

The Jawbone Arch

History

The Jawbones were part of the Zetland and Fair Isle Knitting Stand at the Edinburgh International Exhibition of Science and Industry, held on the Meadows in 1886. The stand was originally a tent-like structure inside the great exhibition building, with the jawbones framing it. At the exhibition, the two pairs of jawbones were placed in parallel, but after the exhibition closed they were moved to the side of Melville Drive and arranged in their present configuration.

Configuration

Two pairs of jawbones, from two whales of the same species (sperm whale?) whose wide ends were put at the bottom in the four corners of a square and their narrow ends met at a point, forming a cross-vaulted arch. This is one of only two whalebone arches with four bones, the other being at Port Stanley in the Falkland Islands.

Construction

The wide ends of the jawbones were fixed to concrete bases by iron rods, and their narrow ends met at a point and were held together at the top by an iron cruciform structure. Bronze bands with descriptive text were fixed round the lower parts of the bones.

Deterioration

Over the 125 years or so, the iron has rusted and expanded, putting pressure on the bone structure at the fixing points. Rain water and its dissolved pollutants have also attacked the bone, staining and weakening it, and allowing lichens and other biological material to grow on the surface. The Portland cement bases trapped rainwater which caused deterioration of the bases of the bones.

About 1970 some damaged parts of the arch were repaired using polyurethane car body filler, textured to make it look like bone.

Proposals

Three options were put forward for the restoration of the arch. The best option was to restore and re-erect the bones, but if that was not possible it was proposed to replace them with a replica, either with a bone-like material as at the arch on North Berwick Law, or a full-sized model in bronze. As it happened, it was still possible to save the bones and re-erect them.

Removal

Before removing the arch for restoration, a photogrammetric survey was made of the bones in situ: several photographs were taken of the bones from various angles, and the digitised photographs were combined to produce a three-dimensional picture of the arch. Many drawings were also made of the structure, and all the parts carefully numbered to make sure that they were put back in the right places.

The bones were encased in a strong bleach-free material which acted as a casing firm enough to allow the bones to stand during dismantling and to be lifted without breaking.

The iron cruciform link at the top was carefully removed by sawing through it and its fixing bolts, and the concrete bases carefully cut away from the bones. Some of the concrete was so firmly attached to the bone that it was kept there because trying to remove it would have caused the bone to disintegrate: for the same reason, one of the iron bars fixing a bone to the base could not be removed.

Conservation

The bones were taken to a place where they could dry out, and six months later they were taken to the conservation workshops. Here they were given another scan with lasers and the results of this scan compared with the one from the photogrammetric scan.

Over the years, the bone surface had taken on a texture similar to tree bark, and was covered with lichen and other biological material. This has been carefully removed as much as possible.

Large voids in the bones have been filled with a lime-based filler, and a similar material is being used for a shelter coat to fill and repair the small cracks in the surface. Shelter coat material that is not inside the cracks will eventually (in a year or two) wash away exposing the surface of the bone. It should also protect the smooth inner side of the bones from fly-posting.

Some parts of the bones are starting to flake away and stick out. The gaps are to be filled with lime filler; they are all quite high up so they should not be attractive to inquisitive fingers.

The large areas of car body filler have been left: as it is not known how deep they are, it was felt that any attempt to remove it could cause the bones to disintegrate. However, the work was well done visually: unless you look at the bones very carefully it is not obvious which bits are real bone and which are filler.

Restoration

The bones will be put on new bases, made of water-permeable lime concrete that will allow trapped rainwater to escape.

The iron cross joining the bones at the top will be replaced by a stainless-steel cross, textured to look like the bone structure; it will look rather like lace, which was one of the exhibits at the knitting stand. The old iron cross still exists and is likely to become a museum exhibit.

The bronze bands at the base of the bones are being kept, and will be cleaned and re-waxed.

It is proposed to put up an information board near the arch. It will mention the history of the arch, the 1886 Exhibition, the knitting stand, and the restoration.

There is also a plan to install floodlighting to illuminate the arch from lights in the ground, linked to the street lights.