

## The Role of Natural History Museum in the Development of a Nation

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**Abstract:** The role of natural history museum in the life of a nation involves: conducting research into the vast natural history heritage and biodiversity of the country; serving as a repository, of natural objects, source materials and taxonomists in that country; creating scientific awareness; on natural history resources of the nation through annotated exhibitions for public enlightenment in display galleries, publications works hops and human development etc., natural history museum prepares data bases on natural history resources, ecological diversity of the country and thus facilitate an information-retrieval system on them for use by the public, tourists and the scientific community as a basis for sustainable development. It also provides identification services on natural objects and rich fauna, flora and minerals resources to user groups especially pest control workers in Agriculture, veterinary/human medicine and science teachers. The Obafemi Awolowo University, Natural history museum Ile-ife Nigeria has in her repository among other things, Type specimens e.g., the Ewekoro formation and giant fossil turtle from Sokoto. Scientists deposit their type specimens in museum all over the world. It is hoped that more scientists all over Nigeria will continue to send their type specimens to the museum. Other individuals and groups should also donate towards the activities of the museum as A.G Leventis foundation has recently donated ≤460,000 (₦14.8 million) to complete the museum's physical structure.

**Key words:** Museum resources, heritage, type specimens, sustainable development, nation

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### INTRODUCTION

Museums are buildings in which are preserved and exhibited objects illustrating antiquities or relics of the past specimens of scientific interest. They ranged from very large buildings such as the British Museum in London, England or the Smithsonian Institution in Washington USA to modest one such as Obafemi Awolowo Natural History Museum Ile-Ife, Nigeria to the small house in which are kept objects associated with eminent person who lived in such a house (Fayenuwo and Lasebikan, 1991).

There are also several types of museum. These include: museum of Antiquities-in which are housed ancient pieces of furniture or objects of art such as sculptures, paintings, ceramics, textiles and other crafts. Public record office museum serving as collection centre for famous documents; War museum containing relics of national wars; Maritime museum for maritime history; museum for architecture, with types, structures and styles

of building, etc., Museum for Local/Indigenous Technologies, Science Museum, with objects depicting history of science and engineering and Natural History Museum.

Natural History is a term which in its original meaning was used for the study of all natural objects in Zoology, Botany, Geology and allied sciences (notably Palaeontology and Physical Anthropology) (FEPA, 1992).

Natural history has gradually become less broad in its meaning and now limited to Zoology and Botany and used to describe the scientific study of the characteristics of living things (i.e., plants and animals both recent and past). A Natural history Museum therefore serves as repository objects of zoological and botanical origin.

To many people, the function or role of a museum starts and ends with attractive and stimulating displays often in glass cases and in large exhibit halls or galleries. Although such displays are often enjoyed by the public

quite often many people do not even appreciate what lessons are to be derived from such displays. Apart from the fact that any Natural history museum is primarily aimed at enlightening and educating the public, a natural history museum performs many more important and varied functions other than the display of exhibits. As a matter of fact, a natural history museum is known not by the quantity and quality of its displays but much more by the way and manner these other functions are performed. In discussing these various functions, the emphasis will be on applied functions played by the natural history museum in the development of a nation, although references will be made of the important intellectual role of a natural history museum in the development of life sciences.

#### **NATURAL HISTORY MUSEUM AS A REPOSITORY FOR COLLECTIONS OF NATURAL HISTORY OBJECTS**

One of the major functions of a natural history museum is to serve as a repository for natural history objects. A museum is therefore judged by its collected collections, of both type specimens and research collections. The possession accounts for its existence and the character of the collection determines the worth of the Museum. There are several reasons why the value of Museum collection is very important but two are stated.

All classification as well as identification is based on the comparison of specimens representing populations and species. A species can only be validly determined or new one created by comparing it with other identical species. An adequate comparable collection is therefore as indispensable to the taxonomist as are electron microscopes, ultracentrifuges and similar equipment for the cellular and molecular biologists (Mayr, 1969).

As an important documentary centre, especially for natural history objects, a natural history museum, through its collections provides permanent records of fauna and flora of a country. This function is particularly more important in a country where the biota (that is animal and plant life) has been or is being destroyed by natural disasters or the activities of man. The aspect of museum functions is no doubt very crucial not only in Nigeria but also in Africa as a whole where the pressure of the agricultural and other aspects of the urban development is causing devastating and rapid disappearance of most of the fauna and flora. Currently unused material in a collection may be dormant but this does not mean that it is dead. Collection, as noted by Mayr (1969) are reference materials and in that aspect they are just as necessary as books in a library which likewise are not in continuous use yet must be available when needed.

#### **NATURAL HISTORY MUSEUM AND ECOLOGY**

The word ecology together with its value has become very important in the developed countries for several decades and is gradually becoming so in Nigeria even though this may be, more so amongst those called political ecologists.

The reason for this among others is that the developed countries suddenly realised a few decades ago the consequences of their social, economic and technological development activities on the environment and were forced to appreciate the fact that development efforts that take no account of the ecological rules of the game are bound to suffer adverse consequences (FEPA, 1992).

If people in developing country are to some of the expensive mistakes of the developed countries in their development activities and thus want to reach the high quality of life to which all people aspire, ecological studies, by scientific ecologists, must not be ignored in any of the developing efforts. It is a well known fact that no serious ecological study can be carried out without the most painstaking identification of all the species inhabiting a particular ecosystem.

In other words, ecology, like most other areas of science is greatly dependent on taxonomy. The natural history museum is again a repository for taxonomists. It is therefore not surprising that ecologists in order to enhance the quality of their research, have either taken up taxonomic studies or collaborate closely with taxonomists working in natural history museum.

#### **NATURAL HISTORY MUSEUM AND AGRICULTURE**

The awareness in developed countries of heavy contaminations of the biosphere with pesticide residues together with other innumerable environmental contaminants and the desire to provide and maintain a clean environment for man and the organisms on which his whole existence depends have made biologists in those countries to turn their attention to the control of potential crop pests and diseases using their natural enemies. One of the most important criteria in the successful application of a biological control is the determination of the exact control region or country of origin of the insect pest and of its total fauna of parasites and parasitoids. This in itself requires correct identification of the pest and the parasite may lead to serious wastage of money and time. A good example of misidentification of a pest resulting in years of wasted efforts and considerable amount of misspent money is that of the mealybug, *Planococcus kenyae* Le Pelley which was reported to appear in severe outbreak in Kenya in 1923. It was first mis-identified as *P. citri* introduced to

Kenya from Italy, however failed to effect control. The pest was later re-identified as *P. lilacinus* Cockerell which parasites were introduced to Kenya from Oriental world. These parasites again failed to control the pest because of misidentification. It was not until 1954 that the pest was recognised as a new species introduced from Uganda to Kenya. Its parasites also introduced to Kenya from Uganda were then able to effect successful control. The role of a natural history museum with well trained taxonomists is no doubt obvious from this and similar examples that abound in the literature.

Agents of domestic animal and human diseases and the insect vectors that transmit them are also regulated in the large part by their natural enemies. Here again as in agriculture, the natural history museum has a conspicuous role to play.

#### **NATURAL HISTORY MUSEUM AND QUARANTINE SERVICES**

The need for the intensification of modern agriculture in order to produce enough food for the soaring human population and enough raw materials for our agro-based industries will no doubt necessitate the introduction of crop plants from other parts of the world. The introduction of such plants may be accompanied by the introduction of their pests or other insects which are not pests in their native countries but could assume pest status in the developing countries. This phenomenon can be further complicated by the propensity of many citizens to be absolutely in love with ornamental plants and variety of fruits imported from Europe and USA.

If a developing country is going to maintain an efficient and effective quarantine service thereby saving her from serious invasion of pests from foreign countries, there will be a need for a well established natural history museum which is adequately staffed with highly qualified taxonomists.

#### **NATURAL HISTORY MUSEUM AS AN EDUCATIVE AND INTERPRETIVE CENTRE**

The real and potential contributions of a natural history museum to educational process in their broadest sense are, of course, immense and invaluable even though these contributions have not been appreciated in many developing countries in fact any where in tropical Africa. The meaning and messages contained in the displayed objects are considerable not to mention the most important fact that the museum, through its exhibitions of natural history objects in three dimensional ways serves as interpreter and spokesman of nature.

In the developed countries of the world, the natural history museums have served and are still serving as

centres where a lot can be learned, through well annotated displays, of the causative agents of many diseases of man (man and biosphere) his domestic animals, the arthropod vectors of such diseases and the effective preventive and control measures for such diseases and their vectors. The gardeners can also derive immense educative ideas from the displays in a museum gallery. In order to discharge its educative and interpretive function much more effectively, museums in developed nations also know in addition to their displays, to organise classes and lectures for schools and other groups, produce publications, films, television and radio programmes. It is therefore not surprising that Albert E. Parr that American distinguished museologist has a decade ago spoken of the progressive conversion of natural history museums into pendant accessories of the school system.

There is however no doubt that the museum may in this way, be providing informal educational outlook of the elites. We believe even if for this alone, a natural history museum is a necessary accompaniment of meaningful development of any nation.

#### **NATURAL HISTORY MUSEUM AND TOURISM**

In the developed countries, museums are providing the prime function of offering enjoyable and rewarding stimulation for individual minds in their hours of freedom from their daily chores. It is not surprising that such museums in Europe and America now make millions of Euros and dollars yearly either through admission charges or/and sales of books, pamphlets, paintings, casts and other souvenirs.

In many developed countries today, the excessive growth of cities with their supermarkets, skyscrapers and network of roads and cars and almost complete disappearance of nature reserves for wild life have lowered the opportunities for observation and exploration in nature, all of which is now confined to natural history museums and zoos.

The very rich and diversified fauna and flora and other natural history resources in tropical Africa provide readily available materials for exhibition in our museums. The impact of this to tourism which is an important service-offer to the outside world is then obvious.

#### **NATURAL HISTORY MUSEUM AND SCIENCE EDUCATION IN NIGERIA**

**Museum as research centre to produce source materials:** Museums in developed countries of the world were founded on a long history of collections of individuals, groups and organisations, e.g., Smithson's mineral collections formed the nucleus of the Smithsonian Institution in Washington D.C. But more recently, rapid

development of natural history museum depend on collections derived from the scientific research of museum staff (Fayenuwo and Lasebikan, 1991).

At the Obafemi Awolowo University; Natural History Museum at Ile-Ife in Nigeria, the initial collections were zoological specimens of the Department of Biological Sciences. Since then the museum has been primarily concerned with building up of its collection of plants and insects and other invertebrates, reptiles, birds, reptiles, rocks, fossils and minerals based on staff activities. And as the Natural History Museum was conceived to fulfil an important intellectual role in the University, it is intended that natural history related research projects in other departments will continue to contribute to the museum. Such researchers are cross-listed in the Museum brochure as affiliate members. Leventis recently gave encouragement with recent donation of  $\leq 460,000$  towards the completion of the Museum's physical structures (<http://www.oauife.edu.org>).

During its 40 years of development, the Museum has acquired a very large number of valuable specimens. Joint expeditions with other departments and even other universities were organised e.g. The Nigerian Sokoto Expedition during which among other specimens, a giant fossil turtle was recovered. And during the Republic of Cameroun Expedition giant mammals were collected. All specimens collected were deposited in the museum and thus saved from being smuggled out. The museum serves as an important repository for type specimens. One of such is Adegoke's world renowned type specimens of Ewekoro Formation deposited in the Museum. These are easily accessible to researchers and students for consultation.

**Museum as information data base:** A careful review of the roles of natural history museums shows that they are systematically evolving into famous research centres and data-base for basic and applied natural sciences. The natural history museum at Ife has within a short time acquired a popular reputation as data-base at both national and international level. For example Bat collection has been the subject of research by several European scientists. The museum herbarium has provided identification service for research within the university, nationally and internationally. Infact, specimens have been exchanged with other famous museums of the world. The Natural History Museum has been recognised by the International Committee on the Organisation of Museum (ICOM).

**Museum exhibits as a technique in teaching science:** One of the most popular functions of the museums is the display of its collection for viewing by the general public and the exhibition of suitable materials for education. In

this regard the museum is very much aware of its responsibilities to its very audience from all ages and segments of the population, primary school children, secondary school students, undergraduate and graduate students. There is also a large audience of adult workers (literate and illiterate) who visit the museum for leisure while at the same time learning about new trends in scientific development.

The natural history museum employs the visual aid technique but in a unique way: Actual specimens are preserved and presented as three dimensional objects. Dioramas are designed to replicate habitats. Furthermore, illustrations and scaled models are presented out not only to simplify many aspects of the theme of display but also to fire the student's imaginations. Consequently, the student understands and experience would be greatly widened in a way a teacher could not achieve otherwise.

Besides, the museum supplements its displays by employing other audio-visual aid techniques like power point presentation or the slide films accompanied by tape recorded sounds of birdcalls of varsity campus produced by Rev. Fr. Farmer. Special tours are organised by for school parties:

In 2005, the museum recorded over 250,000 visitors and subsequently this has increased by about 5% annually. Yet its educational activities are not restricted to the exhibition gallery. Specimens are loaned or supplied to schools on special requests. The museum has also organised scientific excursions and lectures for schools and similar parties.

**Museum as a resource for science teachers:** Obviously, museums can not replace schools in formal education neither can they vie with the specialized training received in laboratories in schools and universities. But Museum exhibits and other activities are designed and specially suited to educate large numbers of people. School teachers have come to recognise this and school parties not only from Ife and environs but also from distant places like Lagos, Ilorin, Benin and other parts of Nigeria have visited the Museum on the initiative of graduate teachers of the university.

Again it is high time we replaced the foreign specimens by specimens that are locally available to illustrate the principles of basic science in textbooks. This will enable students to become exposed to species with which they are acquainted. Professor A.O. Segun, a former Head of the Museum has already produced some such materials and is continuing relentlessly in his effort to produce more of such textbooks. Specimens cited in these books are available in the museum.

**Museum in the propagation of natural history:** Nigeria is undisputedly a developing country endowed with very

rich natural resources-minerals, plants and animals. As the most populous country in black Africa, she is not lacking in human resources. In order to achieve efficient utilization of our natural resources for rapid economic development, the large masses of uneducated adults have to be informed and freed from the banes of ignorance and superstition. Hence, exhibitions that have bearing on health, agriculture and mineral resources are designed to enlighten them. In this way the museum provides the missing link between the highly sophisticated research findings and their extension for the direct benefit of the public. Some of such exhibits now on display include those of vector insect, Honey production by Bees, forest product and economic minerals of Nigeria.

**Museum as centre for staff training:** The Natural History Museum based in a university has the added responsibility of not just ensuring the production of high quality research staff essential for its continuity but also staff for the anticipated development of other museums in Nigeria. Special sub-degree and postgraduate diploma and certificate programmes on plant and animal taxonomy and museum techniques are now being run to train the much needed man power in this novel area.

**Museum encourages the development of other natural history museums:** Obafemi Awolowo University, Ile-Ife has not only blazed the path to the innovative idea of a Natural History Museum in Nigeria but has further gone on to encourage the development of similar museums in other parts of the country. This is being achieved by collaborative efforts with the National commission for Museums and other Monuments and also with the Oyo, Osun and other State Governments. The cooperation between the museum and these bodies will be to the benefit of science education in Nigeria.

### **OTHER FUNCTIONS**

The natural history museum, through the concern of its scientific staff with systematic and taxonomic studies has made important contributions to the conceptual structure of Biology. For instance, population thinking has come into biology through taxonomy. Taxonomic study also has tremendous impact on evolution, ethology and phylogeny of behaviour. Most major contributions to Biogeography were made by taxonomists.

The theory of equilibrium island biogeography as formulated by MacArthur and Wilson (1967) showed that species-area relationship is a balance between

colonization and extinction on islands of varying sizes. This theory has subsequently been extended to include host species as island, and their associated herbivore richness had been interpreted to result also from colonization and extinctions over ecological (Dritschilo *et al.*, 1975; Strong, 1974) and evolutionary (Opler, 1974) time scales.

A good interpretive framework for species-area relationship has been provided by this island analogy. Thus, it has been found that rapid host shifting and colonization may be characteristic of some host-herbivore system but this may not be universal. In general in groups manifesting host shifting, closely related herbivores tend to be found on widely divergent plant taxa. The herbivorous species complex, radiate in this case by sequential evolution (Jermy, 1976). This is true of microlepidopteran leaf miners on California oaks as demonstrated by Opler (1974). The contrast is found in the gallwarps, cynipidae in which the most closely related species occur on the most closely related oaks and radiate by evolution, suggesting rare host shifting (Cornell and Washburn, 1979).

The effect of habitat diversity on species richness has also been studied. It has been shown that larger island have more habitat types which harbour different species assemblage and consequently higher species richness (Williams, 1967; Simberloff, 1976).

Research on species diversity is currently a topical issue, because of the realisation by mankind of the danger signals from careless management of the environment vis-à-vis global change. Existing knowledge about species richness and abiotic relationship from the ecological and evolutionary perspectives has been based largely on work done in the temperate regions of the world.

Immense contribution to Anthropology, most especially physical Anthropology, was also made by natural history museum through the study of man as a species and the variability within the human species past and present by the anthropologists in various museums. In addition, using genetic markers, these anthropologists have been able to specify the degree of genetic affinity linking the network of human population as well as trace the territorial spread and contacts of peoples.

### **CONCLUSION**

It is an established fact that Nigeria is a country of rich natural history. It is however unfortunate to note that the native fauna and flora most especially the former are relatively unknown and much worse is the fact that a

sizeable amount of what is known can be found only in collections and other works housed in museums situated outside the Africa continent. Yet an adequate number of the of the natural history objects is very vital for any effective and judicious utilization of these resources. Furthermore, it is no gain saying that a natural history museum is the natural soul of a nation. This is because the natural history objects are significant objects of any nation as they can reveal the past inform about the present and predict the future. The existence and meaningful development of the first Natural History Museum at Obafemi Awolowo University in Nigeria and in fact of many more of its type is therefore imperative for a nation which is aspiring to be industrially, scientifically and technologically great.

The Natural History Museum, if properly organised, well developed and adequately financed can be a source of fund generation for the university and the nation. This can be achieved through provision of identification services to individualsorganisations and institutesand sales of photographs, paintings, models and casts of natural history objects.

Finally, scientists deposit their specimens in museums all over the world. It is hoped that scientists all over Nigeria will continue to send their type specimens to the Museum. It is heart warming to note that A.G Foundation has recently donated four hundred and sixty thousand pound sterling ( $\leq 460,000$ )/~~₦~~14.8 million to complete the physical structures of the National History Museum at Obafemi Awolowo University, (OAU) Ile-Ife, Nigeria. It is also hoped that others within and outside the country will continue to donate generously towards the fulfilment of the Museum's role in the development of the nation.

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