

The Biodiversity Heritage Library: Reflections on a Knowledge Ecology

RLG Leadership Through Collaboration

September 20, 2010

Thomas Garnett

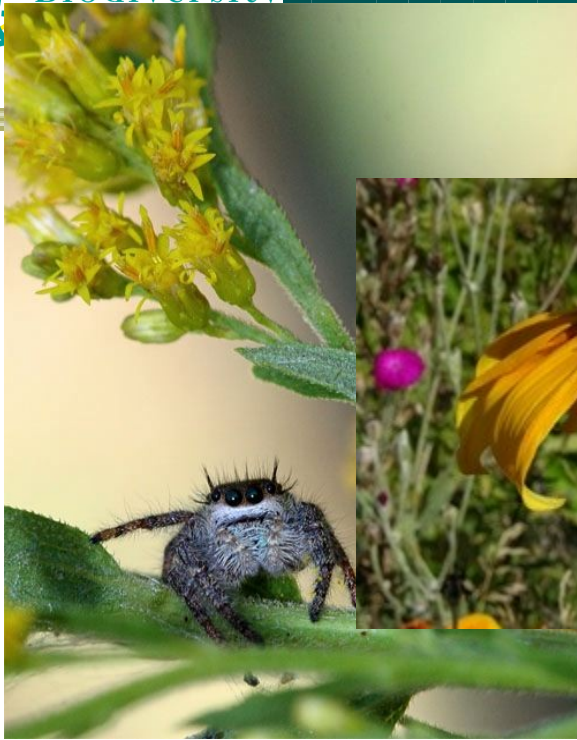
Swimming in a Knowledge *Ecology*

Biodiversity information is created, used, and maintained in a complex knowledge ecology of taxonomists, botanists, zoologists, conservationists, field researchers, professional societies, publishers, librarians and others. Making it available for future generations *requires more than preserving bit streams and creating jobs or funding.*

Wait!



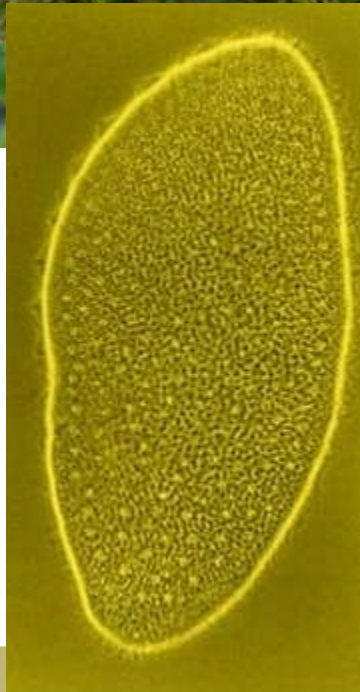
- Why use the term “knowledge ecology?”



salticidae on golden rod



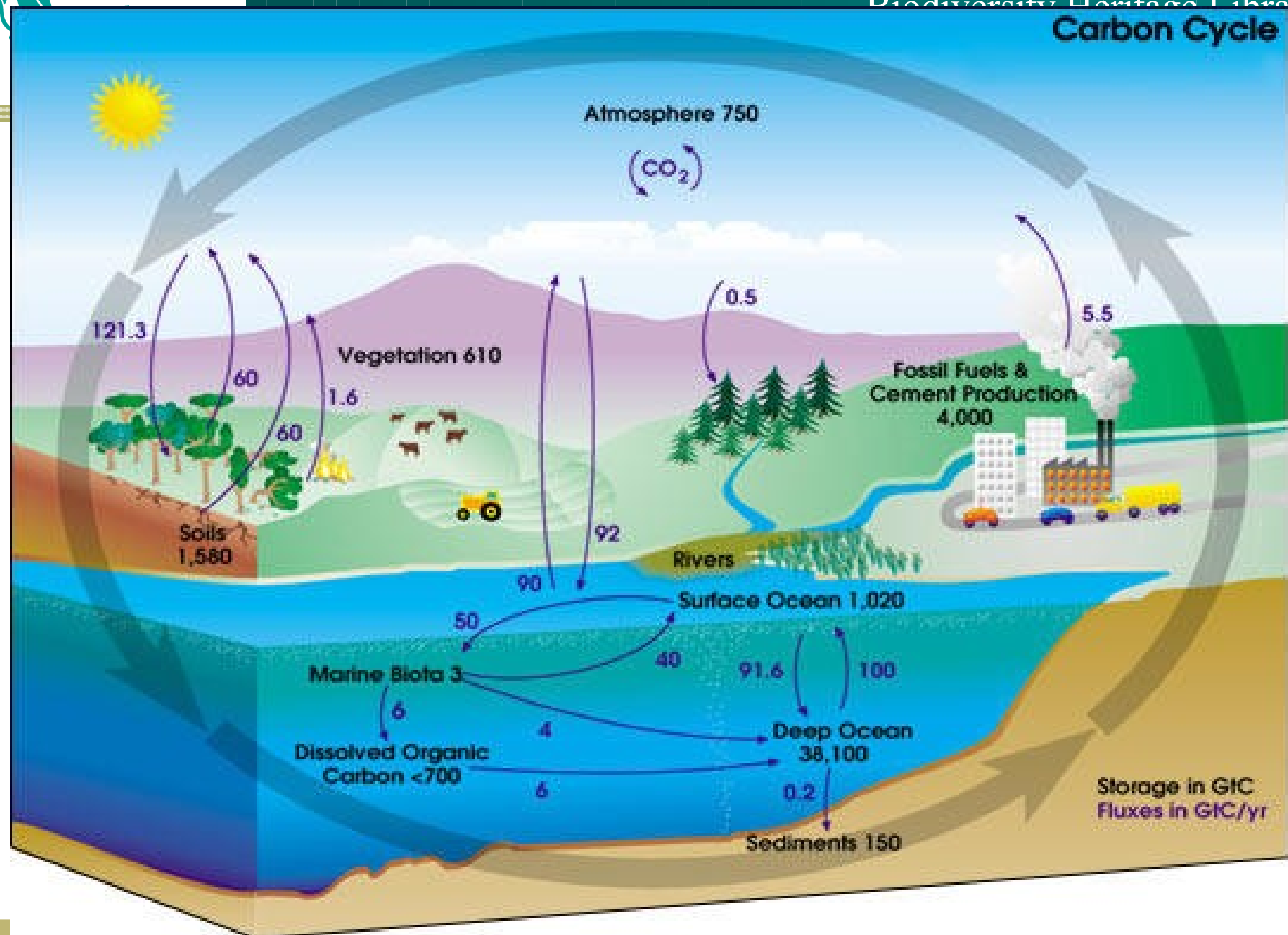
ower fly (*Toxomerus marginatus*) pollinating
ngwort (*Packera nonyma*).







Carbon Cycle



Components: Orgs.

- *Global Biodiversity Information Facility (GBIF)*
- *International Union for the Conservation of Nature (IUCN)*
- *Biodiversity Information Standards (TDWG)*
- *Encyclopedia of Life (EOL)*
- Virtual Biodiversity Research and Access Network for Taxonomy (ViBRANT)
- Libraries
- Museums
- Archives
- Universities
- Research Centers, etc. etc. etc.

Components people.

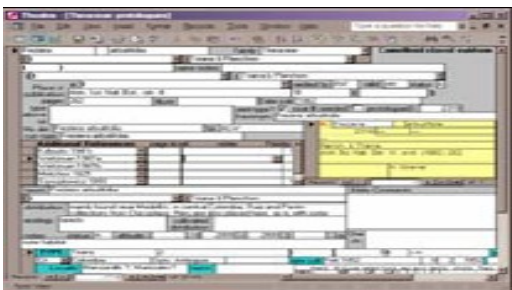
- Taxonomists
- Zoologists
- Botanists
- Mycologists
- Conservation managers
- Nature preserve managers
- Fisheries managers
- Park land managers.
- Biodiversity informaticians
- Students
- Citizen scientists
- Anyone taking an in-breath

Components - flows/effectors.

- Money
- Energy/dedication
- Prestige
- Publication
- research,
- Publication
- Teaching
- Experimentation
- observation

Taxonomic Impediment or complex ecosystem?

- Specimen collections
- Databases
- Publications
- Observations
- 'Gray' literature
- Index cards
- Field notebooks



Human Eye Looks Out



Human Eye Looks In



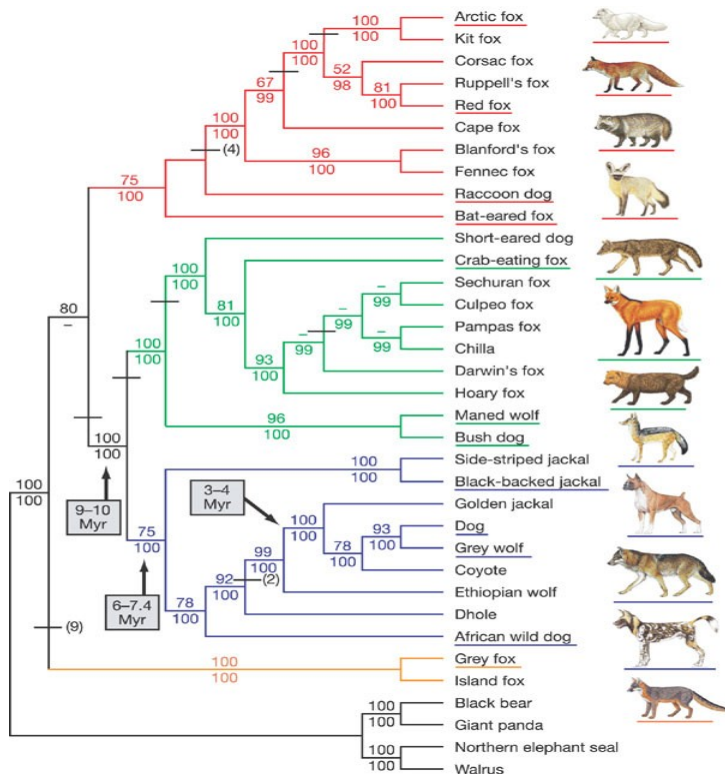
A Fractal landscape of space and time



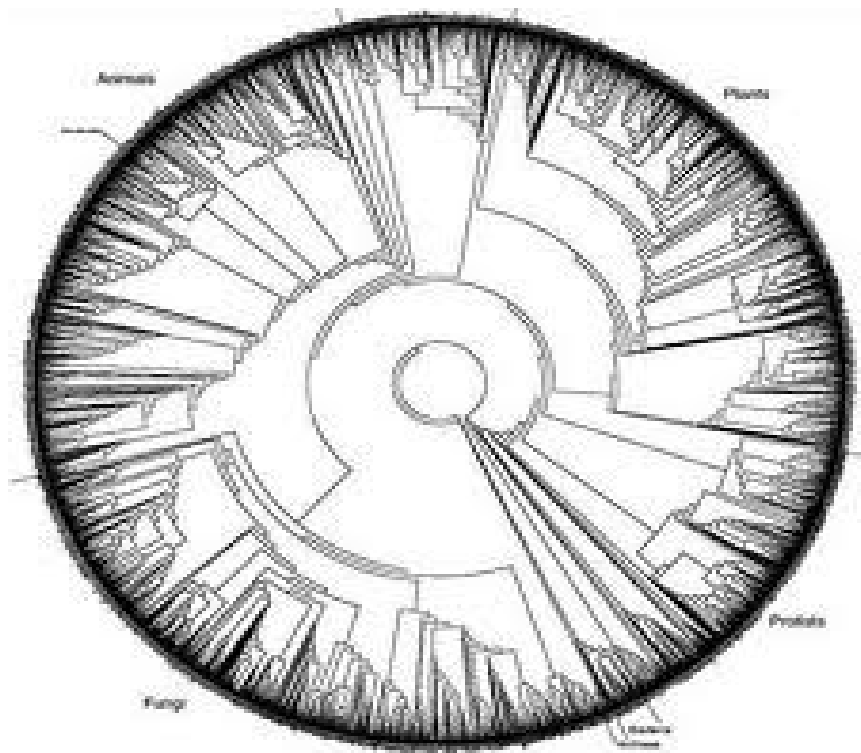
A Fractal landscape of space and time



Humans perceive patterns and project patterns



Humans perceive patterns and project patterns



Movement in the Ecosystem

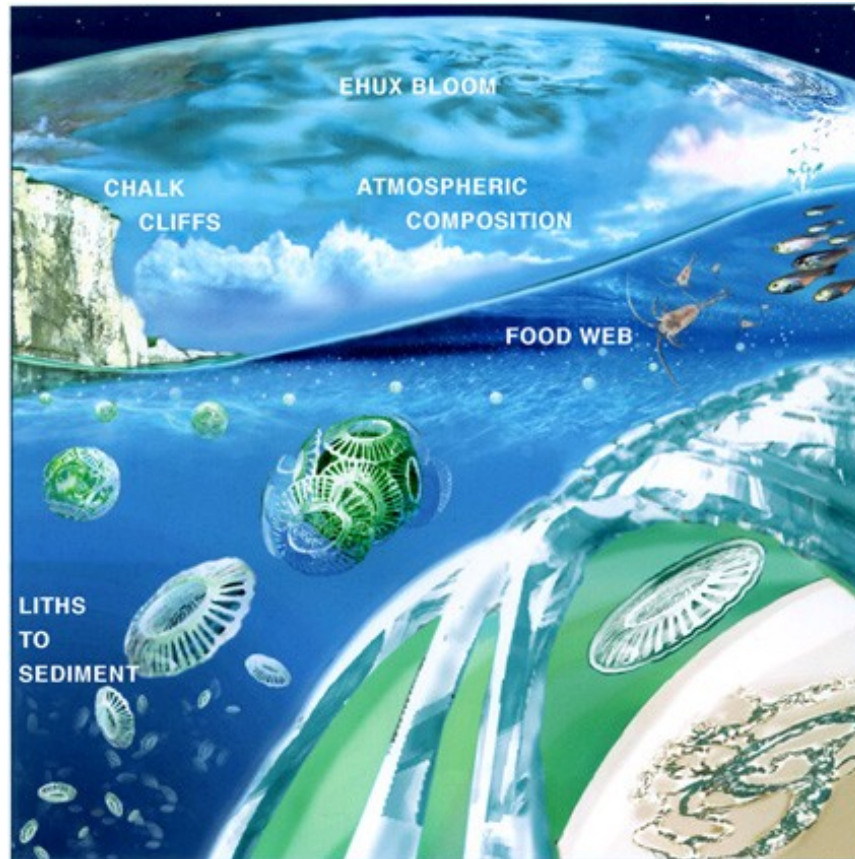


Urban social pressure in Brazil drives deforestation. Carbon from fires adds thermogenic gases to the atmosphere. The capacity of the canopy to retain moisture is diminished, and the rainforest shifts into the process of desertification



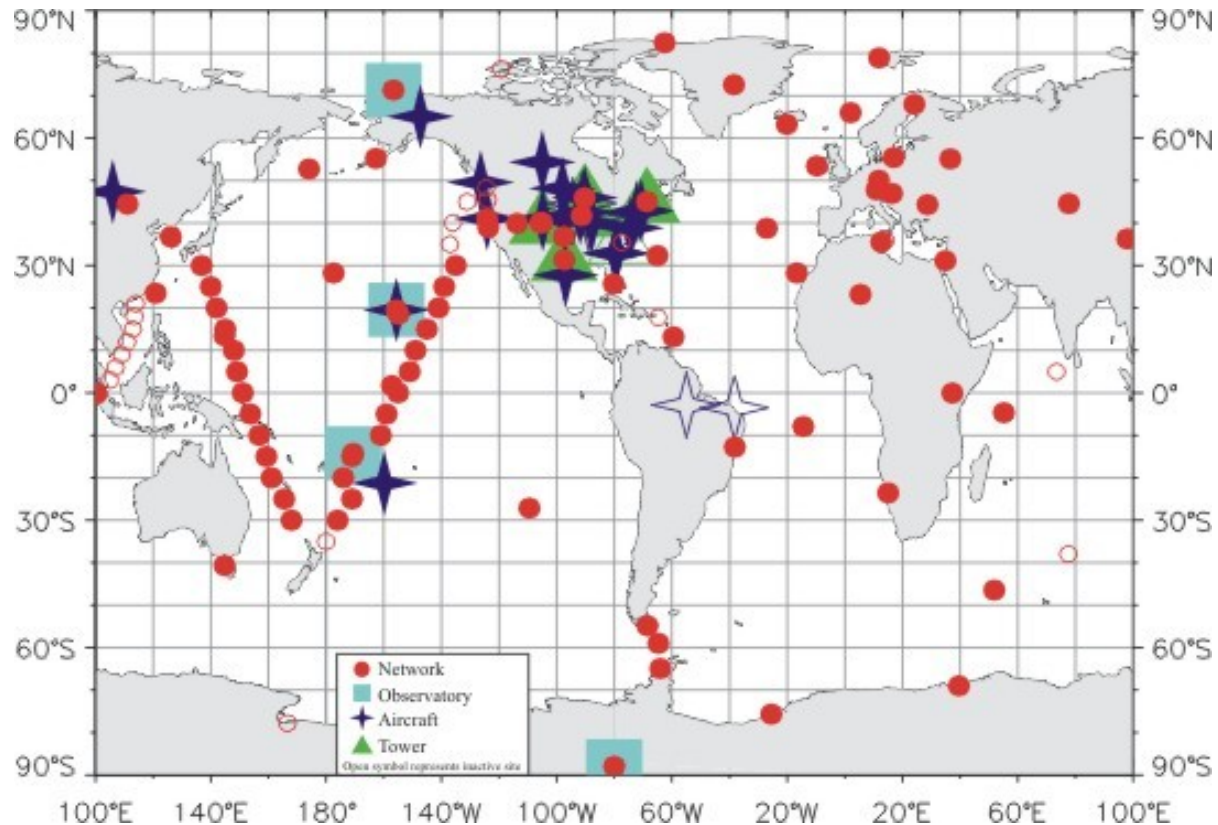
Surface soils and nutrients are eroded and make their way via rivers to the oceans. Oligotrophic waters are temporally enriched. Resulting blooms of the microalgal coccolithophores sequester carbonates as they form scales

[Seen from a SeaWiFS satellite, coccolithophores bloom near Newfoundland.]



The nutrients are exhausted, the algae die, the scales settle to the ocean floor. This is the start of geological burial of calcium carbonates, perhaps. the main counterforce to anthropogenic additions of carbon dioxide to the atmosphere.

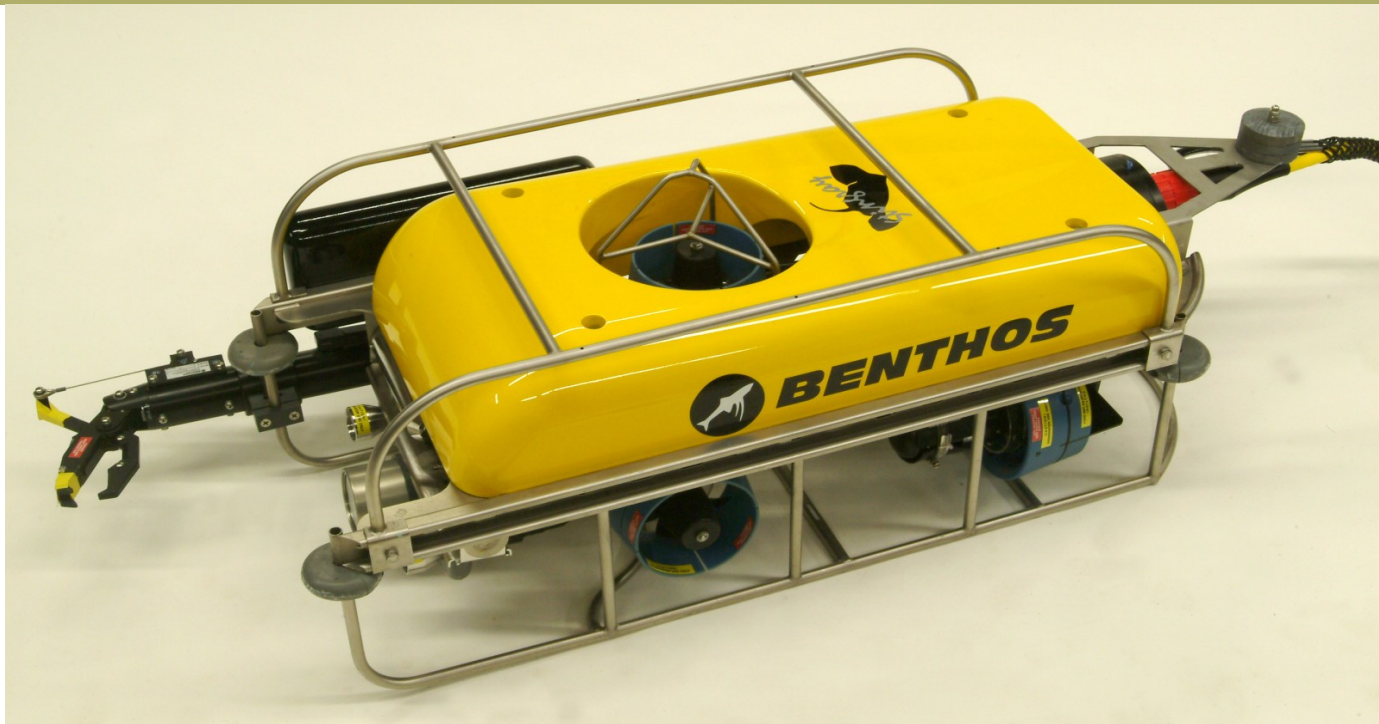
(*Emiliana huxleyi*. Image: E. huxleyi importance.jpg from MicrobeWiki by Glyn Gorick)



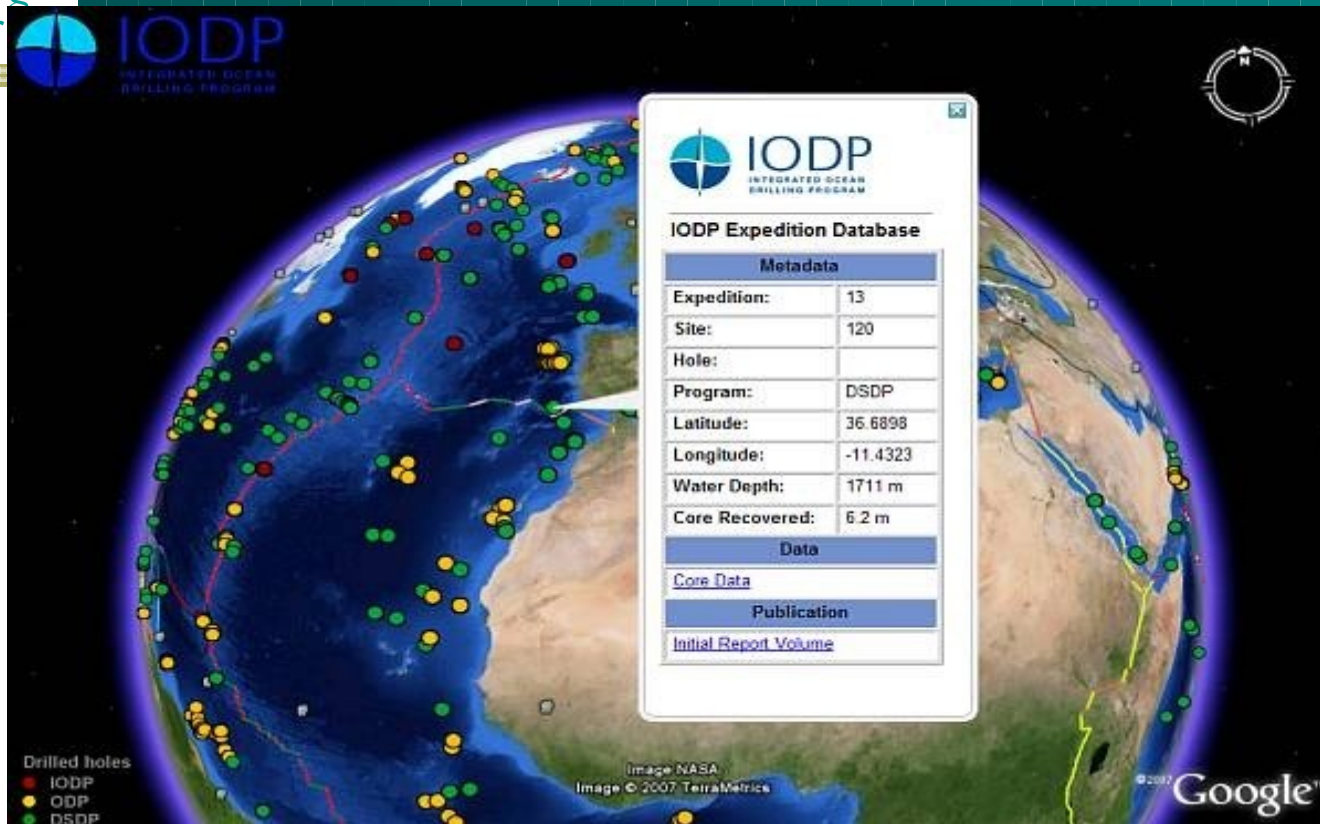
Remote sensing data sets such as those from NOAA ESRL Carbon Cycle Greenhouse Gases Group provide information with very high sensitivity on the shifting atmospheric gas levels in response to changing conditions.



Local, remote, and satellite imagery contribute key information on the changing silt loads in the major rivers, some of which is deposited on the river beds and in estuaries, but the residue that makes its way to the oceans is detected in changing levels of nitrogen, phosphorus, carbon and iron by local chemical oceanographers and remote underwater sampling machines



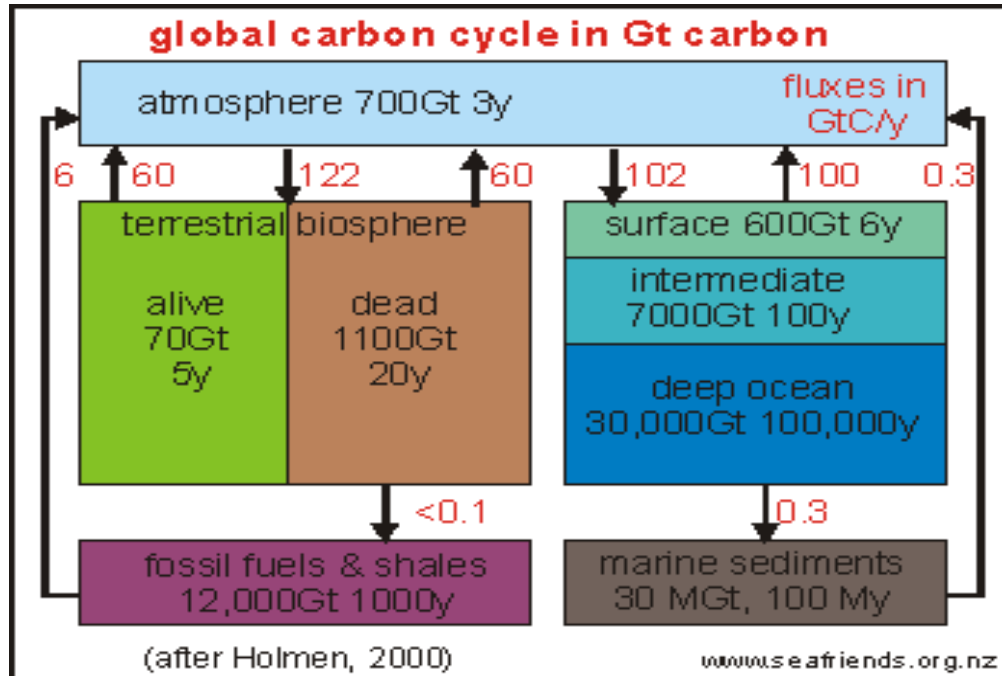
The residue that makes its way to the oceans is detected in changing levels of nitrogen, phosphorus, carbon and iron by local chemical oceanographers and remote underwater sampling machines (ROVs). The ROVs surface, and send information back to the world oceanographic data centers which assemble the information in models that also incorporate reflectance information from satellite imagery systems



Actual deposition is connected to historical patterns through analysis of the Ocean Drilling Program cores at the National Geophysical Data Center in Boulder. The US JGOFS synthesis of modeling project model is refined as the bloom begins. Near-coastal blooms are sampled by local environmental agencies, while ocean samples are taken by duly equipped ships of convenience



Data are also passed to Center for Sponsored Coastal Ocean Research to assess possible harmful bloom occurrences. On reaching port, the samples are taken to local marine biological laboratories for taxonomic identification and population densities. The genetic makeup is assessed through the Barcode of Life project (CBOL) and genetic continuity with previous blooms established, and chemical analysis of coccolithophores. Library research is done on the evolutionary history of marine phytoplankton and climate change from the Mesozoic onward.



The model is then completed by the geochemists calling on the Oak Ridge National Laboratories model archive, and tested by subsequent deep sediment samples taken in subsequent cruises. This iterative process leads to an enhanced model of the impact of human activities on net carbon dioxide balance

Heterogeneity of Information Sources

NOAA ESRL Carbon Cycle Greenhouse Gases Group

National Geophysical Data Center in Boulder

Center for Sponsored Ocean Research

Consortium for the Barcode of Life

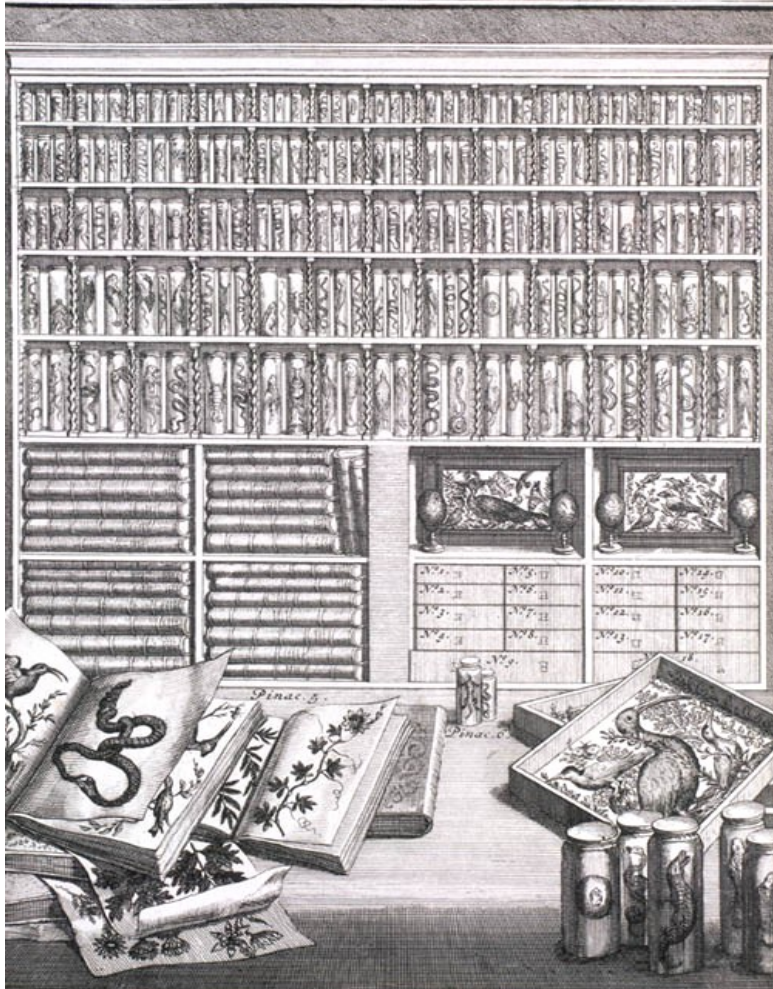
Oak Ridge National Laboratories

Encyclopedia of Life

Biodiversity Heritage Library

Tree of Life

Marine biologists' brains, etc. etc.



The cited half-life of publications in taxonomy is longer than in any other scientific discipline

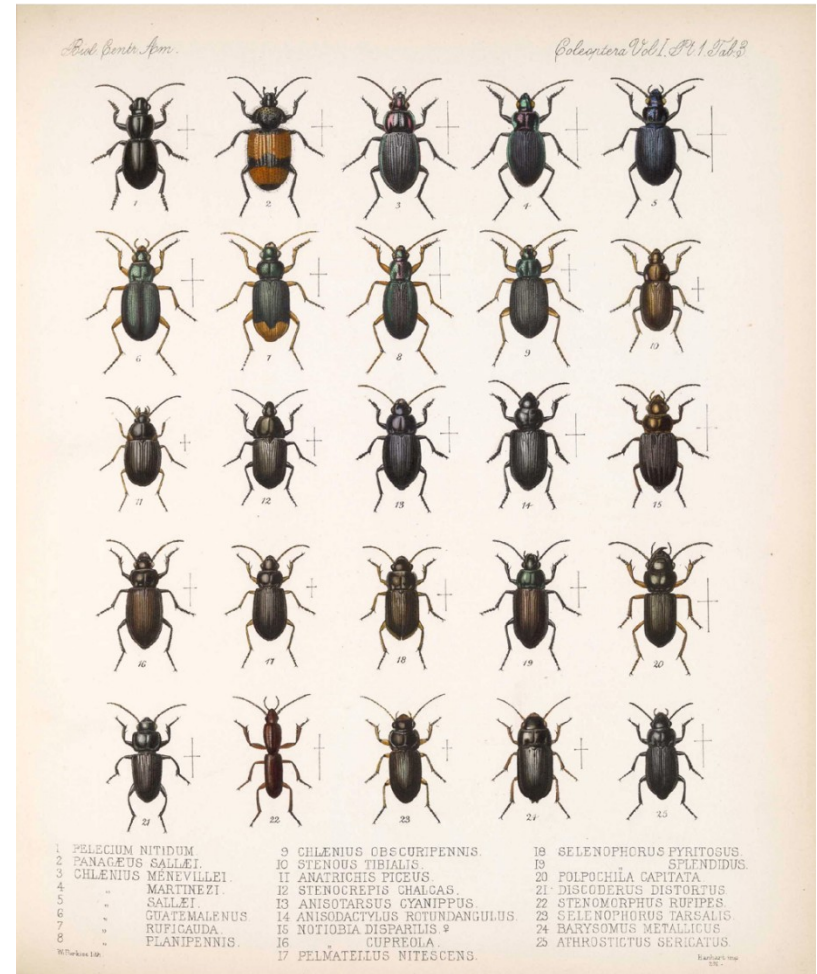
-Macro-economic case for open access, Tom Moritz

-Current taxonomic literature often relies on texts and specimens > 100 years old.

Convention on Biological Diversity:

... exchange of information shall include exchange of results of technical, scientific and socio-economic research ... It shall also, where feasible, include *repatriation of information.*

Henry Bates
Insecta. Coleoptera, 1881-1884



BHL History

- *Library and Laboratory Conference* in London, Feb. 2005 demonstrated the growing need for digital biodiversity literature.
- Several libraries began meeting and planning for a grand digitizing plan.
- Encyclopedia of Life (EOL) was funded to integrate species level information and used BHL as the literature and scanning component
- Though BHL has is composed of libraries it has been a domain-specific program, not just a digital library project. It arose from and is responsive to the biodiversity community composed of the disciplines of taxonomy, systematics, evolutionary biology, ecology, conservation, and wildlife management. These are the primary audience.

Bibliography for "Physetonotus" by Title

As of 28 Jul 2010 9:26AM ([New Search](#))

21 pages found in 11 titles

[View NameBank record](#)

- [Acta Societatis Scientiarum Fennicae](#) / (1)
- [Annalen des Naturhistorischen Museums in Wien.](#) (2)
 - [Bd. 22 \(1907\)](#) (2)
 - [Page 41](#)
 - [Page 161](#)
- [The Annals and magazine of natural history;](#) (3)
 - [7th ser. v. 13 \(1904\)](#) (1)
 - [Page 112](#)
 - [7th ser. v. 13 \(1904\)](#) (2)
- [Archiv für Naturgeschichte.](#) (2)
- [Biologia Centrali-Americana :](#) (2)
 - [Insecta. Rhynchota. Hemiptera-Heteroptera. v. 1. Pentatomidæ. Coreidæ. Lygæidæ. Pyrrhocoridæ. Capsid](#) (1)
 - [Insecta. Rhynchota. Hemiptera-Heteroptera. v. 2. Tingitidæ. Phymatidæ. Aradidæ. Hebridæ. Hydrometrid](#) (1)
 - [Page 409](#)
- [Catalogue of the Hemiptera of America north of Mexico.](#) (2)
- [Catalogue of the Hemiptera of American north of Mexico, excepting the Aphididæ, Coccidæ and Aleurodidæ.](#) (2)
- [Check list of the Hemiptera \(excepting the Aphidid, Aleurodid and Coccid\) of America, north of Mexico.](#) (1)
- [Neue Beiträge zur Phylogenie und Systematik der Miriden, nebst einleitenden Bemerkungen über die Phylogenie der Heteropteren-Familien /](#) (2)
- [University of California publications in entomology.](#) (2)
- [Zoologischer Anzeiger.](#) (2)
 - [bd.16 1893, Litteratur](#) (1)
 - [Page 63](#)
 - [index. bd.16-20. 1893-1897](#) (1)

Dist., D. marginatus, Dist., and D. procarvens, Dist.

ARASPUS, gen. nov.

Ovate, posteriorly widened. Head deflected from in front of eyes, which are large, projecting beyond but not touching anterior margin of pronotum. Antennæ with the first joint slightly longer than head, a little thickened towards apex; second joint considerably longer than first, very prominently incrassate and pilose on its apical half; third joint slender; remainder mutilated. Rostrum apparently reaching the intermediate coxæ (the type a carded specimen); pronotum with the basal margin rather more than twice the width of anterior margin, basal margin truncate, becoming oblique towards posterior angles; scutellum tumid, basally foveate; corium

in the British Museum.

113

BHL Content

- The Biodiversity Heritage Library has the largest collection of full-text digitized biodiversity literature in the world.
- No other repository is even close.
- 32,000,000 pages – 83,000 volumes.





Reptilia and Batrachia. (1885-1902) by Albert C.L.G. Günther

Digitize the core literature on biodiversity.

Open Access: all content can be repurposed, reused, reformatted.

Congruent: must fit in to a dynamic knowledge ecology.

BHL Members: US/UK

- Academy of Natural Science (Philadelphia, PA)
- American Museum of Natural History (New York, NY)
- California Academy of Science (San Francisco, CA)
- The Field Museum (Chicago, IL)
- Harvard University Botany Libraries (Cambridge, MA)
- Harvard University, Ernst Mayr Library of the Museum of Comparative Zoology (Cambridge, MA)
- Marine Biological Laboratory / Woods Hole Oceanographic Institution (Woods Hole, MA)
- Missouri Botanical Garden (St. Louis, MO)
- Natural History Museum (London, UK)
- The New York Botanical Garden (New York, NY)
- Royal Botanic Gardens, Kew (Richmond, UK)
- Smithsonian Institution Libraries (Washington, DC)

BHL Members: BHL-China

- Chinese Academy of Science – Institute of Botany
- Chinese Academy of Science – Institute of Zoology
- Chinese Academy of Science – Institute of Microbiology
- Chinese Academy Science - Institute of Oceanography



BHL 中国节点

[首页](#) [数据检索](#) [联系我们](#) [BHL主站](#) [相关项目](#) [Flickr组](#) [数字化图书馆](#) [用户登录](#)

学名或中文名:

搜索

典型图书推荐



欢迎访问BHL中国节点

由 xuzp 于 星期五, 09/18/2009 - 16:03 发表

数据状况 (截止2010-1-21) :

- (1) 书本: 267册;
- (2) 页码: 149,444页;
- (3) 名称-页码词条记录: 中文名-页码记录: 178,668个; 拉丁名-页码词条: 187,188个。

关于BHL-China

中国生物多样性历史文献图书馆 (BHL-China) 是由中国科学院生物多样性委员会资助的预研项目, 旨在通过与BHL (Biodiversity Heritage Library) 合作, 联合其他生物学研究(院)所, 共同建立BHL-China网络平台, 对重要生物多样性(前期重点是植物学)文献进行全面收集、扫描、重要生物学信息提取和系统整理, 建立可供查询的我国生物多样性信息咨询和交流的网络平台, 同时开发各类API接口, 为生物多样性(包括EOL中国节点、CVH等)及其他相关领域研究提供文献数据服务。

现在项目正在建设期, 依托植物研究所数字化图书馆项目, 先从植物生物多样性文献数字化做起, 逐步扩展到其他生物学领域。欢迎对项目提出宝贵意见和建议(意见反馈到fenghong@ibcas.ac.cn), 同时欢迎在版权许可的情况下, 将您的著作或论文, 提供到该平台供大家交流。

[阅读全文](#)

最新blog文章

- BHL-China 与美国IA合作取得实质性进展
- BHL中国节点工作组参与“Drupal与数字图书馆系统的建设”交流活动
- 美国亚利桑那大学信息资源和图书馆科学学院院长Bryan Heidom访问植物所
- About BHL-China
- 镜像合作、加深了解 - BHL总部与BHL - China座谈成功举办
- ABBYY与图书馆合作经典案例之一
- 版权说明
- 文献数字化版权问题
- 关于BHL-China
- 联系我们

[更多](#)

语言

- 简体中文
- English

搜索

Google™ 自定义搜索

搜索

BHL and BHL China Development Teams January 2010, Institute of Botany, Beijing



BHL Members: BHL-Europe

- Museum für Naturkunde - Leibniz-Institut für Evolutions- und Biodiversitätsforschung an der Humboldt-Universität zu Berlin
- Natural History Museum, UK
- Narodni muzeum NMP CZ
- Angewandte Informationstechnik Forschungsgesellschaft mbH
- Freie Universität Berlin FUBBGBM
- Georg-August-Universität Göttingen Stiftung Öffentlichen Rechts
- Naturhistorisches Museum Wien
- Hungarian Natural History Museum
- Museum and Institute of Zoology, Polish Academy of Sciences
- University of Copenhagen
- Stichting Nationaal Natuurhistorisch Museum, Naturalis
- National Botanic Garden of Belgium
- Royal Museum for Central Africa,
- Royal Belgian Institute of Natural Sciences
- Bibliothèque nationale de France
- Museum national d'histoire naturelle
- Consejo Superior de Investigaciones Cientificas
- Università degli Studi di Firenze
- Royal Botanic Garden, Edinburgh
- Species 2000
- Helsingin yliopisto UH-Viikki



Home

About us

Partners

Outcomes

Events

News

Newsletter

Related projects

Links

Disclaimer

Search the site...

Search



Europeana

project group
member



co-funded by the
Community programme
eContentplus

Members | Contact us



The Biodiversity Heritage Library for Europe (BHL-Europe) is a 3 year project, involving 28 major natural history museums, botanical gardens and other cooperating institutions.

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. However, digital access to this knowledge is difficult. The objective of the BHL-Europe project is to make available Europe's biodiversity information to everyone by improving the interoperability of European biodiversity digital libraries.

The project will provide a multilingual access point for biodiversity content through a global portal ([BHL](#)) with specific biological functionality and to a wide European cultural audience through [Europeana](#).

The literature illustrations shown on this web site show some examples of the rich



BHL Members: BHL-Australia

- Atlas of Living Australia (ALA)
- Museum Victoria
- Australian digitizing projects

BHL Members: Brazil

- BIREME/SciELO (Scientific Electronic Library Online)
- Museum of Zoology, University of São Paulo
- National Biodiversity Program, Ministry of Environment
- Several museum and herbaria libraries
- Will coordinate integration with other South American initiatives

BHL Members: Arab Language BHL (Egypt)

- Bibliotheca Alexandrina

Why Global?

- To distribute responsibility to the wider community and thereby pool resources.
- To digitize/make available the greatest amount of biodiversity texts in as open a manner as possible. This includes open to human reading/downloading/printing but also open to algorithmic investigation by projects that will push the frontiers of biodiversity research.
- To ensure and demonstrate that the legacy of biodiversity research belongs to all of humanity and is the exclusive provenance of no one country

BHL Digital Preservation

- Long-term storage, curation, and preservation of digital text assets for the world-wide biodiversity community
- BHL is a steward for this literature, which is the common heritage of humanity. “Science has no borders.”
- Preservation is both a *technical* and *political/social* process.


BHL Digital Preservation Principles 1

- Ensure long-term continued access to the content of the legacy biodiversity published record by eliminating any single point of failure.
- Distribute responsibility to the wider biodiversity community and thereby pool resources.
- Create responsible ownership of the content by partner projects.

BHL Digital Preservation Principles 2

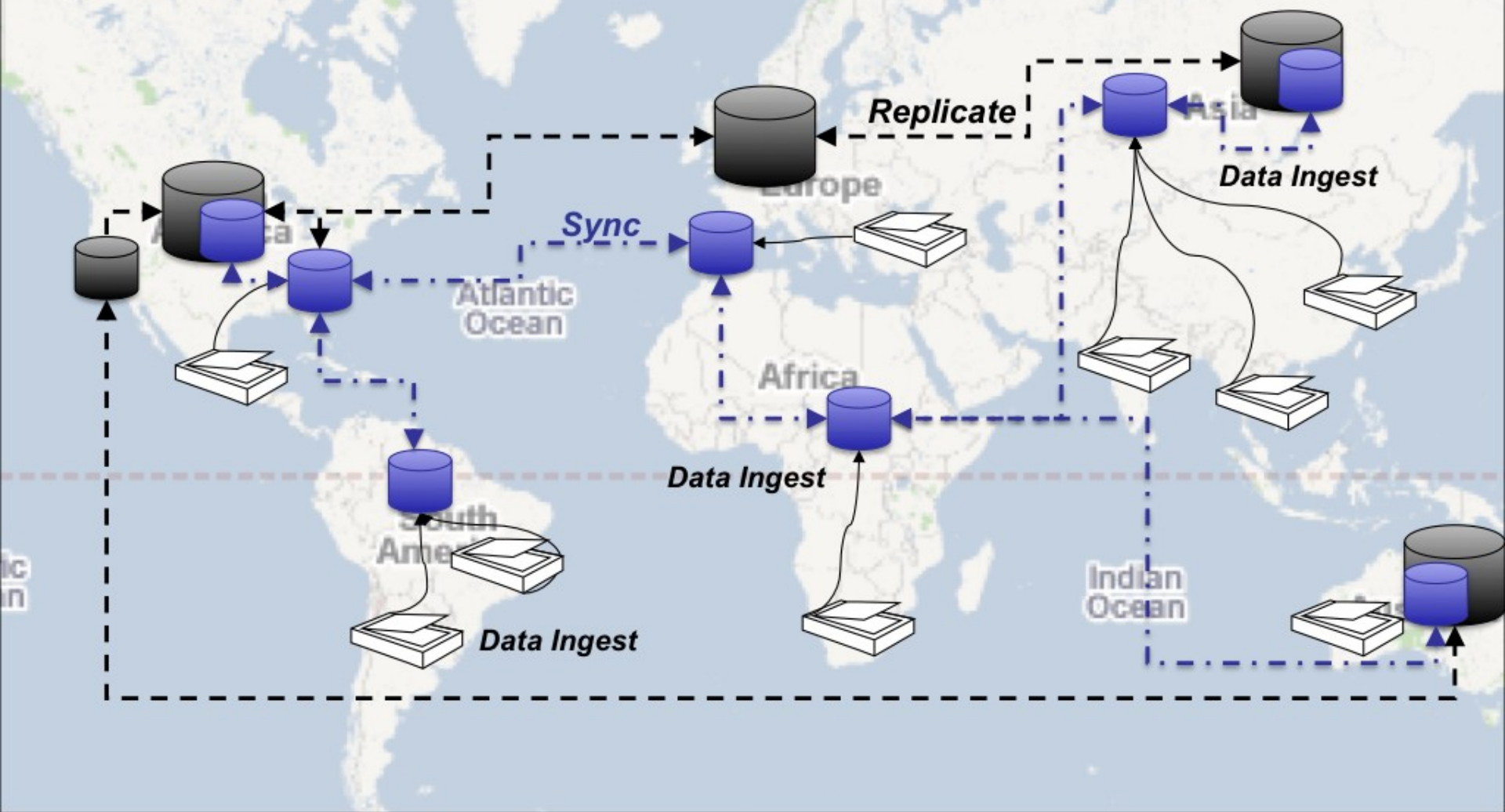
- Replicate the content in different locations
- With different system architectures.
- Under different managements and different funding streams.
- Each partner nodes is self-sustaining.

Global Acquisition and Storage

 Preservation System – multiple redundant copies of all digitized content.

 Access System – files, metadata & services needed to deliver content.

 Data Providers – organizations & projects that contribute content.



Situate BHL in the knowledge ecology

- Make it too useful not to support.
- Embed it current and developing workflows for the identification, tracking, documenting, and researching the biota. BHL is building on many documented use cases.
- Network with professional research societies.
- Bring legacy scientific journal literature into conformance with born-digital current scientific journal practices, e.g. D.O.I, automated structural markup, etc.

So Where was the five year BHL plan?





- The Long Now
 - Institutions that are creating the BHL exist to persist through time. That's an important part of their business. Use them.
 - Do not depend on any one institution.
 - The future is uncertain, the technology landscape changes, people pass on. So create consortial structures that are low-overhead, flexible, and can respond quickly.
 - Craft elegant plans often....then eat them alive.

- The Long Now Strategy for You
 - Seeing your actual knowledge ecosystem is more important than strategizing it. Our bias, our fears, our hustle blind us to seeing.
 - Understand what is there before rushing to tinker. You are already embedded in a knowledge ecology.
 - Sorry no tricks here.

