

# Assembly instructions for the Nelson Telescope

**Before you start assembling, read each section to the end.**

The assembly itself is not difficult because all parts are die-cut to fit exactly together. Each part is marked with a part number ([A1], [A2], [B1], [B2] etc.) and with its name. Remove only those parts from the cardboard plate that you require for assembly.

You will need a sharp knife to remove the parts accurately from the cardboard sheet, a few paper clips to keep the parts together while they are drying, and also a good all-purpose glue. An all-purpose solvent-containing glue is more suitable than a so-called solvent-free glue based on water because it does not produce waves in the cardboard.

“Fold back” means: I fold the part away from myself when I look onto the printed side; the result is a “mountain fold”. “Fold forward” means: I fold the part towards myself; the result is a “valley fold”.

This is how to accelerate the gluing process: put a suitably thick layer of glue onto one of the sides to be glued, press the sides together so that the glue spreads out on both sides, and then take the parts off each other again. Blow 2 or 3 times over the surfaces and press the parts together again, making sure of a good fit – the glue holds immediately. Do not use this method when you are sticking on the lenses because glue threads can occur when taking parts apart.

## Eyepiece tube and the small intermediate tube

**Step 1:** Separate the eyepiece tube [A1] from the cardboard sheet, fold the 6 flaps with the small arrows forward in such a way that the arrows are covered, but do not glue them. Then fold the part to form a hexagonal tube and glue the lateral flap behind the opposite side. The 6 flaps for the eyepiece lens holder are folded back (to the inside of the tube), but will only be needed later on.

**Step 2:** Separate the small intermediate tube [B2] from the cardboard sheet, fold and glue this part also to form a hexagonal tube. Fold the 6 white flaps with the arrows forward, without gluing them. Fold the 6 gold-printed flaps back into the interior of the tube and glue them there.

**Step 3:** Now, the eyepiece lens tube [A1] with its flaps folded outwardly must be placed between these solidly glued flaps of the intermediate tube [B1]. The two sides of the eyepiece lens tube, with the small screws printed on, come behind the sides of the small intermediate tube with the printed brass plates.

The best way to proceed is as follows: place the intermediate tube onto a suitable surface with the internally glued flaps upwards. Press in all 6 outwardly-folded flaps of the eyepiece lens tube a little by placing one finger on each. In this way, the diameter of the eyepiece lens tube is reduced in size and can then be pressed into the intermediate tube. Press it in to such an extent until its folded flaps engage behind the glued flaps of the intermediate tube and then draw it out again. As soon as the flaps of the two tubes meet, you cannot draw further.

**Step 4:** In order to reduce the scattered light in the interior of the telescope, a diaphragm must be installed in front of the internally located end of the eyepiece lens tube. For this purpose, remove the diaphragm [A2] from the cardboard, take out the die-cut disk from the centre and fold the 6 black flaps forward. Push the two tubes together to such a depth that their lower ends are on one level. Now glue the 6 flaps of the diaphragm into the end of the internally located eyepiece lens tube in such a way that the diaphragm and the edge of the tube are flush. The printed side of the diaphragm is now in the interior of the eyepiece lens tube.

## Middle and large intermediate tube

**Step 5:** With the middle intermediate tube [C1], fold the 6 white flaps forwards and fold and glue the part to a tube. Here also, the 6 gold printed flaps are folded into the interior of the tube and glued.

**Step 6:** Draw the two tubes [A1+B2], which already locked in each other, apart up to the point of stop and, as in Step 3, press each of the 6 white flaps at the end of the small intermediate tube with one finger so that you can press them between the inwardly glued golden flaps of the middle intermediate tube [C1]. Here also, the printed brass plates and the small screws should be located on one line. Press the tubes together until the flaps have slipped past each other, and then draw them apart again until they interlock.

**Step 7:** Proceed with the large intermediate tube [D1] in the same way: fold the 6 white flaps, glue the part to form a tube and fold the 6 printed flaps into the interior of the tube and glue as required.

**Step 8:** As described in Step 6, insert the end of the middle intermediate tube into the large intermediate tube between the flaps which are glued to the inside. In this case also, turn the tube before inserting in such a way that the printed screws and signs are on one line.

## Objective tube, objective lens and eyepiece lens

**Step 9:** Fold and glue the objective tube [E1] to a tube. Fold the 12 small triangular gluing flaps back in such a way that they are standing inwardly at a right angle, and fold and glue the 6 printed flaps at the other end completely into the tube.

**Step 10:** As described in Steps 6 and 8, insert the end of the large intermediate tube between the flaps of the objective tube folded to the inside. Here also, the printed screws and signs should be on one line. With this step, all tubes of the telescope are assembled into one another.

**Step 11:** Detach the eyepiece lens holder [A3] from the cardboard and take out the die-cut disk in the middle. Glue the small eyepiece lens onto the non-printed side of the eyepiece lens holder. The lens can be glued on with either side. Proceed as follows: Put the glue onto the cardboard around the hole, but not too close to the rim to keep it from spreading to the visible area. Then place the lens centrally over the hole. Ensure good drying.

**Step 12:** Detach the objective lens holder [E2] from the cardboard and remove the die-cut disk in the middle. The large objective lens is glued centrally over the hole on the non-printed side of the lens holder, with the curved side facing downwards. In this way, only the protruding rim surrounding the lens on this side comes into contact with the glue. Make sure that no glue gets onto the inner part of the lens.

**Step 13:** Glue the eyepiece lens holder in such a way onto the 6 flaps at the opening of the eyepiece tube that the lens lies on the inside. Press the lens holder with the tube onto the working plate so that it is pressed against the flaps.

**Step 14:** Glue the objective lens holder in such a way onto the 12 small triangular gluing flaps of the objective tube that the lens is lying on the inside. Proceed as described in Step 13.

## The ornamental bands

**Step 15:** Detach the eyepiece ornamental band [A4] from the cardboard. Fold the 6 long narrow flaps, separated by cuts from each other, completely over and glue them solidly on the rear side of the ornamental band. Press them together with the help of paper clips. After drying, fold the eyepiece ornamental band to form a hexagonal ring where the narrow glued flaps are lying on the inside, and glue it in such a way around the end of the eyepiece tube that the edges of the narrow internally-located flaps are seated on the eyepiece lens holder.

**Step 16:** Proceed with the objective lens ornamental band [E3] in the same way and glue it around the end of the objective tube in the same manner.

**Step 17:** The remaining 4 tube ornamental bands [E4], [B2], [C2] and [D2] are folded to hexagonal rings and glued in such a way onto the marked locations of the tubes that they close flush with the upper edge of each tube.

## The telescope quiver

**Step 18:** Fold and glue the quiver casing [F1] to form a hexagonal tube.

**Step 19:** Fold the 6 flaps of the quiver bottom [F2] back, place it on a suitable surface with the printed side facing downwards and place the quiver casing onto it. Glue the 6 flaps of the bottom to the designated locations of the casing.

**Step 20:** Fold the 6 flaps of the quiver cover [F3] back and the 2 flap extensions (those with the slot and those with “Made in Germany”) forwards. Fold and glue each of the small non-printed lateral flaps behind the neighbouring part so that a standing rim forms around the cover.

**Step 21:** Place the cover onto the quiver and glue the flap extension with the lettering “Made in Germany” to the designated location of the quiver casing. Now the cover is attached to the casing by a hinge. Make sure it can be opened and shut.

**Step 22:** Glue the 2 parts of the quiver lock [F4] with the hole together. The other parts, onto which small screws are printed, are folded apart and glued onto the designated location on the quiver casing. Make sure that the slot in the extended cover flap can slide over the lock.

**Step 23:** Glue the tube ornamental band [F5] onto its designated location.

Now your telescope is completed. Congratulations! Allow it to dry well before using. In order to get a picture into focus you draw it apart or push it together.

**Very important: Never look at the sun through the telescope! This can cause irreparable damage to the eye.**

**Admiral Viscount Horatio Nelson** (1758-1805) is the most significant British seafaring antagonist of Napoleon. His victories in the sea battles of Abukir / Egypt (1798) and Trafalgar / Spain (1805) established the superiority of the British Empire on all seas around the globe and made him a national hero. Nelson had a reputation of being an exemplary leader. Even though he was seriously wounded several times – he lost an eye and an arm – he always stood in the front lines. He was killed in the battle of Trafalgar. In 1801 he was vice-commander in the sea battle of Copenhagen. As the Danes were about to achieve victory, a flag signal was sent to him from the commander's ship ordering him to retreat. Nelson, who still believed in the chances for a British victory, was not exactly pleased with this order. He put the telescope to his eye and allowed the attack to continue with the words: “I fail to see any signal”. The battle ended with a victory for the British fleet. It was true that he had not seen any signal. He had put the telescope up to his blind eye.

Nelson's personal telescope was, of course, made of brass and glass lenses and was waterproof. However, it is certainly comparable with this Nelson Telescope with regard to its dimensions and its optical features. It has a large convex (outward-curved) lens with a 360 mm focal length and a small concave (inward-curved) eyepiece lens with a 65 mm focal length which, in combination, produce a 6x magnification. This combination of a concave and a convex lens produces an upright image. Such a telescope is also known as a Galilean or Dutch telescope.