

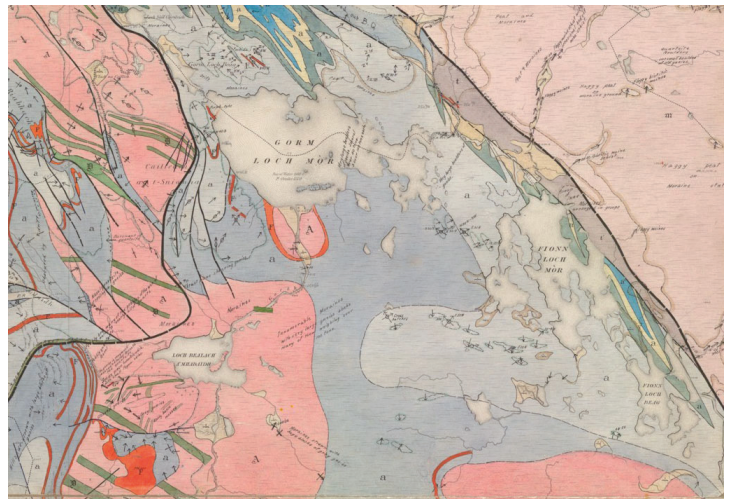
“MAPPING MOUNTAINS” – CELEBRATING SCIENCE THROUGH CULTURAL HERITAGE: REFLECTIONS ON CURATING AN EXHIBITION OF 1880s GEOLOGICAL MAPS

The mountainous Northwest Highlands of Scotland have an international reputation for their geology. The Lewisian Gneiss is perhaps the most intensely studied piece of Precambrian crust in the world, worked on by generations of geologists and used as a testing ground for geochronological techniques. The area is best known for the Moine Thrust Zone, which carries the western edge of the Caledonian fold belt over the Archaean and Proterozoic ‘Foreland’, which is a remnant of Laurentia. For over a century geologists have studied the internal structure of mountain ranges to decipher their formation, and the Moine Thrust Zone, along with classic sites in the Alps, has played a key part in the history of our understanding of mountains and thrust tectonics. It was mapped, over 100 years ago, by geologists of the Geological Survey, led by the great Ben Peach and John Horne, to solve a debate about the sequence of rocks. The resulting map formed the basis for what is known as ‘The Northwest Highlands Memoir’ (Peach et al. 1907)¹.

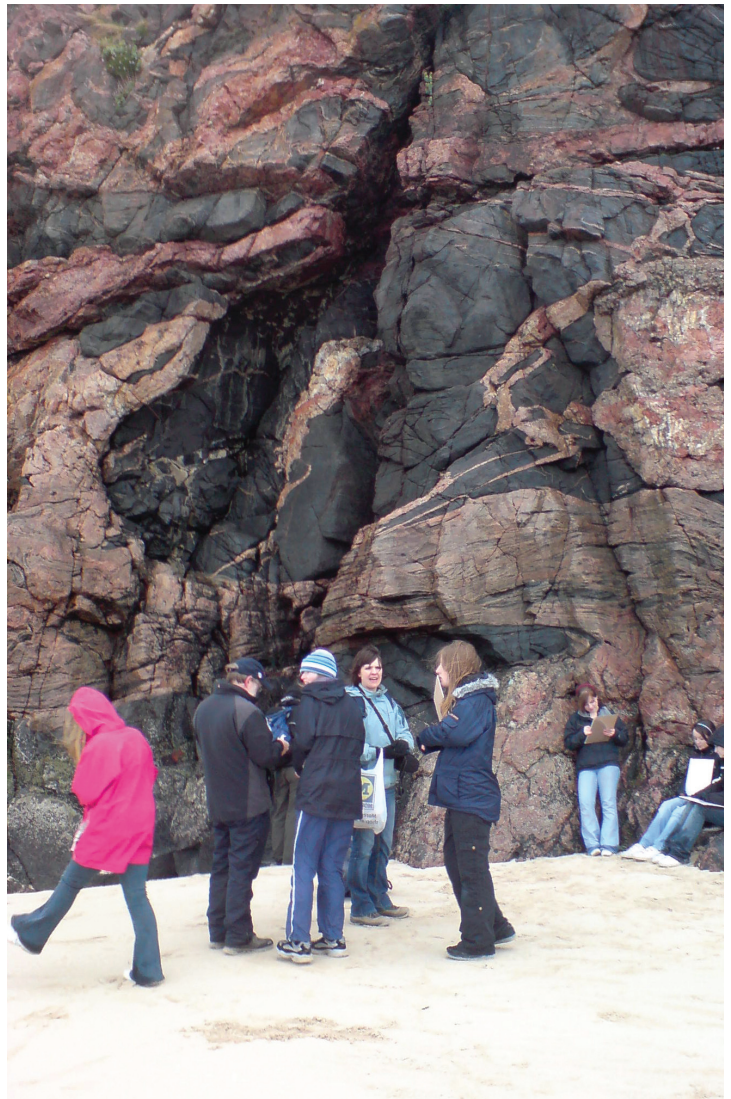
Initiatives in the Northwest Highlands to celebrate the geological heritage of the area resulted in the formation of the Northwest Highlands Geopark in 2004. The European Geopark Network is recognized by UNESCO. It encourages economic sustainability through geo-tourism and has resulted in increased investment in infrastructure and access to information on life in the Northwest Highlands, its landscape and the geology. Visiting historically important sites can be interesting for a learned eye, but purveying to a non-geologist the scientific and historical significance of different rock types in a boggy landscape can be a challenge. Associating the rocks and landscape with material created at the time of discovery can provide an opportunity to really bring the science to life. For the story of mountain building in the Northwest Highlands we are lucky: the scientific discovery is not about a date obtained from a tiny zircon using a large instrument; rather, it is based on sketches and exquisite maps, the detail and intricacy of which are easy to appreciate and are perfect for display.

The 1880s geological maps are kept in archive in the British Geological Survey (BGS) headquarters in Edinburgh, and my first encounter with them was a chance one. I was at the Survey to do some research whilst working as a geologist for Scottish Natural Heritage, the government organisation responsible for nature conservation, when the librarian happened to open the ‘wrong’ map drawer. What I saw were beautiful water-coloured, pen and ink maps of amazing detail. I asked to have a closer look. There in front of me was one of Peach and Horne’s original geological maps of the Moine Thrust Zone. For a structural geologist, this was an exciting moment!

That chance viewing was over ten years ago, but I remember it clearly; maybe it’s because my geological mapping attempts look so messy, in comparison? In 2007 a centenary conference celebrating the Peach and Horne memoir was held in NW Scotland, and this provided a focus for showing some historical material. Rob Butler, one of the organisers of the meeting, joined me as a curator, and we set about releasing the old maps from their archive. The challenge that now faced us was to get the show on the road. This required the coordination of different organisations, people and venues many miles away, with competing requirements of space, time and money. BGS gave us permission to use high-quality reproductions of the material. Not only does the BGS hold the fantastic compilation maps (called clean copies) that I glimpsed that day ten years ago, but also the original field slips (not called dirty copies!)



Part of the Ben More Assynt map surveyed by B.N. Peach and C.T. Clough, c. 1886–1888. The heavy boundary on the right is the Moine thrust itself; that on the left is one of the lower movement planes, the Ben More thrust. Copyright BGS, reprinted with permission



Working with young people from Kinlochberrie High in the field. PHOTO CLARE BOND

¹ Peach BN, Horne J, Gunn W, Clough CT, Hinxman LW (1907) The Geological Structure of the Northwest Highlands of Scotland. Memoir of the Geological Survey of Great Britain



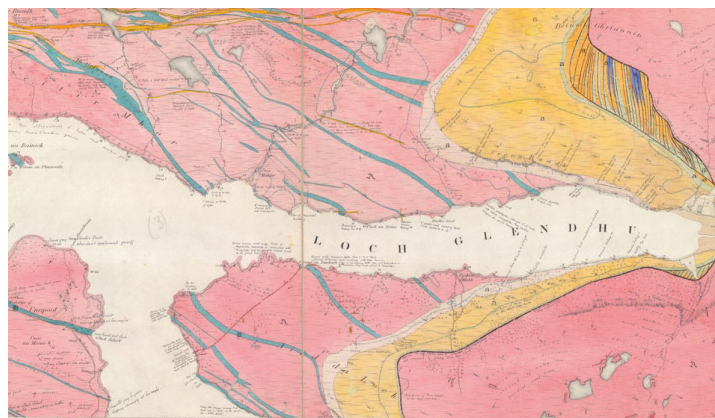
Watercolour from the notebook of B.N. Peach looking east up Loch Glencoul. The Moine thrust runs beneath the summit of the pointed hill to the right of centre, the Stack of Glencoul. The lowermost thrust, the Sole, crops out above the pronounced bedded quartzite horizon on the left. Copyright BGS

and notebooks containing sketches, jottings and landscape watercolours. It was the whole package that I needed to build an exhibition: a story that told of the debate, the geologists, the wild landscape, the exciting science and the establishment of the concept of thrust faulting.

The next step was funding. Each funder requires different outcomes and has different eligibility criteria. If the exhibition was going to coincide with the other key celebrations in 2007, I had to get a move-on. To get the project going I created a portfolio of funding for the different elements, targeting learned societies, industry and heritage organisations. Funding was ultimately secured from the Royal Society, BHP Billiton, Hess and Scottish Natural Heritage.

Working with the Royal Society provided the opportunity for ‘outreach’ activities with local schools to complement the exhibition. The outreach work made the exhibition and its story come to life for me, and hopefully for the children too. I spent four days working with two artists and children from high schools in Kinlochbervie and Ullapool, two small towns on the NW coast, on a sub-project to the exhibition entitled “Making Mountains”. It was a blend of art and geology that took key skills from both subjects – observation, sketching, visualisation and experimentation – and brought them together to explore the theories behind mountain-making. Together, through practical work, we discovered the impressive sketching and observation skills of the 1880s geologists, and their ability to visualise in 3D and to test their theories. We also looked at the importance of mountains in their lives and for humanity in general through the impact on global climate and weather systems.

The exhibition was launched in the Northwest Highlands in May 2007 to coincide with the school activities and the centenary meeting. “Mapping Mountains” then went on tour to the Scottish capital for the Edinburgh Festival and then to Glasgow for Scottish Geology Month in September. It has subsequently visited other venues, including the second Scottish Geopark in Lochaber, further south in the Highlands, and the Geological Society of London. The exhibition consisted of thirteen clean-copy maps, four field slips, sketches from the geologists’ notebooks, and black and white photographs of the geologists in the field and at the Survey offices. The field slips show the contourless base maps they used for mapping and evidence of careful reconnaissance up-stream sections. The geologists’ ideas on the geometrical arrangement of the rocks are sketched on the corner of field slips or carefully drawn up in notebooks. Their notebooks also give an indication of life at the Survey in the 1880s, with colleagues depicted as drunken elephants and the length of mapped boundary carefully noted. The geologists were paid by the length of boundary as well as the area mapped. Mapping narrow dykes in the Lewisian crust (see map) or thin thrust imbrications meant double time – perhaps a reason for the intricacy of the mapping?



Part of the Glendhu map surveyed by C.T. Clough and L.W. Hinxman, with B.N. Peach, 1885–1886. The pink unit is Archaean (Lewisian) gneiss, overlain unconformably by Cambrian quartzite, itself truncated by further Lewisian gneiss carried from east to west on the Ben More thrust. Note the detailed mapping of imbricate structure beneath the thrust. Copyright BGS

The exhibition gives a flavour of the endeavours of the geologists, their skills and the scientific discovery. Visitors appreciated this, as the exhibition comments book shows:

Splendid exhibition. Amazing to think of the labours and conditions which the original surveyors shared. – Birmingham, UK

This is a really excellent exhibit. It shows how geologists collect data – interpret it – build models of how the earth’s crust has evolved. A great national treasure. – Ontario, Canada

Very interesting and informative exhibit, showing not just the facts but also the process of putting them together to inspire and support new ideas. – Massachusetts, USA

Excellent display of mapping, the detail is unbelievable. Can’t believe the quality. – UK

As a geologist I was proud to see my heritage on display and being enjoyed by others. I think we geologists have a duty to make our science accessible and inspirational. If we can do this through art and history, perhaps we should seek to work more directly with organisations that promote historical and cultural heritage.

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