The Natural History Collections of the University of the West Indies (UWI)

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Despite the relatively small size of the country, Trinidad and Tobago is home to a wide range of natural history collections. Over the course of the last two centuries many naturalists have come to Trinidad and collected huge numbers of specimens. Significant collections have been deposited in museums in Canada, Germany, The Netherlands, the United Kingdom and the U.S.A. but equally important collections have also been kept in the country.

These include the Barcant butterfly collection at Angostura Ltd.; the Centre for Agricultural Bioscience International (CABI) insect collection; the Caribbean Epidemiology Centre (CAREC) collection of birds, mammals, reptiles and insects; the Institute of Marine Affairs (IMA) marine collections; the Percharde mollusc collection at the Pointe-a-Pierre Wildfowl Trust and the remaining collections of the National Museum and Art Gallery, formerly known as the Royal Victoria Institute. This last collection is unfortunately a fraction of its former size as most of the original specimens were lost in a fire in 1920 (Tikasingh, 2003).

These collections contain thousands of important specimens, however, the most varied and important natural history collections are those held at The University of the West Indies (UWI) St. Augustine campus. The National Herbarium and the UWI Zoology Museum between them hold around 100,000 objects and it is the history of the these collections, along with the natural history specimens held by the other UWI campuses in Jamaica and Barbados, that will be the focus of this chapter.

University natural history museums around the world fall into two broad categories: – those that have large accessible displays for the general public as well as their research collections – what have been referred to as 'full-service' museums (Humphrey 1991) – and those that function largely as stores of specimens for research and/or teaching. The ability to function as a full-service museum often depends, not surprisingly, on the money available to build, maintain and staff such an institution.

University natural history museums occupy a special place in the world of museums, as they are often more important for their research collections than they are for the specimens on display. Many university collections aren't generally open to public viewing and objects are often kept only for scientific study. This hearkens back to the early days of natural history collections in Europe when most of the collections were private. Public access was the least of the curators' concerns, and scientific research, mainly with a taxonomic focus, was the primary purpose (Farber 2000).

The University Museums and Collections (UMAC) committee, part of the International Council of Museums (ICOM), has around 200 members in 40 different countries and lists over 840 university-related natural history and natural science collections from around the world. This includes zoology, geology, palaeontology and botany collections.(1) This list is by no means comprehensive, but does indicate that universities around the world hold a significant amount of natural history specimens.

The focus for this paper is The University of the West Indies (UWI). UWI is a multi-campus regional institution of higher learning. It was established in 1948 as an external College of The University of London and became fully independent in 1962. The 16 English-speaking countries and overseas territories that support and are served by UWI are Anguilla, Antigua and Barbuda, The Bahamas, Barbados, Belize, Bermuda, British Virgin Islands, Cayman, Dominica, Grenada, Jamaica, Montserrat, St. Kitts and Nevis, Saint Lucia, St. Vincent & the Grenadines and Trinidad & Tobago. There are four campuses – Mona in Jamaica, St. Augustine in Trinidad, Cave Hill in Barbados and The Open Campus. The last one is not a physical campus as much as a focus for long distance learning and only has small resource centres scattered throughout the member countries; as such there are no collections associated with it. The first three campuses, however, all have well-established natural history collections of varying size and content. Who made them, how they were built up, what they are used for, and what the future holds for them will be examined in this chapter.

UWI Cave Hill

The UWI Cave Hill campus in Barbados is home to a herbarium and a small entomology collection. Currently the entomology collection is not curated to any significant degree, but the herbarium has been well looked after in recent years.

Botany Collections

The Department of Biological and Chemical Sciences houses the Barbados National Herbarium. It was established in 1977 by combining botanical collections from three sources – the Department of Agriculture, the Barbados Museum & Historical Society, and the Lodge School.

The first of these collections is the oldest, dating back to 1900. The majority of the specimens were collected by three agricultural scientists: John R. Bovell, the Superintendent of Agriculture; William George Freeman, who went on to serve in the Trinidad & Tobago Department of Agriculture; and J. Sydney Dash the Agricultural Assistant. These men were involved in all aspects of agriculture in Barbados and the surrounding region and conducted a wide range of research. Although their work would have provided them with many specimens for the herbarium, they were also keen on collecting in their spare time. In all they contributed several hundred flowering plants to the collections.

The second collection was started in 1935 by the geneticist, sugarcane breeder and Assistant Director of Agriculture, A.E.S. McIntosh, along with several amateur botanists; over the years they collected around 1300 plants.[128] The final collection of around 700 specimens came from The Lodge School, and was built up by the secondary school students and their headmaster, the Rev. Harry Beaujon Gooding and his cousin Evelyn Graham Beaujon Gooding again around the 1930s.[129] E.G.B. Gooding was responsible for many books and papers about the plant communities on the island, and was one of the authors of the 1965 book *Flora of Barbados*.

Over the last decade much work was done to bring the herbarium up to a higher standard with the collection of more specimens, but the most important work began in 2005 when a project between the Barbados Museum & Historical Society and UWI was launched. Funding from the Barbados Government, the Peter Moores Barbados Trust and UWI was used to create a virtual herbarium. The aim was to allow access by the general public, researchers and students to this regional collection. This was achieved in January 2009 with the launch of the searchable database containing scanned copies of every specimen.(2)

The collection holds around 4000 pressed and dried flowering plant specimens, along with smaller numbers of bryophytes and algal specimens, and is currently curated part-time by the Senior Lecturer in Biology, Dr. Louis E. Chinnery.

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128. This was the Barbados Museum & Historical Society started by sugarcane breeder A.E.S. McIntosh and a group of enthusiasts.

129. Several of their specimens appear as duplicates in the BMHS collection.

Zoology Collections

The entomology collection is a remnant from a larger collection assembled by Munir Alam during his work at the Caribbean Agricultural Research and Development Institute (CARDI). After his retirement the collection was split between the Ministry of Agriculture and UWI. The collection held at Cave Hill consists of three cabinets of 15 drawers each containing a variety of insect groups, with specimens from Barbados and the Lesser Antilles (Peck, 2009).

UWI Mona

The UWI Mona campus in Jamaica has two major collections – a herbarium and a geology museum – as well as several minor zoological collections. The collections are used for a variety of teaching and research purposes.

Botany Collections

The UWI Mona herbarium was established in 1949 by Dr. Charles Dennis Adams, who would go on to work in Trinidad and be instrumental in the development of the herbarium there as well. The collection contains some of the oldest herbarium specimens in Jamaica, dating back to the 1880s, and was used extensively by Adams to write the 1972 book *Flowering Plants of Jamaica* (Frodin, 1984).

One of the most important collections in the herbarium is that of William Harris, who started as the superintendent in the Botanical Department of Jamaica and ended up as the Assistant Director of Agriculture and Government Botanist. Harris was born in Northern Ireland, moved to Jamaica in 1881, and spent the next 40 years tirelessly studying the island's plant life. His collection consists of over 900 plants, many of which are Jamaican endemics.

The other collection of note is that of Paul Sintenis, a German botanist and professional plant collector who gathered a huge number of plants from Puerto Rico between 1884 and 1887. This included many duplicates which were sent to herbaria all over the world (Acevedo-Rodriguez & Strong, 2005).

The majority of the specimens, however, were inherited from the Hope Herbarium in Hope Botanic Gardens in Kingston. The gardens, managed by the Department of Agriculture, were established in 1873 and became a major experimental station for crops such as sugarcane, coffee, cocoa and bananas.

Most of the collection of over 35,000 specimens is currently stored in new metal cabinets and is split into three main groups – Regional, Monocotyledons and Dicotyledons. As well as the Angiosperms, there are smaller collections of Gymnosperms and Pteridophytes, but these were acquired in an *adhoc* fashion and more work is needed to make them a useful resource

(Buddo, 2010). Some specimens remain in older wooden cabinets, but once further funding is achieved they will be rehoused. The herbarium is currently under the charge of a curator, Mr. Patrick Lewis, and is open to staff, students and the wider public.

In 2005 UWI Mona and the Institute of Jamaica (IOJ), an umbrella organisation that covers all aspects of Jamaica's heritage, started a joint project to create the Jamaica Virtual Herbarium. This was an effort to make some of the collections held by the two institutions more accessible, and was part of a worldwide trend to facilitate information retrieval. The project was undertaken as part of a PhD by Philip Rose, who was responsible for the electronic cataloguing and development of a purpose-built website. The first collections to be catalogued were those of Harris from UWI and George R. Proctor from IOJ. These consisted of approximately 900 individual specimens from each collection with representatives from 10 plant families.(3) Each herbarium sheet was catalogued and scanned and added to an online database that was launched in 2009. In the future it is hoped that more specimens will be added to the database so that eventually the complete herbaria of UWI Mona and the IOJ will be available online (P. Rose, pers. comm).

Geology Collections

The UWI Geology Museum (UWIGM) contains geological, mineralogical and paleontological materials from Jamaica and the Caribbean, and has been functioning as a publicly accessible museum for 40 years. The Department of Geology, where the museum is based, was formed in 1961, and by 1965 the gathering of specimens for teaching purposes had resulted in the founding of the UWIGM as a private collection. Over time, as the collection increased in size and importance, proper storage space was needed. Eventually the UWIGM was brought into public existence in 1969 when the specimens and cabinets of the Geological Survey of Jamaica were donated to the museum (Brown & Langner, 2002). The first curator was Dr. Peter Jung, an expert on fossil molluscs who was at the time on sabbatical from the Naturhistorisches Museum in Basel, Switzerland (Donovan *et.al.* 2004). In 1970 the museum was opened for public viewing.

Several important collections form the backbone of the museum. The earliest collection dates back to the 1850s and was the work of Lucas Barrett. In 1859 he had been appointed Director of the Geological Survey of Jamaica at the young age of 22, and set about studying the mountains and seas of the island. He worked out the age of the limestone that makes up some of the Blue Mountains by studying the fossilised shells found there. One of these shells was a type of rudist bivalve new to science, and was named *Barrettia* in his honour. Tragically his promising career was cut short when he drowned whilst using a diving suit in the sea off Kingston, aged only 25.(4) His collection consists of 153 samples of rocks, minerals and fossils, many of which were collected in eastern Jamaica. Although collected for research,

the specimens were also for a potential geology museum, something he had been keen on since his arrival on the island. After his death the specimens were sent back to England. It was only in 1975 that they were acquired by UWIGM from the Sedgwick Museum in Cambridge.

A century after Barrett, the Geological Survey of Jamaica came under the leadership of Verners A. Zans, a Latvian geologist who arrived in the country in 1949. He undertook many studies on the rocks and minerals of the island and also collected recent molluscs and corals. His work resulted in the publication of a new geological map of Jamaica in 1958. Many of his samples were amongst the first objects acquired by the Department of Geology upon its foundation; there are approximately 400 specimens in his collection.

In 1966 Howard R. Versey became Director of the Geological Survey. His work on limestone formation resulted in a collection of roughly 100 foraminifera that were added to the UWIGM collections after he had completed his M.Sc.

Current staff and students in the Geology Department have also contributed greatly to the collections. Another collection of foraminifera was built up by Professor Edward Robinson from 1969 onwards, and numbers around 2000 objects. Professor Simon Mitchell has so far amassed over 10,000 specimens of rudists, corals, molluscs and rocks, including approximately 500 type and figured specimens. Gavin Gunter's collection of about 400 cretaceous period objects was acquired as part of his PhD thesis.

As well as academic collections, there have been objects donated by geologists working in industry. Anthony Porter, who worked for the Geological Survey and then the West Indies Alumina Company, donated a collection of 135 agates in 2009; and Raymond Wright, former head and co-founder of the Petroleum Company of Jamaica, has donated specimens to the museum dating back to the 1970s.

The last major part of the collection was obtained from the Institute of Jamaica and the Survey Department in 1979 and totals over 9000 objects. This added specimens from around the world as well as objects collected by geologists such as Charles Taylor Trechmann and Lawrence Chubb, both of whom were experts on the rudist bivalves. Chubb actually came to Jamaica to retire, but instead spent the last 21 years of his life helping with survey work and even took over as director from 1961 to 1966. His final work was the 1971 monograph on Jamaican rudists (Brown & Langner, 2002).

The current full-time curator is Dr. Sherene James-Williamson who completed her PhD within the department. In total the museum houses more than 20,000 catalogued specimens. Some of these objects are currently on electronic databases such as MS Excel and Access. It is hoped that soon there will be a publicly accessible database joined with other UWI collections. The museum is visited by around 2000 people per year, mainly from schools and colleges across Jamaica; many are organised primary school tours looking at rocks and minerals in general.

A recent project, supported by funding from the Canadian High Commission, resulted in the creation of an Interactive Learning Centre. This is the first phase in the UWIGM Rejuvenation and Modernization Project, and is intended to provide better teaching and training facilities for the museum.

One of the highlights of the collection is a cast of the fossilised skeleton of an extinct sea cow, *Pezosiren portelli*, discovered during a joint research project between Howard University, Florida Museum of Natural History and UWI. Daryl Domning, one of the researchers, named the specimen in 2001. It is well known in paleontological circles because it is the only sea cow fossil to have been found with legs, and it provides a unique look into the transition of a species from land to sea. Although the original fossil is currently in the USA, it is hoped that once suitable storage conditions have been attained in the UWIGM, this important specimen will one day be brought back to Jamaica (S. James-Williamson, pers. comm).

Zoology Collections

The UWI Mona terrestrial invertebrate collection is currently under the charge of Dr. Eric Garraway, co-author of the 2005 book *Butterflies of Jamaica*, and is curated by Dr. Catherine Murphy. Originally the Department of Life Sciences only maintained a teaching collection and reference material was sent to the IOJ, but from around 2000 the department started to assemble its own collection. Specific collections were made for Masters and PhD studies including Arctiid and Noctuid moths, aphids, carabid beetles and land snails. At a very rough estimate there are thought to be 50,000 insects, many collected during student field studies, but the vast majority of these are yet to be curated (C. Murphy, pers. comm.).

Other collections held by the department include marine phytoplankton and marine zooplankton, in particular the crustaceans, collected by Dr. Mona Webber; marine bony fish collected by Dr. Karl Aiken; freshwater fish collected by Dr. Eric Hyslop; mangrove ascidians collected by Prof. Ivan Goodbody, and a small collection of sponges (Buddo, 2010).

UWI St. Augustine

As mentioned at the beginning the UWI campus in St. Augustine, Trinidad is home to two major collections – the UWI Zoology Museum (UWIZM) and the National Herbarium of Trinidad & Tobago.

Zoology Collections

The collections held by UWIZM date back to the 1920s. Before UWI existed, the St. Augustine campus was home to the West Indies Agricultural College which in 1924 became the Imperial College of Tropical Agriculture (ICTA). The early collection was basically a repository for researchers in-

vestigating animal species of agricultural importance, and as a resource for teaching (Tikasingh, 2003). Insects formed the bulk of the specimens, and consisted of pest and beneficial species associated with the various crops under study – cocoa, maize, coffee, cotton, tobacco, citrus, pineapple and banana, to name a few. Many of these were collected by the Professor of Entomology and Commissioner of Agriculture, Henry Arthur Ballou, a prolific author on many aspects of entomology throughout the Caribbean and beyond.

In 1933 Martin Adamson was appointed Senior Lecturer and Head of the Department of Entomology. He started to collect a wider range of animals, including marine invertebrates such as echinoderms and crustaceans, and also terrestrial animals such as beetles and amphibians. He had earned his undergraduate degree at The University of St. Andrew in his home country of Scotland, and during his time at ICTA he gained his PhD from the University of California. He was with ICTA until his death in 1945.(5)

His successor, Professor Thomas Winfred Kirkpatrick, Head of Department from 1946 to 1959, expanded the reference collections further with a wider variety of insects. As well as producing many journal articles he also wrote the well received book *Insect Life in the Tropics*, which contains photographs and drawings of many of the insects in the collections. Around the same time his colleague Michael Emsley added more non-pest insects, as well as establishing a snake collection, some of the information from which he used to write his 1977 publication, *Snakes and Trinidad and Tobago*. Unfortunately his original specimens have either disappeared, or over time the labels have become disassociated from them, as during a recent cataloguing of the reptiles none were recorded as being collected by Emsley.

From 1960 to 1964 the reptile collections were increased further due to the work of Professor Garth Underwood. He was a keen herpetologist who started his career at the University College of the West Indies in Jamaica before moving to Trinidad to become the Head of Department. He collected and studied reptiles from all over the Caribbean during his time at UWI, many of which are deposited in the collection. In recognition of his work, the lizard *Gymnophthalmus underwoodi* was named after him. He presided over the department at a time when Zoology began to be taught separately from Agriculture, and so a wider ranging teaching collection was required.

Professor Julian S. Kenny, who served as Head of Department from 1970 to 1990, collected widely, but was particularly keen on amphibians and fish. He was author of *The Amphibia of Trinidad* in 1969, and went on to write many books and articles on all aspects of Trinidad and Tobago's wildlife.

His successor, Peter R. Bacon, also added a variety of specimens ranging from barnacles and molluscs, to turtles and plankton. Bacon had gained the first Zoology PhD from St. Augustine in 1969, and went on to conduct studies of Trinidad's wetlands and threatened leatherback turtle populations.(6)

Over the years many collectors have contributed to the museum: some have bequeathed items in their wills, and some were collected as part of Masters or Doctoral studies. Examples include the shell collection of Sybil

Atteck, one of Trinidad's most famous and influential artists; the P. Thompson mollusc collection; freshwater decapods from Wayne Rostant and Dawn Phillip; marine decapods from Jan Stonley; fossils from Robert Kennedy; freshwater insect larvae and fossils from Mary Alkins-Koo; social insects from Christopher K. Starr and Alan W. Hook, freshwater fish from Julian Kenny and Dawn Phillip; marine fish from Robin W. Bruce; bats from Frank M. Clarke; octocorals from Doon Ramsaroop; marine invertebrates from staff aboard the Research Vessels *Oregon II* and *Discoverer*, and the Texaco collection of marine molluscs, to name but a few.

One of the most colourful collections, both literally and in terms of the life and death of the donor, was the Sir Norman Lamont collection of Lepidoptera. Lamont was a Scottish baronet with an estate in Trinidad who had served as a Governor of ICTA and was a prolific writer on many subjects.(7) At the age of 79 he was gored by a bull and died of his wounds. His collection of local butterflies and moths was split between ICTA and the National Museum of Scotland in Edinburgh.

In January 2010 I became the first full-time curator of UWIZM, and I have spent the last two years cataloguing, cleaning, and opening up the collections. One of the first tasks undertaken was to provide a website with collection-level descriptions of all specimens; this provides information to the family level of all the specimens stored in the UWIZM.(8)

The current holdings of the museum stand at approximately 25,000 specimens split between two storerooms. The Land Arthropod Room contains around 20,000 pinned and identified insects from around 200 different families, made up of six cabinets of butterflies and moths, six cabinets of ants, bees and wasps, five cabinets of beetles, three cabinets of bugs, one cabinet of flies and smaller numbers of other orders. There are also small collections of immature insects, arachnids and myriapods in spirit.

The Zoology Room houses the spirit and dried non-insect collections. The specimens in alcohol are made up of approximately 100 amphibians, 400 reptiles, 700 freshwater fish, 500 marine fish, 100 bats, several thousand marine and freshwater crustaceans, a few hundred marine invertebrates and a small number of birds and mammals. The room also houses the dried collections of sponges, corals, echinoderms and approximately 4000 mollusc shells. Skeletal specimens include various skulls and whole skeletons of domestic animals, African mammals and vertebrates from Trinidad and Tobago.

Currently there are spreadsheets listing the mollusc, fish, reptile, amphibian and mammal collections and there are paper catalogues of some of the smaller groups. The UWIZM staff and student volunteers are in the process of cataloguing and photographing the entire collection. Eventually the records will be made accessible on-line using Past Perfect 5.0 as the database software. In the meantime the UWIZM has been opened up to visits by students, staff and the public, and a variety of organised tours are on offer.

Although not strictly a part of the natural history collections there are a small number of archaeological remains held in the museum. Along with the collections stored at the UWI Archaeology Centre, based on the St. Augustine campus, UWI does have a significant number of archaeological specimens. The most important and well known specimen is the 'Banwari Man', a 5000-year-old human skeleton from the south of Trinidad that has been stored in the Zoology Room since 1978.

Botany Collections

Although the National Herbarium of Trinidad & Tobago is a national collection, because its history is so closely entwined with the University of the West Indies, and as it is housed on the St. Augustine Campus, its inclusion here is appropriate. The herbarium has its origins in the Royal Botanic Gardens in Port of Spain which were established in 1818. For many years the superintendents of the gardens collected specimens, but it was only with the appointment of the fifth superintendent, John Hinchley Hart, in 1887 that a properly organised herbarium began. Hart and his assistant, Paula McLean, spent the next 30 years organising, preserving and cataloguing the specimens, and it is largely due to McLean's devotion that the early collection is in such good condition.

The Department of Agriculture offices in St. Clair provided housing for the collection, and from here it was used by botanists and researchers working in the departments of Forestry and Agriculture, as well as the Royal Botanic Garden and ICTA. One of the most important publications from this time was the *Flora for Trinidad & Tobago* compiled by Ernest Entwistle Cheesman, William George Freeman (recently moved from Barbados), and Robert Orchard Williams. Cheesman was the Professor of Botany at ICTA and also a world expert on bananas – he even had a species of banana named after him, *Musa cheesmani.* The first volume of the flora was published in 1928, with further volumes coming out over the next 80 years.

Over time the collections came to be of the most use to ICTA as more botanical research was undertaken and new publications produced, so the herbarium was transferred to the campus in 1947. At first it was stored in the Plant Pathology Building, before moving to its current home in a purpose-built room in the Sir Frank Stockdale Building.

In 1960 ICTA became the Faculty of Agriculture of the newly formed University College of the West Indies, which by 1962 had become The University of the West Indies. From 1957 to 1967 the Professor of Botany and the person with responsibility for the growth and maintenance of the herbarium was John William Purseglove. Along with the help of talented staff such as Norman W. Simmonds and with the assistance of overseas taxonomists, more volumes of the *Flora* were produced and more specimens were collected. Simmonds had left by 1959 to carry on a career as a world-renowned plant breeding expert in tropical agriculture (Spoor & England 2001).

After a promising start for the herbarium being run by UWI, financial difficulties in the early 1970s forced the Head of Department, Francis William Cope, to approach the Government for assistance. This led to the Ministry of Planning and Development agreeing to finance the herbarium indefinitely, and to it becoming the 'National Herbarium of Trinidad & Tobago'. However it stayed on campus and was still administered by UWI through the Department of Life Sciences.

With the funding secured, the use of the collection picked up again in 1976 when Dr Charles Dennis Adams started. He revived the herbarium by promoting plant research and taxonomic work, and also pushed for the establishment of a full-time curator. Yasmin S. Baksh-Comeau was appointed to the newly created position in 1980, and has been at the herbarium ever since.

Since then the herbarium has expanded to include a dedicated library staffed by a full-time librarian, a permanent secretary and a variety of postgraduate and intern students all working on the collections. The current herbarium has recently benefited from an extensive refurbishment, with the old wooden cabinets having been replaced by sealed insect-proof and waterproof metal cabinets. It has hosted over 15,000 guests and has provided over 20,000 identifications of plant specimens, as well as increasing the number of specimens held overall to around 70,000 (Acham, 2009).

The catalogued collection consists of approximately 40,000 Angiosperms, 3,500 Pteridophytes, 600 Marine macro-algae, 550 Bryophytes, 500 Fungi and 50 Gymnosperms. The majority of these are in the form of herbarium sheets although there are a few envelopes and seeds as well.

Perhaps the most significant undertaking of the past few years has been the joint project between Oxford University and UWI, funded by the UK Darwin Initiative, to complete a vegetation survey of Trinidad and Tobago and make the herbarium collections accessible through an online database. Over 25,000 new specimens were collected, and so far around 20,000 herbarium sheets have been digitised and added to the database.

In the future it is hoped that the herbarium and UWIZM will both benefit from purpose-built storage and display areas and, with plans currently being developed for a dedicated St. Augustine campus museum, this is looking increasingly likely.

Conclusions

Looking at the natural history holdings of UWI as a whole, a rough count gives a total of close to a quarter of a million specimens. This is broken down into 110,000 botanical, 100,000 zoological and 20,000 geological specimens many of which, however, still need proper identification and cataloguing.

How best to use this treasure trove of biological specimens could be the subject of much debate, but underlying all the possibilities the most important requirement for the future is arguably accessibility. Letting the wider

world, both the general public and scientific researcher alike, know what there is and where it is will make these collections more valuable. Utilisation of traditional museum techniques, such as creating displays and providing exhibitions, and the more modern techniques of developing virtual displays, would provide access to the general visitor or enquirer. Provision for the scientific researcher requires more detailed online databases, as well as good storage facilities with well-conserved specimens and access to good working spaces. However, perhaps the most important requirement for all of the collections is to have dedicated, knowledgeable, well-trained staff – collections need curators!

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