Explanations Regarding Technical Detail of the Calendar Update on Jan. 1, 2018

Fedor Mitschke, 26. Oct. 2019

The calendar data, i.e. the inscription of the calendar disk with a plethora of calendaric items, covering the period from 1885 to 2017, was replaced on Jan. 1, 2018 with great ceremony with a new data set which covers the period 2018-2150.

The time span of 133 years is based on astronomical facts according to which lunar phase and weekday (and in the Julian calendar also Easter date) almost exactly repeat themselves on the same day after 532 years. To inscribe such enormous amount of data runs into space limitations. The full range was used only in the Paulus Dome in Münster, Westphalia; elsewhere clockmakers usually settled for a fraction thereof, like here 133 years = one quarter of 532 years.

On earlier occasions of updating the calendar, the old inscription was removed from the disk, and a new one was painted on it; this rendered the previous inscription lost forever. In the spirit of conservation of cultural heritage, this time a method was sought that keeps the previous calendar data intact for the benefit of future researchers.

This is why the new data set was inscribed on a thin plate of the same diameter as the calendar disk; this plate was then mounted in front of the calendar disk so that it can be removed later without any trace. This front disk is thin enough (4.5 mm) to remain inconspicuous, and is light enough (10 kg) to not unduely burden the shaft that carries the weight of the calendar disk (67 kg).

This text explains the method by which the front disk was mounted without damage to the previous inscription beneath it.

1) Preparation of the Front Disk

As early as 1994, Prof. Dr. Manfred Schukowski had calculated the complete set of data for the new calendar. Six years later, three students at “Goethe Gymnasium” in Rostock – Juliane Helke, Ingolf Sölling und Konstantin Wehrhahn – performed the same calculation in the framework of a national science competition. The results were in agreement.

Then, arts restorer Marcus Mannewitz and his assistents Susanne Ruynat, Albrecht Radtke, Monika Staciwa, Silke Weber and Anna Klünder painted these data in painstaking work onto the front disk, made of 4,5 mm thick plywood (three layers of birchwood). When rendering numerals and letters he took his cues from the existing calendar of 1885 which represents the taste of its time of origin in the 19th century. The appearance of earlier inscriptions will probably never be known. The finalized front disk stood by in a side chapel of St. Mary’s and was left there for several years so that the wood could acclimatize.

2) Preparation of and Schedule for Calendar Replacement

The first time since the 19th century that the calendar disk was dismounted presented a unique opportunity for close inspection and for maintenance of the shaft and other mechanical parts. As there was no advance knowledge whether defects would be discovered and, if so, how long it would take to fix them, and because the date of unveiling on Jan. 1, 2018 was deemed mandatory, the following schedule was agreed upon:

100 days prior to year's end, on Sept. 23, 2017, in a first step a photographic reproduction of the retiring calendar at 50% original size was unveiled so that this calendar data would remain accessible for the future. The photography was prepared by Fedor Mitschke and was printed by the Whitewall company on the rear side of an acrylic glass plate. It stands in a wooden frame which was made by Westphal carpentry (Rostock) from sketches by F. Mitschke.

Then, on Nov. 2, 2017 (right after celebrating 500 years of Luther's Wittenberg theses) the calendar disk was removed from the clock and temporarily kept in a side chapel. It was there that the front disk was attached to it on Nov. 11, 2017, following the procedure described in the next section. The thus updated calendar disk was then fitted to the clock again on Nov. 28, 2017. It was kept under veils until the ceremonial unveiling on Jan. 1, 2018.

3) The Method of Assembly

It is known from dendrochronological assessments that the wood of the calendar disk dates form the time of origin olf the clock (1471/72). The round calendar disk is made of several boards; at the joints small gaps exist where in some places light can shine through. These crevices are at the core of the assembly of the front disk without damage to the old calendar underneath.

The basic idea, as first raised by M. Mannewitz, appears simple: A thin disk the size of the calendar disk is laid on top of the retiring calendar. Wires are fitted through small drill holes, and passed through the crevices of the calendar disk to its back side where they are fastened. Thus, this disk is tied to the calendar disk. In a second step, glue can be applied to the disk, and the front disk can be fixed on it.

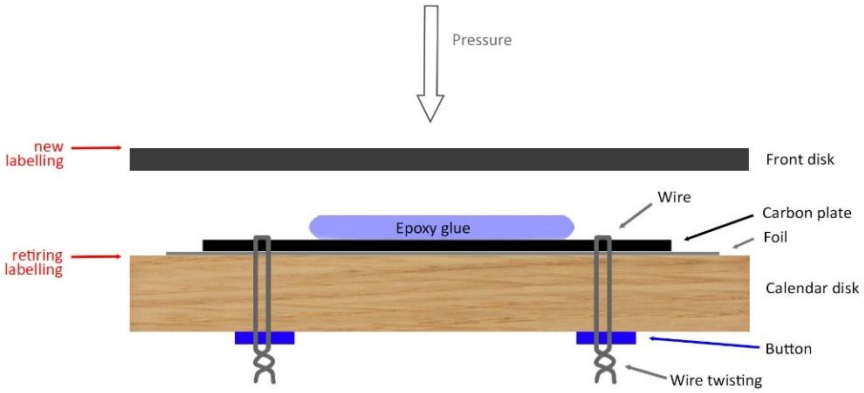
The practical realization required expertise and ingenuity. Prof. Dr. Gerhard Scharr, Chair of Engineering Design / Lightweight Construction at Rostock University contributed his ideas and, together with his coworkers and Andreas Holtz in particular, also performed the assembly. Eight smaller plates, or tiles, of a carbon fiber compound material were used; in the pictures they are easily recognized by their black color. The wires bear the main responsibility for the durability of the entire construction. Unfortunately, no useful information is available on the durability over periods exceeding a century; therefore, wires of different metals were used side by side – the one that lives the longest defines the overall lifetime. Wires of silver, brass, and stainless steel were employed.

4) Procedure by Which the Front Disk Was Attached

First, at the position of each carbon plate a nylon film ('foil') was placed. Its purpose is to protect the retiring calendar from spilling glue. On top of the foil came the carbon plates, each with pairs of drill holes for the wires, in groups of three for the three wire materials.

On the calendar disk's rear side the wires were threaded through a button (zinc alloy), then twisted. For good measure, a drop of epoxy glue helped secure this fastening. For the final assembly, an adhesive was spread on the carbon plates (the drill holes for the wires were covered first). Its counterpart, the rear side of the front disk, was carefully cleaned in the corresponding positions, and also coated with glue. The last step was to put the front disk on top of the calendar disk, and to press it down until curing was complete.

Left: One of the eight carbon plates on the calendar disk. Two groups of three wires each are visible. Each wire is passed through two drill holes and through gaps in the calendar disk. **Right:** On the rear side of the calendar disk, the wires go through buttons and are twisted to secure them in pace. Both pictures by Edeltraut Altrichter / ITMZ.



Sketch: The carbon plate (black) is tied to the inscribed side of the calendar disk with wires which are stuck through cracks in the disk and are twisted on the reverse side. Then, adhesive is applied to the carbon plate; a foil protects the historical inscription from excessive glue spilling sideways when the front disk is finally pressed down.

5) Report by Prof. Dr. Gerhard Scharr

Prof. Scharr has laid down technical detail of the procedure in a protocol which is reproduced verbatim in the German version of this text.