Opening Up the Natural History Heritage for Europeana

COMPONENT REPORT

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Operational content provision (zoology), first report

C4.3.1

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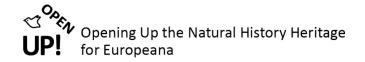Martin Fikáček   NM (zoology, content description)

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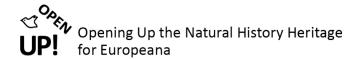
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0 REVISION AND DISTRIBUTION HISTORY AND STATEMENT OF ORIGINALITY

Revision History

Revision	Date	Author	Organisation	Description
Draft 1	2012-07-13	J. Hoffmann	MfN	First draft of document structure
Draft 2	2012-08-10	J. Hoffmann	MfN	Incorporation of content providers comments and content descriptions
Draft 3	2012-08-22	J. Hoffmann	MfN, BGBM	Incorporation of comments and additional paragraphs of NM, ZMFK, BGBM
3a	2012-09-12	Coordination Team (P. Böttinger, A. Michel)	BGBM	Minor editing
3b	2012-10-09	J. Hoffmann	MfN	Update of information

Statement of Originality

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

Distribution

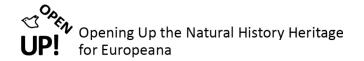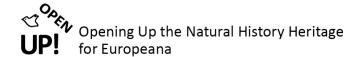| Recipient	Date	Version	Accepted YES/NO
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Project coordinator (W. Berendsohn) BGBM	2012-09-24	3b	yes

Table of Contents

1   INTRODUCTION

Work package 4 is realising the mobilisation and provision of zoological multimedia objects and associated metadata in the OpenUp! project. Furthermore, a model for the integration of paleontological, mineralogical and anthropological multimedia objects was developed and is successfully implemented (see C4.5.0[1]). The standards used for data exchange in WP4 are ABCD 2.06 and ABCDEFG 1.0. WP4 is the only Work package in OpenUp!, which mobilises content from four different domains, such as zoology, palaeontology (zoology and botany), mineralogy, and anthropology.

The quality check of the object associated metadata as well as the display of content in Europeana are important tasks in WP4 in order to assure consistent multimedia objects and metadata standards across all content providers and datasets despite the heterogeneous nature of the content (see also C4.4.1[2]).

Content in WP4 is highly diverse and so far includes digital representations of specimens, labels, field books, maps, and scientific drawings but also digital sound recordings.

Although OpenUp! content provided to Europeana is currently dominated by botanical objects, the value and uniqueness of the zoological content should not be underestimated. The production of multimedia objects for WP4 is limited by the nature of zoological natural history objects themselves. In contrast to botanical specimens, which often are preserved as dried flattened specimens on herbarium sheets, zoological objects are 3-dimensional or represented by audio recordings. They have to be photographed or recorded individually which is a time-consuming process and of course limits the output. Nevertheless, high quality specimen images of zoological objects and sound recordings have a high potential to attract users. In the future, new and more sophisticated imaging technology, like SAT-Scans and Micro-CT, will speed up the production process of zoological multimedia objects.
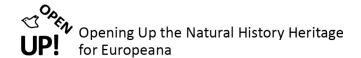
In the OpenUp! Project, not all content providers release their full metadata set to Europeana due to issues with the currently imposed CC0 license on metadata in Europeana (see Europeana Data Exchange Agreement – DEA). Therefore, we differentiate between providers releasing the full metadata set to Europeana (OpenUp! Data Access Agreement unrestricted) and those releasing a restricted metadata set to Europeana (OpenUp! Data Access Agreement restricted). There are two content providers not providing any data to Europeana at the moment, such as RBINS and MRAC. However, the full metadata set of each provider provided in the OpenUp project is stored in an OpenUp! metadata database, which will act as a repository also for other platforms.

This document describes the current status of content provision in WP4 of the OpenUp! project and provides a more detailed description of content currently accessible via Europeana. The technical set up of the BioCASe Provider Software and the mapping of partner's data sources is described in C4.2.0[3] in more detail.

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[1] OpenUp! C4.5.0 - Model for the integration of content from the areas of palaeontology and mineralogy:
http://open-up.eu/sites/open-up.eu/files/u2/C450_Model_for_the_integration_of_content_palaeontology_mineralogy_NM.pdf

[2] OpenUp! C4.4.1 - Data quality check feedback (zoology) (Draft)

[3] OpenUp! C4.2.0 - Local zoological provider software and metadata mapping functional for all data sources (Draft)

2   STATUS OF CONTENT PROVISION

2.1 Overview

The content provided in WP4 in M18 is summarised in Table 1. It shows the number of objects available through BioCASE provider software installations and the number of objects successfully harvested by Europeana. Furthermore, the type of multimedia objects per partners is given. The latest harvest by Europeana was performed beginning of June 2012[4]. The next Europeana harvest is scheduled for mid of September 2012. A more detailed overview including all connected data sources per provider is given in the C4.2.0 – Local zoological provider software and metadata mapping functional for all content data sources, Table 2. Furthermore, there is a frequently updated document maintained by AIT (WP3) on the transformation status[5] of each partner.

Table 1. Content provided by WP4 in M18 of the OpenUp! project.

No.	Provider Acronym	Type of Object[6]	Objects via BioCASe[7]	Objects in Europeana[8]
2	NHM	Image	0	0
3	MFN	image, sound	10,596	**9,402**
6	MRAC	Image	1,137	**n/a[9]**
7	NM	Image	3,806	**2,121**
8	ETI	image, movie, sound	50,035	**47,592**
9	ZFMK	image, sound	13,243	0
10	RBINS	Image	4,074	**n/a[10]**
12	UCPH	Image	170	**164**
15	UH	image, text	3,161	**3,157**
17	NCBN	Image	558[11]	0

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[4] Schedule for Europeana harvest: http://open-up.eu/content/transformation-and-standard-conformance-europeana

[5] Transformation status: http://open-up.eu/sites/open-up.eu/files/u16/OpenUp_Europeana_Ingest_OVERVIEW_120801-web.pdf

[6] Terminology according to Annex 1: Description of Work, Table 1: Underlying content, p. 14

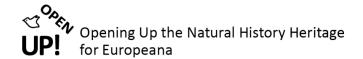[7] Count of distinct file URLs via BioCASe Monitor Service: http://edit.africamuseum.be/biocasemonitor/. Status: 22 August 2012

[8] Multimedia objects accessible via Europeana at www.europeana.eu. Status: 10 August 2012 (except No. 17)

[9] Partner has not signed the OpenUp! DAA, no content in Europeana

[10] Partner has not signed the OpenUp! DAA, no content in Europeana

[11] Status: 31 August 2012

20	UT-NHM	Image	28	0
23	LANDOOE	Image	511	**511**
Total:			**87,319**	**62,947**

2.2 Stages in content provision process in WP4

Here we document the different stages of content provision in WP4 in order to allow a more detailed picture of the current status of content provision for each partner.

2.2.1 Content provision (to Europeana) completed

Definition: content provision for OpenUp! completed, currently no updates of data sources expected

Content providers: UH, RBINS

Description:

University of Helsinki, Finish Museum of Natural History (UH)

The UH indicated in the DoW[12] that they will provide about 8,000 high quality specimens and 30,000 pages of historical accession books in WP4. Unfortunately, images incorporated in this count will not be available for the OpenUp! project due to restriction related to their deposition in JSTOR. However, UH was able to mobilise about 600 specimen images of the Sahlberg collection for Europeana.
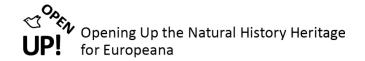
Also the number of pages of accession books to be provided to Europeana was misjudged. The technical set-up of content provision in OpenUp! using the ESE standard does not allow for referencing of different taxa mentioned on one and the same scanned page. Unfortunately, the number of taxa per page, which are individual records for example for GBIF, was used as the basis for the estimation of content being provided to OpenUp!/ Europeana. In Europeana, it is not possible to refer to all taxa listed on the respective page of the accession book, but only to the higher taxa rank, e.g. Lepidoptera or Diptera, represented on one page. This drastically reduced the amount of objects being provided to Europeana from 30,000 to the actual amount of 2,547 scanned pages.

Royal Belgian Institute of Natural Sciences (RBINS)

RBINS indicated in the DoW (B.2.1b. Underlying Content, Table 1, p. 19) that they will provide about 3,000 high quality specimen photographs of beetles in WP4. In fact, they were able to mobilise more than 4,000 multimedia objects for the OpenUp! project. Currently, RBINS has not signed the OpenUp! Data Access Agreement (DAA) for content provision in Europeana and thus their objects are not accessible via Europeana. However, all previous technical steps including a test-harvest for Europeana have been finalized successfully. It remains to be seen whether RBINS will eventually sign the OpenUp! DAA. Given the current situation, RBINS has (over)fulfilled their tasks in content provision for OpenUp!.

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[12] Annex 1: Description of Work, B.2.1b. Underlying Content, Table 1, p. 20-21.

2.2.2 Content provision to Europeana ongoing

Definition: content provision for OpenUp! ongoing, regular updates/ harvests, ongoing connection of new data sources

Content providers: MFN, NM, ETI, Land OOE, UCPH

Description :

These content providers have been successfully harvested by Europeana. However, all these partners will add either new multimedia objects to the existing data sources or will connect new data sources to Europeana in order to fulfil their obligations. Thus, a regular harvest of their data sources will be necessary.

2.2.3 Content provision to Europeana in preparation

Definition: content provision for OpenUp! ongoing, ongoing test-harvest by WP2

Content providers: ZFMK, UT-NHM, (MRAC), NCBN

Description:

These content providers have finalized their technical set-up of the provider software and mapped their data to the OpenUp! standards (ZMFK, UT-NHM, MRAC). They are currently in the process of test-harvesting their data sources for Europeana (only ZMFK, UT-NHM; MRAC has not signed the OpenUp! DAA and there will be no import to Europeana). This process includes modifications of the current mapping according to the established standards in the OpenUp! project. Once the test-harvest is successful, the data sources of the respective providers will be included in the next Europeana harvest.

2.2.4 Technical set-up and metadata mapping

Definition: content provision for OpenUp! ongoing

Content providers: NHM

This content provider is completing the technical set-up of the provider software and mapping their data to the OpenUp! standards.

2.3 ESE vs. EDM

Currently, the numbers of multimedia objects provided to Europeana is limited by the Europeana metadata schema ESE (Europeana Semantic Elements) which cannot handle multiple multimedia objects associated with the same metadata record. However, this is a common case in data originating from the natural history domain and results in a major deviation of the number of objects provided by the provider software and objects accessible in Europeana (see Table 1). Multimedia object of the GloBIS data source provided by the MFN are a good example to illustrate this issue. Here, multiple views of a type specimen were photographed and can be viewed in a taxon-specific website[13]. However, they all are connected to the same metadata

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[13] http://www.globis.insects-online.de/

record. Due to the limitation of ESE only one of these up to four images per specimen can currently be displayed in Europeana, which limits the number of multimedia objects available in this data source from 1,510 to only 382. The new Europeana Data Model (EDM), specifically the concept edm:HasView, will be able to overcome these issues. A more detailed description is given in C3.2.1[14].

2.4   Harvesting and Indexing Toolkit (HIT)

There are some technical issues encountered which are associated with GBIF's HIT tool used for harvesting the content provider's data in OpenUp!

Incompatibility of HIT and ABCDEFG standard

During the test of the model of integration of paleontological and mineralogical content it was discovered that the currently used HIT tool cannot correctly harvest mineralogical data sources. It became clear that HIT always refers to the concept:

/DataSets/DataSet/Units/Unit/Identifications/Identification/Result/TaxonIdentified/ScientificName/FullScientificNameString

in the ABCD standard for indexing the records. For mineralogical data, this concept is not meaningful, but a concept in the EFG extension provides for mineral names:

*/DataSets/DataSet/Units/Unit/Identifications/Identification/Result/**Extension**/MineralRockIdentified/InformalNameString (see also C 4.5.0).*

A preliminary workaround was established in order to harvest a very small portion of mineralogical objects of NM (Prague) for dissemination purposes by mapping the mineral name to the required concept in ABCD. As this is no sustainable solution, currently it is being investigated whether to change the model of integration or to adapt the HIT tool accordingly.
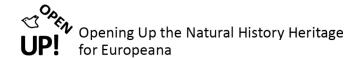
Dropped objects in HIT

Another issue, which limits the objects accessible in Europeana, is that there is a deviation between the objects provided through the BioCASe provider software installation and the number of objects harvested by the HIT tool.

FUB-BGBM together with GBIF is currently investigating what causes objects to be dropped by HIT using small data sources of content providers. First results of this analysis show that in some cases a wrong encoding setting in the BioCASE software (http://wiki.bgbm.org/bps/index.php/DatasourceSetup) is responsible or XML breaking characters (e.g. &, %, $) in the scientific name field cause problems for building up the name range by HIT. This will be investigated further by the technical team.

3   DESCRIPTION OF CONTENT

Here, a detailed description of the type of content provided by WP4 is given. Individual multimedia objects per domain of content already available in Europeana are featured in order to give a better

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[14] OpenUp! C3.2.1 - Domain specific vocabularies for EUROPEANA - interim Concept for inclusion of domain specific metadata vocabularies and contribution to improving access to scientific information via EDM (Version 1)

impression of the nature of the WP4 content. Furthermore, it is indicated what detail of metadata is available and whether a partner provides full metadata access to Europeana or only restricted access.

3.1   Description of Content in Europeana

3.1.1 Museum für Naturkunde Berlin (MFN)[15]

- Metadata provision to Europeana: **unrestricted**

Zoology (Animal Sound Archive & GloBIS)

The Animal Sound Archive (German: Tierstimmenarchiv) is one of the oldest and largest collections of animal voices in the world. Presently, the collection consists of about 120,000 bioacoustical recordings comprising almost all groups of animals.

It was founded in 1951 when Günter Tembrock recorded a wild tawny owl in the garden of the institute of zoology. The aim of the collection was the scientific documentation of animal voices as one expression of animal behaviour. In the first years the work was focussed on the vocal behaviour of red foxes. From January 1952 until April 1966 Günter Tembrock documented the vocalizations of red foxes on 345 tapes with a total duration of more than 20 hours. Under the direction of Günter Tembrock, a motion picture on acoustic communication on red foxes and other canids was produced in 1958. It was worldwide the first film with special attention on acoustic behaviour of animals
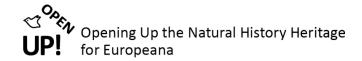
In the middle of the 1950s, the first recordings were made in the two zoological gardens of Berlin. Based on this material Tembrock wrote the review paper on acoustic communication of mammals published in 1963 in Busnels book "Acoustic behaviour of animals". From 1960 more and more animals were recorded in the wild. This was the basis of the series of discs "Voices of the Birds of Central Europe" edited by Günter Tembrock and Michael Schubert published in 1967. While until 1990 the majority of the recordings were made by Günter Tembrock, his collaborators and students, now the collection is being expanded by external collections such as those of D. Langwald (recordings from the Tierpark Berlin), K. Conrads (a large bird sound collection) and G. Hohmann (recordings of primates from India and Sri Lanka).

The butterfly (Lepidoptera) collection of the Museum für Naturkunde Berlin comprises approximately 4 million prepared Lepidoptera specimens. The geographic focus of the Lepidoptera collection is Africa, although other continents are also represented. Various individual collections co-exist, covering either a fauna region or following a taxonomic or ecologic theme (e.g. all taxa of one family). Alongside these individual collections, there is the main collection, which is displayed following taxonomic principles. The oldest parts of the collection are over 200 years old, originating from the late 18th century (coll. Laspeyres, coll. J.C. von Hoffmannsegg). However, other scientifically important collections have either been integrated into the main collection or still exist as separate collections, such as collections by O. Staudinger,

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[15] **MfN in Europeana:**
http://www.europeana.eu/portal/search.html?query=europeana_dataProvider%3A%22Museum+fuer+Naturkunde+Berlin%2C+Tierstimmenarchiv%22

http://www.europeana.eu/portal/search.html?query=europeana_dataProvider%3A%22GloBIS+%2F+Museum+f%C3%BCr+Naturkunde+Berlin%22

R. Püngeler, A. Schultze, H. Stichel, A. Mell and M.E. Hering. In addition, there are large and small collections by A. Bergmann, E. Urbahn, K. Huhst, H. Belling, and H. Steuer as well as the complete repurchased material from several expeditions, e.g. Schäfer 1938-39 or the Augusta River Expeditions [Sepik] 1911-1913.

The type material of the butterflies collection of the Museum für Naturkunde Berlin was documented and photographed in the course of the GART project (The Global Species Register Butterflies or Globales Artregister Tagfalter) and is now available via the Global Butterfly Information System (GloBIS, http://www.globis.insects-online.de/). The aim of the GART project was to provide access to general information about butterflies based on a global taxonomic catalogue. In a first step, a global, fully synonymic species register for two families of butterflies, Swallowtails (Papilionidae) and Whites (Pieridae), was developed based on comprehensive taxonomic databases for these two butterfly groups. Furthermore, all butterfly type specimens housed in the institutional collections of the cooperating GART partners were recorded, photographed, and databased. For selected taxa within the Papilionidae and Pieridae, a comprehensive species information system was developed offering data about distribution, ecology, and morphology of individual species as well as links to other existing data sources

Example in Europeana:

GloBIS/ MFN:

http://www.europeana.eu/portal/record/11609/514E4196A35D2A02CE8310757D3733B8AE31F690.html?query=zerynthia+caucasica

*Zerynthia caucasica (*Lederer, 1864)

The pictured butterfly is the type specimen of the species Zerynthia caucasica (Lederer, 1864) and is deposited in the butterfly collection of the Museum für Naturkunde Berlin. This butterfly species originates from Russia. Representatives of the genus Zerynthia belong to the swallowtail butterflies placed in the subfamily Parnassiinae (Snow Apollos).

Animal Sound Archive:

http://europeana.eu/portal/record/11611/F9C22A5E57822DDF6D6899ACE935D8468DD45A2E.html?start=9&query=Tierstimmenarchiv&qf=text:Asio%20otus

Asio otus (Linnaeus, 1758) – Northern Long-eared Owl

For Europeana a short representative snippet of the original sound recording was produced. You can hear an adult female and two fledglings. The length of the original recording is 6:26 minutes.

Additional information on multimedia object in metadata:

Animal Sound Archive: scientific name, age, sex, collector, collection time, biotope, locality (country, area, coordinates, description), description

GloBIS: scientific name, higher classification, synonymy, type status, year of identification, locality (country, area), notes

3.1.2 National Museum, Prague (NM)[16]

- Metadata provision to Europeana: **unrestricted**

Zoology (including Entomology)

The zoological collection of the National Museum comprises over two million specimens. The most numerous groups are some of the invertebrates (corals, worms, mollusks, spiders and echinoderms) and all classes of vertebrates. The collections are divided into five sections: evertebrates (invertebrate animals except for insects), ichthyology (fish), herpetology (amphibians and reptiles), ornithology (birds) and mammals. Insects are not part of the zoology department's fund, but are handled by a separate entomology department in the National Museum.

The zoological collection of the National Museum in Prague was established in 1818, when the museum as a whole was founded. Numerous specimens acquired at this time were already historical items back then and comprise a significant part of the collection. An especially interesting piece is the beak of a Mauritian Dodo (*Raphus cucullatus*)*,* evidently from an animal kept at court by the emperor Rudolf II during the early 17th century. The collection has been constantly enlarged, primarily by donations from various collectors and travelers, as well as targeted activity by the museum staff. For example, Emil Holub donated a significant collection of African animals. Today the collections are supplemented almost exclusively by field work of the department employees, each of whom specializes in certain geographic areas and taxonomic groups, e.g. bats of the Palearctic and Africa, fresh-water Mediterranean fish or South American amphibians. An important part of the collection is the set of documentary examples of now-extinct species. This includes a young great auk (*Alca impennis*, two male Labrador ducks (*Camptolaemus labradorit*), a Tasmanian tiger or Thylacine (*Thylacinus cynocephalus*) and a Cape Verde Giant Skink (*Macroscincus coctei*).

The collection of the Department of Entomology of the National Museum, Prague contains mainly primary type specimens, non-type specimens from historical collections, and non-type specimens of the species of special importance for the public (iconic insects, pest species, and endangered species).

Example:

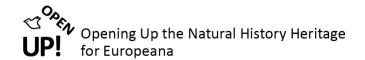http://www.europeana.eu/portal/record/11613/A72CDA787111290C0BA7B717B2224E4B9EDB3429.html?start=308&query=europeana_dataProvider%3A%22N%C3%A1rodn%C3%AD+muzeum%22&startPage=301

Cobitis ohridana Karaman, 1928

This is a ray-finned fish in the true loach family (Cobitidae).

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[16] **NM in Europeana:**
http://www.europeana.eu/portal/search.html?query=europeana_dataProvider%3A%22N%C3%A1rodn%C3%AD+muzeum%22

http://www.europeana.eu/portal/record/11613/08F0B80CE3A79FB44532968E738A75D7D2C0E33D.html?start=388&query=europeana_dataProvider%3A%22N%C3%A1rodn%C3%AD+muzeum%22&startPage=385

Helophorus crinitus Ganglbauer, 1901

Additional information on multimedia object in metadata:

Zoology: scientific name, higher classification, collector, collection time, locality (country, area description, coordinates, altitude),

Entomology: scientific name, higher classification, type status, collector, collection time, locality (country, area description)

Anthropology

The anthropological department of the National Museum houses over 30,000 items in its collections, divided into four main groups. The first consists of around 540 specimens documenting the phylogenetic development of humans. This sub-collection contains casts of significant world finds and several original finds from the lands of former Czechoslovakia - a travertine Neanderthal braincase effusion from "Hrádok" in Gánovce near Poprad, remains of an anatomically modern human from the Zlatý Kůň cave near Koněprusy dated to the Magdalenian culture and remains of apes from the Tertiary-Quaternary boundary from Ivanovice near Třenice and Hajnačka Nera Filákovo.

The second, most extensive sub-collection contains skeletal remains of previous populations, dated from the Neolithic up through the present. The collection has specimens from around 25,000 individuals, from archeological digs in former Czechoslovakia, today the Czech Republic. It is one of the largest collections of former populations of Europe. The oldest human remains are from the late Stone Age, (5000 - 4000 B.C.). Examples are graves from the Linear Pottery culture of Bžany, graves of Stroke-Oriented ware culture from Liběchov and cremation sites from Velešovice from the Moravian colored ceramic culture. Most of the skeletons come from the medieval age, from Great Moravian cemeteries (Mikulčice, Prušánky) and from the early days of the Czech state (Stará Kouřím, Libice).

The third sub-collection is a set of pathological changes and oddities in skeletons and soft tissue of human bodies, from the 19th-20th centuries. It contains around 6000 specimens, transferred to the National Museum from the first medical faculty of Charles' University. It is an immensely valuable collection for comparison research, since we generally have demographic data on the afflicted individual, as well as the diagnosis and course of the disease. Part of the collection is a set of mounted skeletons documenting overall disruptions in growth, a large set of pelvic and long bone afflictions, skulls with syphilitic changes, skulls with prematurely fused seams and signs of variously healed injuries.

The fourth sub-collection is a set of casts of death masks, skulls and hands of significant persons and face casts of various ethnic groups. The collection contains, for example, death masks of famous Czech politicians (T. G, Masaryk, E. Beneš), artists (V. Nezval, B. Martinů) and scientists (J. E. Purkyně, J. Heyrovksý). There are also masks of Bushmen, Eskimos, Mongols and Indians, and a set of recent skulls of Chalcha-Mongols. The collection contains about 280 specimens.

Example in Europeana:

http://www.europeana.eu/portal/record/11613/F429FB5A0B872FF91D56BF0DE29AFDB3EFBC1187.html?start=236&query=europeana_dataProvider%3A%22N%C3%A1rodn%C3%AD+muzeum%22&startPage=229

Homo sapiens: Human skull from the Bronze Age.

Additional information on multimedia object in metadata: scientific name, culture, stratigraphy, part of organism, locality (area description)

Palaeontology (Botany & Zoology)

From its founding in 1818, the National Museum's collections have been enriched by private paleontological collections. The core of the fund was the extensive collection of Caspar count Sternberg, containing Carboniferous, Permian, Mesozoic and Cenozoic flora, including many type specimens. Sternberg's monograph "Versuch einer geognostisch-botanischen Darstellung der Flora der Vorwelt" is the first publication that serves as a source of valid paleobotanical nomenclature. At the end of the 19th century, the museum acquired Joachim Barrande's collection of early Paleozoic fauna, containing several thousand type specimens, described in the comprehensive monograph "Système Silurien du Centre de la Bohême". Another sizeable increase of the museum's wealth came courtesy of Antonín Frič, who expanded primarily the late Paleozoic and Mesozoic collections. His work "Fauna der Gaskohle und der Kalksteine der Permformation Böhmens", describing late Paleozoic vertebrate fauna was twice awarded the Lyell medal. However, Frič's most important contribution was the creation of a systematic paleontological structure, which is utilized in the field to this day. These funds today contain numerous additional collections of original and type material cited in hundreds of professional publications. In the almost 200 years of its existence, this collection has grown to the point that it now belongs among the most important databases in the world in the field of palaeontology. It contains unique type and documentary material, as well as scientifically valuable fossils - over five million, accessible to researchers all over the world.

The collection is divided into individual sub-collections, whose members document the developmental history of the collection as a whole. The principal criterion is stratigraphic placement, then further subdivisions are on the basis paleozoology versus paleobotany. The only collection separated from the stratigraphic division is the paleozoological vertebrate collection. The paleontological collections are divided as follows: early Paleozoic invertebrates, early and late Paleozoic plants, Mesozoic invertebrates, Mesozoic and Cenozoic plants, Cenozoic invertebrates and all vertebrates.

In view of its geological variety and paleontological significance, much of the museum's collection activity focuses of the Czech Massif, but the wider European geographic context is not neglected. A similar set of detailed paleontological data from central European localities is a valuable basis for complex paleographic, paleoecological and stratigraphic studies.
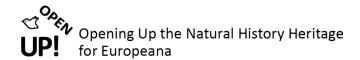
The paleontological collection is currently housed in the museum's new depositories, which have good spatial and laboratory capacities for continued development.

Example in Europeana:

http://www.europeana.eu/portal/record/11613/AE03394691CE5815518BF55DBEB5F0835D895423.html?start=181&query=europeana_dataProvider%3A%22N%C3%A1rodn%C3%AD+muzeum%22&startPage=181

Calamostachys germanica Weiss: Fossil plant.

Additional information on multimedia object in metadata: scientific name, higher classification, collector, stratigraphy, locality (country), reference

Mineralogy

The Mineralogical collection of the National Museum (Prague, Czech Republic) is a unique collection of mineral samples from all over the world, with a particular interest in minerals from the Czech Republic and Europe.

The origin of this collection is closely related with the foundation of the National Museum in 1818 by a group of people around the earl Kašpar Šternberk. From the original 8500 pieces, the collection has expanded into today's more than 92,000 individually registered items. The collection contains mineral samples that were parts of mineral collections created as early as in the 17th and 18th centuries. These historical samples came to the National Museum together with the collection of the former Prague German University and with the collections of aristocracy forming the basis of the National Museum resources at its establishing. However, most of the minerals represent samples acquired by collecting in localities since the 19th century. In this period the collection was extended by donations, purchase and exchange as well as direct collecting by the museum employees in quarries, mines and other natural places.

The mineralogical collection nowadays contains about 1700 mineral species in various forms from the Czech Republic and world localities. The mineralogical collection is an archive of natural materials illustrating a very multifarious mineralogical situation, often in places that are lost or inaccessible these days, such as closed mines, quarries and other natural places. The collection contains both esthetical mineral samples of immense value (e.g. unique samples of gold sheets from Křepice) and purely documentation samples, i.e. less common or rare mineral species (including holotype specimens) with mostly scientific value.

Example in Europeana:

http://www.europeana.eu/portal/record/11613/808AC09590C29C45EF49518B8B0109A00BDE2AC8.html?start=379&query=europeana_dataProvider%3A%22N%C3%A1rodn%C3%AD+muzeum%22&startPage=373

Johannite: Aggregates of johannite crystals.

Additional information on multimedia object in metadata: mineral Name, locality (country, area), description, reference

3.1.3 Stichting Expertisecentrum voor Taxonomische Identificaties (ETI)[17]

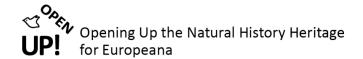- Metadata provision to Europeana: **unrestricted**

Zoology

Since 1990 ETI BioInformatics works with the taxonomic community to develop digital species information and identification systems in the form of e-monographs and e-publications.

For OpenUp! ETI provided more than 56.000 images of a broad range of animal species for WP4, including worldwide or regional overviews of e.g. Bats, Corals, Crabs, Fishes, Insects, Lemurs, Mushrooms, Plankton, Sharks and Turtles. Spectacular are the almost thousand images from the 'Van der Laan Collection' on

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[17] **ETI in Europeana:**
http://www.europeana.eu/portal/search.html?query=europeana_dataProvider%3A%22ETI+BioInformatics%2C+Leiden%2C+the+Netherlands%22

zooplankton and micronekton species, which were made of living animals on an expedition vessel at sea. Very rare are the historical images of ETI's e-publication 'Bloch's Fishes Revisited': over 400 color plates published in 1782-1795. Unique are also the 1800 images of bird feathers in various magnifications that are an aid to the identification of bird remains in airplane engines. In addition to these images 800 sound and movie files have been made accessible through OpenUp! These provide an aid for identifying birds, marine mammals, lemurs, and frogs. Also almost seven hundred 3D QuickTime VR images were made available of bird type specimen and of extinct bird species, as well as of squid beaks.

Additional information on multimedia object in metadata: scientific name, description

3.1.4 University of Helsinki, Finnish Museum of Natural History (UH)[18]

- Metadata provision to Europeana: **restricted**

Zoology (Sahlberg & Notebooks)

The man who did the most for Finnish entomology and particularly for the insect collections at the end of the 19th century was John Sahlberg (1845-1920). He collected many more insects than anybody else, and he described hundreds of new species. He made expeditions to various parts of Finland, to Russian Karelia, Siberia, the Mediterranean area, and to Central Asia. Furthermore, during his work as assistant professor at the museum he united the many previously separate collections, thus facilitating their use.

John Sahlberg was also an inspiring teacher, who attracted many students. The most international acclaim would later be given to Bertil Poppius (1876-1916), Walter Mikael Axelson (later Linnaniemi) (1876-1953) and Antti Silfvenius (later Siltala) (1878-1910); Poppius specialized in Coleoptera, Axelson in Collembola and Silfvenius in Trichoptera. They collected large numbers of insects for their studies and gave material to the museum. Many others also received guidance from Sahlberg, and many of them collected insects at least while university students, in some cases afterwards, too. We should at least mention Aulis Westerlund (1870-1898), who mainly collected Hymenoptera, Johan Emil Aro (1874-1928), who studied Ephemeroptera, and Karl Emil Stenroos (later Kivirikko) (1879-1947). Many of Sahlberg's students made collecting trips within Finland, with some going even further, for instance to Siberia and Central Asia.
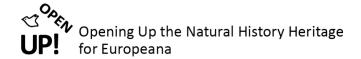
Sahlberg's type specimen (the original specimen from which he made the description of a new species) where chosen to be a pilot project for digitizing insect specimen at the Finnish Museum of Natural History.

Finnish Museum of Natural History keeps about three hundred collection notebooks that include data relating to the older parts of the insect collections of the museum. These entomological notebooks are basically catalogues containing sample numbers and collection data about insect specimens.

Back in the time of ink pen it was impossible to fit much data on small hand-written labels that were put to the same needle with insect samples, so a separate notebook for recording sample data was kept.

Data included at least collector's name, collection date and locality. In addition, information on possible host plant, method of collection, hatching date of specimens collected as eggs or larvae etc. could be recorded. Notebooks can also include quite detailed information about the geology, soil characteristics and weather conditions of the collection locality, as well as other habitat details. One can also find hand drawn maps,

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[18] **UH in Europeana:**

http://www.europeana.eu/portal/search.html?query=europeana_dataProvider%3A%22Finnish+Museum+of+Natural+History%22

excursion budget calculations and different kinds of descriptions of the collection events and other happenings. The oldest notebooks date back to 1860's and include collection data of several entomologists in one book. However, most of the books are personal notebooks of one collector, whether a professional entomologist or a hobbyist collector.

Example in Europeana:

Sahlberg:

http://www.europeana.eu/portal/record/11604/D357C7F28E717C2072EE9F8BB99F8942D9BFEFC2.html?start=263&query=europeana_dataProvider%3A%22Finnish+Museum+of+Natural+History%22&startPage=253

Notebooks:

http://www.europeana.eu/portal/record/11604/99E98820CDE9BA460C09E770DF1E2D97B95DCA70.html?start=7&query=europeana_dataProvider%3A%22Finnish+Museum+of+Natural+History%22

Additional information on multimedia object in metadata:

Sahlberg: scientific name, type status, collector, locality (continent, country, area description), notes, reference

Notebooks: scientific name (higher taxa), collector, biotope, locality (country, area, area description), notes

3.1.5 Land Oberösterreich – Oberösterreichische Landesmuseen/ Biologiezentrum (LANDOOE)[19]

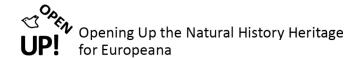- Metadata provision to Europeana: **restricted**

Zoology

The Biology Center in Upper Austria represents the largest natural history collection in the federal state of Upper Austria and the second largest in Austria, next to the Natural History Museum in Vienna. The Biology Center contributes zoological and botanical content to the project OpenUp!

By now, several hundreds of images of molluscs are provided to OpenUp!. In the year 2002, the Biology Centre bought the collection of Prof. Fritz Seidl (1936-2001). He was born in Braunau am Inn (Upper Austria) and started to work in his parents company, which he took over later. Beside his job, Fritz Seidl was engaged in collecting and investigating snails and mussels. He completed his knowledge thoroughly and became one of the most qualified experts (some called him in a friendly and funny way "snailologist"). In 30 years he established one of the largest Austrian private collections of snails and mussels in 650 drawers in four self-made cupboards.

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[19] **Land OOE in Europeana:**
http://www.europeana.eu/portal/search.html?query=europeana_dataProvider%3A%22Biologiezentrum+der+Oberoesterreichischen+Landesmuseen%22

Example in Europeana:

http://www.europeana.eu/portal/record/11613/808AC09590C29C45EF49518B8B0109A00BDE2AC8.html?start=379&query=europeana_dataProvider%3A%22N%C3%A1rodn%C3%AD+muzeum%22&startPage=373

This specimen of *Murex troscheli* is deposited in the collections of the Biology Center in Linz (Austria). *Murex troscheli* is a predatory sea snail and occurs on sandy bottom of the shelf sea from Indopacific Region to Japan. Its total length is about 10 cm. *M. troscheli* belongs to the family of Muricoidea, the so-called rock snails.

Additional information on multimedia object in metadata: scientific name, identifier, collector, locality (country, area description), collecting time

3.1.6 University of Copenhagen, Natural History Museum of Denmark (UCPH)[20]

- Metadata provision to Europeana: **unrestricted**

Zoology

The Natural History Museum of Denmark holds a total of about 14 million specimens in botany, zoology and geology. The zoological contribution to OpenUp! will primarily be images of the types at UCPH (museum acronym ZMUC). The first contribution consists of micro-photos of the Kinorhynca (a group of marine worms) type collection at the Natural History Museum of Denmark.

Example:

http://www.europeana.eu/portal/record/11615/67252757D3002EC00B76BE7F68E740159462FF0A.html?query=tubilak

This is *Echinoderes tubilak* Higgins and Kristensen 1988, collected in Disko, Greenland, and named after the Greenland spirits, called tubilaks. The original description of this species (protologue) is online available at http://www.sil.si.edu/smithsoniancontributions/Zoology/pdf_hi/SCTZ-0458.pdf.

Additional information on multimedia object in metadata: scientific name, locality (area, area description, water depth), collector, collecting time, collecting method

3.2 Description of content – Coming soon…

3.2.1 Tartu Ulikool (UT-NHM)

- Metadata provision to Europeana: **restricted**

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[20] **UCPH in Europeana:**
http://www.europeana.eu/portal/search.html?query=europeana_dataProvider%3A%22Natural+History+Museum+of+Denmark%22

Natural History Museum at Tartu University collects and preserves specimens of plant, fungus and animal kingdom, and geological objects, in amount of 1068677 specimens.

The geological collections contain 80 701 items. There are 17 different collections in the museum which contain type specimens as well as. Most impressive are the materials collected from Estonia.

Zoological collections include 89 000 specimens of vertebrates and 300 000 specimens of mollusks and insects, the biggest among them is the collections of *Ceratopogonidae.*

Additional information on multimedia object in metadata: scientific name

3.2.2 Zoologisches Forschungsmuseum Alexander König (ZFMK)

- Metadata provision to Europeana: **restricted**

The Verkest Archive - A ZFMK Project

Between 1955 and 2003 the self-taught insect photographer José Verkest (1917-2005) took about 126,000 pictures of arthropods, identified them and recorded the date and time of each picture. The Zoologisches Forschungsmuseum Alexander König in Bonn, Germany made it a project digitising the archive. Due to its size, the collection was divided into two batches of about 63,000 pictures each, the first batch being digitized at present and presumably available by autumn or winter 2012.

Most of the pictures taken during those 48 years show insects or spiders and were taken in different regions of Europe, mainly Germany, Belgium, Hungary, Italy, France and Spain. Beside the mere record of a taxon, a date and a place, José Verkest also wrote down his observations on the development and interactions of arthropods, thus producing about 5.600 handwritten pages contained in 26 diaries not yet digitised.
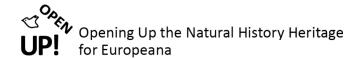
Furthermore, ZFMK will add around 500 butterfly and moth type specimens of the Forschungsmuseum Alexander König in Bonn, as another component of the GloBIS data source

Additional information on multimedia object in metadata: scientific name, locality (continent, country, area description, coordinates), gathering (agent, time)

3.3 Description content not provided to Europeana

Due to the enforced CC0 license on metadata two providers have not signed the OpenUp! DAA and thus do not provide any content to Europeana. However, these partners still follow the OpenUP! technical requirements and provide their content via the BPS to other platforms, e.g. GBIF.

3.3.1 Royal Belgian Institute of Natural Sciences (RBINS)

- Metadata provision to Europeana: **no provision of content to Europeana, OpenUp! DAA not signed**

Zoology

A pictorial atlas of remarkable beetles form the collections of the Royal Belgian Institute of Natural Sciences consisting of more than four thousand pictures of Cetoniidae, Buprestidae, Cerambycidae and other miscellaneous families of beetles (Coleoptera) from all over the world collected in the last hundred years.

Example:

http://projects.biodiversity.be/openup/rbins/4.jpg

Eutrachelus temminck: Beetle.

Additional information on multimedia object in metadata: scientific name, locality (country)

3.3.2 Musée royal de l'Afrique centrale, (MRAC)

- Metadata provision to Europeana: **no provision of content to Europeana, OpenUp! DAA not signed**
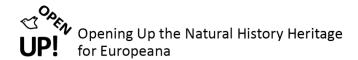
Zoology

The amphibian collection of the Royal Museum for Central Africa, Tervuren, Belgium holds about 140,000 registered specimens mainly originating from Central Africa. Primary types (i.e. holotypes and syntypes) are highly valuable for scientists as they are the reference material used in describing new taxa (species or subspecies). The most important authors of the type material in the RMCA are Gaston-François de Witte (curator 1919-1936) and Raymond Laurent (curator 1949-1960). From this collection, a set of primary types was photographed as part of a digitisation project funded by the Belgian Science Policy Office (BELSPO) and will be made available through the OpenUp! project to the interested public, also allowing access through the Global Biodiversity Information Facility (GBIF). Altogether 159 specimens are represented at least in dorsal (back) and ventral (belly) view, in total 323 photographs. The worldwide decline of amphibian populations, mainly due to habitat destruction, is accelerated by the rapidly spreading fungus *Batrachochytrium dendrobatidis*, and gives the study of amphibians a high priority, and good species recognition becomes crucial*.*

Most amphibians depend on both aquatic (larvae) and terrestrial (adult) environmental effects. The permeability of their skin makes them highly susceptible to toxins. Amphibians are seen as highly sensitive bio-indicators and may be regarded as "canaries in a coal mine" indicating that other groups of animals and plants will soon be at risk.

Example:

http://193.190.223.55/images/openup_herpnet/herpRMCADetails.php?image=RMCA_B.112074_D

Worldwide nearly one-third of the 6,300 known amphibian species are threatened and 397 species are now considered "critically endangered". Among those, *Conraua derooi* Hulselmans 1972 (Togo Slippery Frog) was already listed as critically endangered on The IUCN Red List of Threatened Species in 2004.

OUTLOOK

Currently (M18), about 580,000 natural history objects are provided by the OpenUp! project (WP4 & WP5) to Europeana[21]. In order to achieve the goal of 600,000 objects in Europeana by the end of the second project year (performance indicator 1), 20,000 objects have to be mobilised in the coming 6 months. However, a number of content providers are already in the process of test-harvesting their data. Thus, it can be assumed that the performance indicator 1 for the second project year will be reached without any problems.

The two content providers, which have not signed the OpenUp! DAA are further approached in order to convince them to eventually provide multimedia objects to Europeana. Actually, one partner (RBINS) was successfully test-harvested for Europeana and there are ongoing negotiations whether this content will be finally displayed in Europeana.

A main focus for the coming 12 months will be, next to a more thoroughly quality check of the data, to connect the rest of the content providers in WP4 to Europeana and mobilise new content either in the institutions already being partner of the project or by attracting new content providers.
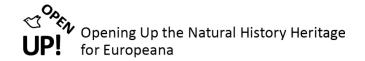
4 LIST OF REFERENCES

- Annex 1: Description of Work, Table 1: Underlying content, p. 14

- B. Jacob, J. Hoffmann & F. Theeten: C4.2.0 - Local zoological provider software and metadata mapping functional for all data sources (Draft)

- J. Hoffmann: C4.4.1 - Data quality check feedback (zoology) (Draft)

- K. Zágoršek , J. Sejkora & J. Hoffmann, 2012: C4.5.0 - Model for the integration of content from the areas of palaeontology and mineralogy: http://open-up.eu/sites/open-up.eu/files/u2/C450_Model_for_the_integration_of_content_palaeontology_mineralogy_NM.pdf

- G. Koch, O. Benda, A. Höller & W. Koch: C3.2.1 - Domain specific vocabularies for EUROPEANA - Interim concept for inclusion of domain specific metadata vocabularies and contribution to improving access to scientific information via EDM (Version 1)

Links & Services:

BioCASe Monitor Service v1.0: http://edit.africamuseum.be/biocasemonitor/

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[21] **OpenUp! content in Europeana:** http://www.europeana.eu/portal/search.html?query=*:*&qf=PROVIDER:OpenUp%21

Europeana: www.europeana.eu

GloBIS (Global Butterfly Information System): http://www.globis.insects-online.de/

Content in Europeana:

OpenUp! content in Europeana:
http://www.europeana.eu/portal/search.html?query=*:*&qf=PROVIDER:OpenUp%21

MfN in Europeana:
http://www.europeana.eu/portal/search.html?query=europeana_dataProvider%3A%22Museum+fuer+Naturkunde+Berlin%2C+Tierstimmenarchiv%22

http://www.europeana.eu/portal/search.html?query=europeana_dataProvider%3A%22GloBIS+%2F+Museum+f%C3%BCr+Naturkunde+Berlin%22

NM in Europeana:
http://www.europeana.eu/portal/search.html?query=europeana_dataProvider%3A%22N%C3%A1rodn%C3%AD+muzeum%22

ETI in Europeana:
http://www.europeana.eu/portal/search.html?query=europeana_dataProvider%3A%22ETI+BioInformatics%2C+Leiden%2C+the+Netherlands%22

UH in Europeana:
http://www.europeana.eu/portal/search.html?query=europeana_dataProvider%3A%22Finnish+Museum+of+Natural+History%22

Land OOE in Europeana:
http://www.europeana.eu/portal/search.html?query=europeana_dataProvider%3A%22Biologiezentrum+der+Oberoesterreichischen+Landesmuseen%22

UCPH in Europeana:
http://www.europeana.eu/portal/search.html?query=europeana_dataProvider%3A%22Natural+History+Museum+of+Denmark%22

5 LIST OF TABLES

- Table 1. Content provided by WP4 in M18 of the OpenUp! project