

The Restoration of a 34 cm Terrestrial Globe by Blaau

One of the most distinguished publishers and makers of maps and globes during the 17th century was the dutchman Willem Jansz Blaau who started his business around 1598 in Amsterdam. This business was continued by the family well into the 18th century. The first pair of globes made and published by Blaau goes back to 1599 (the terrestrial globe) and 1603 (the celestial) and they both have a diameter of 34 cm. The globe mentioned in this paper is also dated 1599 but since the name of the cartouche is Guillelmus Janssonius Blaau and the name "Blaau" was first adapted after 1621 it must be concluded that the globe is an updated version made after 1621 (1), (see Fig.1).

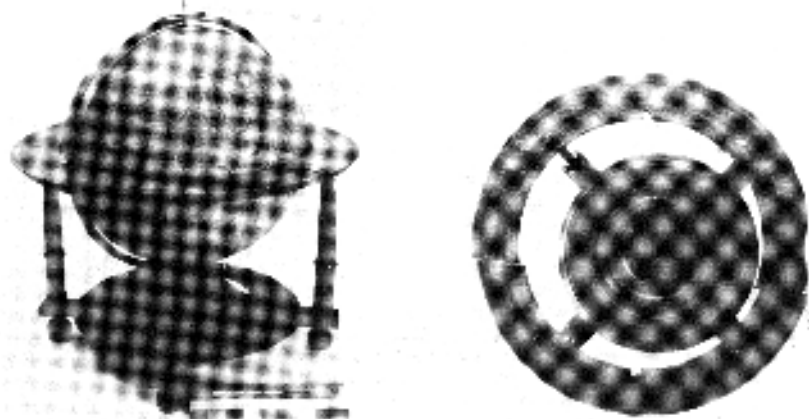


Fig.1 The globe before treatment Fig.2 The broken stand

The construction of globes

The general principles for the construction of globes were more or less the same from the 16th century when the large scale production of european globes began till the end of the 19th century where industrialism called for changes in the methods of production and the aesthetic appearance.

Originally a globe was made of two hemispheres of papier mache or cardboard joined together over a wooden construction of struts. The ball was then covered with a layer of plaster made smooth and even by the use of a template. Segments or gores of paper with the printed image was pasted to the shell.

Usually there would be twelve gores and two calottes at the poles; any colouring would be done at this stage. In most cases the globe was varnished in order to protect the surface; this could only be done if the paper had been well sized to prevent the varnish sinking into the paper. The printed paper of the horizonring was pasted to the wooden ring sometimes with an intermediate layer of plaster and then sized and varnished like the globe.

The globe was mounted in a meridianring of brass and fitted into the stand. Thus the globe would rotate within the meridianring

and the meridianring would rotate within the stand. Usually an bearing with a little pointer was present on top of the meridianring. (see Figs.3,4).

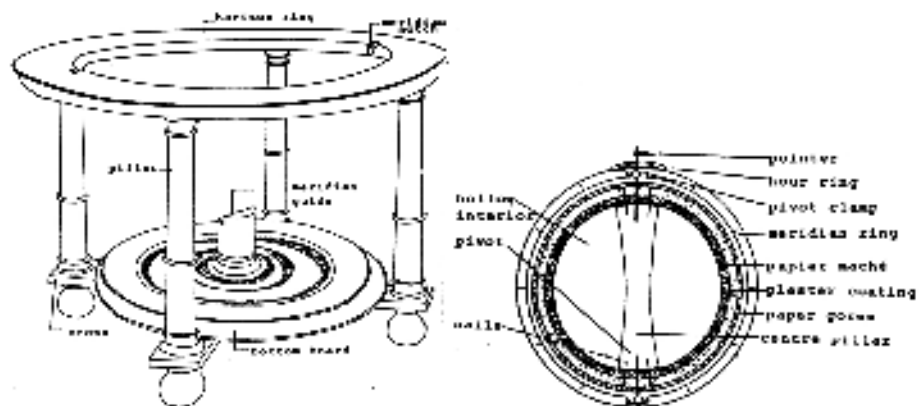


Fig.3 The parts of the stand Fig.4 The construction of a globe

The general condition of the globe seemed good at first, but when looking closer several typical damages appeared. As the globe was not varnished the paper had been exposed to dust, direct light and touching hands. The northern hemisphere was rather dark and somewhat worn - several places the print had faded and was hardly visible. The southern hemisphere was much lighter but rather yellow - probably because of the original animalglue-size; but also because of a glazing patina of ocre, which had been applied very carelessly all over the surface of the globe.

There were several cracks on the northern hemisphere, around equator and at the poles. Only one of them was caused by a punch; the others derived from peelings of plaster. The fact that the shell tends to become slightly smaller by contraction and that flakes of plaster peel off because of contractions of the surface of the globe (or the gores more likely) is thoroughly described by A.D. Baynes-Cope (2). These contractions are most probably caused by fast drying of the globe after a period in very damp surroundings. Several factors indicate that the Blaau globe had been exposed to extreme fluctuations of the relative humidity.

The paper on the horizonring was pasted directly to the oakwoodring on the stand (see fig.2). Subsequently the paper was heavily deteriorated due to the large amount of tannic acid in oakwood. Furthermore, the wood had shrunk about 4 millimeters so that the paper was creased and wrinkled in the two places on the ring, where the grain of the wood allowed for contractions. This had caused the ring to split in its two joints (also placed along the grain), because of the meridianring which is made of brass and therefore much more stable.

The meridianring fitted exactly into the two notches in the horizonring and the guide in the bottom of the stand. This enabled the globe to rotate in the horizonring. However, this was

impossible because the internal diameter of the horizonring was too small.

Apart from that the rest of the stand was in a good condition. The four pillars were stained black and the whole stand was polished with wax. This type of stand was very typical for the Dutch globes, though it was soon adopted elsewhere probably because of its good and solid construction.

An interesting detail about the construction of the stand is the importance of the "bottom-board". If the stand is constructed merely by means of four pillars, a horizonring at the top and a couple of cross-stays at the bottom (to fix the pillars) the center of this cross (where the meridianguide is placed) will be weighted by the globe and it will slowly bend until it touches the ground. Dutch globemakers however, avoided this problem by supporting the cross with the bottom-board, which in this case was nailed to the cross from under.

Moreover, it was evident that the bottom-board was cut out of the same board of wood as the horizonring. By comparing the patterns of the engrained wood of the horizonring and the bottom board they proved similar - and so did the shrinkage. Hence the working procedure has been as follows. (see fig. 5).

Two boards of oak approx. 2 cm of thickness were glued together forming a square board. This was placed in a lathe and turned circular. The decorative grooves of the bottom board were carried out after which the ring was parted from the board using a parting tool. Four holes were drilled in the ring to receive the top-pins of the pillars. As the horizonring shrank the pins stuck up above the paper-surface and were visible. This is often seen on dutch-type stands.

a) two boards glued together b) horizon & board before turning

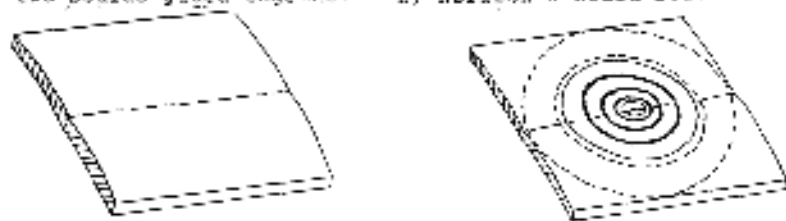


Fig.5 The construction of the bottom board

The meridiangring was badly tarnished but not corroded. The pivot clamps and their rivets were in perfect working order. The hour ring was preserved but it was bent and broken 4-5 places. The pointer on top of the northern pivot was missing. On both the meridian- and hourrings the same serial number - 9 - was punched. From this it can be concluded that this globe is the ninth of the second edition from 1621.

Treatment

After having removed excess surface dust with a very soft brush it became clear that further cleaning could only be done after consolidation of the plaster flakes. This was done by injecting animal glue into the cracks and pressing down the flakes in the same moment. Now cleaning tests were carried out on the globe using water and different solvents; but nothing seemed to work. The dust had sunk deep into the papertibres and the surface was

so worn that I had to be very careful not to damage the print. Furthermore the papersurface of both the globe and the horizonring seemed as if they had been coated with wax.

As it was more or less impossible to remove all the dirt from the paper without damaging the surface, it was decided only to use methylcellulose and water. The methylcellulose was gently brushed onto the surface, after a few minutes it removed with a damp cottonswap followed by yet another damp swap. The methylcellulose used was a Tylose MHU 10.000 from Hoechst, Germany in concentrations from 2-5 %. To some extent it proved useful, it retained the water in the paper well and some dirt was encapsulated but not very much. The wax seemed to be the invisible barrier that would let the water pass through the paper but not loosen the dirt.

These few places where colours were preserved on the northern hemisphere great care was taken though the colours were stable. One major difficulty about this treatment was the varying contrasts of the surface look after treatment.

The cleaning of the southern hemisphere was easier. Paper, print and colours were much better preserved and there were only a few stains and cracks. Most of the yellow discolouration derived from size in the paper, but the core patina also contributed to the yellowing. The casual strokes of core patina proved impossible to get off - it must have some kind of oil- or perhaps casein based colour; but since it did not disturb the general impression of the cartographic information it was decided to let it be untreated.

Around the polar regions, about 10 places on the northern hemisphere and in the area representing equatorial Africa (where the globe had received a great punch) plaster and paper were missing and the papier mache shell was more or less visible. Round these areas the gores or parts of them were removed by using steam (see fig.6). The paste dissolved easily as it was obviously dried out several places. In order to stabilize the globe surface the holes were re-plastered. As the plaster would have to resemble the original one of the globe it was made from a solution of rabbit-skin glue and water (1:7) and precipitated chalk mixed to a consistency like that of curdled milk. The plaster was applied hot and was allowed to dry between each application.

Finally the surface was sanded down with sandpaper and sized with wheat starch paste. After the gores had been pasted back on the globe, the holes were repaired with hand laid paper of approximately the same thickness and texture as the original paper. All repairs were retouched with watercolour and the whole globe was re-sized 3 times with a 2% methylcellulose solution.

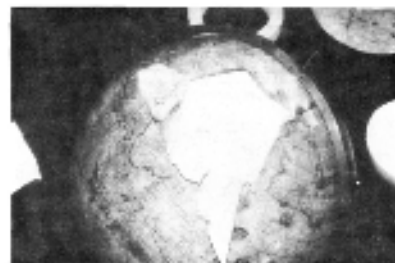


Fig.6 Restoration of plaster



Fig.7 peeling off the horizon

Treatment of the stand

The restoration of the stand was perhaps the most exciting part of the enterprise. As mentioned above the horizon-paper and the horizonring did not fit very well together as the wooden ring had shrunk. In order to save the badly deteriorated paper from being completely disintegrated by tannic acid it was decided to try to peel off the horizon-paper. Another advantage gained by this procedure was the opportunity to restore the wooden ring as well as the paper to its original size. Being aware that such a treatment perhaps was a very hazardous solution to the shrinkage-problem every precaution was taken not to damage the paper. First the paper was cleaned in exactly the same way as the globe. Here it was clearer that the paper had been waxpolished, so again several organic solvents were tested but without any satisfactory results. After having cleaned as much as possible with the methylcellulose/water swabs the paper was ready to be taken off. The horizon-paper was pasted down in 4 pieces the joints following 4 scratches on the wooden ring. The paper was covered with lense-tissue and a thick solution of methylcellulose was pasted through it in order to safeguard the fragile paper on the ring and to retain the moisture to the paper. After this steam was applied by use of a hand steam-cleaner (Rowenta DA-55) and the paper was removed using tweezers and a scalpel. The lense-tissue was a great help during this process; fragments were kept together and it served as a transport. After the removal of the four horizonpapers they were gently washed in hot water and deacidified from the back with a 0,2 % solution of CaOH. In order to remove the protective lense-tissue from the surface the papers were lined on the back with a very thin kozo paper and wheat starch paste. Furthermore, the papers were lined with a rather thick kozo paper which had previously been treated with a 0,2 % solution of CaOH - this should serve as a buffer when pasted onto the oak-ring. Before pasting on the paper the ring was restored to its original size by inserting two pieces of oak-wood in the broken joints. By gently stretching the paper it was made fit the enlarged horizonring.



Fig.8 The horizonring restored Fig.9 The globe after treatment

Treatment of the meridianring

The meridianring was cleaned with a glassbrush to remove flyspots and polished to a medium grade of gloss. It was important to keep down the gloss so that the brass would right to the somewhat worn globe. The broken hourring was hard-soldered and polished. A copy of the pointer was produced after an original one from the Royal Library in Copenhagen.

Conclusion

All paper on the globe was cleaned with methylcellulose and water, but the result was only slightly satisfactory as the wax and dirt ingrained in the surface would not dissolve. Apart from cleaning the globe the stand was restored. Removing the paper from the horizonring was the most difficult part of the project. The horizonring was restored to its original size so that the globe and the meridianring would fit properly into the stand. The hourring was soldered and a new pointer was produced. The paper parts of this globe was not varnished after treatment but coated several times with methylcellulose in order to protect and stabilize it.

Notes:

- 1) P. van der Krogt p.55
- 2) A.D.Baynes-Coper:"Problems in Re-shaping Globes" in "Der Globusfreund" no.15-17,1997 pp.31-35.

Materials:

- Methylcellulose: Tylose MHB 10000 from Hoechst 6230 Frankfurt am Main 80, Germany.
- Rabitskin glue (franch) from København Farvehandel, Bodstestrade 8, 1209 København K, Denmark.
- Wheat starch from Struers Chem, Valhøjs Alle 176, 2610 Rødovre, Denmark.
- Hand Steam Cleaner, Rowenta DA-55 bought in Germany.
- Handmade paper:"Vellum Parchment" from Barcham Greene & Co.Ltd., Bayle Mill, Kent, Great Britain.
- Kozo paper 9g/m2 BK-1 on roll from Paper Neo, 1-29-12-201 Sengoku, Bunkyo-ku, 112 Tokyo, Japan.
- Kozo paper Bankosai 71 g/m2 from Japico Drissler & Co., Inshurger Str.16, 6008 Frankfurt am Main 90, Germany.

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- A.D.Baynes-Coper:"The Study and Conservation of Globes" published by Internationale Coronelli-Gesellschaft, Dominikanerbastei 21/28, A-1010 Vienna, Vienna 1985.
- "Der Globusfreund", Journal for the Study of Globes and Related Instruments, published by Internationale Coronelli-Gesellschaft für Globen- und Instrumentenkunde, Dominikanerbastei 21/28, A-1010 Vienna, 1952-.
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- Kim Elizabeth Leysdon:"The Restoration of a Pair of Senex Globes" in The Institute of Paper Conservation 10th Anniversary Conference 14-18 April 1986, part 3, Oxford, England, pp.13-20.
- Gillian Lewis, Anne Leane and Sylvia Sumira:"Globe Conservation at the National Maritime Museum, London" in The Institute of

Paper Conservation 10th Anniversary Conference 14-18 April 1986, part 3, Oxford, England, pp.3-12.

Dianne van der Reyden: "Technology and Treatment of a 19th Century American Time Globe" in The Institute of Paper Conservation 10th Anniversary Conference 14-18 April 1986, part 3, Oxford, England, pp.21-30.

Otto Wachter: "Die Konservierung von Globen und Landkarten", Kartensammlung und Kartendokumentation no.4, Bad Godesberg 1968.

Abstract

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All paper on the globe was cleaned with methylcellulose and water, but the result was only slightly satisfactory as wax and dirt ingrained in the surface would not dissolve. Apart from cleaning the globe the stand was restored. Removing the paper from the horizonring was the most difficult part of the project. The wooden horizonring had shrunk, but it was restored to its original size so that the globe and the meridianring would fit properly into the stand. The hourring was soldered and a new pointer was produced. After treatment the paper parts was not varnished but coated several times with methylcellulose in order to protect and stabilize it.

Michael Højlund Rasmussen
paperconservator

Abstract

Das Papier af dem Globus wurde mit Methylcellulose und Wasser gereinigt, aber es gab nur eine kleine Verbesserung, da Wachs und Schmutz in der Oberfläche des Papiers nicht löslich war. Ausser die Reinigung der Globus wurde der Ständer restauriert. Der schwierigste Teil dieser Arbeit war das Papier vom Horizont-ring abzunehmen. Der Horisontring war geschrumpfen und wurde in die originale Grösse restauriert, so dass der Globus und der Meridianring wieder in dem Ständer passen konnten. Der Ständering wurde gelötet, und einer neue Zeiger wurde hergestellt. Die Papierteile werden nicht nach Behandlung aber nur mit Methylcellulose konsolidiert.

Michael Højlund Rasmussen
Papierkonservator

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