petr Parléř played an important role in the construction of St. Vitus Cathedral and Charles Bridge in Prague. He was also the builder of Karlštejn Castle and St. Barbara's Church in Kutná Hora. But Petr Parléř was not just a builder, he was also an excellent sculptor. After his death in 1399, his workshop continued to operate in Bohemia right up to the outbreak of the Hussite Revolution. The Hussite Wars were probably also the cause of the disappearance of a considerable part of the astronomical clock's ornamentation. The execution of the leader of the radical wing of the Hussites – priest Jan Želivský – by the Old Town councillors in the courtyard of the Old Town Hall in early 1422, gave rise to retaliatory acts of violence by his followers on the building of the town hall which could not remain without consequences. Most of Parléř's ornamentation was then replaced by Late Gothic ornamentation produced in the late 15th century probably by the workshop of **Matěj Rejsek**, a city sculptor and builder. His Late Gothic ornamentation is thematically greatly focused on alchemy, therefore the intricate sacred symbolism may appear today's observer very difficult to understand. However, part of Parléř's ornamentation has been preserved on the jamb of the astrolabe. Perhaps the angel (probably a guardian angel) that is installed at the top of the astronomical clock dates back to this period. The angel on the ledge points down with the index finger of its right hand as a reminder of God's concern for all earth's pilgrims.

## Mechanism of the astronomical clock

The ancient clock mechanism rotates the Sun, Moon and the stars to this day inside the stone structure, behind the astrolabe of the astronomical clock. The Prague Astronomical Clock is the oldest clock in the world to contain the miraculously preserved original mechanism. Over the centuries it faced many risks of being destroyed, was modified several times, but, despite all the modifications, the original mechanism survived and still works.

The very **first mechanism** wasn't too complicated. It consisted only of a pointing machine with a verge or crown wheel escapement as the drive controller, from the shift of the rotation from the gear train of the pointing machine for the raffia of the Sun, Moon and zodiac and from the ringing machine. The shift of the rotating parts of the astrolabe, the Sun, Moon and zodiac was executed very simply here – by a single common pinion with 24 teeth. The pinion rotated the Sun, Moon and zodiac using three large wheels fitted to concentric shafts. The ringing machine only rang for a short time before the chiming machine was set in motion. It rang out a warning that in a moment the chiming machine would begin to strike the number of hours and to carefully count how many strikes would ring out. The chiming machine which would be set in motion was not, however, located in the clock. Formerly it was located a little higher above the town hall chapel on the bottom floor of the tower. This was the remains of the former very old clock mechanism, perhaps dating from the 1360s which at the time the clock was constructed, was no longer in full working order because of its bad condition. The creator of the astronomical clock, Mikuláš of Kadaň, then used his frame, into which he constructed and fitted new wheels. The chiming machine was then set in motion

## GUARDIAN ANGEL

*The statue of the stone angel is one of the oldest parts of the astronomical clock's stone ornamentation – it probably comes from Petr Parléř's workshop. The photograph from the Prague City Archives shows how it looked before World War Two. After the fire of the Old Town Hall in 1945, it was replaced by a copy and the original statue, which was considerably damaged, is missing to this day.*

**“REPORT ON THE PRAGUE ASTRONOMICAL CLOCK” BY JAN TÁBORSKÝ**

*Jan Táborský devoted a great part of his life to caring for the Prague Astronomical Clock. The written work of 1570 he left behind is the first historical document providing a technical description of the monument. Today, the book is stored in the collections of the Prague City Archives.*

remotely by a wire from the clock’s mechanism and after being set in motion it struck the cimbalom the same number of times as was the number of hours.

## Creation of the astronomical clock

Over the past six centuries, the face of the clock has been modified many times. In about 1558, it received a new Renaissance canopy with one doorway in the centre of a brick extension, newly built behind the stone angel. At this time, the mechanism was maintained by clockmaster **Jan Táborský**. He looked after the clock from 1552 to 1556 and then from 1560 to 1570. He left behind a hand-written book of sixteen parchments describing his problems with the clock, all the repairs and new additions he had made to the monument.

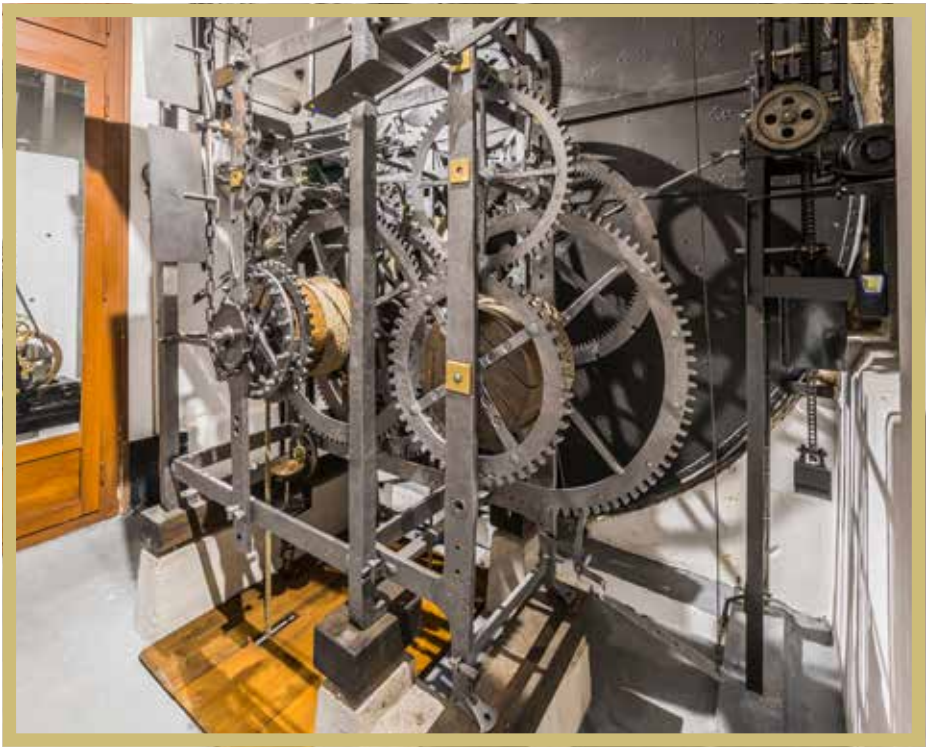
It was he who was the first to present the assumption that the clock was constructed by **Master Hanuš** in about 1490. He was concerned about the fact that such an important monument had an unknown creator and that it was not even known when the clock had been built. This assumption then took on a life of its own. Priest and historian Bohuslav Balbín developed the legend by turning Master Hanuš into a prominent astronomer of Prague University, and popular tales then related to how town councillors had the creator of the clock, Master Hanuš, blinded so he could not build another such wonderful and remarkable masterpiece anywhere else. Both tales are no doubt made up, but Master Hanuš (Jan Růže) really did work on the clock at this time. He lived nearby in Jilská Street and was called the *“clockmaster of the lords of Prague’s Old Town”*. We may not know if he had made and left behind any changes, but it is certain that he repaired and maintained the clock in working order. We can find more stories about the origin of the clock in history. The famous Czech archivist, writer and poet of the 19th century, Karel Jaromír Erben, quoted his contemporary, historian Řehoř Volný, when he stated that the *“father and master of the Prague Astronomical Clock was Anton Pohl, born Saxon”*. One must also not overlook the

popular tale about a blind youth who was to have built the clock sometime in the distant past.

Today there is the prevailing widespread opinion of Zdeněk Horský, a notable expert in the history of the astronomical clock, who in 1967, stated that the main creator of the clock was Jan Šindel, a professor at Charles University. According to his calculations, royal clockmaker **Mikuláš of Kadaň** then merely constructed the clock. But the assumption about Jan Šindel's contribution to the creation of the clock is not based on any credible source and is contradicted by many facts. It is the very text of the burgomaster's charter of 1410 that has survived in a transcription and states as the clock's builder to be *"Master Mikuláš of Kadaň, the sworn master of our clock"* as well as also writing that *"said Master Mikuláš, apart from his skill and the natural sense for this town and the honesty of the whole community, produced an astrolabe"*. The actual construction of the astrolabe of

**DETAILS OF THE METALWORK FROM THE ASTRONOMICAL CLOCK'S MECHANISM**

*The clock's mechanism is proof of the precision metalwork of the medieval period and further centuries.*



**VIEW OF THE INSIDE OF THE ASTRONOMICAL CLOCK**

*This technical jewel is housed inside the stone annex of the town hall tower. This is the ancient mechanism of the Prague Astronomical Clock. Its basic clockwork mechanism was constructed by clockmaker Mikuláš of Kadaň as early as 1410. Today the Old Town Astronomical Clock is the oldest working clock of its kind in the world.*

this archaic type was not really that complex and does not match the precise construction of an astronomical astrolabe. Therefore, the differences from that of the theoretically accurate size of the tropics that appear on the clock seriously question mathematician and astronomer Jan Šindel's contribution to the work. Horský's theory also overlooks the extraordinary skills of clockmaster Mikuláš of Kadaň, who could not have been awarded his title without the necessary education and expertise as well as the craftsmanship required to build the astronomical clock's mechanism and the astrolabe.

## Sculptured ornamentation

In 1659, after the Thirty Years' War, new Baroque wooden statues were added to the face of the astronomical clock when it was undergoing repairs. Three of these, which are moving statues, were mounted on a corbel on the top row where they were added to the most significant of the polychromed statues – Death. The smiling skeleton is an allegory of blissful death followed by salvation and the statues nods its head to such death. Each hour of the turn of the sandglass it symbolically stops the passage of time and Death ringing out is a reminder that the time measured out to us all will unavoidably expire one day. And death which will catch up with us one day should not be a sad one followed by damnation at the Last Judgement and being condemned to Hell. The other statues at the top represent the allegories of three of

the **worst human deadly sins** – pride, greed and envy.

The allegories of the sins are complemented by three statues on the bottom row, as the opposite to the statues above representing the **most beautiful human virtues** – kindness, charity and humility. The statues are wearing oriental dress so none of the allegories of the vices could be considered possible caricatures of prominent contemporaries of the time. Apart from the calendar plate in the spot where Archangel Michael stands today holding a shield and sword, at the end of the 18th century the figure of Chronos stood there as an allegory of eternal time, as the counterpart of the allegory of Death and, in contrast, recalling the time reserved for human life. The silhouette of his likeness, recalling an old man, can be seen on some of the historical effigies of the Old Town Hall. It is likely that in view of the statue's poor condition, today's statue of the Archangel Michael, the guardian of the south gate of Heaven, was erected in its place. Originally it stood on the town's guardhouse and, after this was demolished, it was moved to the astronomical clock.

## Statues of the apostles

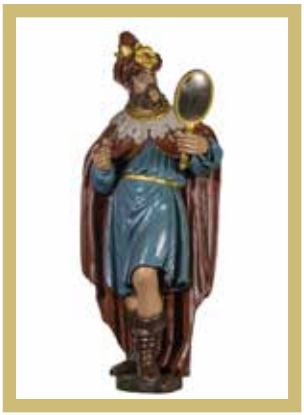
An important event in the history of the astronomical clock must have been the mounting of the apostles on the mechanism. We also have no records of this event, but we know from the book of historian Bohuslav Balbín of 1682 that here *"there are no feigned games or trifles, old women dancing with Death, no cherubs playing on violins (…) and no male and female figures take to the floor to be admired by boys and wilful children and farmers bringing straw and timber to town"*. So, the apostles could not have already been installed there in the late 17th century.

In contrast, the travelogue of Emanuel Swedenborg of 1733 in the sections describing the astronomical clock already mentions *"various statues here and there on plinths and in the doorways"*. Therefore, it can be assumed that the apostles must have been mounted on the clock sometime between 1680 and 1733. It is not exactly clear when this came about. This could have been in the summer of 1723 on the occasion of the coronation of the highly devout Catholic, emperor Charles VI, as the Bohemian king. He was spending four months in Bohemia at the time, apart from Empress Elisabeth Christine he was also accompanied by his six-year-old daughter, Maria Theresa. The Old Town councillors and above all burgomaster Jan Kašpar Prandt evidently needed to improve the hitherto very atheistic and alchemistic ornamentation of the clock by a significant Catholic theme which became the motif of the apostles.

During the 19th century, the original statues of the apostles gradually disappeared somewhere. Three of them – St. Peter, St. Paul and Christ – were later found and passed on to the collections of the Prague City Museum. The missing statues were replaced in 1865 with new apostles. Their creator became **Eduard Veselý**, a prominent sculptor of the second half of the 19th century. At the present time, the apostles on the clock are the third in a row to be made. They were sculpted by sculptor and puppeteer **Vojtěch Sucharda** in 1948 as a replacement for Eduard Veselý's apostles burnt on 8 May 1945 in the final hours of World War Two.

## Modern day events

In 1864 and 1865 the astronomical clock underwent one of the biggest repairs in its existence. At the time, after many previous centuries, it was put out of operation so it could be reconstructed because of its poor condition. The clock was sensitively restored keeping in mind that it was a unique historical monument. The craftsmen of the time preserved the original mechanism of the clock and only made changes to it that they considered essential. Its rather inaccurate verge or crown escapement as the drive controller was removed and replaced with a highly accurate **chronometer**. It is this that makes sure the gear train turns by one minute every minute. The clock's astrolabe plate, originally riveted from rectangular metal plates, was replaced with a newly made one together with



1

2

4

3

5

## OVERVIEW OF STATUES FROM THE CLOCK FACE

*Baroque statues as allegories of human vices and virtues were mounted on the front of the clock in the 17th century. Some of the statues were altered in the 20th century by sculptor Vojtěch Sucharda – he placed new attributes in their hands altering their original meaning.*

***1** – Coxcomb (originally the allegory of Pride) **2** – allegory of Greed **3** – Death **4** – Hedonist (originally the allegory of Envy) **5** – Scribe (originally the allegory of Kindness) **6** – Archangel Michael **7** – Stargazer (originally the allegory of Charity) **8** – Chronicler (originally the allegory of Humility)*

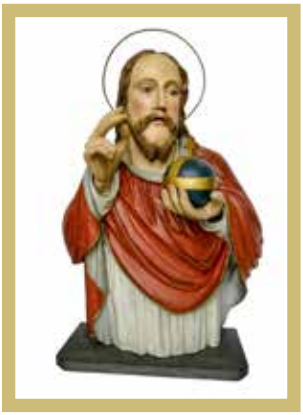
6

7

8

## HISTORICAL STATUES

*The photograph from the Prague City Archives shows two statues – the allegories of Humility and Kindness – before the repair of the clock in 1911. Later, the carver Sucharda placed a book and a quill pen with a scroll in the hand altering the symbolism of the statues – the personification of Humility became the Chronicler and that of Kindness became the Scribe.*



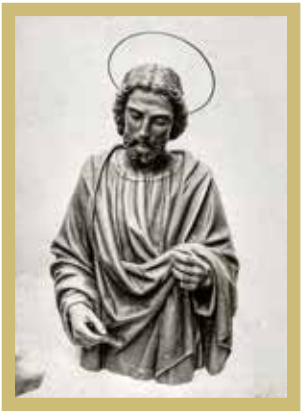
1

2

3

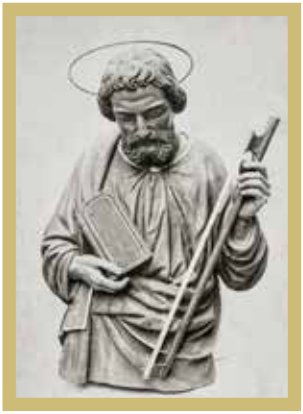
## ORIGINAL ASTRONOMICAL CLOCK APOSTLES

*The very first apostles probably appeared on the clock before the mid 18th century. The baroque statues later disappeared somewhere, only three of them – Christ (**1**), St. Peter (**2**) and St. Paul (**3**) – can be found today in the collections of the Prague City Museum.*



A

B



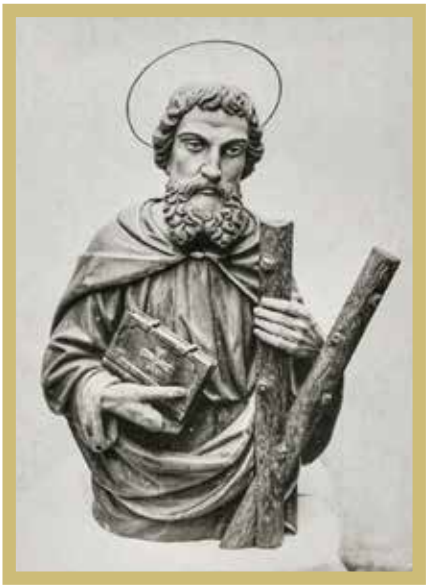
C

## EDUARD VESELÝ'S APOSTLES

*The missing Baroque statues of the twelve apostles were replaced during the major repair of the astronomical clock in 1865 by Neo-gothic figures which were the work of sculptor Eduard Veselý. They remained inside the clock until 1945 – when they were engulfed in flames as the result of the Old Town Hall being fired upon by the Nazis. Photos of some of them have been preserved in the Prague City Archives.*

***A** – Christ **B** – St. Peter **C** – St. James the Less **D** – St. James the Great **E** – St. Andrew **F** – St. Paul **G** – St. Matthew*

D



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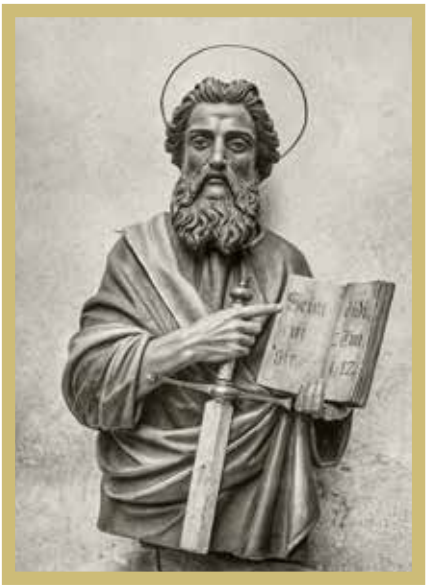

F

G

new raffias and zodiac. The original zodiac with painted figures of the zodiac signs was replaced by a **new zodiac**, however in error, by the dimension of the circle that is equal to the circle of the equator on the astrolabe, i.e. being considerably smaller. To correct the error, in 1866 they attached a hoop steel ring of the correct diameter to the circumference of the zodiac circle to which dividers separating the circumference of the zodiac circle every five degrees were then added in 1882. So, this error resulted in the characteristic and beautiful detail of the clock – the golden "ladder" around the zodiac.

In 1882, a **golden cock** was added to the clock that crows, flaps its wings three times and simultaneously bends its head back three times after the walk of the apostles.

Today it is difficult for us to imagine that the entire clock and its stone ornamentation were originally polychromed. The colours eventually disappeared from the stone ornamentation because they were not restored in recent centuries. This was due to the imperial edict of emperor Joseph II who by his decree banned the polychromisation of statues. Today the remains of the red and ochre colours can only be found in the hidden corners of the stone jamb.

**COMPARISON OF TWO VERSIONS OF THE ZODIAC**

*To this day the depositary of the Prague City Museum houses the zodiac from the Prague Astronomical Clock's astrolabe with the painted figures of the zodiac signs. In 1866 it was replaced by a new version where the zodiac signs are depicted by their astronomical symbols. This zodiac circle with its characteristic golden ladder running along the circumference is the most iconic feature of the clock today.*

The mid 20th century turned out to be the most fateful for the Old Town Astronomical Clock in its entire history. In the final hours of World War Two, on the morning of 8 May 1945, the clock and the entire town hall building were heavily damaged by a **huge fire**. This was caused by artillery fire battering the building and its tower mainly from the edge of Letná Plain. The fire reached the clock from the adjacent chapel – the flames first reached the wooden apostles and then continued down to the very mechanism of the clock.

The wooden floors below the apostles and the clock's mechanism burned up so the entire mechanism ended up surrounded by a pile of burning beams and the ruins of the apostle figures, while the mechanism's brass bearings flowed out due to the heat.

When part of the burnt-out town hall was demolished after the war, it was planned to build a completely new modern astronomical clock. Sculptor Vojtěch Sucharda intended to mount sixteen new statues all over the clock

in line with the spirit of the time and these would move in various ways. He considered the original Baroque statues on the face of the clock to be in bad taste – perhaps because he did not understand their primary significance at all. Fortunately, however, his proposed modifications were not carried out. Great credit must go to the historian, **Václav Vojtíšek**, for saving the astronomical clock as he managed to push through the plan to have the old rare clock repaired and restored to its condition before the fire. Because it had been destroyed by fire, the canopy with the spire above the clock was rebuilt, the stone ornamentation was repaired and new copies were made of the wooden Baroque statues from the front of the clock. Vojtěch Sucharda may not have been successful with the idea of rebuilding the clock, but he is the author of the new, post-war apostles which he carved according to his own designs. The clock's mechanism was repaired and received a new drive. This new mechanism ensured weights lifted by electric motors and suspended by chains on sprocket wheels mounted on a shaft in the place of the original rope drums. But this drive system was removed during the **reconstruction in 2018**. At the time the clock's mechanism was not only restored, cleaned from corrosion and layers of paint, but its original drive was restored too. So, it has been fitted with old-new stone weights suspended on hemp ropes that turn the restored wooden rope drums.

The Prague Astronomical Clock is unquestionably the most visited and admired astronomical clock in the world. Every hour several hundred tourists from all over the world stand in front and wait for the walk of the apostles. Every year it is seen by millions of admirers.

## WEIGHTS AND ROPE DRUMS OF THE CLOCK'S DRIVE

*In 2018 the entire clock underwent major reconstruction work. The repairs, which lasted nine months, restored the original drive to the mechanism – these are weights suspended on hemp ropes that turn the wooden drums.*

## OLD TOWN HALL IN MAY 1945

*A photograph from the Prague City Archives showing the destruction caused to the Prague Town Hall and its astronomical clock on 8 May 1945. The ancient building was fired upon by the Nazis and was heavily damaged. While a large part of the damaged town hall was demolished after the war, the clock was reconstructed to its historical appearance.*

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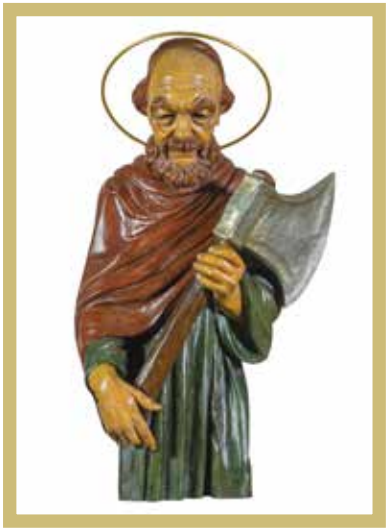

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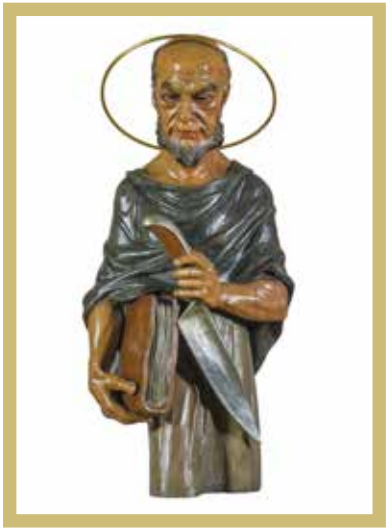

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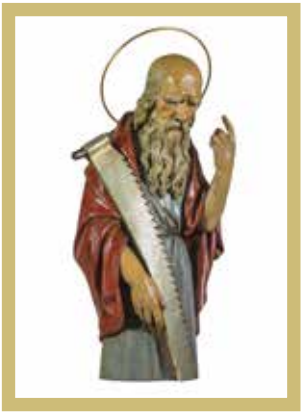
## OVERVIEW OF TODAY'S APOSTLES

*The statues of the twelve apostles that decorate the Prague Astronomical Clock were sculpted after the war. They have been part of the clock's mechanism since 1948. They were created by carver Vojtěch Sucharda according to his own design.*

***1*** *– St. Philip* ***2*** *– St. Matthias* ***3*** *– St. Peter* ***4*** *– St. Bartholomew* ***5*** *– St. Simon* ***6*** *– St. Paul* ***7*** *– St. James the Less* ***8*** *– St. Andrew* ***9*** *– St. Judas Thaddeus* ***10*** *– St. Barnabas* ***11*** *– St. John* ***12*** *– St. Thomas*



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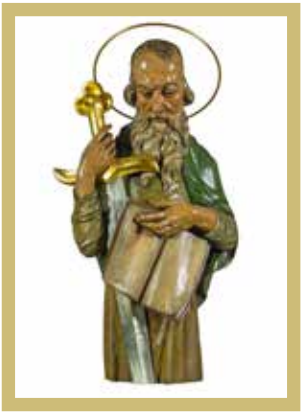

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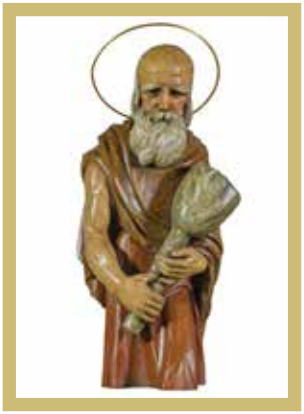

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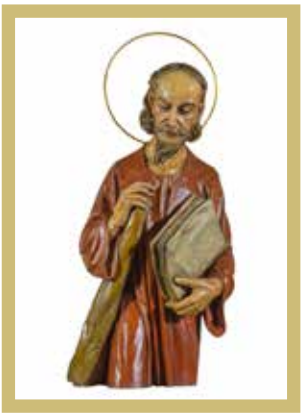

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10

11

12

# CHRONOLOGY OF THE CLOCK

**14th century – construction of the town hall tower**

The construction of the town hall tower was underway. After its completion, not known when, the machine for chiming out every hour was built into the tower. However, after the astronomical clock was constructed in 1410 by Mikuláš of Kadaň, the entire chiming mechanism was not yet in full working order. The clockmaker had to modify it – he made new gears for the chiming machine and it was newly set in motion remotely by a wire from the astronomical clock's mechanism.

**1410 – creation of the Prague Astronomical Clock**

The burgomaster's charter of 9 October 1410 declared the completion of the clock by clockmaker Mikuláš of Kadaň.

**1475 – 1497 – Late Gothic modifications to the clock**

Master Hanuš (Jan Růže) works on the clock. The builder and sculptor Matěj Rejsek carried out new stone ornamentation of the clock face in the style of Jagiellonian Gothic.

**1552 – 1570 – clockmaster Jan Táborský**

Jan Táborský entered the history books by becoming one of the most prominent Prague clockmasters. He looked after the clock for virtually two decades (from 1556 – 1560 being temporarily replaced as clockmaster by Václav Tobiáš).

**about 1558 – a canopy above the clock**

A canopy with a spire and doorway were built above the clock and two sundials appeared on pillars next to the clock.

**1629 – the chiming machine moved from the tower to the clock**

The chiming machine was moved and mounted to the side of the clock mechanism from the tower which until that time had struck a bell after being actuated by a wire drawbar from the clock.

**1659 – Baroque statues mounted on the front**

Wooden statues were mounted on the face of the clock. They were probably sculpted by someone from the circle of Jan Jiří Bendl – a sculptor who was the creator of the Marian Column erected in 1652 on Old Town Square.

**1723 – apostles on the clock**

Perhaps it was at this time, on the occasion of the coronation of Charles VI as Bohemian king, that the apostles first appeared on the clock.

**1787 – monument on the verge of demolition**

When the historical four Prague city quarters were merged in 1784, the Old Town Hall was extended and rebuilt. The clock was not working so it was to be sold as old metal scrap. It was deputy burgomaster Fischer who saved it from destruction.

**1791 – the clock was repaired by Ferdinand Londensperger**

**1824 – stagnation of the clock**

Between 1824 and 1838 the clock was only set in motion during feasts. The clock was never wound up after the start of the great Neo-gothic reconstruction of the town hall in 1838.

**1842 – the threat of the end of the clock is imminent again**

Cracks appeared on the tower of the Old Town Hall because of the Neo-gothic reconstruction of the building, so the city's governorship ordered the dismantling of the tower. However, it also discussed the possibility of saving the tower.

### 1846 – the clock is preserved

The disturbed oldest structural parts of the town hall were reinforced. So, it was finally confirmed that the clock and the tower would be preserved. This simultaneously involved the restoration of the entire clock face.

### 1864 – 1865 – major repair of the clock

The clock had not been working at all since 1838. Now it was decided to repair it. The entire mechanism was dismantled on 1 September 1864 and moved to a workshop. Some modifications were made to it, but the original mechanism was preserved as a whole. The verge or crown escapement – the old, original drive controller – was replaced and a new accurate chronometer made according to the drawings of constructer Romuald Božek. Sculptor Eduard Veselý carved the new apostles and their chamber got new doorways. Two clocks with a translucent, backlit dial were produced for the side of the astronomical clock by the company L. Hainz.

### 1866 – new calendar

Painter Josef Mánes created a new calendar for the Old Town Astronomical Clock.

### 1880 – next restoration of the clock

The big restoration of the tower began in November. The clock and apostles were dismantled by L. Hainz and moved to a workshop. The repaired mechanism was put back into operation on 31 December 1882. The original Mánes' calendar was replaced with a copy by painter Emanuel Krescenc Liška. Every five degrees, dividers were mounted on the zodiac circle giving rise to the characteristic golden "ladder" around its circumference. A cock was made and placed in the opening above the doorways of the apostles. It was made by František Kamberský, an employee of L. Hainz.

**MECHANICAL COCK**

*This is the appearance of the original cock from the Old Town Astronomical Clock. It has decorated the front of the monument since 1882. Its purpose is clear – its crowing and individual movements signal the end of the walk of the twelve apostles on the hour. But it is also the symbol of the birth of a new day – it scares away death and night demons.*

### 1911 – alteration of the Baroque statues and restoration of the clock

Sculptor Vojtěch Sucharda altered the statues on the face of the clock – the Turk at the bottom of the face had a quill pen and scroll placed in his hand and the Turk on the right of Death came to hold a lute. Thus, the original meaning of the statues was inappropriately altered – the allegory of Kindness became the "Scribe" and the personification of Envy became the "Hedonist". The stone features of the clock were restored and the calendar repaired. The clock's mechanism was dismantled and reassembled. The clock lost the remains of the sundials which were removed.

### 1912 – new lights for the side dials

The original gas lights of the side clocks on the astronomical clock were changed to electrical ones.

### 8 May 1945 – fire of the Old Town Hall

The Old Town Hall was exposed to Nazi attack. The building was battered by artillery fire and the structure was engulfed in fire. The Old Town Astronomical Clock and its components were seriously hit – the mechanism was damaged, the apostle figures were burned down, the stone ornamentation of the face and Liška's calendar were destroyed.

### 1945 – 1948 – post-war restoration of the clock

All parts of the clock were dismantled and reconstructed, the clock face and its interior were restored. Painter Bohumír Číla produced a new copy of the calendar plate, sculptor Vojtěch Sucharda carved new apostles. The Gothic angel between the doorways of the apostle was replaced by a copy. The drive of the repaired clock was changed to a self-winding one and the lost rope drums of the clock's mechanism were replaced by sprockets. The chiming machine was rebuilt – formerly the chiming according to the Old Czech Time was replaced by the chiming according to Central European (Civic) Time.

### 1966 – further alteration of the Baroque statues

Just as in 1911, sculptor Sucharda altered the attributes of the other statues on the clock face. The Turk on the right of the calendar plate had a spyglass placed in his hand whereas the adjacent Turk held a book. The allegory of Charity became the "Stargazer" and the personification of Humility was transformed into the "Chronicler".

### 1993 and 2005 – repair of the clock in a workshop

### 2018 – general repair of the entire clock

The self-winding drive using weights suspended on chains were removed from the clock and, according to a design by clockmaster Petr Skála, the drive was restored in the form of stone weights suspended on hemp ropes wound onto new wooden drums. The automatic winding mechanism is concealed inside the wooden rope drums. The clock's stone ornamentation, wooden statues of the face and the apostles were completely restored. The stained-glass windows in the chamber containing the apostles and the paintwork of the dark blue sky with golden stars on the ceiling of the canopy above the doorways of the apostles and in the room where the apostles are housed were restored according to historical photographs. Academic painter Stanislav Jirčík painted a new copy of the calendar plate – this is the third copy of Mánes' calendar of 1882.

**ASTRONOMICAL CLOCK'S MECHANISM DURING THE REPAIR WORK IN 2018**

*During the major restoration in 2018, the astronomical clock's mechanism was completely dismantled and moved for full restoration to the workshop of the clockmaster. The photo on the left shows the remarkable view in which the mechanism is only visible while dismantled outside the clock itself – from this angle the mechanism is normally hidden by the astronomical plate and cannot be seen. The other photograph captures an image of the mechanism from a different angle as normally mounted on the Old Town Hall.*

**Name:** Prague Astronomical Clock
**Text:** Prague City Tourism, Petr Skála
**Photos:** Prague City Tourism, Prague City Hall, Prague City Archives, Prague City Museum, Martin Frouz
**Layout:** Touch Branding

Prague 12/2018
First Edition


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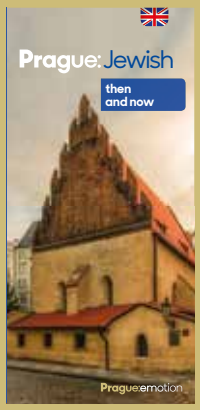




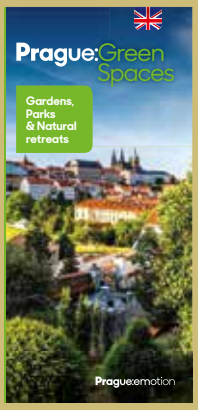



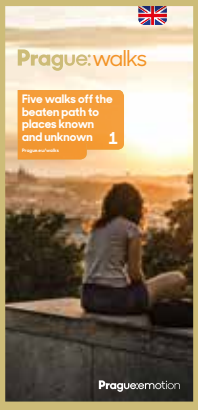


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