

Scientific treasure chests or public heirlooms?

Prof Paul Skelton argues for investment in African natural history collections for Africa

From the point of view of a natural systematist, Africa is a paradox in terms of biodiversity: Africa is extraordinarily rich – in many ways unparalleled – in biodiversity, yet it is embarrassingly impoverished in terms of indigenous scientists and its own natural history collections. It is as if this incredible wealth of natural living resources has little or no value or meaning to Africa itself. If this is so, why should this be? Is this one of the unfortunate legacies of colonialism? Whatever the reason we need to ask, 'What can and should be done about it now?'

To understand what seems to be under-investment in natural history collections in Africa, it is instructive to consider natural history museums in other parts of the world. In developed countries natural history collections are highly esteemed keepers of the nation's natural treasures and revered bastions of generations of high scientific scholarship. The science they perform and the richness of the natural history collections they care for has provided the world with much of the knowledge we have of global biodiversity. National and large regional natural history museums, public or private, are grand buildings located in the heart of capital or other major cities. In Africa, with some exceptions, there are few esteemed, world-class, national natural history museums and collections.

Investing in Biodiversity

At this time of global crisis in biodiversity the need for nations to invest in the resources that enable science to assess the state of nature should be unquestioned. I am aware of few natural history museums in African that have had major re-investment in recent times. With some notable exceptions, such as the natural history museum in Nairobi, Kenya, which is currently undertaking a rebuilding programme, "Museum in Change", in my experience, many of the natural history museums that do exist in Africa are either run down or their collections are slowly deteriorating.

Even in South Africa many museums and collections are struggling to maintain themselves. However, in South Africa there are signs of renewal and interest, coming especially from the promulgation of the Biodiversity Act (NEM:BA) and the establishment of the South African National Biodiversity Institute (SANBI) as the agency responsible for taxonomy and natural history collections.

Does Africa need such treasures in a continent where poverty and social deprivation are so prevalent?

The investment by the National Research Foundation (NRF) in a new building to house SAIAB's wet collection for the National Fish Collection also signals the nation's awareness of and preparedness to assume South Africa's responsibility to develop and care for its scientific biodiversity resources.



Photo: Heather Jackson © SAIAB

For many years the coelacanth was thought to be extinct. However, after JLB Smith's identification in 1938 of a specimen captured by fishermen and the subsequent discovery of living coelacanths off Sodwana in KwaZulu-Natal in 2000, the coelacanth became an icon for marine ecological exploration and discovery along the east coast of Africa. Providing a legacy for systematic ichthyology in Africa, the National Fish Collection at SAIAB houses carefully preserved coelacanths and some 700 000 diverse fish specimens for posterity.

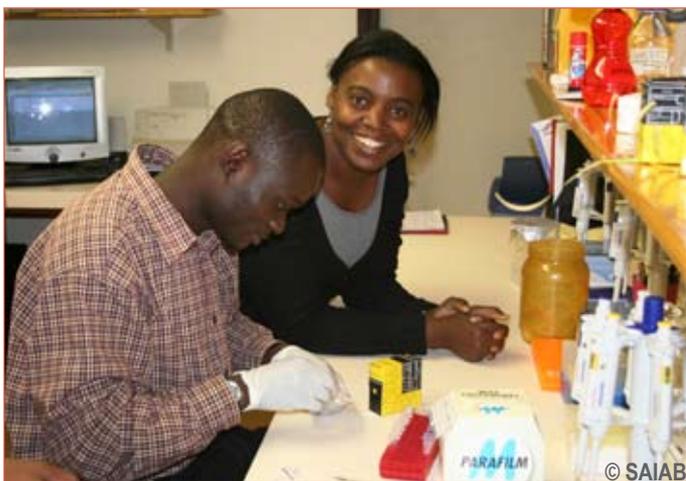
Give the job to someone else?

Given the challenges facing Africa at this time, should African nations develop and foster their own collections of natural history? Can they commit themselves to the cost of providing suitable infrastructure and of collecting, caring for and managing such collections? Or should they rather delegate to nations that can afford it? Running successful collections requires trained, skilled manpower familiar with the business of international systematic science.

At present, few skilled African scientists or curators are available. Training in Europe or North America is expensive apart from the question as to whether training outside Africa is appropriate for the conditions in Africa which are very different from those in developed countries. For instance, the supply and availability of services and materials for the care of collections are not equivalent.

In addition, with technology driving rapid change in taxonomic and systematic research, the very nature of collections is changing rapidly. There is an increasing need to preserve not only whole organisms for study but also tissues that are suitable for biochemical (especially DNA) analysis. Equipment for technologically driven studies requires specialized laboratories, expertise and equipment. Such changes present new challenges for institutions and curators.

Colleagues in the developed world (with its superior resources) have pointed out to me that existing collections in Europe, North America and elsewhere include the type specimens of most described African animal and plant species. Establishing our own collections in Africa will not replace these types. Scientists, wherever they are, refer to the types as well as the historical collections lodged internationally. Even when new collections include previously undescribed species, African researchers will still need to refer to the established 'out of Africa' collections, either via electronic data bases or through visits made at great cost in time, money and effort.



Most developing African countries have limited access to sequencing and museum facilities. To meet this need, links between African countries must be promoted and institutions that can assist in training and capacity building be encouraged to do so. For example, young researchers at SAIAB, Dr Monica Mwale and Dr Ernst Swartz, are providing leadership to the African continent in its involvement with the International Barcode of Life initiative. SAIAB holds the African Fish Barcode of Life (FISH-BOL) regional working group chair. Its strengths are in its taxonomic expertise, its collections and curation facilities. Its genetic resources and infrastructure for biomaterials banking and its molecular laboratory and collection provide a regional centre for barcoding. African collaborators Kenya and Tanzania lack information and taxonomic keys on species descriptions. Discussions have resulted in the registration of two collaborative projects on the barcoding of life databases (BOLD). These links serve as a starting point for data sharing and collaboration with east Africa. Above, Dr Monica Mwale works with Tom Akeyo, from the National Museum of Kenya, who spent three months training at SAIAB from April–June 2008 with funds secured from an NRF mobility grant.

Repatriation of material to African collections is unlikely and is not the answer, although digital images and data of type specimens will increasingly assist studies in future. In our globalised world, is it worthwhile, therefore, or even feasible for African nations to develop their own natural history collections? Is it not better to foster close relationships with established institutions in developed countries and embark on collaborations and partnerships that train local scientists, enable visits to collections, undertake joint expeditions and facilitate collecting and export permits?

African Collections for Africa

Research collaborations are obviously beneficial to everyone. However, delegating Africa's collections to developed countries seems simply to favour the status quo and denies African scientists and nations the opportunity to even begin to stand on their own feet.

Without collections in Africa, the continent's scientists and research structures will remain impoverished in terms of scientific resources and unable to provide their people with crucial, local knowledge. They will remain at the benevolent mercy of foreign nations, required to do no more than to explore, study and reveal to the world the richness of Africa's biodiversity.

Such dependency would inevitably mean that valued traditions will never be established; that the cost of conducting systematic research will never be challenged but remain prohibitive for most African scientists; and Africa will never be able to set its own agendas or priorities.

For science at large African biodiversity would remain a global feast at which African scientists will be uninvited bystanders, without the resources to earn the respect or recognition they deserve. For this reason I believe it is time for African nations to expand their own expertise and traditions in natural history and natural history collections. There is much to be done, but the future holds unlimited scope.

Achieving a paradigm change

What has to be done to achieve the paradigm change needed for us to engage at the highest level with Africa's biodiversity?

- ▣ We need to develop self-belief and determination, and to have confidence in Africa's ability and means to establish its own systematic expertise and custodians of natural history.
- ▣ The few science leaders in Africa need to start the process of convincing the international community that this is the right path for Africa and scientists everywhere should support and invest in African initiatives, for their own and Africa's benefit.
- ▣ We have to develop partnership and genuine collaboration.
- ▣ Politicians and other decision makers must be brought on board to support the development of systematics knowledge, expertise and resources for Africa.
- ▣ Institutional leaders and governing boards must inform and educate politicians and bureaucrats how museum collections can serve national needs and interests, and what support these institutions require to do a good job.
- ▣ Educators must bring systematics back into African curricula and generate the thirst and passion for biodiversity that is at the heart of any healthy scientific tradition.

In time, and with the right support, will come the pride and power of success. Then Africa will better serve its own interests in terms of understanding and conserving its wealth of biodiversity.

This is an edited version of an article which originally appeared in *Quest*, Vol 3 No 2, 2007 to mark the opening of the SAIAB Collection Facility in Grahamstown, South Africa. For more information on this and other interesting stories from SAIAB, please contact us on saiab@ru.ac.za