



# From Dewey Decimal to digital

Keen to develop a central resource that is easily accessible, particularly for developing countries, **Dr Henning Scholz** tells us about the latest developments in the Biodiversity Heritage Library for Europe programme and the challenges the project's contributors have had to overcome

**Could you begin by outlining the mission of the Biodiversity Heritage Library for Europe (BHL-Europe) and what inspired its creation?**

The mission of BHL-Europe is to mobilise and digitally preserve European biodiversity heritage literature and facilitate open access to this information through a multilingual community portal, the Global Reference Index to Biodiversity (GRIB) and the Europeana digital platform. The libraries of the European natural history museums and botanical gardens collectively hold the majority of the world's published knowledge on the discovery and subsequent description of biological diversity. This wealth of knowledge is only currently available to those few people who can gain direct access to these collections. Once the collections of biodiversity literature are freely available on the Internet, it will facilitate access to this literature for a wide range of target users.

**BHL-Europe will make early and rare publications available for the first time. What are the projected impacts of making older literature available in this way?**

Most biodiversity literature is only held in a few specialist libraries. Currently the study of these distributed collections is difficult, time-consuming, and expensive. Researchers and students from developing countries are particularly disadvantaged. The usage and user feedback of the BHL service in the U.S. shows the level of acceptance and appreciation of making this literature available online. This is not only true for scientists, but also for the general public. Europeana and Wikipedia are among the top 10 referring sites to the biodiversity library website.

**Can you elaborate on BHL-Europe's relationship with the BHL in the U.S.? What**

**roles do the two U.S. partners of BHL-Europe play?**

BHL in the U.S. is the largest content provider for BHL-Europe. They have digitised a large amount of literature that was published in Europe and thus is part of the European biodiversity heritage, which is now also included in a European repository to serve the European users. The U.S. partners also support BHL-Europe with knowledge and best practice from the BHL network in the U.S. This network consists of 10 major biodiversity libraries that have been collaborating since 2007 in digitising the biodiversity literature in an open access manner via the BHL project. The Natural History Museum, London, is the major connecting point with BHL U.S. as one of the founding partners of the BHL project in 2007.

**What measures have you taken to promote interoperability with existing repositories and ensure the network is easy to use?**

From the first conceptual stages of architecture development, the team has engaged with both the user communities – via case studies – and the developer community. A standards-based solution using open source applications and code was chosen to reduce technical interoperability issues. Open Archival Information System (OAIS) is the main repository standard we are using. A metadata standard, various tools and processes for metadata translation between repositories have been developed. The OAIS framework is technologically agnostic and allows institutional freedom within the implementation to make best use of available skills.

**How are you promoting the library to the European public, researchers, decision makers, and citizen scientists? Do events**



**provide a valuable opportunity for dissemination?**

BHL-Europe staff members are regularly promoting the library to our target users in conferences, workshops and other events. Dissemination activities to particularly reach the public are under way. We are currently working on virtual exhibitions to promote the value of our literature corpus to this important user group. We will be using best practice approaches, which we share with Europeana and the European Digital Library projects.

**What has been the stand out success of the project thus far? Do you believe that you are on course to meet your aims?**

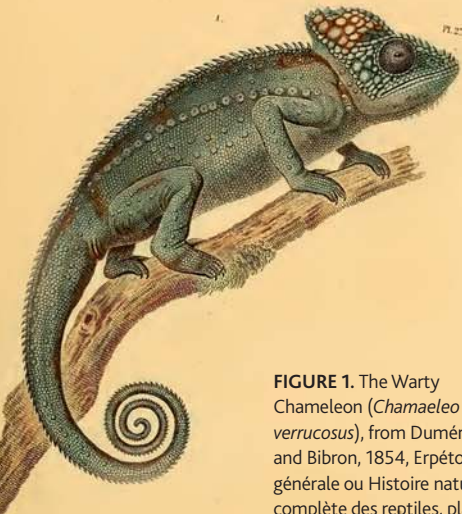
The main achievement has been developing a large, cultural and professional heterogeneous consortium of European partners who will work together to provide the European node of a global system. Europe has a tremendous history in biodiversity exploration and research and BHL-Europe is developing the platform to share that knowledge globally. We are currently on course to meet our aims by April 2012.

# Europe's local biodiversity library

In an era defined by the ease with which electronic data may be shared, there is no excuse for important scientific information to be solely held in difficult to access specialist libraries. The **Biodiversity Heritage Library for Europe** seeks to provide wider access to biological diversity publications through collation and digitisation of existing collections

**DATA ON BIODIVERSITY** is an important resource for life scientists, yet access to the wealth of retrospective information, particularly in very early publications from past centuries, is limited. To date, this canon of published knowledge on the discovery and subsequent description of biota is only available to a minority of people with direct access to the physical publications, and most are from scientific societies and local groups. For the majority of people, visiting such specialist libraries would be prohibitive on grounds of both time and expense. Furthermore, a great deal of early published literature is rare or has limited global distribution and is only available in a very small number of libraries. As a result, a body of biodiversity knowledge has been effectively withheld from use for a wide range of scientific applications including research, education, taxonomic study, biodiversity conservation, protected area management, disease control and maintenance of diverse ecosystem services.

Digitisation of the information is obviously the first step in improving openness, but providing effective access to this digital data for end-users is not simple. A large number of small projects are starting the process of digitising biodiversity material in numerous institutions across the EU, but once this is complete, the body of work will still be seriously fragmented. Moreover, it is also not affordable for all the libraries to establish professional scanning facilities. Addressing these



**FIGURE 1.** The Warty Chameleon (*Chamaeleo verrucosus*), from Duméril and Bibron, 1854, *Erpétologie générale ou Histoire naturelle complète des reptiles*, plate 27.

issues requires a coordinated approach and very large scale digitisation and storage facilities. The 'Biodiversity Heritage Library' (BHL) project was set up with precisely this ambition in mind. It was initially launched in the U.S. in 2007, and more recently in 2009, with support from this original initiative, the 'Biodiversity Heritage Library for Europe' (BHL-Europe) project was initiated to run for three years.

## DIGITISING THE DATA

The project will provide access to data via a web portal with innovative search functionalities designed to facilitate quick access to all information required by users. The interface of the portal will be multilingual, enabling users to search in their native language. In addition to the biodiversity community portal, all literature will be accessible through Europeana. For the first time, the wider public, citizen scientists and decision makers will have unlimited access to important sources of information. Everybody will be able to gain first-hand information on animals and plants, study rare, original work by important scientists such as Charles Darwin or Alexander von Humboldt, and admire the artwork of publications from the 17<sup>th</sup> and 18<sup>th</sup> Century. Conservation organisations will have a tool for collecting data on rare or threatened species in order to produce better plans for protection strategies.

## CONSISTENCY CHALLENGE

Bringing together and collating the existing digital collections of biodiversity literature from all over Europe is no mean feat. The coordinator of the project, Dr Henning Scholz, points out that there is little consistency between collections: "These projects do not use common standards or interfaces and are not interoperable. BHL-Europe aims to make the existing corpus interoperable by promoting common standards for data and common interfaces for search and retrieval," he explains. It should be noted then that BHL-Europe itself is not focused on digitising – this is within the competence of each member of the EU – but the project can serve as a support for the implementation of digitising programmes. As a best practice network, the main goals are the interoperability of existing repositories and the implementation of existing technological solutions for search and retrieval and long-term sustainability of digitised objects.



## DATA ACCESS

BHL-Europe will implement three access routes to the digital library. One is the main portal primarily serving the scientific community. This provides specific functionality such as the option to search for taxonomic names to help scientists find literature efficiently and effectively. Past experience has shown that this functionality is also useful for other target users such as librarians and public users. There is also a plan to assist those with a background in bioinformatics to build other applications on top of the BHL-Europe portal through Application Programming Interfaces (APIs). The second access route will be the Global References Index to Biodiversity (GRIB), a global union catalogue of library holdings. GRIB will compile the biodiversity-related library catalogues of the partners into one single index to help users finding literature and help librarians and scanning operators to



**FIGURE 2.** The African Rock Python (*Python sebae*), from Duméril and Bibron, 1854, *Erpétologie générale ou Histoire naturelle complète des reptiles*, plate 61.

All plates and pages shown herein are currently available at [www.biodiversitylibrary.org](http://www.biodiversitylibrary.org)



plan and manage digitisation projects. The third access route is Europeana and this is anticipated to be the major gateway for people interested in cultural heritage in a more general sense.

## PROJECT MANAGEMENT

BHL-Europe represents the European node of a developing global BHL community which aims to share content, experience, software and know-how across multiple institutions in many countries and regions, and in many languages. This will provide a biodiversity resource that is both globally and locally relevant, and will have a substantial impact on developing countries with diverse biota but few library facilities. With a consortium of 28 partners (26 from EU countries plus two members of the U.S. branch of BHL), each with at least one staff member significantly dedicated to BHL-Europe, the group of people actively involved in the work processes is between 50 and 60. This group covers an extremely diverse range of skills, including software engineers, librarians, taxonomists, consultants, and project managers; thus Scholz describes the true nature of the project: "It is less a technology challenge than a management and communication challenge. Consensus-building across such a heterogeneous environment is a great challenge," he reveals.

## THE FUTURE

The project budget is composed of 80 per cent EC contribution and 20 per cent contribution in-kind from all 26 of the EU consortium partners. With this budget, the project goals and objectives are achievable. BHL-Europe is working on future plans for a sustainable operational service after 30 April 2012, when the project terminates. It is too early now to specify the sources of future financial support, but Scholz will definitely be looking for funding sources and streams: "We hope that within the framework of BHL-Europe, we can improve the current situation with regard to the financing of digitisation in the EU". The corpus will be mirrored in Europe (at the National History Museum, London), in Egypt (Bibliotheca Alexandrina), in Australia, in two locations in

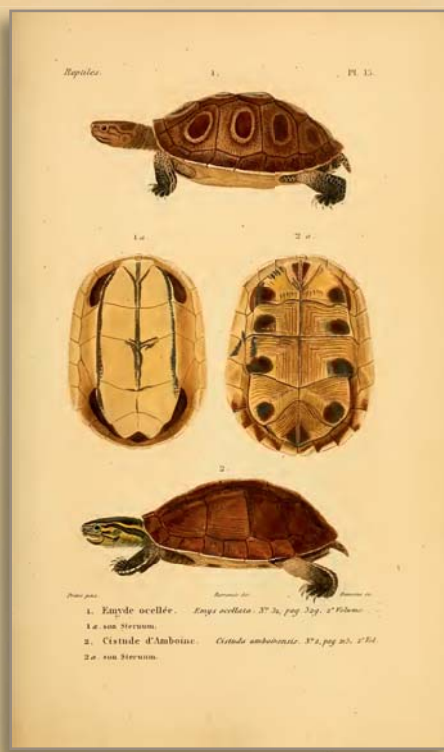


FIGURE 3. The Burmese Eyed Turtle (*Emys ocellata*) and the Amboina Box Turtle (*Cistuda amboinensis*), from Duméril and Bibron, 1854, *Erpétologie générale ou Histoire naturelle complète des reptiles*, plate 15.

the U.S., and in China. The content, which BHL-Europe aggregates, will therefore be available via the Web indefinitely. The most important target for the coming year is a functional preservation and archive system and the BHL-Europe portal. Scholz is keen to outline the future plans for the project, concluding: "We have scheduled a second user evaluation for autumn 2011 to evaluate the performance of this system for further improvements in the final months of the project. Currently, a number of tests are running in parallel to build the individual modules of the system. Communication and management procedures need to be effective to ensure a successful delivery of the system".



FIGURE 4. Plate from D Marcus Elieser Bloch, *Ökonomische Naturgeschichte der Fische Deutschlands*.

## INTELLIGENCE

# BHL-EUROPE

BIODIVERSITY HERITAGE LIBRARY FOR EUROPE

## OBJECTIVES

To make Europe's biodiversity information available to everyone by improving the interoperability of European biodiversity digital libraries.

## PARTNERS

BHL-Europe is a three year project involving 28 major natural history museums, botanical gardens and other cooperating institutions. Please visit the project website for further information on partners: [www.bhl-europe.eu/en/partners](http://www.bhl-europe.eu/en/partners)

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## CONTACT

**Dr Henning Scholz**  
Project Coordinator

Museum für Naturkunde  
Leibniz Institute for Research on Evolution and Biodiversity at the  
Humboldt University Berlin  
Invalidenstraße 43  
D-10115 Berlin  
Germany

T +49 30 20 93 8864  
F +49 30 20 93 8868  
E [henning.scholz@mfn-berlin.de](mailto:henning.scholz@mfn-berlin.de)

[www.bhl-europe.eu](http://www.bhl-europe.eu)

**DR HENNING SCHOLZ** is a palaeontologist at the Museum für Naturkunde in Berlin. His main scientific interest is the (palaeo)ecology and evolution of freshwater molluscs. He recently worked as project manager for a graduate research programme and the exhibition department of the Museum für Naturkunde. He is currently the coordinator of the BHL-Europe project and secretary of the Europeana Council of Content Providers and Aggregators.

