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Preserving the heritage of gemstone regions and resources worldwide: Future directions

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Gemstones – including emeralds, rubies and sapphires and many other mineral varieties – have fascinated humans for millennia. Many of the regions producing gemstones are experiencing unsustainable social, economic and environmental pressures at present. In regions such as the Mogok Stone Tract in Burma (Myanmar), strong traditions have evolved around the mining and processing of the different gemstones. It is proposed that specific criteria and a heritage designation scheme be developed for such regions that have been outstanding producers of gemstones, in some cases for many centuries. Ultimately, the aim would be to preserve the traditions of these provinces and increase cultural, scientific and touristic interest in their gemstone resources as a way of contributing to sustainable development in these regions.

Introduction

Gemstones have been considered culturally significant in many different cultures since antiquity where they have been and are used for trade, personal adornment or symbolic reasons. The cultural and symbolic value of gemstones is today frequently overlooked as the trade focuses on the monetary or investment values of emeralds, rubies, sapphires and other gems. At the same time, many gemstone producing regions are experiencing unsustainable social, economic and environmental pressures (Cartier and Pardieu, 2012). The heritage of regions such as the Mogok Stone Tract (Burma/Myanmar), a source of the world's finest rubies and sapphires for the past 500 years, is potentially at risk due to overexploitation of gemstone resources.



Figure 1. The three most well-known coloured gemstone varieties. From left to right: Sapphire from Sri Lanka, ruby from Mogok (Burma/Myanmar) and emerald from Colombia. Composite photo by Laurent E. Cartier, images courtesy of SSEF.

In 1292, the explorer Marco Polo wrote of his visit to Sri Lanka: “I want you to understand that the island of Ceylon is, for its size, the finest island in the world, and from its streams comes rubies, sapphires, topazes, amethyst and garnet” (Keller, 1990). Giving such heritage-worthy gemstones and gemstone regions a heritage status could raise awareness and be a way of preserving their longstanding cultural and geological contribution to humanity.

Why a Heritage Status?

The UNESCO World Heritage List has done much to raise awareness about cultural and natural properties meriting world heritage status (Leask and Fyall, 2006; Di Giovine, 2008). Other organisations such as the Heritage Stone Task Group have built on this momentum to develop heritage status for building stones, and it is discussions by the author about development of the Global Heritage Stone Resource (GHSR) designation that have prompted this discussion paper.

Precious gemstones are a rare and finite resource, and certain varieties and producing provinces could greatly benefit from a heritage status. Specific gemstones can be truly considered of outstanding universal value, having been part of many myths, kingdoms and traditions worldwide for many centuries.

There are over a hundred different varieties of gems identified commercially, many of which are unknown to the greater public. The majority of people are not aware of how and where rough gemstones are found, nor how they are cut and polished and later manufactured into jewellery. Gemstones may fascinate but little is known about where they originate and their geological setting. At present, the huge economic interest and rapid development in gemstone producing regions raises the risk of losing major heritage attributes in areas facing considerable environmental and social challenges.

Heritage designation would be most effective if it could cover specific geographic provinces that have been famous producers of gemstones (e.g., Mogok ruby, Muzo emerald, Sri Lanka sapphire). Many of these sources continue to produce gemstones and deserve to be highlighted not only for their gemstones' cultural contribution to humanity but also for their intrinsic scientific interest. Oftentimes, strong local traditions have developed around such gemstone resources in legendary localities. This includes mining and cutting techniques that are often unique to these regions. Provinces such as the Mogok Stone



Figure 2. Map of main gemstone producing areas worldwide. Grey corresponds to diamonds, red to rubies, blue to sapphires and green to emeralds. Source: www.gemexplorer.org



Figure 3. A view over the Burmese town of Mogok and its lake (a former gem mine). The Mogok Stone Tract has been one of the richest and most diverse gemstone provinces in the world since the 16th century. Photo: Laurent E. Cartier.

Tract (Burma/Myanmar) and the Elahera Gem Field (Sri Lanka) have been sources of other types of gemstones due to rich geological environments and merit to be recognized as heritage-worthy gemstone provinces. The ultimate aim would be to preserve the traditions of these provinces and increase cultural, scientific and touristic interest as a way of contributing to sustainable development in these regions.

What Kind of Status?

The importance of a proposed heritage status is multi-faceted. Outstanding natural, economic and cultural features must characterize

any such type of heritage status. The added benefit for gemstones and gemstone producing regions/provinces would be to establish a designation that could cover both gemstone types that are of historic and cultural significance (i.e., from certain sources) and to cover gemstone-rich provinces.

Heritage status for gemstones has already been discussed within the Heritage Stone Task Group (HSTG) network (Cartier, 2015; Cooper, 2015). The Global Heritage Stone Resource (GHSR) designation seeks international recognition of natural stone resources that have achieved widespread utilization in human culture (Cooper, 2010). This designation has been extended to include a Global Heritage Stone Province (GHSP) when more than one heritage stone type occurs in the same region and these may be associated geographically and/or related geologically.

Cooper (2015) discussed the limitations of heritage status and the possible inclusion of gemstones as GHSRs through the example of Australian opal. The main argument against inclusion of gemstones as a GHSR is that the GHSR denomination focuses on stones used as building materials. Furthermore, most gemstones are single minerals that are subsequently cut and polished. The added value of designation would also certainly be stronger for gemstones if such a designation were solely established for gemstones, given that the audiences are so different.

UNESCO World Heritage Sites could also be potentially of interest for certain gemstone regions, but may not cover actual gemstone varieties. UNESCO World Heritage Status is separated into cultural and natural properties based on a set of 10 criteria. Sites that meet cultural and natural criteria can be designated as possessing mixed properties. However, mining which is central to gemstone extraction, is listed as an 'ascertained' danger for UNESCO World Heritage Sites considered as natural properties. Obviously, there may be a strong conflict in

trying to reconcile the present gemstone mining activity with heritage preservation in a UNESCO context. The only UNESCO sites linked to gemstones known to the author are Diamantina and Ouro Preto in Brazil, both considered cultural properties due to their rich mining and prospecting history.

In developing such a concept for gemstones it is especially criteria 2, 3 and 8 of UNESCO's list that are most relevant. These are:

- to exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design;
- to bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared;
- to be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features.

In light of these differences it would be more realistic and productive to develop a framework that is based on the excellent work already carried out by both UNESCO and HSTG in developing criteria for heritage-worthy sites. These could be slightly modified and expanded to cover the cultural and natural aspects of gemstone resources and their environments.

Global Heritage Gemstone Provinces: Preserving Traditions and Raising Awareness

A number of different gemstone provinces could, in a first step, be considered for heritage designation (see examples in Table 1). These have all been sources of exceptional gemstones for centuries. Numerous other examples exist, these could be added to this list once the criteria for such a status has been more clearly defined.

In general terms, the key factors that could characterize such a heritage status for gemstones may be the following:

- Of outstanding universal value
- Historic use of gemstone (decades/centuries)
- Uniqueness of gemstone (e.g., found only in one locality)
- International use of the gemstone
- Continuing availability and use
- Local traditions surrounding the extraction and processing of these gemstone resources

For gemstones it makes sense to offer heritage status to provinces that produce individual gems or large varieties of gems. Many gemstone-bearing areas are sources of different types of gems due to rich local geological environments. Such a separate category could build upon Global Heritage Stone Province (GHSP) criteria. It is hoped that raising awareness about the long-standing use of these gemstones may also provide impetus to protect resources so that they are available for decades to come.

Sri Lanka's 2000-year gemstone mining tradition continues to ban large-scale mechanized mining operations with the aim of preserving small-scale mining techniques, offering more local jobs and ensuring gemstone deposits can be mined for longer. Sri Lanka also pioneered the heat treatment of rubies and sapphires to improve the appearance with reports dating back to the 13th century (Hughes, 1997).

In the Mogok Stone Tract (Burma/Myanmar) there is a century-old kanasé tradition. This means that any tailings produced by mines can be searched by anyone. This remains a good source of modest income



Figure 4. Traditional heat treatment of gemstones in Ratnapura, Sri Lanka. Photo courtesy of Richard W. Hughes/Lotus Gemology.

Table 1. Mining regions that have a rich and longstanding tradition in gemstone production and trade and could be considered for heritage designation

Location	Gemstone(s) Mined	Mining History
Mogok Stone Tract (Burma/Myanmar)	Ruby, sapphire, spinel, peridot, garnet, topaz, zircon and many others	A source of high-quality gemstones since the 16 th century, especially rubies and sapphires (Hughes, 1997)
Muzo (Colombia)	Emerald	A source of high-quality emeralds, were known in Europe already before 1520 (Giuliani, 2000)
Elahera Gem Field (Sri Lanka)	Sapphire, spinel, garnet, tourmaline, chrysoberyl, zircon and many others	One of the most active gem producing areas in Sri Lanka for centuries (Gunawardene and Rupasinghe, 1986)
Sar-E-Sang (Afghanistan)	Lapis lazuli	Mining and trade of lapis lazuli in Central Asia for at least 4000 years. Continues to be world's best source of lapis lazuli today (Wyart et al., 1981)
Kuh-I-Lal (Tajikistan)	Spinel	Produced spinel (long mistaken for ruby) for over a millennium. The Black Prince Ruby, currently part of the British Crown jewels, appeared during the 14 th century and is believed to come from this mine (Hughes, 2013)



Figure 5. The century-old *kanasé* tradition in Mogok allows anyone to search tailings produced by mines, a unique example of interaction between mines and local communities. This is an important source of income for local miners. Photo: Laurent E. Cartier.

for many local miners. With the rise of much larger and more mechanized mining activities this *kanasé* tradition may disappear. There is also a strong tradition of local trading and cutting, where gemstone-trading knowledge is transferred from generation to generation. This can only be preserved if there are enough gemstones that are locally traded and cut into brilliant gemstones.

How to Give a Status? – Ways Forward

The Global Heritage Stone Resource (GHSR) network has done excellent work on heritage designation of building stones and is a great platform on which to build. Rather than to integrate gemstones within GHSR it is proposed that a new network be created for gemstones. However, collaboration between different initiatives is welcome and should be promoted.

At present, only preliminary discussions with representatives from some of the gem producing countries listed in Table 1 have been had, regarding possible heritage designation of the highlighted mining regions. The aim of this article is to serve as a starting point for discussions with a range of partners in order to develop a more structured vision for the proposed ideas, and that fits with local demands. Little is known about the building stone heritage in the discussed countries, but all apart from Afghanistan possess UNESCO World Heritage Sites pointing to awareness for the need to protect heritage-worthy sites.

Ultimately, the aim of heritage designation is not to police gemstone provinces but to raise awareness and increase benefits for local communities. Such a scheme may give much-needed recognition to communities and environments in gemstone mining regions. Much like dinosaurs, gemstones have a huge appeal in the public mind and are an excellent way of inspiring people about geosciences. On-going discussions of heritage designation for gemstones and gemstone provinces and other gemstone-related themes could benefit from the support under the auspices of IUGS.

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