Outside the square: A considered approach to the treatment of a three-dimensional paper object

Ute Larsen and Camilla Baskcomb

ABSTRACT

Three-dimensional paper objects can cause quandaries for paper conservators who are accustomed to dealing with two-dimensional works, their structural aspect often requiring the collaboration of conservators and museum professionals from other disciplines. This paper describes the process of conserving a rare inflatable terrestrial paper globe and explores possible methods of displaying such an object.

The early 19th-century globe is part of the Voyager New Zealand Maritime Museum's (VNZMM) collection. Preliminary research has revealed that none of the few remaining examples of this type of globe held in international collections have been conserved to date.

The unusual functional nature of this three-dimensional object and how this challenges the conservators' conventional working methods will be explored.

KEYWORDS

globe, inflatable, paper, Pocock

INTRODUCTION

In 2001, during an impromptu tidy-up in the paper conservation studio at the Auckland Art Gallery Toi o Tāmaki (AAG), a box labelled 'Handle like raw eggs' came to light and sparked our interest. What was this folded, crumpled and torn work made from ultrathin tissue? After carefully unpacking it, we knew that we were looking at a map of the world in a rather unusual format and in a very poor state (see Figure 1).

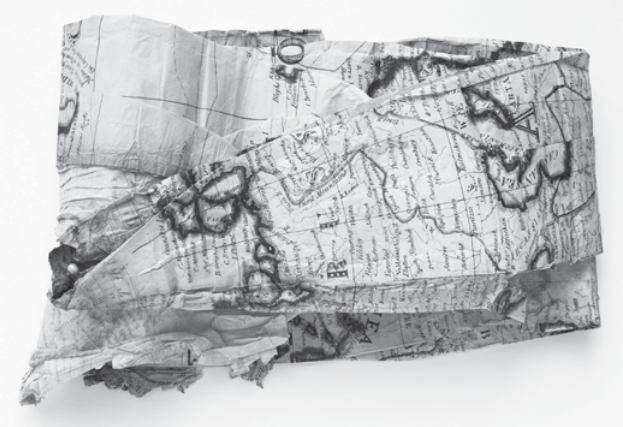

Figure 1 The deflated globe folded in three as found in the box.

After some detective work we found out that in 1992 the Voyager New Zealand Maritime Museum (VNZMM) had deposited an inflatable terrestrial paper globe with the conservation department for treatment, as part of the Conservation Service at the AAG. Due to a lack of funding and changes of staff in both institutions, the globe had languished for almost 10 years untreated. Once ownership by the VNZMM had been confirmed, the globe was brought out for reassessment in 2004. An application for funding to the New Zealand Lotteries Grant Board was successful and meant that the conservation treatment and an investigation into the method of display could proceed.

Having never seen an object such as this, we were intrigued by its history and complexity, and felt challenged by the conservation treatment options.

The globe was stored deflated and folded up, together with an

Figure 2 The bamboo ring and the South Pole before treatment.

HISTORY

In order to understand better what we were dealing with, we started to investigate the history of paper globes. Vicky Spalding, registrar at the VNZMM, provided us with valuable information regarding the invention of inflatable globes.

The invention and spectacular inaugural flight of the Montgolfier Brothers hot air balloon in France, 1783, provided the inspiration for two other brothers, Ebenezer and George Pocock, to design and publish inflatable globes in Bristol, England. George Pocock (1774 – 1843) was a well-respected citizen of Bristol, who owned a boarding school for young gentlemen. With his inventive mind, he not only developed collapsible globes, but also invented an automated spanking machine and a light, horseless, family carriage, which he called a 'charvolant', drawn along by a series of kites controlled by the driver (Barron 2008).

In April 1831, Pocock advertised his inflatable globes and recommended them to travellers of the world and ships captains. The folded globes were housed in a little cardboard box and came in the dimensions of 24, 36 and 48 Zoll diameter, equivalent to 63, 94 and 126 cm (Wohlschläger 1994). The globe was accompanied by a tape / scale measure of printed-paper on linen, together with an eight-page booklet of instructions, called 'Remarks'. The booklet advertised the 126 cm globe, in fully made-up form, for a price of £1-5-0 or in sectional form only for 8

shillings, (which in today's money would cost approximately NZ$ 95 and NZ$ 30 respectively). Versions of the globes were also available in silk at significantly higher prices. A 126 cm diameter fully made–up inflatable globe in silk would cost £ 9 guineas, approximately NZ$ 1,605 today. The latter was described as 'highly ornamental, suited for Drawing Room, Study or Library' ('Remarks' n.d.).

As described in 'Remarks', the provision of a scale tape measure with a globe acted

> … as a substitute for both brazen meridian and quadrant, common to other Globes… marked with degrees and corresponding number of miles… On the underside of the globe, North and South of the Equator, is a scale called the analemma, by which the sun's declination is easily found for every day of the year. On the left edge of the scale are marked the degrees of Latitude, North and South, of the Equator; on the right edge is figured the number of degrees throughout the whole length of the tape, beginning at the North end; and underneath every degree marked across the scale, is placed the number of miles, by which all tedious calculations are avoided. (n.d.)

The original method of inflation was also described in the booklet as follows:

> First holding the globe by the hoop with one hand, wave it to and fro several times, so that air may rush in at the orifice, this will throw asunder the folds; then raise it vertically by the stud at the North pole, so that the hoop may rise a foot or two above the floor or table over which it is inflated; then letting it drop, raise it again, and thus by a few elevations and descents it will be expanded to a sphere. (n.d.)

This extremely physical approach probably explains why there are not too many examples left in existence today. Inflation by means of hot air from a small burner or candle was also possible, but this was again a rather hazardous method as shown by the areas of scorched material on the North Pole. Later, Pocock globes were sold with a small air pump, for use as an alternative means of inflation, which would have caused less stress on the paper tissue. It was also possible to use the un-inflated globe in a much more traditional way, by turning the gores over, to be read as if pages in an atlas (see Figure 3).

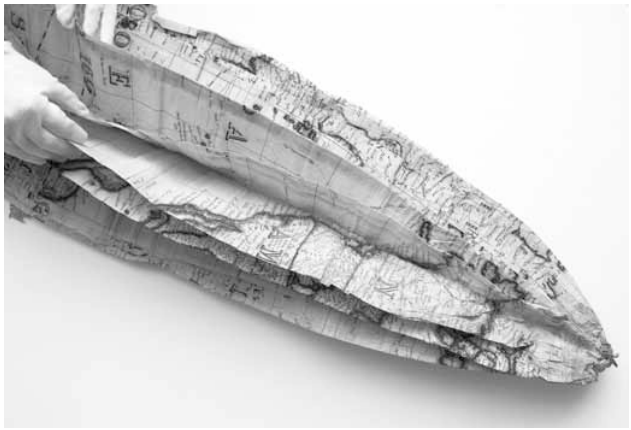

Figure 3 An alternative atlas-like use of the deflated globe.

Imitations of this fabulous invention were to follow. Originally from Germany, Phillipp Cella (1790 – after 1831) lived in England for 16 years where he learned of the Pocock balloon globe and soon produced his own version (Dekker 1999). Wohlschläger states that in 1831 Cella produced his own version of inflatable globes in Munich with some improvements. There are several Cella globes still in existence today including an example in the National Maritime Museum (NMM) collection, Greenwich, London (Wohlschläger 1994).

Even today, after nearly 180 years, inflatable globes continue to be sold, albeit mainly made from plastic as a blow-up ball with a sealable bung. They are ever popular toys but also still used for educational purposes.

DESCRIPTION AND DATING OF THE GLOBE

The VNZMM globe is an inflatable terrestrial globe, assembled from 12 lithographically printed half gores, which have been hand-coloured with coloured inks (see Figure 4).

Figure 4 The unfolded globe at its full length.

The diameter measured along the north-south axis is about 152 cm. Unfortunately, this globe came without the accessories it would have been sold with originally, which have been lost over time. The lightweight, soft fibred paper is very delicate, yet was intended to withstand numerous inflations. Both the North and South poles had been reinforced with material.

The gores with linen reinforcements had been wrapped around a bamboo ring at the South Pole. Narrow silk strips, attached on the inside of the gores at the North Pole, and sewn onto the underside of an ivory finial, similar to a gentlemen's shirt stud, appeared to be partially scorched, an indication that a candle may have been used in the past to inflate the globe. A printed inscription on one gore reads: 'E Pocock, Patentee, Bristol, author of various other scientific spheres, stationary and revolving. W Day, Lithog. London'.

With no date appearing on the globe itself, the best clues we had to work with were that Pocock called the North Island of New Zealand 'Eaeinomauwe' and the South Island 'Tavai Poenammo' (see Figure 5).

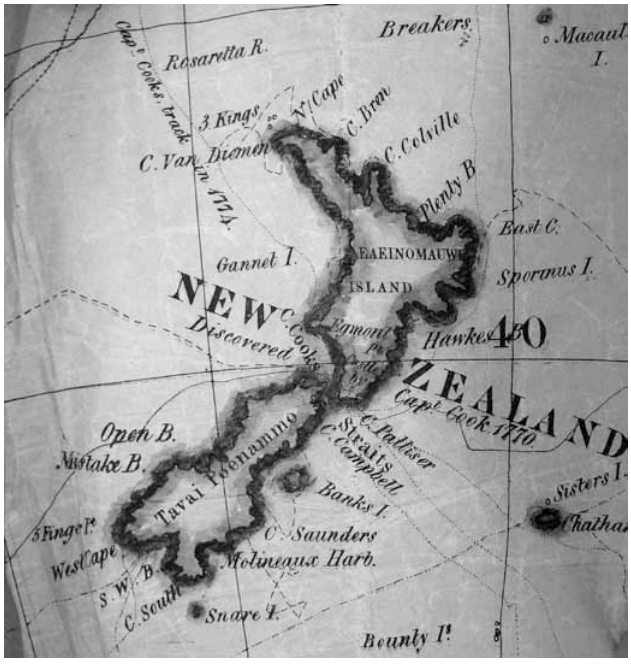

Figure 5 New Zealand's islands.

In undated correspondence from the Lands & Survey Department at the Turnbull Library in Wellington, which we found together with the original conservation report, we were provided with useful information. For example, the map of New Zealand on the globe shows Stewart Island joined to the South Island when the strait was actually discovered in 1804. Furthermore, Banks Peninsula is shown as an island when it was found to be joined to the Mainland in 1809. One would have expected that this information should have filtered through to the British cartographic scene by 1820 and have been generally available.

Another helpful point in the dating was that the city of Melbourne was not on the map, which indicated that it must have been published before 1835, the year that Melbourne was established (see Figure 6).

Figure 6 Detail showing Victoria without the city of Melbourne.

We therefore believed that a date of circa 1820 would be justifiable. This makes the globe one of the few surviving early examples of Pocock's globes in existence.

Investigating the history and dating the object was one part, but we also needed to find out if there were other examples of this type of globe in the world and whether any conservators had treated similar globes in the past. We contacted the two known map and globe conservators in the UK: Sylvia Sumira (a globe specialist in private practice, London) and Paul Cook at the NMM. Sylvia recounted that she had not conserved one to date and Paul stated that there are three Pocock globes in the NMM collection in need of conservation treatment, but no-one had attempted to conserve them as yet. However, Paul expressed interest in being updated with the outcomes of our conservation treatment, as this information would be helpful for the conservation of the globes in the NMM collection. Apart from seeing a similar model on the BBC Antiques Road Show programme in 2006, where the method of inflation was demonstrated with great gusto, we found only one other inflatable globe, intact with all accessories, which was for sale through a map dealer in Kent, England. When searching on the internet, we were unable to find anything in the major conservation publications regarding the preservation of inflatable globes. However, the article by Nichols et.al. on the conservation of two Japanese paper lanterns was found helpful in the preparation phase of this treatment (Nichols et al 2007).

TREATMENT

After re-examination of the globe's condition, the full extent of the damage was photographed by the AAG photographer John McIver. Armed with little information, but relying on our combined 43 years of practical conservation experience and basic common sense, we started the conservation treatment on 8 January 2007, in the area of 70 degrees Longitude to the right of the Seychelles - to be precise.

Several Japanese tissue papers were selected for suitability as a repair paper, based on their colour, weight and strength. The best results were achieved with Yama Kozo Hadaura, a 16 gsm paper, sourced through a supplier in Canada. Wheat starch paste was tested as a possible adhesive, but was quickly dismissed as it was too strong for the existing fragile paper and in contrast made the repair patch too rigid. Methylcellulose (1: 40 weight/volume) was selected instead.

First, we temporarily aligned each damaged and detached gore at the South Pole, but realised that the diameter of the paper exceeded the diameter of the bamboo ring. By comparing the linen sections still attached to the bamboo ring with the detached paper parts, we understood that the paper had to be folded in order to reduce the diameter. As some areas of the crumpled paper were extremely frail and limp, tests for dry cleaning were carried out with a small piece of a vulcanised natural rubber sponge. This method worked well however, sometimes it was safer to carry out dry cleaning after the repair had been completed.

One major problem we encountered was not being able to easily turn the object around in order to look underneath it and check for parts that were folded over, missing or could possibly line up incorrectly when being re-attached. With excessive damage mainly on the poles, but also with the paper torn directly adjacent to the overlapping seams of the gores, we had to re-think how to place a repair inside the globe and then be able to weigh it down without crushing the opposite gore underneath. The solution was a domestic one - a sleeve ironing board, covered with Tyvek® and silicone release paper to prevent snagging during use. We were able to place the board safely inside the globe, as there was an almost full-length opening split down one gore. This allowed us to move the paper gently over the board as we worked our way around the world. Although there appeared to be numerous large losses, in fact most of the paper was still there, even though folded and extremely crumpled. When carefully unfolded, we were able to re-align most areas with minimal infills.

With the use of a Reemay®-covered inflated balloon, which was placed inside a gore opening and pushed up to expand the North Pole area, we were able to re-attach the fragile silk strips to their corresponding gores beneath the ivory finial. Initially we had considered replacing the partially scorched and loose silk strips with Terylene fabric. Tests carried out included sealing the frayed edges of the Terylene strips with heat, which proved to be unsuccessful due to severe distortion of the man-made fibre. Sealing the edges with a clear drying neutral pH water based PVA acrylic worked much better. However, since the finial would not have to be load bearing for inflation and display purposes, we elected not to introduce any foreign materials and instead only secured the existing strips with MC (see Figure 7).

Figure 7 The ivory finial and the North Pole before treatment.

Initially, we weighed down the repair patches in the traditional way, with blotters and weights onto the sleeve board as the support base. However, we quickly realised that because of the non-alignment of the surrounding areas, particularly in very frail parts, this technique resulted in a very flat and stretched repair, contrasting with the crumpled soft tissue.

A much better result was achieved by letting the repaired area 'air dry', with the pull of the drying adhesive creating gentle tensions, which blended in with the rest of the paper. We also found that it was critical to have the repair patch just the right size – if too large, the MC would dry before the edges were joined together and the parts that were adhered first would expand and distort. With progressive closure of the largest opening, which we had used as our main point of access during repair, we encountered another problem. When looking through the bamboo ring opening, sometimes we were unable to find the hole we were about to repair, which was so obvious on the outside. To help with locating the area of damage, one of us would put a micro spatula through the hole, which could be seen and felt easily, so the repair could be placed in the right position.

DISPLAY CONSIDERATIONS

As this object can only be fully appreciated when inflated, we had to consider our directive from the VNZMM to formulate a feasible method of display.

Their exhibition schedule is such that objects can stay on display for a considerable amount of time. With this and the nature of the globe in mind, we consulted our previous exhibition designer as well as fellow objects conservators. Brainstorming ideas ranged from inserting a large inflated balloon, to inserting a flexible, Teflon®-like skeletal structure, to an umbrella-type opening device. Most of these ideas seemed to be (to our knowledge anyway) too far-reaching, un-trialled and considered to be too risky for such a fragile object. Obviously, costs were also a consideration.

It seemed to us that the best option was the insertion of an inner fabric sleeve that could be filled with a suitable material to gently expand the paper structure. Fabrics such as silk and calico were considered, but we decided to trial Tyvek®, because of its stable properties.

We had been requested to investigate the longevity and chemical stability of polystyrene beads for a work by the New Zealand artist Michael Parekowhai in the AAG collection. In this instance, the beads were intended to be used for packing while the work was in transit. Tony Clark, conservator at the Museum of New Zealand - Te Papa Tongarewa in Wellington tested them for us for suitability and off gassing. Initially, the Oddy tests were found to be inconclusive, but when the tests were repeated, the beads passed. However, the results applied only to this particular batch of polystyrene beads, as according to the manufacturer the composition of the beads can change at any time without notice, even from batch to batch.

In 2007 we were fortunate enough to have with us Amelie Jung, a German intern from the Sorbonne, who was not only mathematically minded but also familiar with the sewing machine. The word globe derives from *globus*, the Latin word for sphere. Therefore, to calculate the volume of the globe and its inner, Amelie adapted the principles used to sew a football.

Initially, she made a mini mock-up from paper, followed by a small-scale globe inner from Tyvek®. For test purposes, the finished full-scale version of the Tyvek® inner was tied at one end and filled with polystyrene beads, without being inserted into the globe. We immediately realised that the combined weight of Tyvek® and beads posed a risk to the fragile paper of the globe. When filling it, the inner expanded in a pear-shaped manner, which could potentially have damaged the globe.

As a possible alternative we are currently investigating the use of a lighter weight Tyvek® inner, filled with air sacks, such as the ones used in packaging to protect fragile objects.

On completion of all the repairs, we felt justified in treating ourselves to a preview of the final look of the globe. Without resorting to historical methods of inflation, we referred to the NMM and their very high-tech option and used a hair dryer (see Figure 8).

Figure 8 Ute Larsen and Camilla Baskcomb test inflating the globe after treatment.

We invited our photographer John to witness this unique experience and he produced a video of the inflation. It was with great excitement that we saw the limp, shapeless form we had worked on for so long come to life and begin to expand. At one stage, it almost floated - and so did we.

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MATERIALS USED/ SUPPLIERS

Methyl Cellulose paste
Hercules Aqualon MC 2000
Viscosity at 2% is 2.100 – 2.900 at 20˚ C
Conservation Supplies
81 Great North Road
P.O.Box 646
Warkworth 0941
New Zealand

Tel: +64 9 425 7380
Fax: +64 9 425 7385

Absorene dry cleaning sponge
(made of vulcanised natural rubber)
Conservation Supplies

81 Great North Road
P.O.Box 646
Warkworth 0941
New Zealand

Tel: +64 9 425 7380
Fax: +64 9 425 7385

Lineco reversible adhesive
Polyvinyl acetate, pH neutral
Conservation Supplies
81 Great North Road
P.O.Box 646
Warkworth 0941
New Zealand

Tel: +64 9 425 7380
Fax: +64 9 425 7385

Japanese tissue – Yama Kozo Hadaura S-1-304 16 gsm
(25 x 38 inches, sheet size)
The Paper Place
77 Brock Avenue
Toronto
Ontario
Canada M6K 2L3

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BIOGRAPHIES

Originally from Germany, **Ute Larsen** completed her conservation studies at the University of Canberra, graduating in 1997 with a Bachelor of Applied Science. She has worked in archives in Australia and The Netherlands, as well as with Australasian Conservation Services and Archer Fine Art Preservation in Melbourne. In 1998 she moved to New Zealand to take up the position of Paper Conservator at the Auckland Art Gallery Toi o Tāmaki.

For the last 12 years she has worked on the Gallery's exhibition programme, while also treating works from the collection, which contains over 11,000 works on paper by New Zealand, Pacific and International artists. Ute's recent publications include articles in the Journal of the Institute of Conservation on the materials and techniques of Frances Hodgkins, and an investigation into the use of drawing papers by Henry Fuseli. Ute was co-curator and co-author of the exhibition and publication *Frances Hodgkins: Leitmotif.*

After completing a three-year conservation training course in London, specialising in Prints and Drawings, **Camilla Baskcomb** co-founded Bates and Baskcomb in 1980, a paper conservation studio in Battersea, London. After sixteen years in private practice, Camilla was employed by the Tate Gallery, London, as Senior Conservator for the Oppé Collection from 1996 - 2000. For the past nine years, Camilla has worked at the Auckland Art Gallery Toi o Tāmaki as the Regional Conservation Services paper conservator – an income generating section of the conservation department. This provides a professional conservation service for the public, Historic Places Trust and private collectors.

In 1994 she co-organised The Institute of Paper Conservation (IPC) Conference held at the Tate Gallery, *Modern Works, Modern Problems?* Camilla has published articles in The Paper Conservator, the British Association of Paper Historians and more recently, she co- wrote *Henry Fuseli: Necessity or frugality? – the artist's selection of drawing papers* in The Journal of the Institute of Conservation. She is an Accredited Conservator-Restorer member of the Institute of Conservation.

CONTACT DETAILS

Ute Larsen and **Camilla Baskcomb**
Auckland Art Gallery Toi o Tāmaki
PO Box 5449
Auckland
New Zealand

Email: ute.larsen@aucklandcity.govt.nz;
camilla.baskcomb@aucklandcity.govt.nz