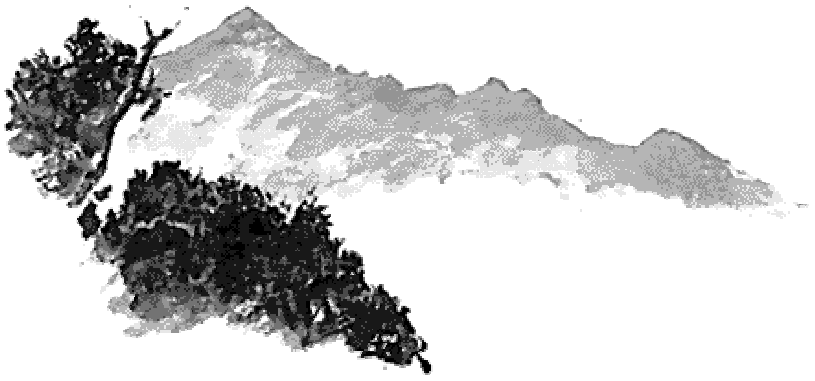
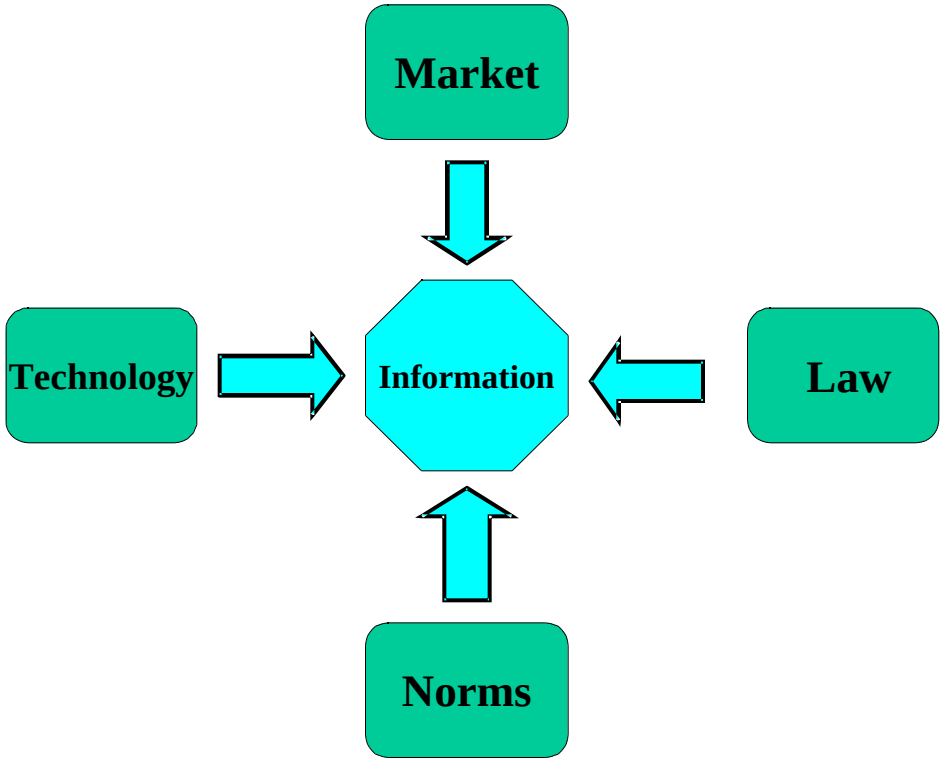
Toward Sustainability: "Margin" and "Mission" in the Natural History Setting



NINCH @ NYPL

April 8, 2003

Constraints on Open Access to Information



Adapted from: Lessig, L. ***Code and other laws of cyberspace. NY, Basic Books, 1999.***

"Innovation makes enemies of all those who prospered under the old regime, and only lukewarm support is forthcoming from those who would prosper under the new. Their support is indifferent partly from fear and partly because they are generally incredulous, never really trusting new things unless they have tested them by experience."

Niccolo Machiavelli, *The Prince*, 2nd ed. London and New York: W.W. Norton, 1992, 17.

Stages of Digital Library Development

Stage	Date	Sponsor	Purpose
I: Experimental	1994	NSF/ARPA/NASA	Experiments on collections of digital materials
II: Developing	1998/1999	NSF/ARPA/NASA, DLF/CLIR (A.W.Mellon → AMNH)	Begin to consider custodianship, sustainability, user communities
III: Mature	?	Funded through normal channels?	Real sustainable interoperable digital libraries

†
†
Howard Besser. Adapted from *The Next Stage: Moving from Isolated Digital Collections to Interoperable Digital Libraries* by First Monday, volume 7, number 6 (June 2002),
URL: http://firstmonday.org/issues/issue7_6/besser/index.html
†

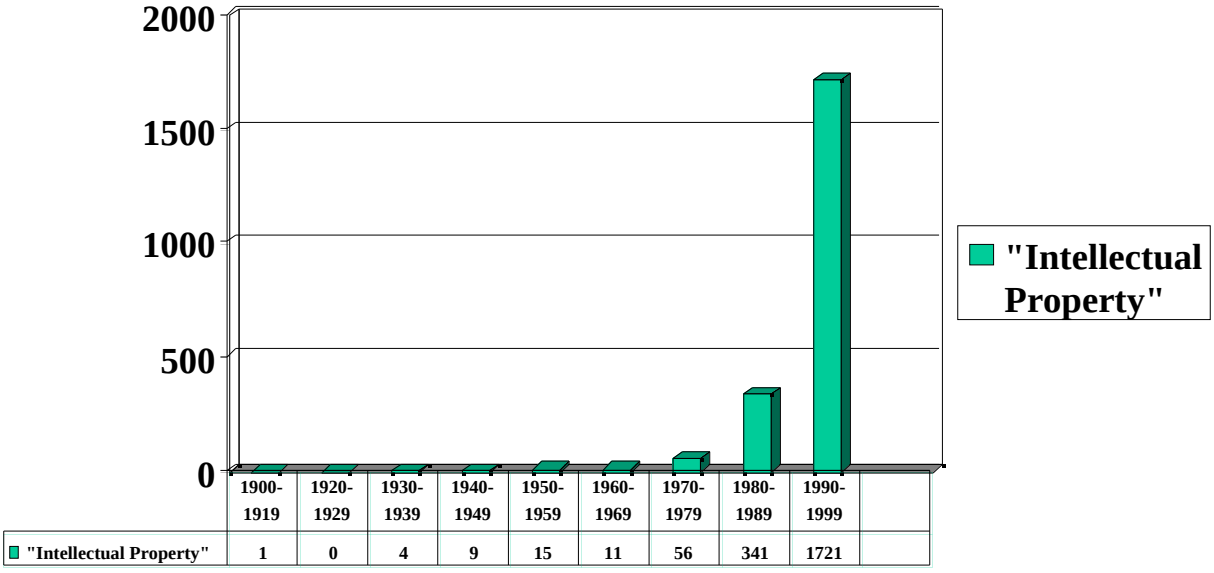
Start-up "Project" or Sustainable "Program" ?

- How "*mature*" is digital library development???
- Are we placing an expectation on "digital libraries" that we don't place on our analog programs (for example traditional "analog libraries"?)
- In *academe*, robust analog libraries are *required* for institutional accreditation…
- "Indirect costs"/ "overhead" do not encompass *digital support* (yet) – at least until digital programs are made intrinsic to overall library development…

A brief digression:

“The Second Enclosure Movement” ?

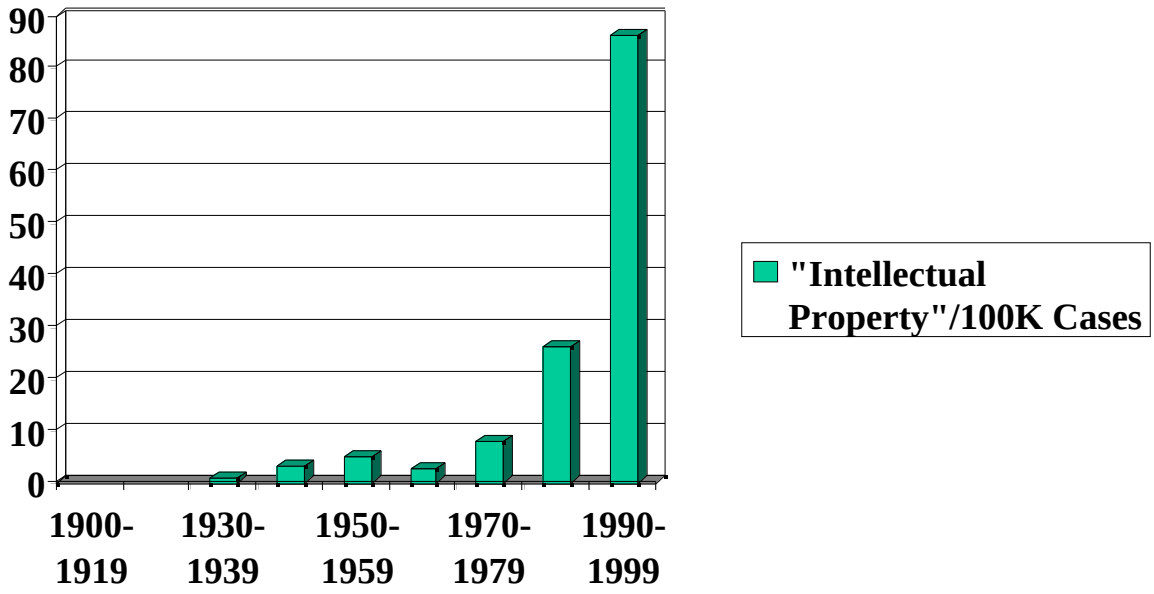
References to "*Intellectual Property*" in U.S. federal cases



	1900-1919	1920-1929	1930-1939	1940-1949	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999
"Intellectual Property"	1	0	4	9	15	11	56	341	1721

"Professor Hank Greely" Cited in Lessig, L. *The future of ideas: the fate of the commons in a connrcted world.* NY, Random House, 2001. P. 294.

Occurrences of the phrase “intellectual property” per 100,000 U.S. Federal Cases



“Professor Hank Greely” Cited in Lessig, L. *The future of ideas: the fate of the commons in a connrcted world.* NY, Random House, 2001. P. 294.

Persistence?: Flexplay DVDs

What is Flexplay?

A Flexplay DVD differs from a conventional DVD only in that it has a limited-time viewing window that begins when the consumer chooses to remove it from its packaging. After the allotted time, the disc becomes unreadable by the DVD player. For more information about how the Flexplay technology works, click here.

Flexplay Benefits

By utilizing Flexplay DVDs, content providers gain the advantages of increased distribution control while reaching a broader audience. Consumers, in turn, are provided many new outlets from which to purchase rental-priced DVDs without the need for returns or the incurrence of late fees. For more information on the benefits of Flexplay technology, click here.

Flexplay Applications

Flexplay technology can be used in a variety of industries and applications including: music, movies, video games, television and software. Flexplay DVDs are also suitable for promotions and any other applications developed by Flexplay's clients.

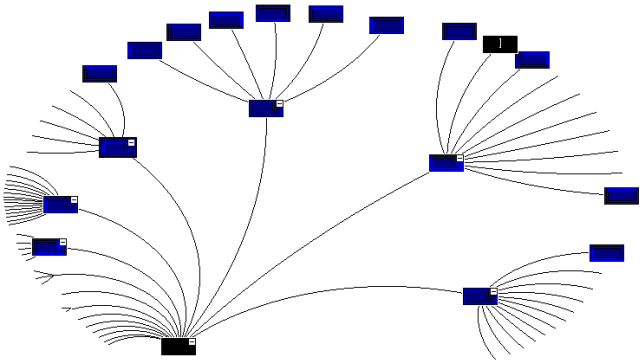
http://www.flexplay.com/what_is.html

“Flexplay” : How it Works

- All DVDs are optically read via a laser beam. The laser beam focuses through the surface of the disc onto an information layer and is then reflected back to the DVD player’s photo detectors. Because DVDs are optically read, the clarity and transmission of light through the disc’s surface are critical to playback performance.
  Flexplay has developed a proprietary process that makes a DVD unreadable by the DVD player’s laser beam after a pre-determined time period lapses.
  For more information on Flexplay's proprietary technology, contact Flexplay at customer.service@flexplay.com.

http://www.flexplay.com/

“Common Knowledge”



Creating the Biodiversity Knowledge Commons
Business plan and implementation strategy

A proposal developed with contributions from

American Museum of Natural History
Biodiversity Conservation Information System
BirdLife International
Conservation International
Global Biodiversity Information Facility
Inter American Biodiversity Information Network
IUCN Environmental Law Commission
IUCN Species Survival Commission
IUCN The World Conservation Union
IUCN World Commission on Protected Areas
NatureServe
North American Biodiversity Information Network
Rio Tinto
Society for Conservation Biology
The Nature Conservancy
TRAFFIC International
UNEP- World Conservation Monitoring Centre
Wildlife Conservation Society

D-Lib Magazine
June 2002

Volume 8 Number 6
ISSN 1082-9873

Building the Biodiversity Commons

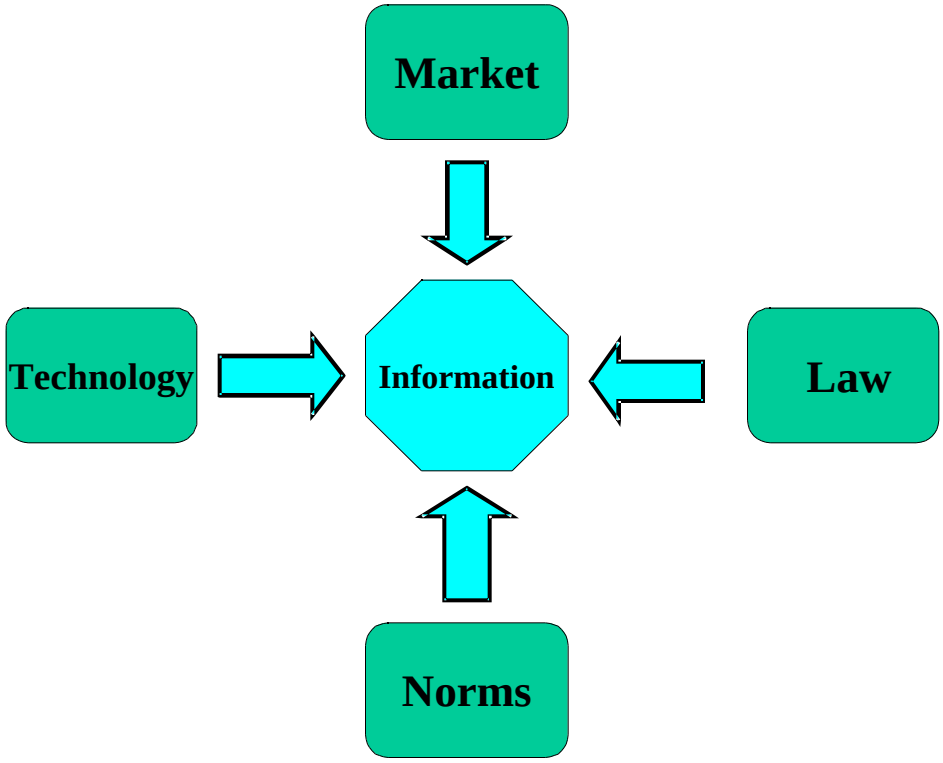
Thomas Moritz
American Museum of Natural History
tmoritz@amnh.org

(This Opinion piece presents the opinions of the author. It does not necessarily reflect the views of D-Lib Magazine, its publisher, the Corporation for National Research Initiatives, or its sponsor.)

Provision of free, universal access to biodiversity information is a practical imperative for the international conservation community — this goal should be accomplished by ***promotion of the Public Domain*** *and by development of a* ***sustainable Biodiversity Information Commons*** *adapting emergent legal and technical mechanisms to provide a free, secure and persistent environment for access to and use of biodiversity information and data.*

http://www.dlib.org/dlib/june02/moritz/06moritz.html

Constraints on Open Access to Information



Adapted from: Lessig, L. ***Code and other laws of cyberspace. NY, Basic Books, 1999.***

“Mission”? & “Margin” ?

- For a commercial enterprise, it is more obvious how all four Lessigian elements apply…
- But for a “not-for-profit” organization that is (in theory) driven by a “non-commercial” mission…?
- SO… How does “digital” fit into an “analog mission”…?
- “No margin, no mission…”?

Institutional Mission of a "Not-for-Profit"

The act to incorporate the American Museum of Natural History, which passed the New York State Congress on April 6, 1869, states:

The American Museum of Natural History, to be located in the City of New York for the purpose of establishing and maintaining in said city a Museum and Library of Natural History; of encouraging and developing the study of Natural Science; of advancing the general knowledge of kindred subjects, and to that end of furnishing popular instruction.

The 1996 strategic plan, adopted by the Board of Trustees on December 10, includes the following statement of mission:

To discover, interpret, and disseminate -- through scientific research and education -- knowledge about human cultures, the natural world, and the universe.

Scientific Senate
Ad Hoc Committee of Data Access
Proposed Institutional Policy and Guidelines
on Access to Collection-based Information

Preamble

Through their collections natural history institutions house a permanent record of the world's biodiversity, earth history, and cultural change, as well as, in their libraries and archives, a written record pertaining to these subjects.

These collections serve as essential resources for a broad user community, from scientists and other scholars who seek to understand and interpret the natural world, to those concerned with preserving biological and cultural diversity, to countries and peoples attempting to promote their well-being through sustainable use and conservation of their natural resources, to societies in general through educational outreach.

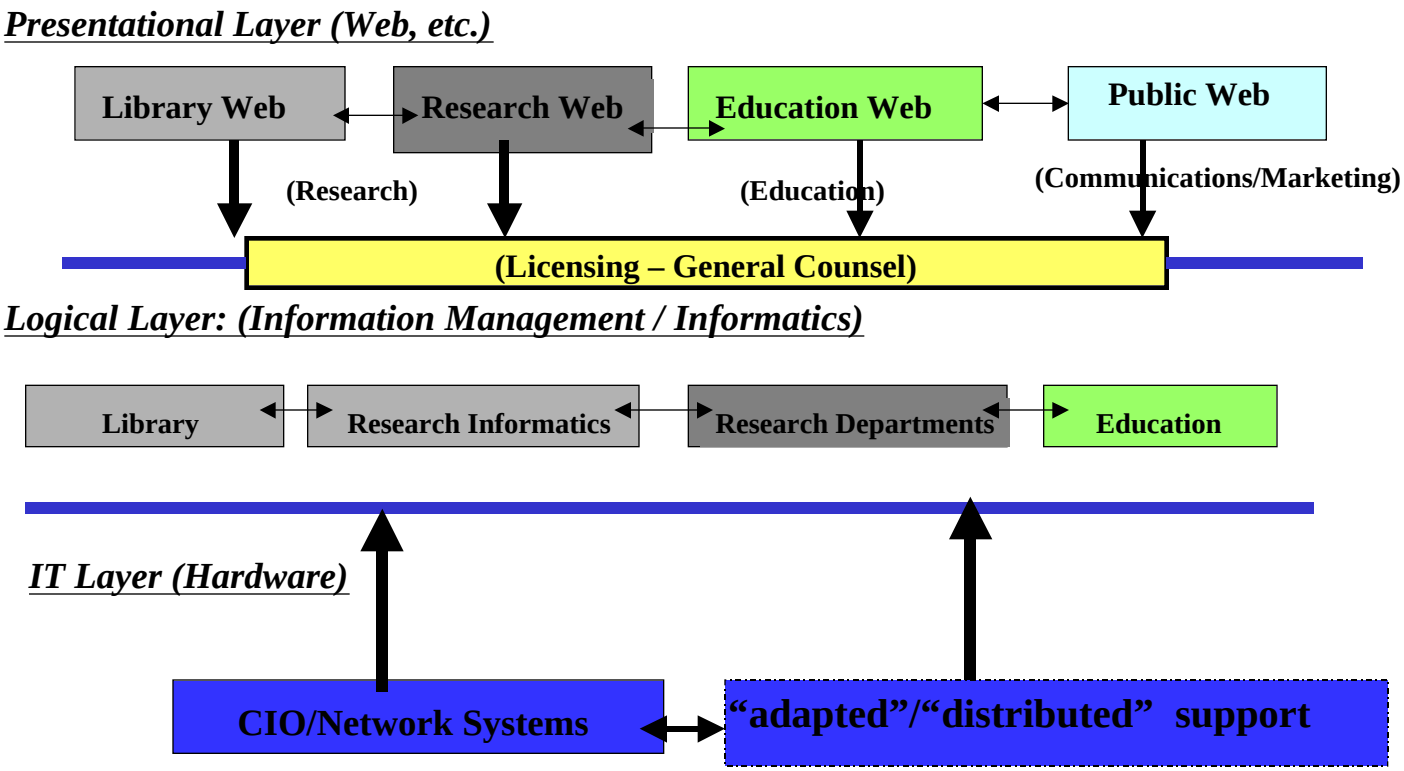
Because of the critical services that collections-based information provides to society, **the curatorial staff of the American Museum of Natural History endorses a policy that makes data freely available in a timely way to the user community, with restrictions to be noted below.**

Collection-based information

For the purposes of this document, collection information is defined to be those data (whether in electronic form or not) directly linked to the Museum's scientific collections, including but not necessarily limited to specimen or object identification, provenance, and disposition, such as is provided by catalogs, label information, images and field notes deposited with collections, and other associated descriptors.

Excluded by this definition are unverified and preliminary data or notes as well as interpretive data and conclusions that are derived from specimens/objects in the normal course of scientific and scholarly research. It is assumed that free, open, and timely access to these kinds of data will result from standard avenues of scholarly publication and dissemination.

A “snap shot”: Information Technology & Management at AMNH



tm 07/15/02

Triage: an emergent standard (?) for ***Mission-consistent*** **Revenue Generation?**

- *Straight for-profit* licensing/sale: full market value
- *Not-for-profit education, research, conservation* (i.e. environmental conservation): at cost (often “free”)
- *For-profit mission-consistent:* discretionary-charges

Potential or Actual Sources of Revenue

- Licensing images
- Sales of images
- Scientific Publications
  - Sales of print (subscriptions/ single issues)
  - Royalties from value added databases (*BioOne*)
- Consultancy
  - Salary Relief
- Interlibrary Loans
- Grant support (“hamster wheel”…?)

“Natural History”?

Strategic development within a domain of knowledge?

Toward a rigorous, reductionist, “ontological” analysis of the problem domain

The Problem of “Integration”?

Traditional natural history information is maintained in a variety of formats:

- formal publications
- archival records
- field notes/ observational records
- museum collections records
- specimen/artifact labels
- specimens/artifacts
- “institutional memory” (expertise)

Information is typically not well “integrated” i.e. information relevant to an object or a collecting event can not be easily and coherently accessed (on-site or remotely).

Information may also be incomplete, lacking some essential descriptive elements.

Many faculty/curators may not perceive lack of integration as a problem…

The Semantics of
"*Natural History*"

"*The comparative study of variation in organisms, natural systems and human cultures over time and space.*"

“*Natural History*”

the collected specimen / object **is essential to this study** (and by extension)

the *collecting event* or *collecting effort*

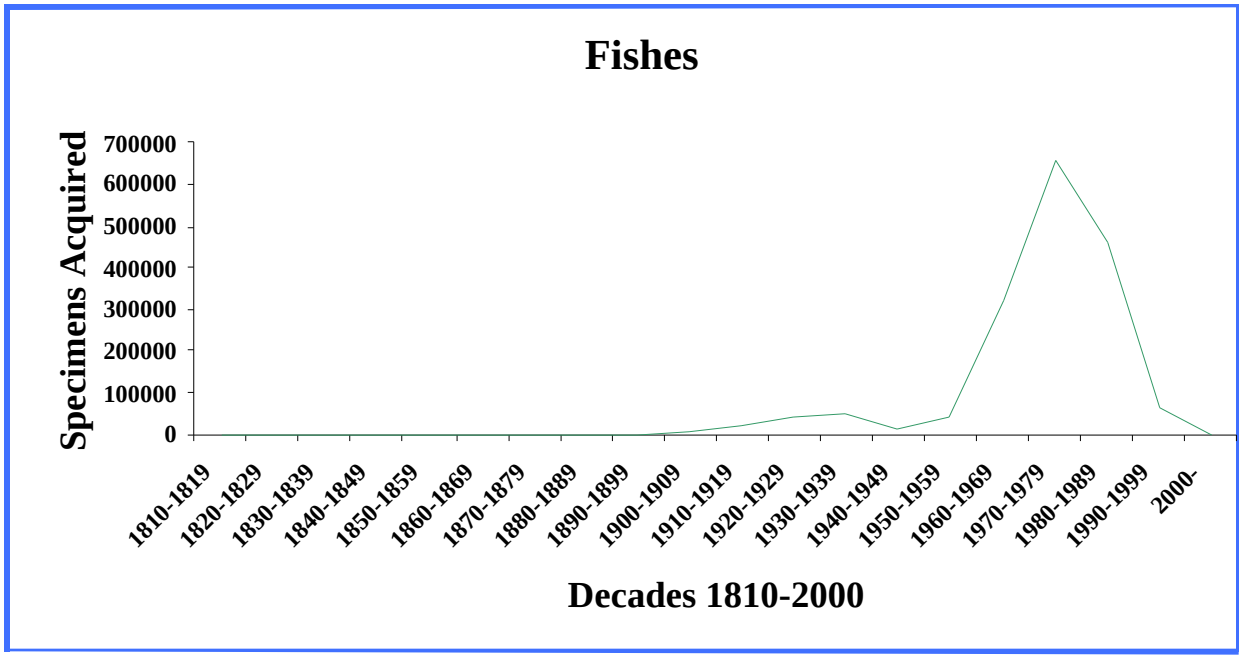
Natural History data information and knowledge widely *distributed* but weakly integrated

- **Specimen collections** preserved & living (museums, herbaria, botanical gardens, zoos and aquaria)
- **Derivative and ÅvirtualÅ specimens and samples**
- **Genetic sequence data**
- **Scientific publications & Ågray literatureÅ**
- **Images of all types** (satellite to electro-micrographs)
- **Time-based media** (film, video, recorded sounds)
- **Bibliographic indices** (e.g. Zoological Record 1864-present)
- **Observational data** on occurrences of species
- **Maps** (analog or digital)
- **Archives and manuscripts** (field and lab notes)
- **Expertise**: the experience-based knowledge of individuals or cultures

"Legacy" Data and Information

- 3 ***Billion*** Specimens in 6,500 natural history museums (*Nature, 1998*)
- Provides **essential baseline** for world wide biodiversity
- Museum data has rarely been readily available/used…

Collections trends at the American Museum of Natural History

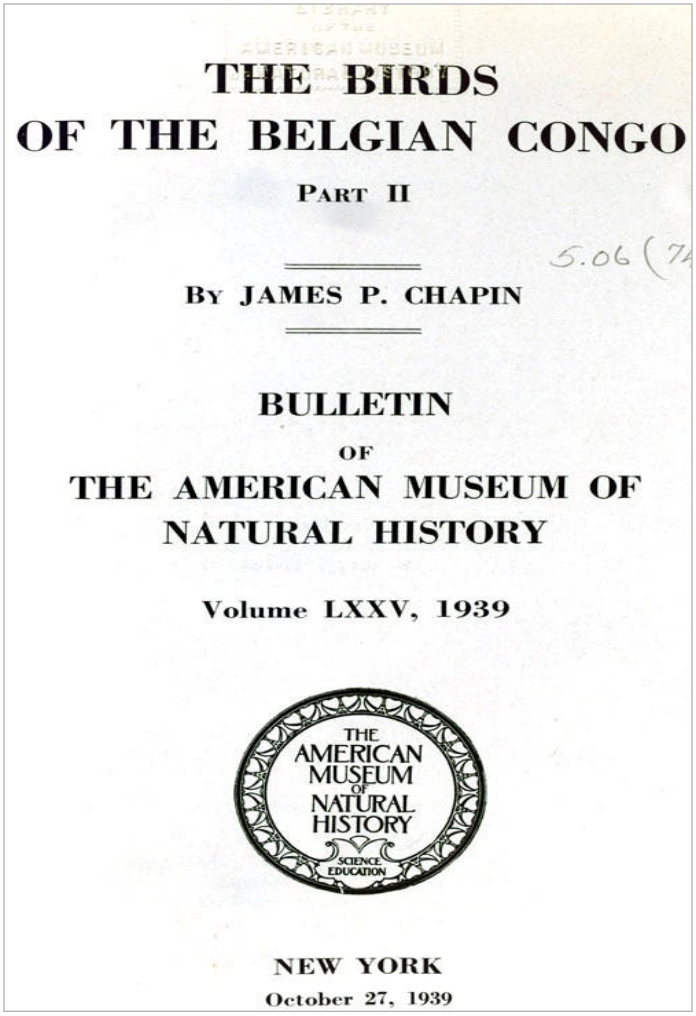


465 “types” / ca. 2 million specimens in alcohol

35,000 skeletons / ca. 30,000 larvae

Virtual types? / “e-types”? / “e-vouchers” ?

The American Museum of Natural History has published 240,000+ pages of scientific literature.



THE BIRDS OF THE BELGIAN CONGO

PART II

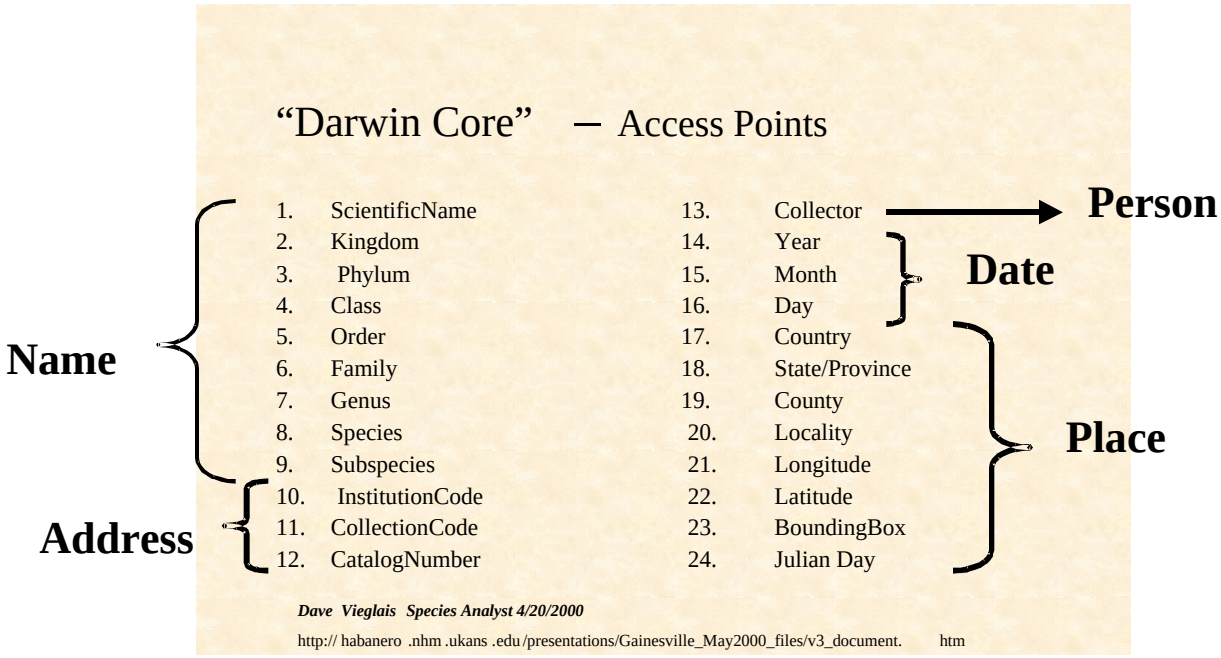
BY JAMES P. CHAPIN

BULLETIN
OF
THE AMERICAN MUSEUM OF NATURAL HISTORY

Volume LXXV, 1939

NEW YORK
October 27, 1939

“Natural History” Content


"Darwin Core" – Access Points
1. ScientificName
2. Kingdom
3. Phylum
4. Class
5. Order
6. Family
7. Genus
8. Species
9. Subspecies
10. InstitutionCode
11. CollectionCode
12. CatalogNumber
13. Collector
14. Year
15. Month
16. Day
17. Country
18. State/Province
19. County
20. Locality
21. Longitude
22. Latitude
23. BoundingBox
24. Julian Day
Name
Address
Person
Date
Place
Dave Vieglais Species Analyst 4/20/2000
http:// habanero .nhm .ukans .edu /presentations/Gainesville_May2000_files/v3_document. htm

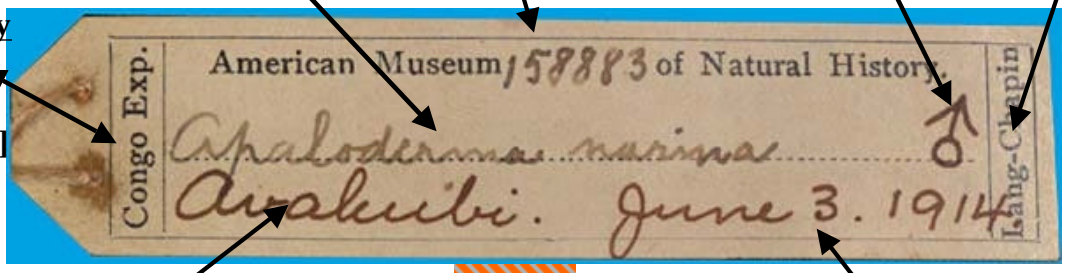
Address element (Institutional Name) [print -- alpha] + (Specimen #) [manuscript -- numeric]

Nominal/ Descriptive element (Sex) [manuscript -- icon]

Nominal/ Descriptive element (Scientific Name) [manuscript -- alpha]

Responsibility (collectors) [print – alpha]

Responsibility (expedition name) [print –alpha]



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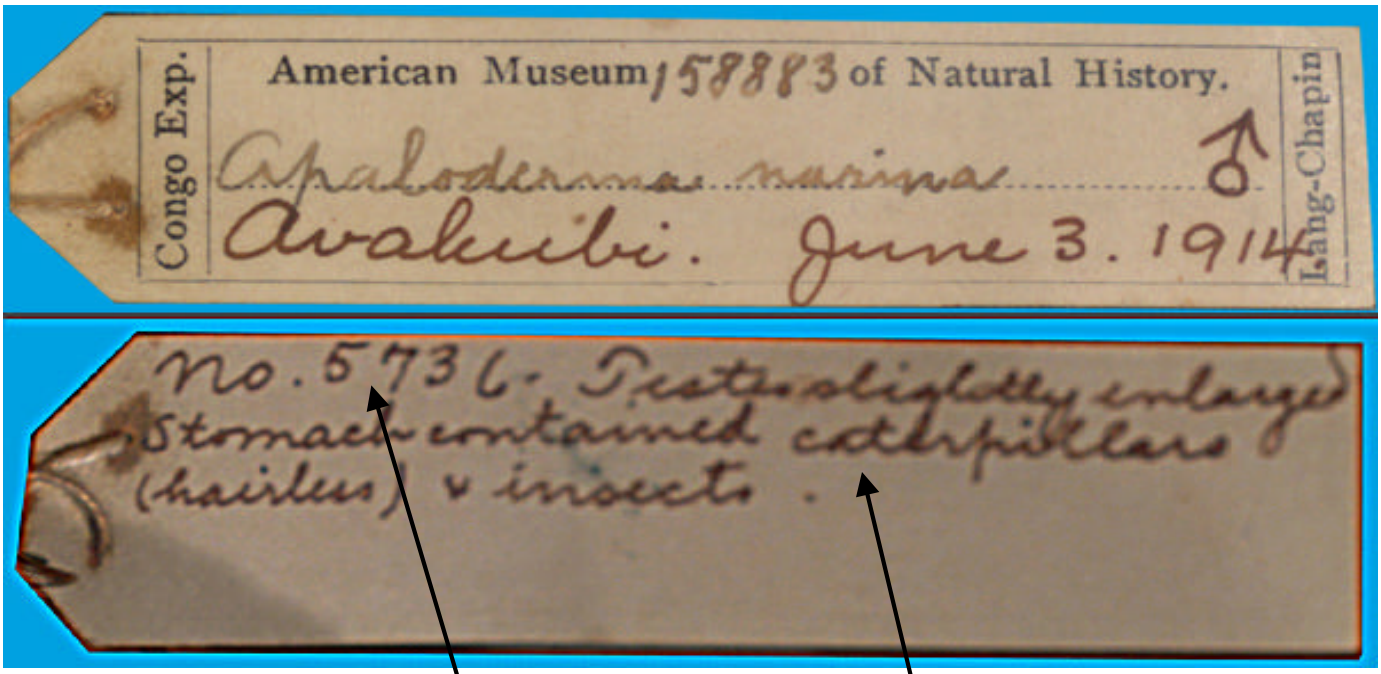
Date element (mm-dd-yyyy) [manuscript -- alphanumeric]

Specimen Label

Specimen Label + Verso



<u>Address element</u> (Specimen *Field* #)
[manuscript -- numeric]

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Spatial Element (geographic place name) [print/typescript -- alpha]

Responsibility (expedition name) [print –alpha]

Responsibility (collectors) [print – alpha]

Date element (mm-dd-yyyy) [print/typescript – alpha/numeric]

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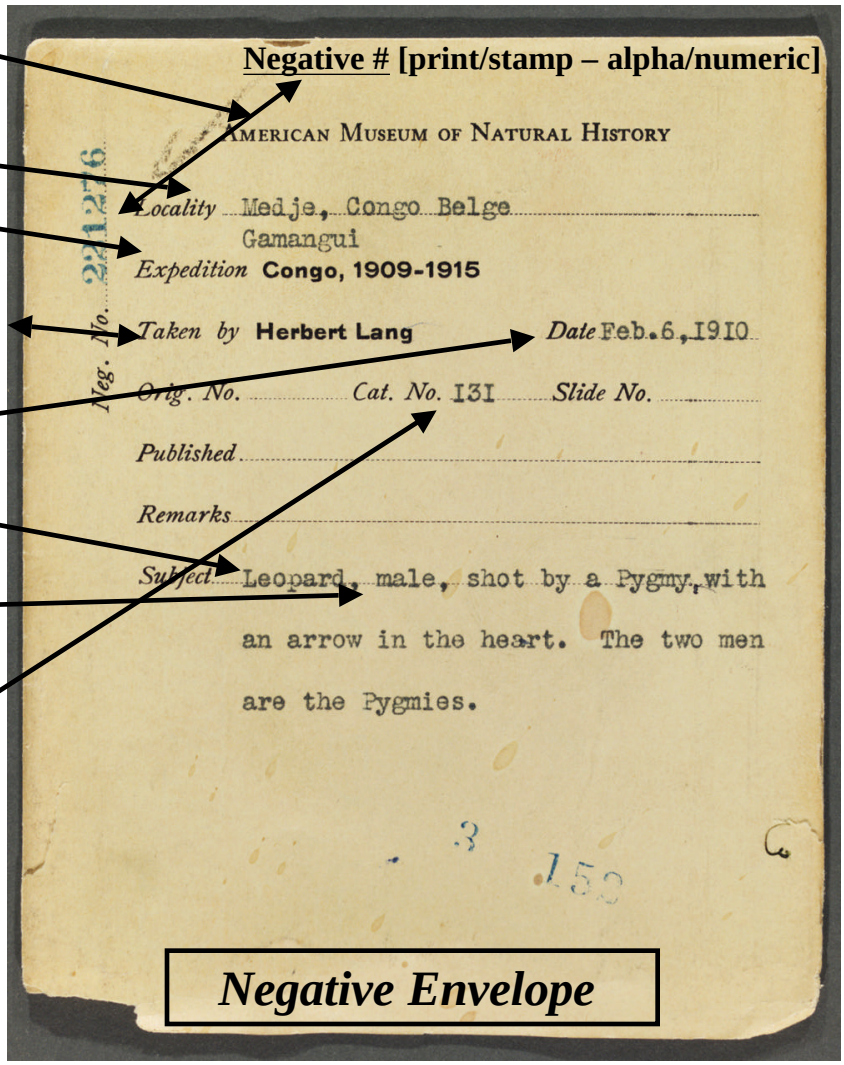
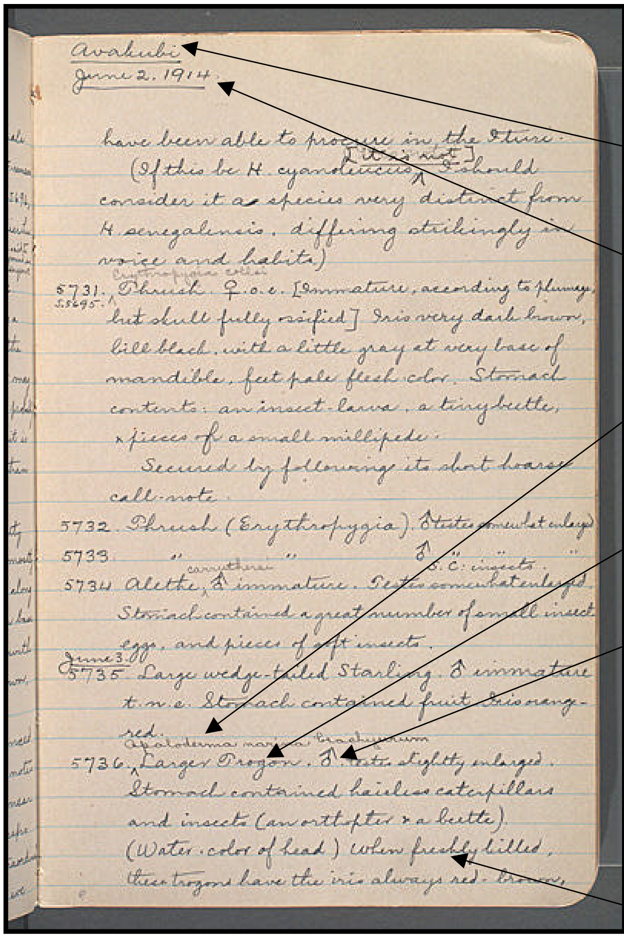
Nominal/ Descriptive element (Sex) [typescript -- alpha]

"Catalog No." (Collection #) [print – alpha/numeric]



Field Notebook



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Nominal/ Descriptive element (Common Name) [manuscript - alpha]

Nominal/ Descriptive element (Sex) [manuscript -- icon]

[Responsibility (collector) [implied]]

[Responsibility (expedition name) [implied]]

Nominal/ Descriptive element (Notes) [manuscript -- alpha]

Field Notebook Transcription

Field book name: Birds 7

Page #57

Taxonomic name (Apaloderma narina brachyurum)

Field #5736

Catalog #158883

Locality (Avakubi)

Date: June 03, 1914

Sex: M

Description: Larger Trogon (apaloderma narina brachyurum). Testes slightly enlarged. Stomach contained hairless caterpillars and insects (an orthopter and a beetle). (Water color of head). When freshly killed, these trogons have the iris always red brown, but if allowed to lie long, it may appear deep red.

http://diglib1.amnh.org/cgi-bin/database/index.cgi

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Nominal/ Descriptive element (Scientific Name)
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Date element (mm-dd-yyyy)
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Responsibility (collector)
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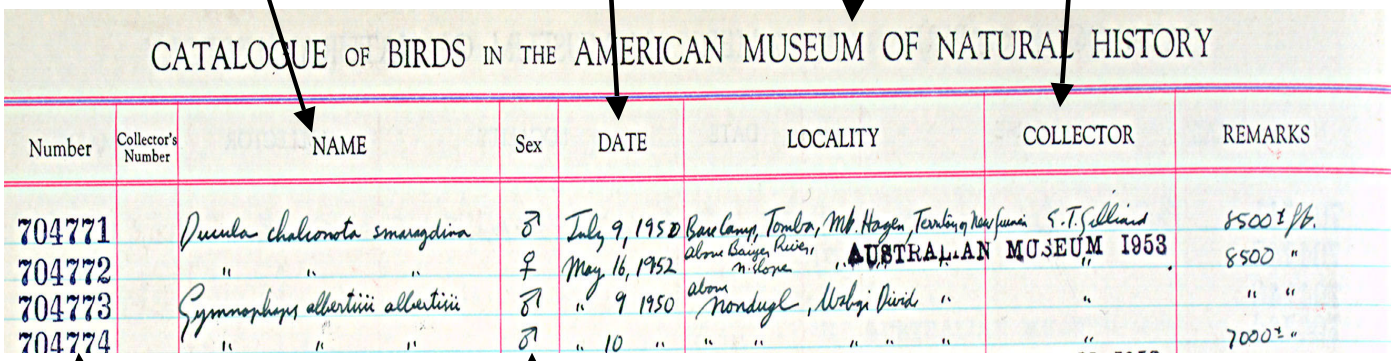


CATALOGUE OF BIRDS IN THE AMERICAN MUSEUM OF NATURAL HISTORY

Number	Collector's Number	NAME	Sex	DATE	LOCALITY	COLLECTOR	REMARKS
704771		Ducula chalconota smaragdina	♂	July 9, 1950	Bau Camp, Tomba, Mt. Hagen, Territory of New Guinea	S.T. Gilliard	8500 ft.
704772		" " "	♀	May 16, 1952	above Baiyer River, m. Hope	AUSTRALIAN MUSEUM 1953	8500 "
704773		Gymnophaps albertisii albertisii	♂	" 9 1950	above Nondugl, Waghi Divid	"	" "
704774		" " "	♂	" 10 "	" " " " "	"	7000± "

Nominal/ Descriptive element (Sex) [manuscript -- icon]

Address element: (Specimen #)
[print -- numeric]

Spatial Element (geographic place name)
[manuscript -- alpha]

Specimen Catalog

"Taxon Treatment"

Apaloderma narina brachyurum Chapin

Apaloderma narina brachyurum Chapin, 1923, A. M. Nov., No. 56, p. 4, Fig. 1B, map (type locality: Avakubi, Ituri distr., Congo. Also from Banalia; Gamangui; Bafwabaka; Pawa; Medje; Poko; ~~Kilo; forest N. of Beni~~). Schouteden, 1923, Rev. Z. A., XI, p. 327 (Basongo; Kamaiembi; Dumbi; Luebo); ~~1936, Ann. Mus. Congo, Zool., I f. 2 p. 97 (Kotili; Buta; Popoie; Panga; Poko; Bondo Mabe).~~ Gyldenstolpe 1924 K. Svenska Vet. Akad. Handl., (3) I, No. 3, p. 259 (Kartushi; Lesse). Sassi, 1924, Ann. Naturh. Mus. Wien, XXXVIII, p. 74 (Beni; Mawambi; Ukaika). W. L. Sclater, 1924, 'Syst. Av. Æth.,' pt. 1, p. 268 (Ituri). Friedmann, 1930, Bull. 153, U. S. Nat. Mus., p. 338. Bannerman, 1933, 'Birds Trop. W. Afr.,' III, p. 357. Bouet, 1934, Ois. R. F. O., (N. S.) IV, p. 634.—*Trogon narina* Emin, 1894, J. f. O., p. 166 (old Irumu).—*Hapaloderma narina* Flower, 1894, P. Z. S. Lond., pp. 597, 606 (Indekaru village; Muyeméma or Kinnene). Dubois, 1905, Ann. Mus. Congo, Zool., I, f. 1, p. 35 (in part. Ituri; Kisantu). O.-Grant, 1908, Ibis, p. 312 (Ponthierville); 1910, Tr. Z. S. Lond., XIX, p. 426 (Mpanga forest near Fort Portal). Schouteden, 1935, Bull. C. Z. C., XI, p. 68 (Buta).—*Apaloderma narina* Reichenow, 1902, 'Vög. Afr.,' II, p. 212 (in part. Muyomema); 1911, 'Wiss. Ergeb. D. Z.-Afr. Exp.,' III, p. 284 (in part; forest N. of Beni). Sassi, 1912, Ann. Naturh. Hofmus. Wien, XXVI, p. 374 (in part. Beni; Mawambi; Ukaika). Schouteden, 1914, Rev. Z. A., III, p. 265 (Kilo); 1918, idem, V, p. 245 (in part. Kilo; Masidongo; Baraka; Bolovet; Lesse). W. DeW. Miller, 1924, Bull. A. M. N. H., L, p. 330.—*Apaloderma narina* (*equatoriale?*) Chapin, 1915, Bull. A. M. N. H., XXXIV, p. 512 (Ituri distr.).

Specimens.—Banalia, ♂, Sept. 25. Avakubi, 8 ♂, Feb. 26, June 3, Aug. 16, Sept. 8, 9, 18, 20, 27; 5 ♀, Apr. 17, July 9, Aug. 15, Sept. 20, Nov. 4; ♂ im., Nov. 9; ♀ im., July 10. Bafwabaka, 2 ♂, Jan. 7, July 24. Gamangui, 2 ♂, Jan. 28, Feb. 8; ♀, Jan. 28. Medje, ♀, 2 ♂ juv., Mar. 24. Pawa, ♂, July 10.

Adult Male.—Iris red-brown, naked patch above eye pale bluish green, the two below eye light green, with a little light blue along their upper borders. Skin of throat (hidden by feathers in life) light blue, that of hind-neck pale pinkish. Basal portion of bill deep cadmium-yellow, distal portion light greenish gray. Feet brownish pink.

Adult Female.—Iris dark brown or red-brown, naked spot above eye light blue, those below light green, or light blue washed with green. Bill greenish yellow basally, pale greenish gray beyond. Feet brownish pink.

Immature Male.—Iris brown, naked patches below eye light green, each with a little light blue anteriorly. Bill light yellowish green at base, outer part of maxilla gray, becoming blackish above, tip of mandible light greenish gray. Feet grayish flesh-color.

Immature Female.—Similar to young male, but cheek patches noted as dull grayish green.

Distribution.—From the coast of southern Cameroon and Gaboon eastward through the rain forest of the Congo basin to the Uelle district, Semliki Valley, and the heavier forests of Uganda as far as Chagwe. In the Congo its northern limit is not far beyond the edge of the unbroken forest. I believe this race inhabits the Mayombe forest, though the

Nominal/ Descriptive element (Scientific Name) [print-- alpha]

Responsibility (author) [print – alpha]

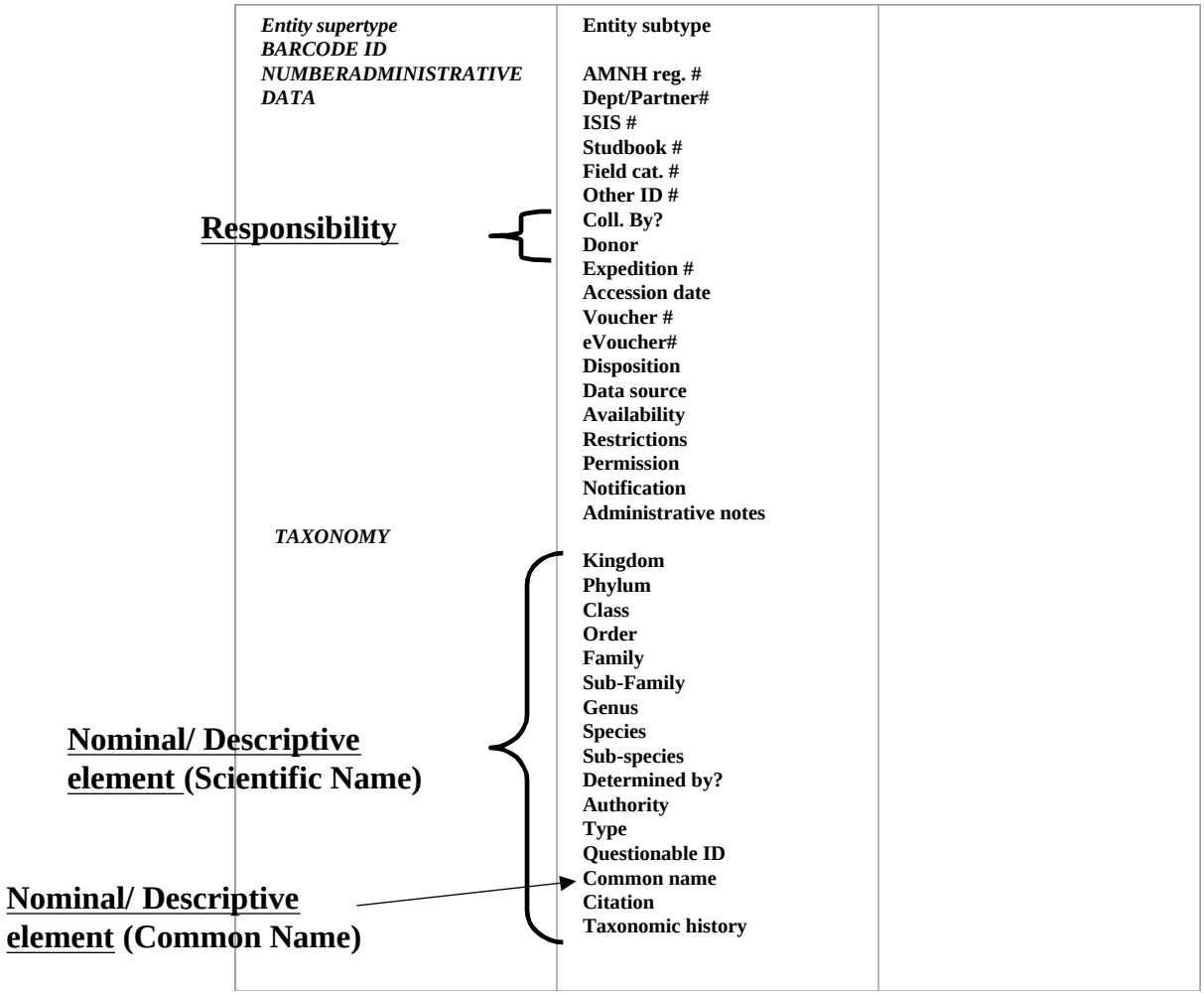
Spatial Element (geographic place name) [print -- alpha]

Nominal/ Descriptive element (Sex) [print-- icon]

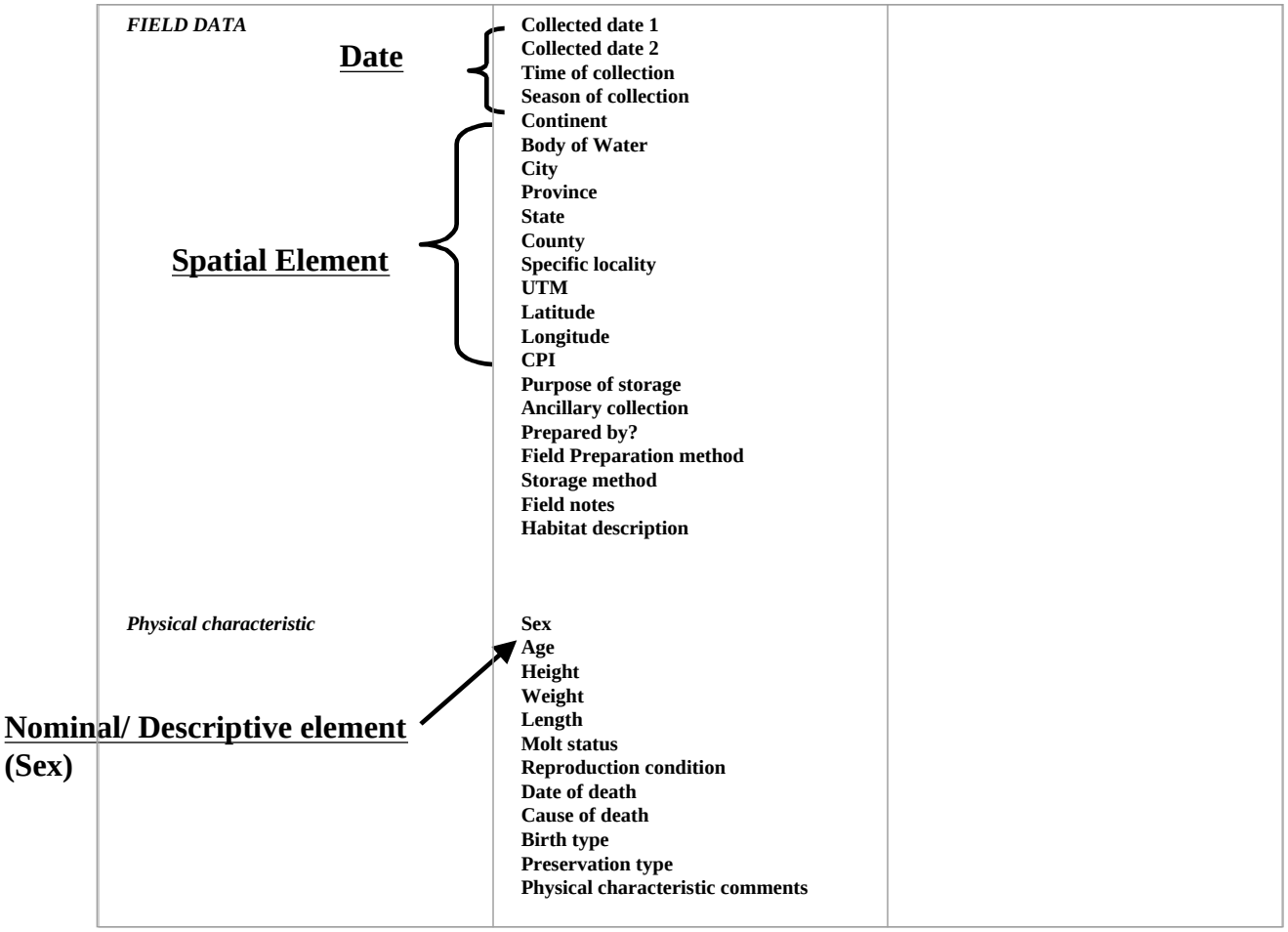
Date element (mm-dd-[yy implicit]) [print-- alphanumeric]

Nominal/ Descriptive element (Notes) [print – alpha (continued on following pages)

Cryo Collections “Freezerworks” record structure (I)

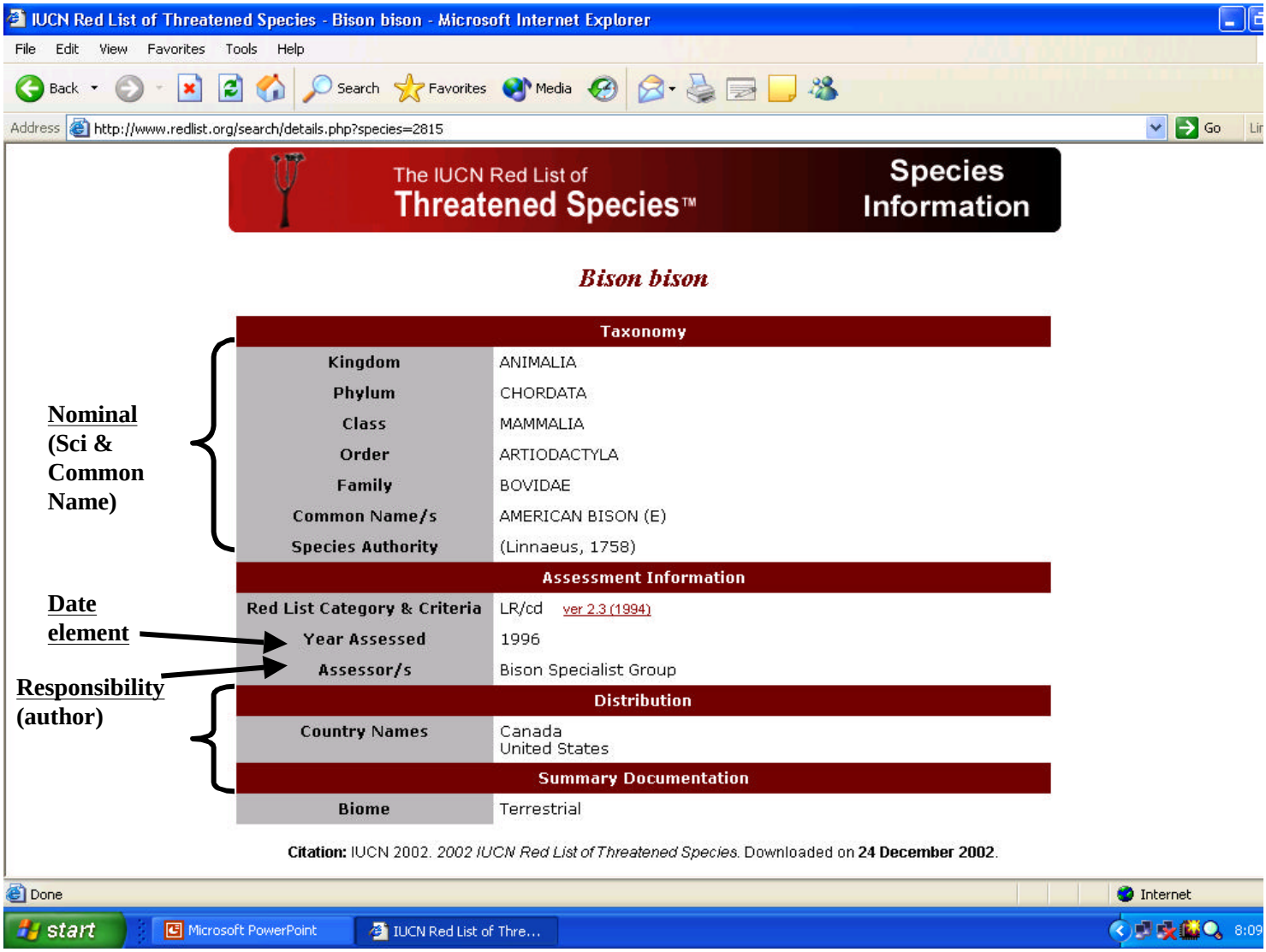


Cryo Collections “Freezerworks” record structure (II)



Cryo Collections “Freezerworks” record structure III

	ALIQUOT	
	Position	
		Vat
		Section
		Rack
		Box
	Results tab	**Position**
		Initial
		Current
	Protocol	**Aliquot type**
		Assay
		Results
	Medium	
		Protocol date
		Protocol
	Preservation History	**Storage Medium**
		Loan date
		Loan
		Preservation History

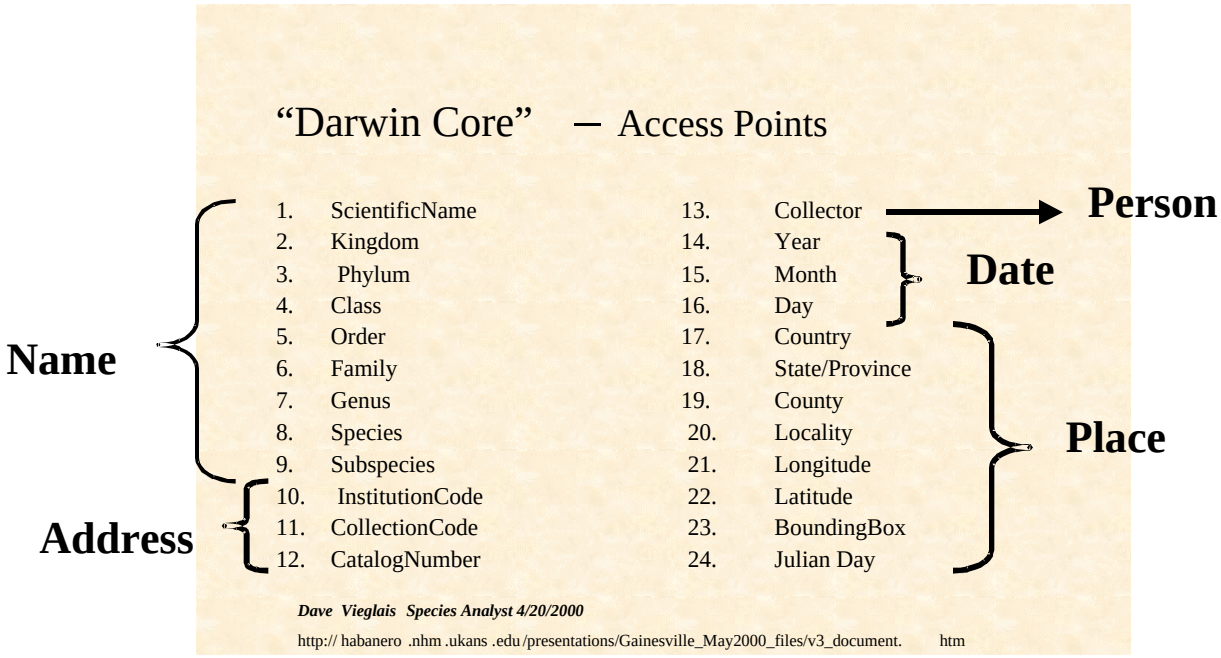

IUCN Red List of Threatened Species - Bison bison - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://www.redlist.org/search/details.php?species=2815
Go
The IUCN Red List of Threatened Species™
Species Information
Bison bison
Taxonomy
Kingdom ANIMALIA
Phylum CHORDATA
Class MAMMALIA
Order ARTIODACTYLA
Family BOVIDAE
Common Name/s AMERICAN BISON (E)
Species Authority (Linnaeus, 1758)
Assessment Information
Red List Category & Criteria LR/cd ver 2.3 (1994)
Year Assessed 1996
Assessor/s Bison Specialist Group
Distribution
Country Names Canada
United States
Summary Documentation
Biome Terrestrial
Citation: IUCN 2002. 2002 IUCN Red List of Threatened Species. Downloaded on 24 December 2002.
Nominal (Sci & Common Name)
Date element
Responsibility (author)
Done
Internet
start
Microsoft PowerPoint
IUCN Red List of Thre...
8:09

Logical Integration Matrix for Natural History Information

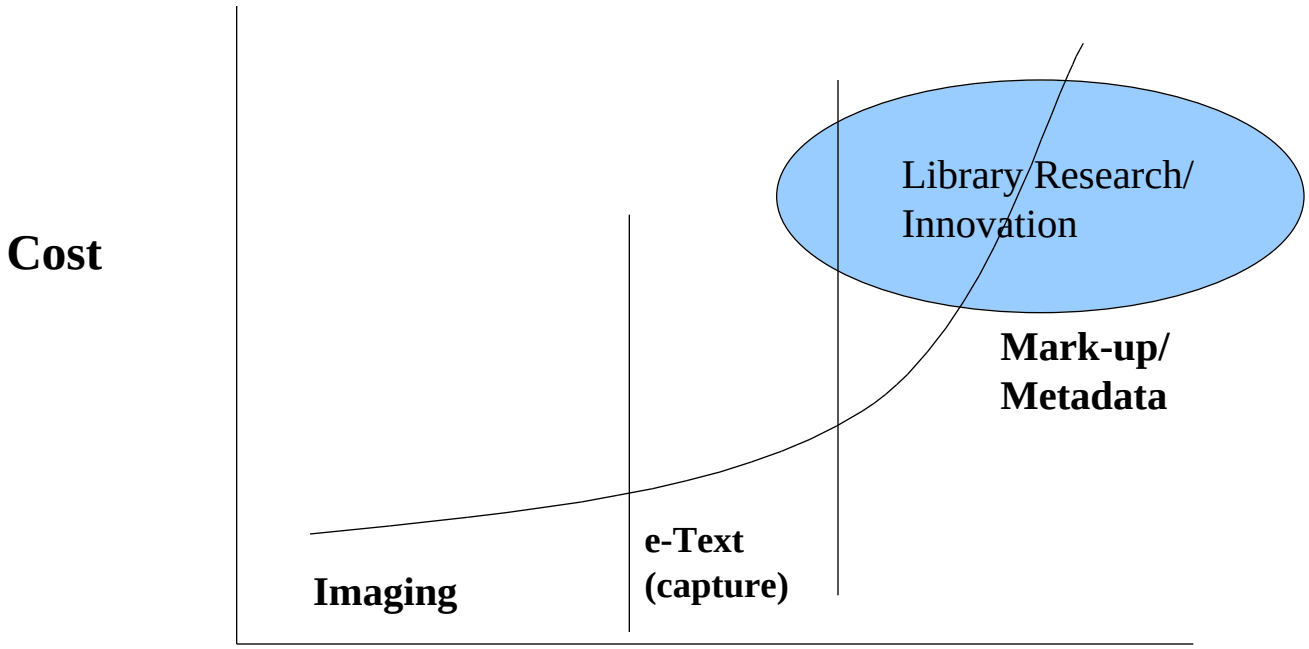
Type of Information /Data

Core Elements	**Specimen Label**	**Field Note**	**Manuscript Catalog**	**Publication ("Taxon Treatment")**	**Database**	**Red List**
Scientific Name						
Common Name						
Address (Inst. / Cat. #)						
Responsibility						
Date Element						
Spatial Element						
Descriptive (Sex, etc.)						

Toward “optimal”
(most efficient, most parsimonious)
solutions…


"Darwin Core" – Access Points
1. ScientificName
2. Kingdom
3. Phylum
4. Class
5. Order
6. Family
7. Genus
8. Species
9. Subspecies
10. InstitutionCode
11. CollectionCode
12. CatalogNumber
13. Collector
14. Year
15. Month
16. Day
17. Country
18. State/Province
19. County
20. Locality
21. Longitude
22. Latitude
23. BoundingBox
24. Julian Day
Name
Address
Person
Date
Place
Dave Vieglais Species Analyst 4/20/2000
http:// habanero .nhm .ukans .edu /presentations/Gainesville_May2000_files/v3_document. htm

Library Investment?



MARC Record: an ***expensive*** solution

ID 10507973BASE DG STS n REC am ENC I DCF a ENT 960314
INT REP GOV CNF 0 FSC 0 INX 1 CTY onc ILS ab
MEI FIC 0 BIO MOD CSC d CON b LAN eng PD 1995
006 p <CAS>
015 C95-980201-0 <DG>
020 0660130734 : $c $45.00 Can. <DG,CAS>
040 VXG $c VXG $d CUV <DG> 040 VXG $c VXG $d CSFA <CAS>
041 0 engfre <DG,CAS> 043 n-cn--- <DG,CAS> 082 0 574.5/0971 $2 20 <DG>
100 1 Mosquin, Theodore, $d 1932- <DG,CAS>
245 10 Canada's biodiversity : $b the variety of life, its status, economic benefits, conservation costs, and unmet needs / $c by Ted Mosquin, Peter G. Whiting, and Don E. McAllister ; prepared for the Canadian Centre for Biodiversity, Canadian Museum of Nature. <DG,CAS>
246 1 $i Title on diskette: $a Biodiversit_e du Canada : $b _etat actuel, avantages _economiques, co_uts de conservation et besoins non satisfaits <CAS>
260 Ottawa, ON, Canada : $b Canadian Museum of Nature, $c c1995. <DG,CAS>
300 xxiv, 293 p. : $b ill., maps ; $c 21 x 26 cm. <DG>
300 xxiv, 293 p. : $b ill., maps ; $c 21 x 26 cm. + $e 1 computer disk (3 1/2 in.) <CAS>
440 0 Henderson book series ; $v no. 23 <DG,CAS>
500 "French text provided on diskette"--P. [4] of cover. <CAS>
504 Includes bibliographical references (p. 259-286) and index. <DG,CAS>
538 System requirements for diskette: WordPerfect 5.1, version MS-DOS. <CAS>
650 0 Biological diversity $z Canada <DG,CAS>
650 0 Biological diversity conservation $z Canada <DG,CAS>
700 1 Whiting, Peter G. <DG,CAS>
700 1 McAllister, D. E. <DG,CAS>
710 2 Canadian Centre for Biodiversity <DG,CAS>
CAS: 901 aOb34363082$cCAW 902 $a19960618224327.0 903 $aCAS 904 $a19960618$b19960618$b19960618
Hol: 920 $aCAWR 922 $aZCAS 924 $aCSFA 926 $aBiodiv 930 $aQH106$b.M67 1995 932 $aRef. 935 1$lLI.96.100 DG: 901 aVb1374AKO$cDAVD 902 $a19980713093351.0 903 $aDG 904 $a19980713$b19980713 910 $aocm34363082
Hol: 920 $aCUVA 922 $aUCD 924 $aCU-A 926 $aShields 930 $cQH106.M67 1995

CIMI: Consortium for the Computer Interchange of Museum Information
From Guide to Best Practice: Dublin Core (DC 1.0 = RFC 2413)
Final Version 12 August 1999

The 15 Dublin Core Elements

- Resource Type
- Format
- Title
- Description
- Subject and Keywords
- Author or Creator
- Other Contributor
- Publisher
- Date
- Resource Identifier
- Source
- Relation
- Language
- Coverage
- Rights

Mediated Dublin Core: a **somewhat less expensive** solution

CIMI: Consortium for the Computer Interchange of Museum Information

Guide to Best Practice: Dublin Core (DC 1.0 = RFC 2413)
Final Version (12 August 1999)

Example D-4 Record Describing a Natural History Specimen

```
<?xml version="1.0" ?>
<dc-record>
<type>physical object</type>
<type>original</type>
<type>natural</type>
<title>Prosorhynchoides pusilla</title>
<description>Specimen fixed in Berland's fluid and preserved in 80%
        alcohol.</description>
<description>Prepared by: Taskinen, J.</description>
<description>Determiner: Gibson, D.I. </description>
<description>Determination date: 1993-08-21</description>
<subject>parasite</subject>
<subject>fluke</subject>
<subject>animal</subject>
<creator>Gibson D.I.</creator>
<contributor>Taskinen, J.</contributor>
<publisher>The Natural History Museum, London</publisher>
<date>1993-08-21</date>
<identifier>NHM 1994.1.19.1.</identifier>
<relation>IsPartOf Bucephalidae</relation>
<relation>Requires Esox lucius</relation>
<coverage>Battle River</coverage>
<coverage>Fabyan</coverage>
<coverage>Alberta</coverage>
<coverage>Canada</coverage>
<rights>http://www.nhm.ac.uk/generic/copy.html</rights>
</dc-record>
```

Address element (Institutional Name) [print -- alpha]

Spatial Element (geographic place name) [print/typescript -- alpha]

Responsibility (expedition name) [print –alpha]

Responsibility (collectors) [print – alpha]

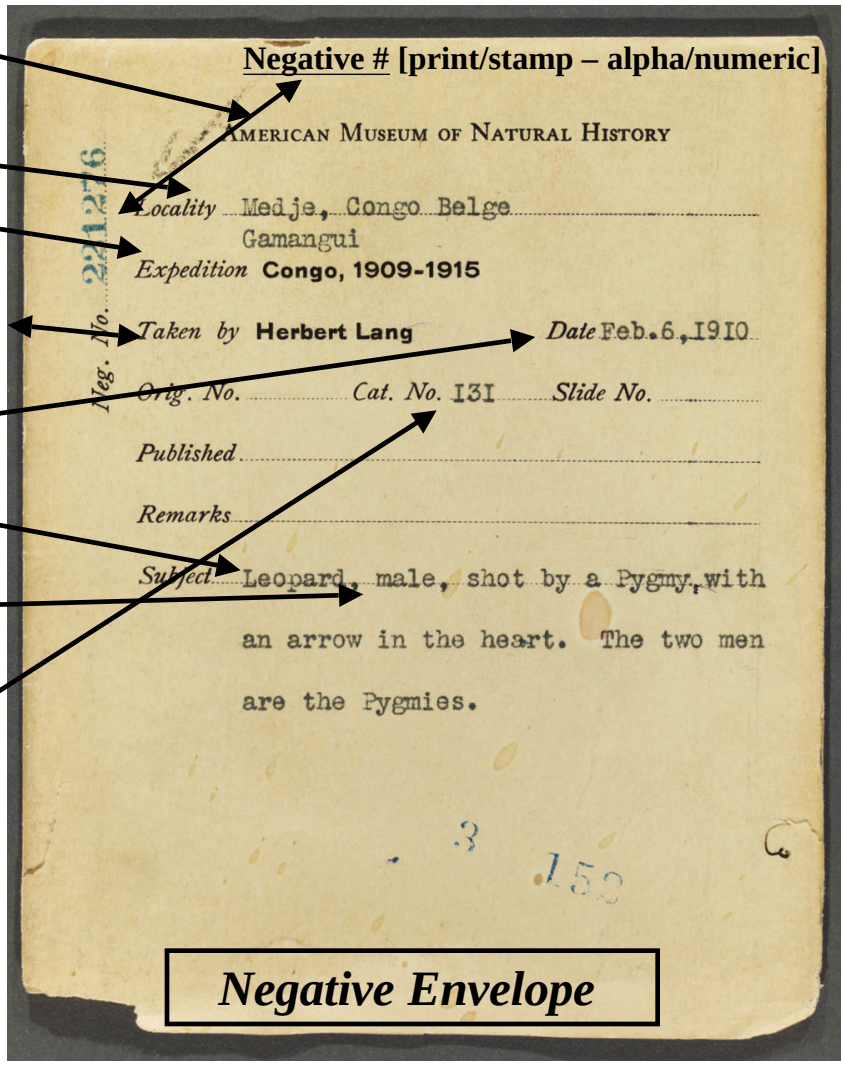
Date element (mm-dd-yyyy) [print/typescript – alpha/numeric]

Nominal/ Descriptive element (Common Name) [print - alpha]

Nominal/ Descriptive element (Sex) [typescript -- alpha]

"Catalog No." (Collection #) [print – alpha/numeric]

"*Native*" or "*Vernacular*" Metadata" →



“Native” / “vernacular” Metadata from negative sleeves
(Congo Project I)

221276 Medje, Congo Belge, Gamangui
Feb. 6, 1910
Leopard, male, shot by a Pygmy, with an arrow in the heart.
The two men are the Pygmies.

221277 Faradje, Congo Belge
Mar. 28, 1911
Leopard, male. Entire side view.

221278 Near Faradje, Congo Belge
Jan. 5, 1912
Matari with Lion, male.

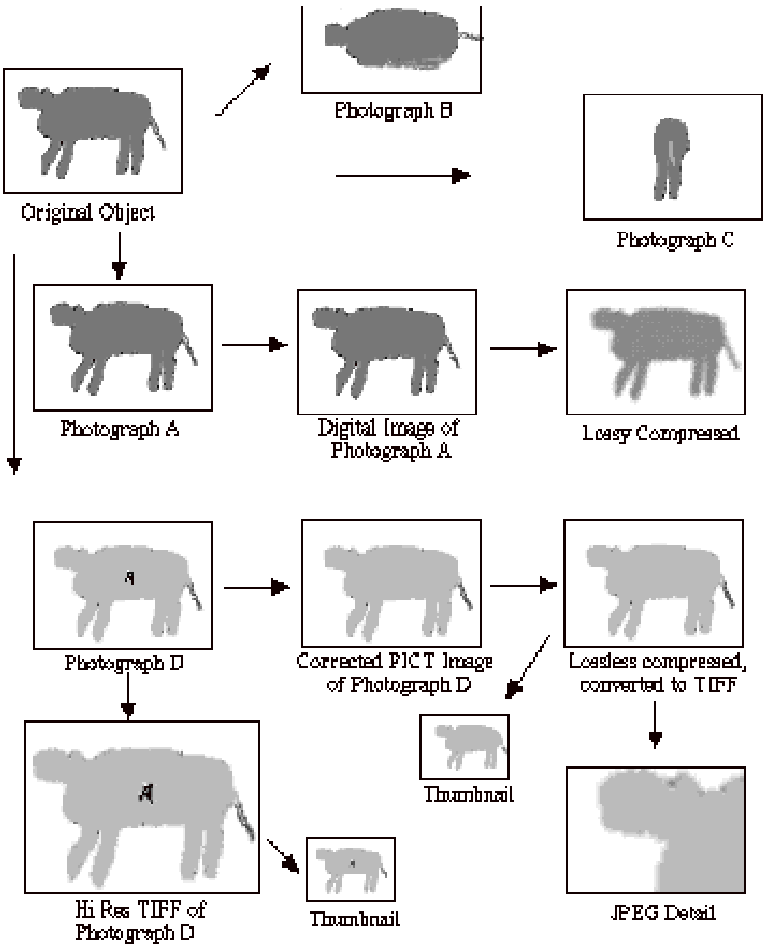
221279 Faradje, Congo Belge
Jan. 5, 1912
Lion, male. Entire specimen, side view.

```
<?xml version="1.0"?>
<!DOCTYPE rdf:RDF PUBLIC "-//DUBLIN CORE//DCMES DTD 2002/07/31//EN"
"http://dublincore.org/documents/2002/07/31/dcmes-xml/dcmes-xml-dtd.dtd">
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:dc="http://purl.org/dc/elements/1.1/">
<rdf:Description>
<dc:title>Leopard, male, shot by a Pygmy, with an arrow in the heart.
The two men are the Pygmies.</dc:title>
<dc:creator>Lang, Herbert, 1879-1957.</dc:creator>
<dc:subject>Panthera pardus</dc:subject>
<dc:publisher>American Museum of Natural History</dc:publisher>
<dc:contributor>American Museum Congo Expedition,
1909-1915</dc:contributor>
<dc:date>Feb. 6, 1910</dc:date>
<dc:type>Image.photographic</dc:type>
<dc:format>jpg</dc:format>
<dc:source>image number 221276</dc:source>
<dc:coverage>Medje, Congo Belge, Gamangui</dc:coverage>
<dc:rights>For conditions of use see:
http://library.amnh.org/diglib/conditions.html</dc:rights>
</rdf:Description>
</rdf:RDF>
```

Transformation of native metadata record to RDF/DC

Blue = native record natural language
Green = native record inferred/derived elements

“Image Families”



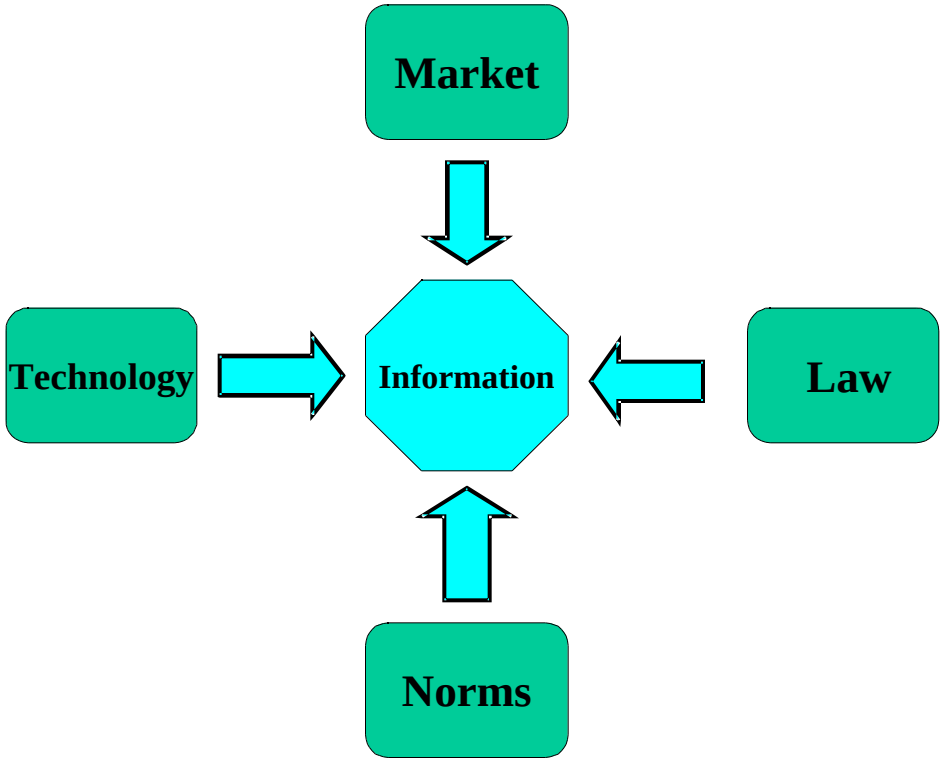
Optimal use of metadata depends on ***“heritability”***-- defined in terms of:

- technical integrity (of image)
- semantic properties
- legal ownership

From:**Howard Besser. The Next Stage: Moving from Isolated Digital Collections to Interoperable Digital Libraries by First Monday, volume 7, number 6 (June 2002),**
URL:
http://firstmonday.org/issues/issue7_6/besser/index.html

Toward an “Ontological” Approach

Constraints on Open Access to Information



Adapted from: Lessig, L. ***Code and other laws of cyberspace. NY, Basic Books, 1999.***

- **Rigorous, reductionist, “ontological” analysis of the problem domain**
- **Application of state-of-the-art tools and methodologies**

Hence:

Careful consideration of

Semantic Web applications

Toward a possible "*ontology*"
of natural history information?

"Ontology"? :

"A formal explicit specification of a shared conceptualization"

(T.A. Gruber. *A translation approach to portable ontologies, Knowledge 7.)*

“Semantic Web” Definitions[1]

“ONTOLOGIES”: Collections of statements written in a language such as RDF that define the relations between concepts and specify logical rules for reasoning about them. Computers will “understand” the meaning of semantic data on a Web page by following links to specified ontologies.

[1] *The Semantic Web.* Tim Berners-Lee, James Hendler and Ora Lassila SCIENTIFIC AMERICAN SPECIAL ONLINE ISSUE APRIL 2002

“Semantic Web” Definitions[1]

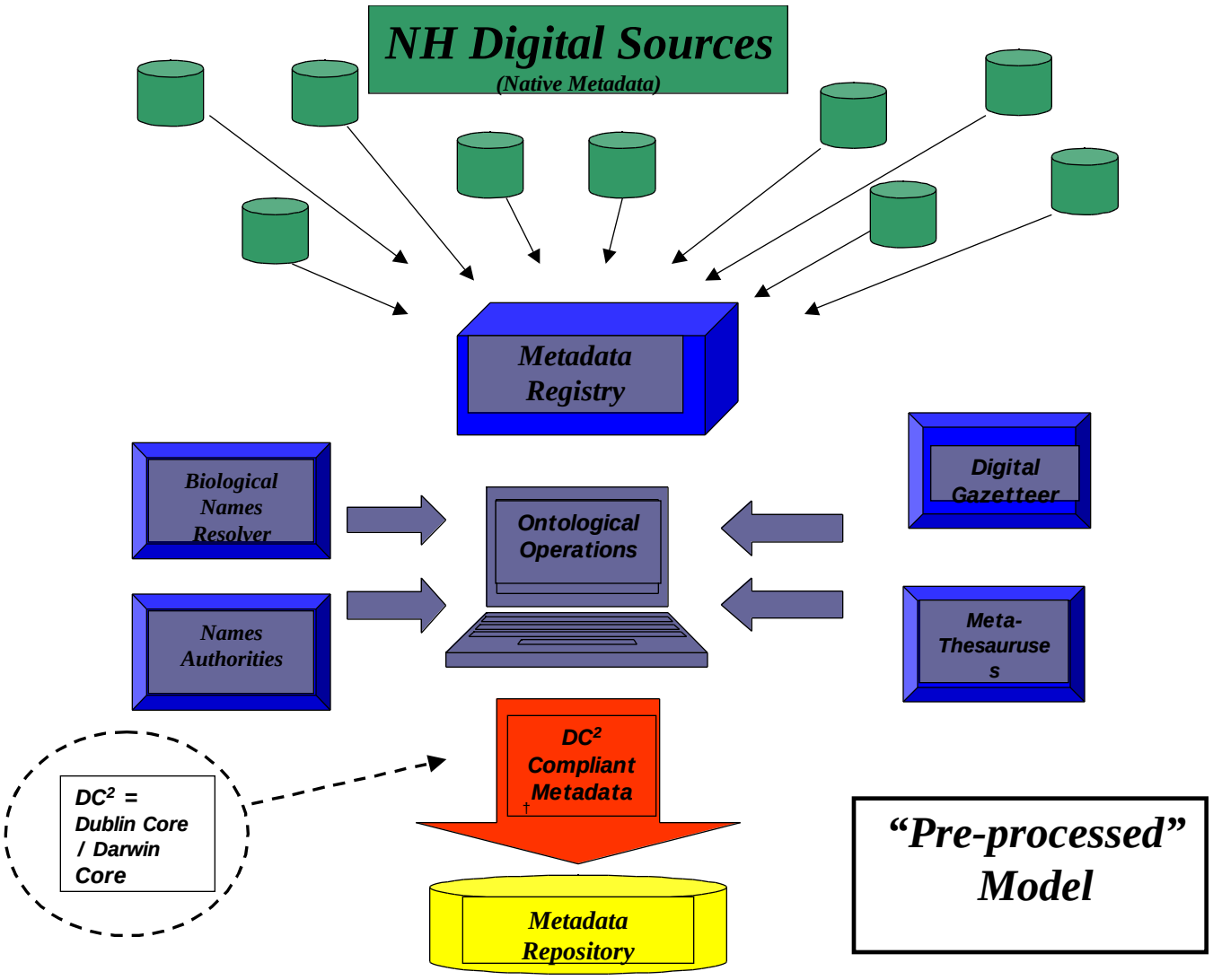
“RDF”: Resource Description Framework. A scheme for defining information on the Web. RDF provides the technology for expressing the meaning of terms and concepts in a form that computers can readily process. RDF can use XML for its syntax and URIs to specify entities, concepts, properties and relations.

“ONTOLOGIES”: Collections of statements written in a language such as RDF that define the relations between concepts and specify logical rules for reasoning about them. Computers will “understand” the meaning of semantic data on a Web page by following links to specified ontologies.

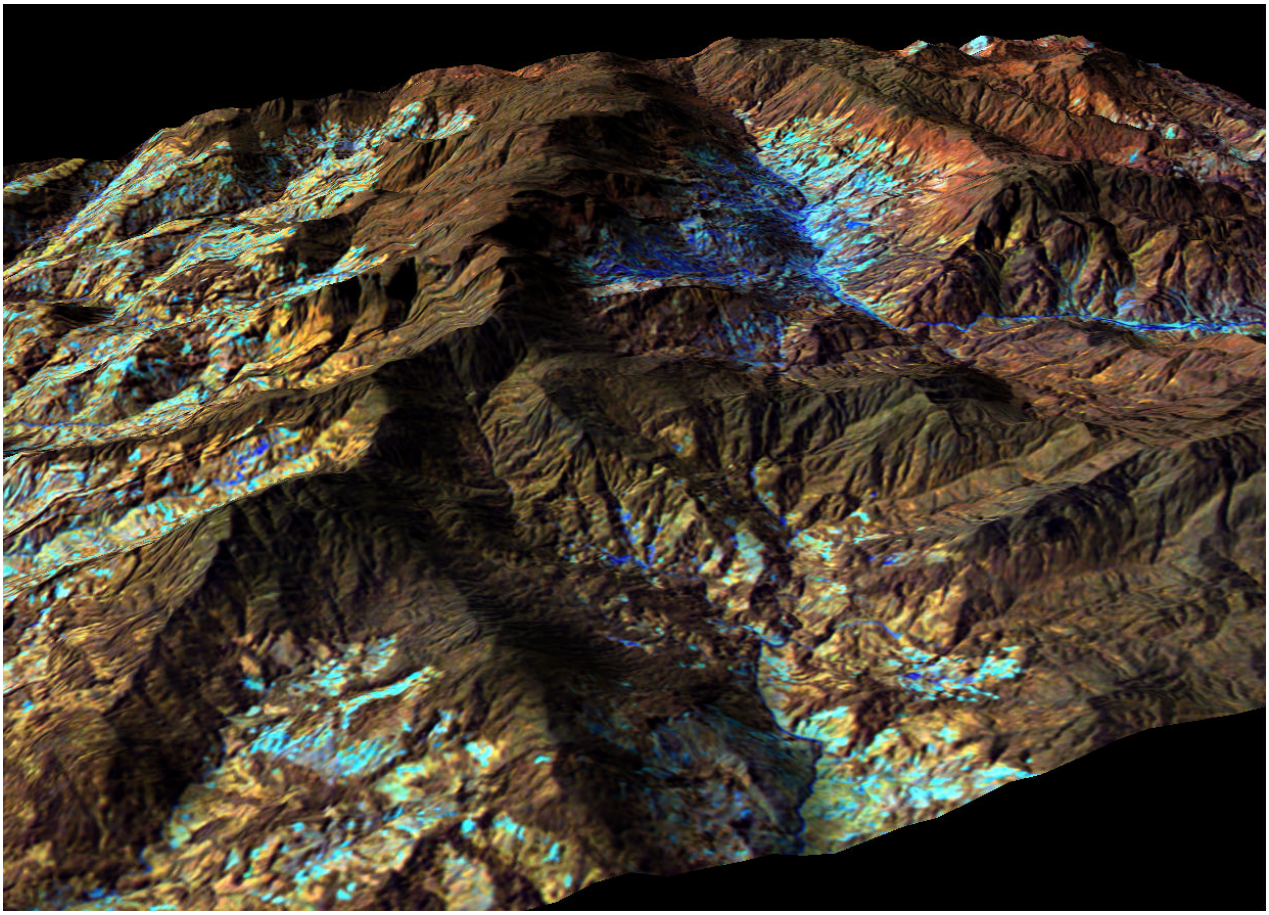
“AGENT”: A piece of software that runs without direct human control or constant supervision to accomplish goals provided by a user. Agents typically collect, filter and process information found on the Web, sometimes with the help of other agents.

The Semantic Web. Tim Berners-Lee, James Hendler and Ora Lassila

SCIENTIFIC AMERICAN SPECIAL ONLINE ISSUE APRIL 2002


NH Digital Sources
(Native Metadata)
Metadata Registry
Biological Names Resolver
Names Authorities
Ontological Operations
Digital Gazetteer
Meta-Thesauruses
DC² = Dublin Core / Darwin Core
DC² Compliant Metadata †
Metadata Repository
"Pre-processed" Model

The “New Natural History”

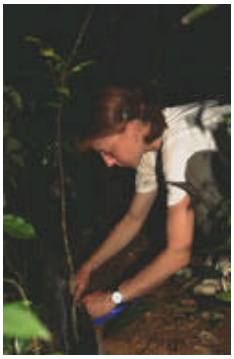


View from the north of the Ngoc Linh Mountain Range in Vietnam's Central Highlands. This image was created by draping a LandSat scene (1998) over a three-dimensional model.

Courtesy AMNH Center for Biodiversity and Conservation

AMNH ornithologist Paul Sweet removing an owl from mist nets.

Looking northwest from the Ngoc Linh escarpment in the Central (Western) Highlands of Vietnam. In 1999 survey teams visited the range's northeastern slopes.



AMNH entomologist Dr. Christine Johnson checking pitfall trap lines at Ngoc Linh

Homemade snare used to trap mammals and large ground-dwelling birds (foreground, Dr. Nguyen Tien Hiep)

CBC Program Director Dr. Eleanor J. Sterling examining an orchid at Ngoc Linh; orchids (Orchidaceae) are the most species rich plant family in Southeast Asia.

Courtesy AMNH Center for Biodiversity and Conservation

Ornithological specimens from Ngoc Linh (Quang Nam Province).

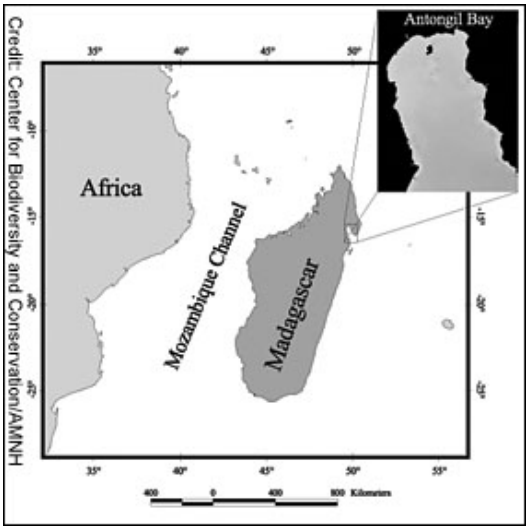
Ornithological specimens from Ngoc Linh (Quang Nam Province).

***Elaphe mandarina*, the Mandarin Rat Snake, from Rao An, Huong Son District, Ha Tinh Province, Vietnam (Northern Truong Son Mountains Herpetofaunal Survey 1998).**

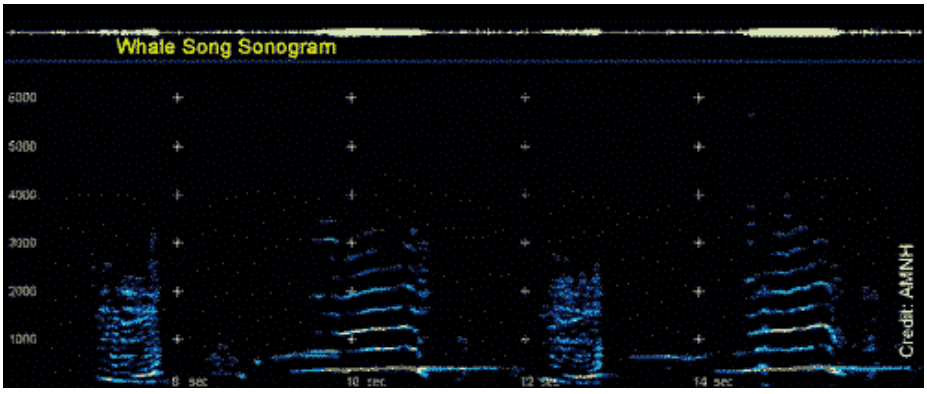
Courtesy AMNH Center for Biodiversity and Conservation

http://research.amnh.org/biodiversity/center/cbcnews/archive/sprng_sum01/song.html

Humpback whale breaching, Antongil Bay, Madagascar.



Humpback whale fluking.



Cornell Lab of Ornithology

BIRDSCOPE

News and Views from Sapsucker Woods Cornell Lab of Ornithology

SUMMER 2002/VOLUME 16, NUMBER 3

Ivory-bill Absent from Sounds of the Bayous

By JOHN W. FITZPATRICK

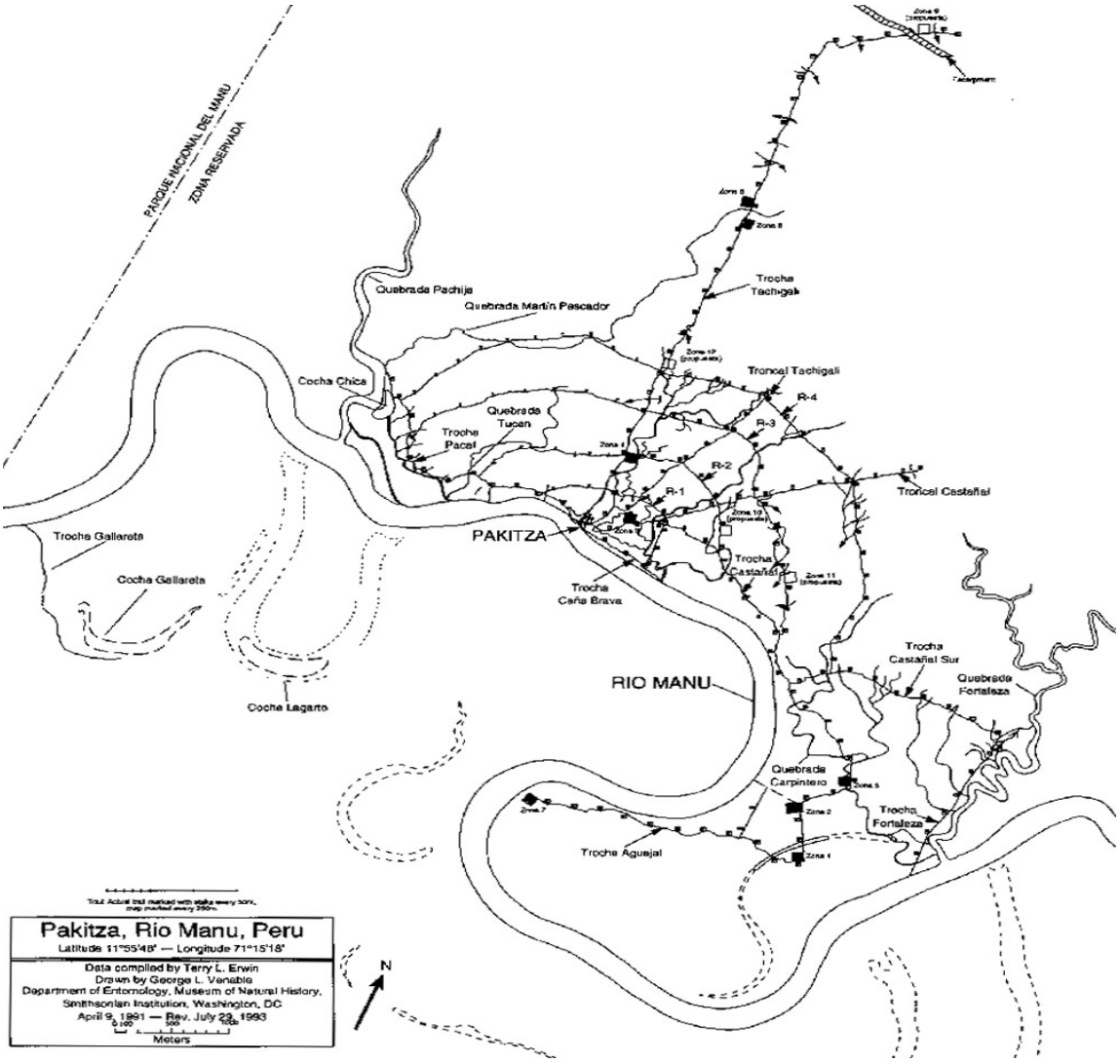
More than 4,000 hours of recordings analyzed

In February 2002, a six-member search team funded by Zeiss Sports Optics emerged from the Louisiana bayous, unrewarded but hopeful. They had not found an Ivory-billed Woodpecker during a month of searching, but they had heard and tape-recorded several loud double raps that were reminiscent of the species long feared to be extinct. Meanwhile, we hoped that 12 autonomous recording units (ARUs) deployed by the Lab's team would capture the sounds of the magnificent woodpecker if it still existed there.

Technician Chris Tessaglia-Hymes identified the recorded sounds by listening to them and inspecting the spectrographic images.
Diane L. Tessaglia-Hymes

We recovered 4,146 hours of data recorded at 12 dispersed locations in the bottomland forests of the lower Pearl River, Louisiana. Sadly, after scrutinizing more than 130,000 sounds deemed most likely to have been produced by an ivory-bill, we can state with some confidence that no Ivory-billed Woodpeckers were present in the area between January 25 and March 17, 2002.

http://birds.cornell.edu/publications/birdscope/Summer2002/ivory_bill_absent.html



Recent site map from Peru

depicting elements of "collecting effort"

Source: Voss & Emmons, AMNH Bull. No. 230, 1996

(by permission: T. Erwin)

***Rheinardia ocellata*, the Crested Argus. Photographed at night by an automatic camera-trap in the Ngoc Linh foothills (Quang Nam Province).**

Courtesy AMNH Center for Biodiversity and Conservation

Dryshippers:

The AM-CC provides researchers with dry-shippers allowing control-rate freezing type of samples collected in the field. Recently, the AM-CC has managed to outfit the small dryshipper (content: 80 vials on cryo-canes) in a external frame backpack, making its transport more manageable.

A manual on how to fill and how to use the dryshipper is provided with it.

AMNH Ambrose Monell Collection for Molecular and Microbial Research

The Ambrose Monell Collection for Molecular and Microbial Research is the American Museum of Natural History's newest research collection. Launched in May 2001, the Monell Collection will house approximately one million frozen tissue samples representing the DNA of a wide range of species. Potentially the largest and most comprehensive initiative of its kind, the Museum's frozen tissue collection will support a broad range of research, and allow scientists, today and in the future, to take full advantage of advances in genomic technology.

http://research.amnh.org/amcc/labfacilities6.html

Ambrose Monell Cryo Collection Database

Database Search

Carcharhinus amboinensis

Phylum	Chordata
Class	Elasmobranchii
Order	Carcharhiniformes
Suborder	[no suborder data]
Family	Carcharhinidae
Subfamily	[no subfamily data]
NCBI taxonomy # *	7806 (click to view NCBI's record)

Determined by	Phaedra Doukakis
Taxonomic history	[no taxonomic history data]
AMCC Barcode #	103713
GenBank #	

click for full-size image



* *Not all species names are currently represented in the NCBI Taxonomy Database. In such cases, the NCBI Taxonomy number associated to an AM-CC specimen reflects the lowest taxonomy category in the NCBI Database that can be associated with the specimen.*

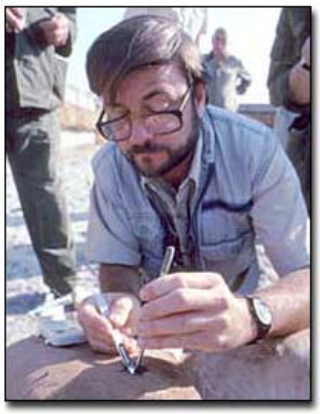
Oliver A. Ryder, Ph.D.

Kleberg Genetics Chair, Head of the Genetics Department
Genetics/CRES

What I Do

ZOO InternQuest Mentor

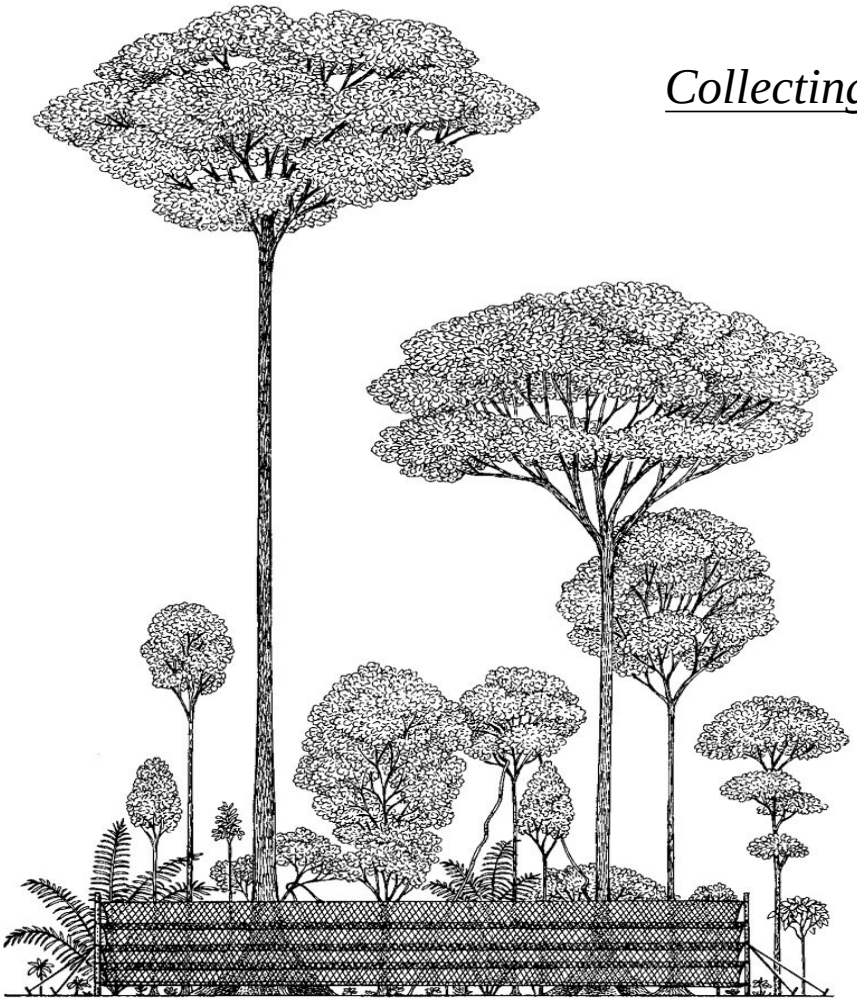
The Zoological Society of San Diego (ZSSD) includes the San Diego Zoo, the Wild Animal Park and CRES. I work for CRES, which is the conservation and resarch arm of the ZSSD. My specialty is genetics, which is the science of heredity (in other words, I study the traits that animals pass on to their babies.) Genetic studies are extremely important to keep our animals healthy, to insure healthy offspring, and to help in the conservation of animal habitat and species survival. As the head of the genetics division at CRES, it is my responsibility to research the genes of animals. We share what we learn with our colleagues around the world. The genetics division of CRES studies chromosomes and DNA, identifies species, finds out who an animal's parents are, and examines whether some animals have developmental problems due to genetic factors. Zoos and scientists studying animals in the wild send us samples, such as hair and feces, and we send the results back to them. We also have what we call the "Frozen Zoo" containing small vials of frozen cells from thousands of mammals, birds, and reptiles. My staff can thaw and grow more cells when needed. A scientist doing research on a rare animal will contact us for some of these cells or



Ollie works on an endangered Przewalski's horse.

Ollie and a colleague examine animal tissue samples preserved in the Frozen Zoo.

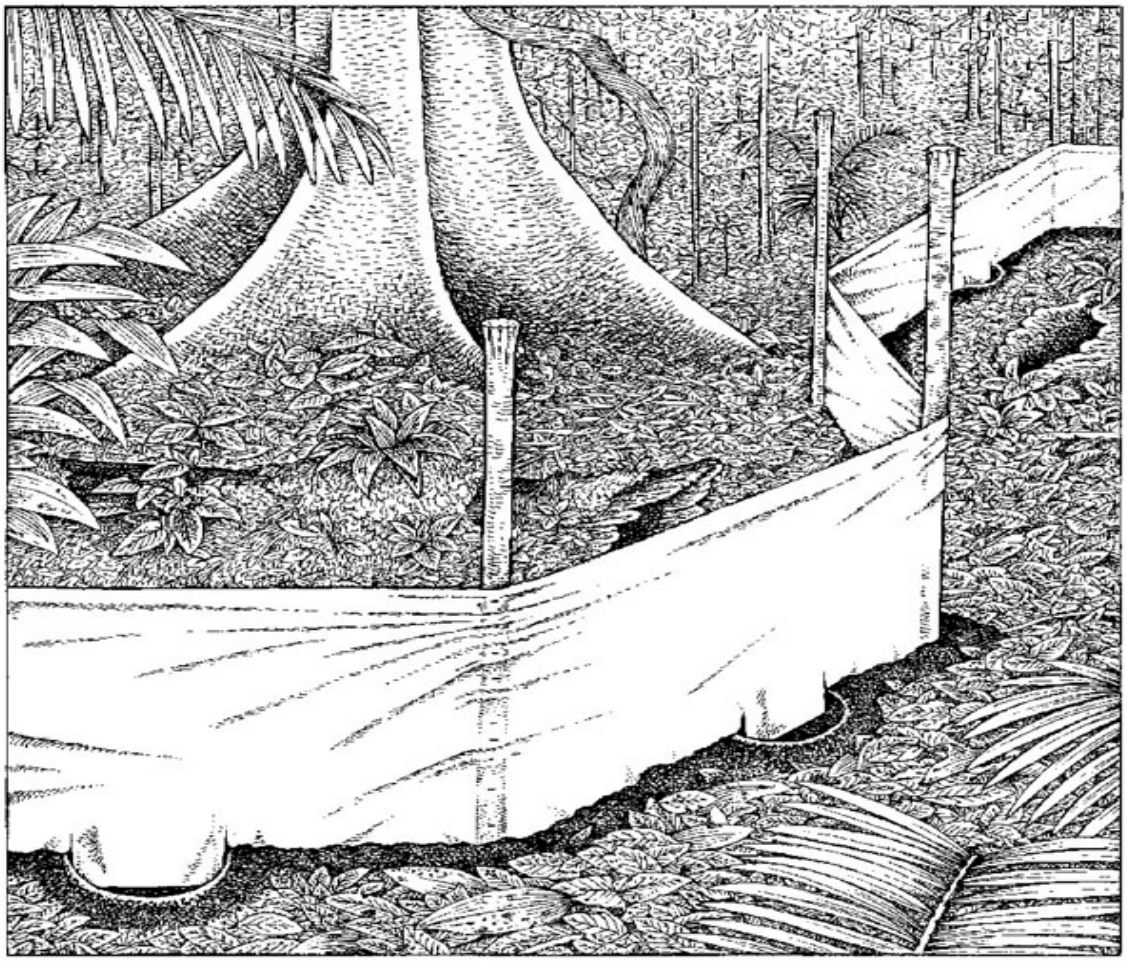
http://www.sandiegozoo.org/wildideas/kids/job_ryder.html



Collecting Methods

Source: Voss & Emmons, AMNH Bull. No. 230, 1996

(by permission)



Collecting Methods

Source: Voss & Emmons, AMNH Bull. No. 230, 1996

(by permission)

CBC-AMNH herpetologist Raoul Bain establishing pitfall trap lines c. 1400m at Mt. Tay Con Linh II.

Collecting fish with seine nets in a Ha Giang stream.

Pitfall trap lines with drift fences for capturing small mammals; located in bamboo forest c. 2000m on Mt. Tay Con Linh II (Ha Giang).

Introducing NSDL Core Integration

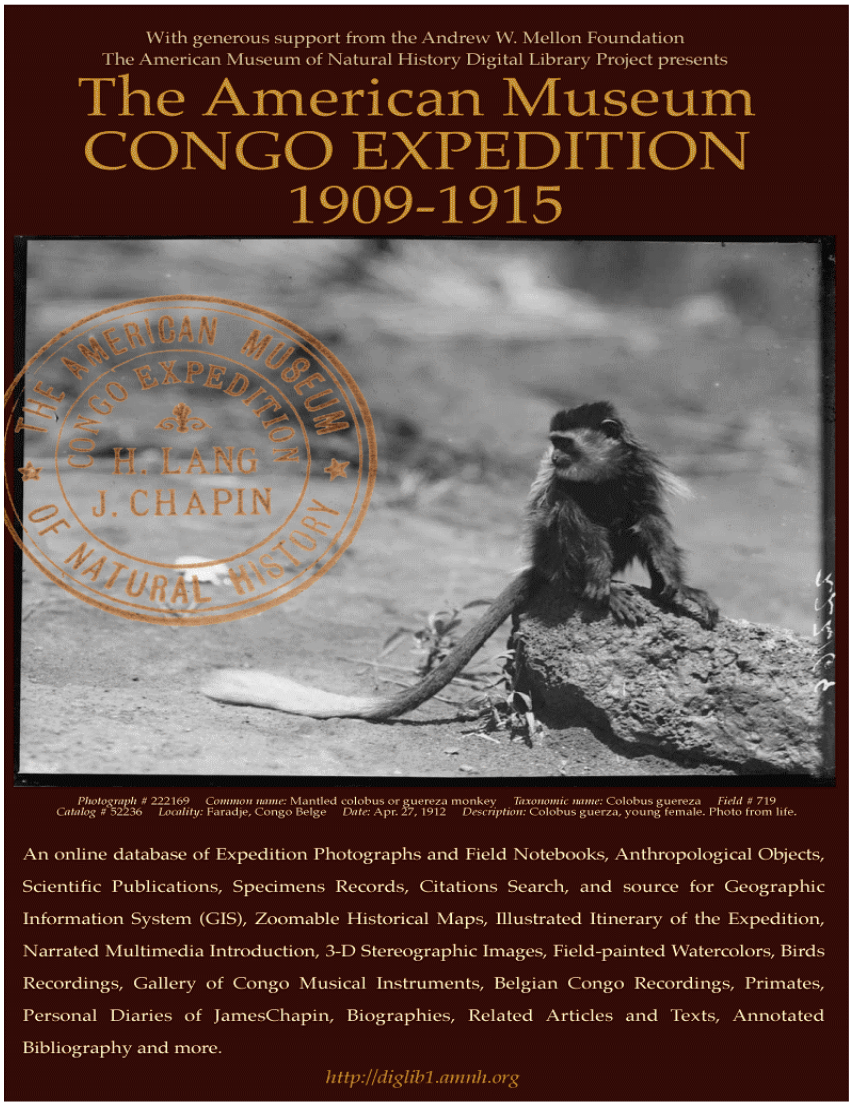
The basic Core Integration role is: enabling the education community, beginning to form around NSDL, to achieve the overarching goals set by the NSF and by the community itself. The immense, multifaceted scope of the NSDL—combined with a highly decentralized strategy for building it—will require CI efforts that are carefully selected and well organized. We have done this by defining five major objectives and three categories of CI effort (which cross all of the objectives): engaging the community, providing the technology and operating core services.

Categories of Core Integration Effort

OBJECTIVES	ENGAGING THE COMMUNITY	PROVIDING TECHNOLOGY	OPERATING CORE SERVICES
Diverse Collections	Seek out Collections Integrate Collections Consult on Metadata	Cataloging Tools Middleware	Collection Registry Metadata Repository
User Interfaces and Library Services	Integrate Service Projects, Consult on Portals	Customized Portals Protocol Library Client Toolkit	Primary Portal Specialized Portals Information Discovery
Educational Excellence	Outreach to Disciplines Workshops and Training Consult on Evaluation	Evaluation Toolkit Tools for Collaboration	Community Portal Usage Statistics
Access and Content Management	Dialogue with Community Models for Access Consult on IP	Authentication Toolkit	User Database Authentication
Framework for Evolution	Plan for Sustainability Develop Business Model Consult on Software	Open Interfaces Open Implementations	Reference Architecture

The relationships between these categories of CI effort and objectives are summarized above. Its rows reflect our analysis of what should be done by the Core Integration team, and its columns indicate how we will proceed.

http://diglib1.amnh.org



"...organic processes have an historical contingency that prevents universal explanation."

Richard Lewontin in *The Triple Helix*

Tom Moritz
Boeschenstein Director of Library Services
American Museum of Natural History
79th St. @ CPW
NY,NY 10024
212 769 5417
tmoritz@amnh.org

http://diglib1.amnh.org
http://library.amnh.org/diglib/resources/index.html