THE GLOBAL MUSEUM:

NATURAL HISTORY COLLECTIONS AND THE FUTURE OF EVOLUTIONARY SCIENCE AND PUBLIC EDUCATION

BACKGROUND

For hundreds of years, natural history museums around the world have provided the general public and scientists with numerous **opportunities to learn more about our natural world**. Whereas natural history collections and museums began with a focus on describing the diversity and peculiarities of species on Earth, they are now **increasingly leveraged in new ways that significantly expand their impact and relevance**.

THE GLOBAL MUSEUM: IMPORTANCE

When **joined together through emerging digital resources**, the global community of natural history museums (the 'Global Museum') is more than the sum of its parts:

INNOVATION

The Global Museum can function as an **innovation incubator** where questions are addressed that we did not consider before.

SCIENCE

The Global Museum enables scientists to study and sample each other's specimens on a large scale and connecting different types of data. This results in far **greater power than obtained by single museums**.

PLACE-BASED WINDOW

Museums can provide a place-based window to focus on the **integration of science and discovery**, as well as a locus for community engagement.

EXAMPLE

Citizen science projects in which volunteers help in interpreting and digitizing information from old collection labels.

GLOBAL QUESTIONS

The Global Museum facilitates insights into and answers to diverse biological, environmental, and societal **questions on a global scale**, throughout eons of time, and across the Tree of Life.

EXAMPLE

Lamichhaney et al. (2019) focused on phenotypical convergence and its possible genetic architecture, integrating natural history collections and comparative genomics in their approach

THE GLOBAL MUSEUM: CHALLENGES

SPECIMEN STORAGE

To maximise the use of specimens, it is imperative to carefully consider how to best **sample, preserve, handle, and store** them in ways that will be compatible with tomorrow's technologies and hence further increase the relevance of natural history museums; this includes large-scale and secure long-term storage of image data.

CONTINUED COLLECTION

Continual field collection ensures that museums build time series, collected over decades or even hundreds of years, that enable us to address future questions that we may not yet know. Additionally, collecting a subset of a common, widespread species is necessary when establishing baselines for studies of organismal responses to global change.

DIGITIZATION & IMAGING

To facilitate the coordination of collection and databasing efforts between museums – essential for a Global Museum – digitization is key in **increasing awareness of what knowledge is available**, both at the regional and global level.

FUTURE QUESTIONS & PROMOTING SCIENCE

Museums need room to grow in targeted ways that will allow us to **address scientific issues critical to looming societal issues**, such as emerging pathogens and food security. Museum communities should explore ways to use specimens to bridge the traditional chasm between the sciences, arts and humanities.

CONCLUSION

The Global Museum must be seen as **one of the most valuable assets of modern society and culture, providing the material to address challenges facing humanity today** – such as baseline information against which to test hypotheses of local and global environmental change – and a critical regional cultural touchstone for the public.

Viewing natural history museums as critical infrastructure for scientific inquiry and public understanding may **help raise their profile and awareness, facilitating continued support**.

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