Imaging Collections

Loïc Costeur

naturhistorisches museum Basel

archive des lebens

Why?

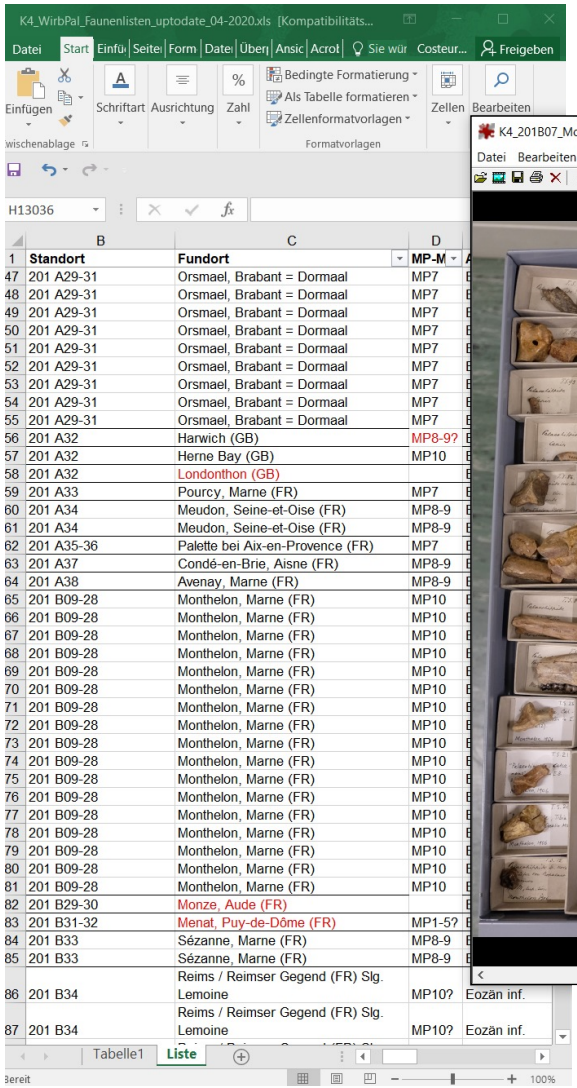
support management

facilitate everyday work
facilitate asset identification
facilitate digitization
open new projects

improve long-term conservation

serve research purposes

serve educational/promotional purposes



What?

Collection units

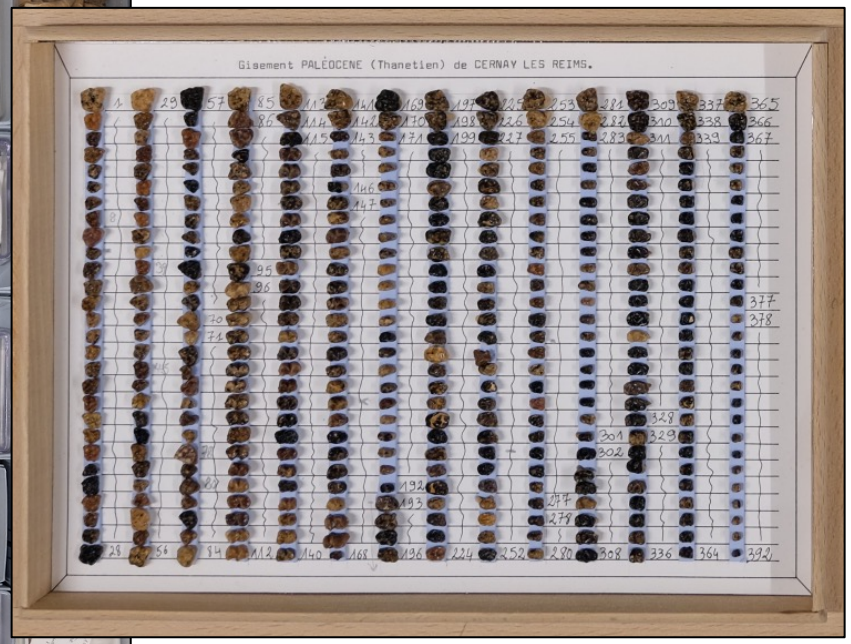
Drawer

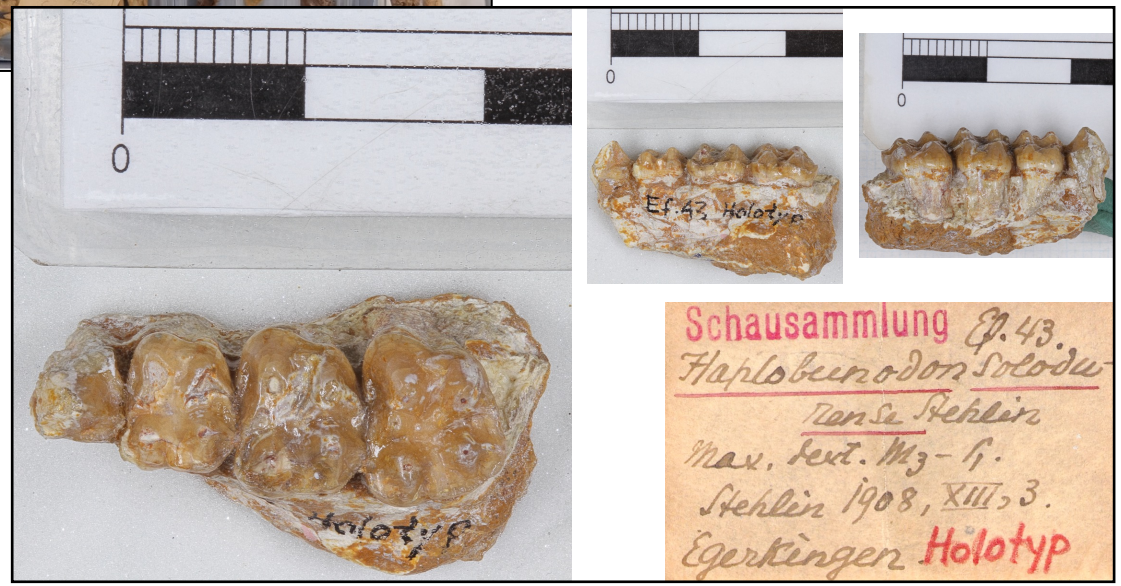
Box

Labels
Objects
Image

easy

Time consuming





"Drawer-level digitization has become the most practical way of unlocking the research potential for natural history collections"

Hudson et al., 2015 – PLoSONE

How?

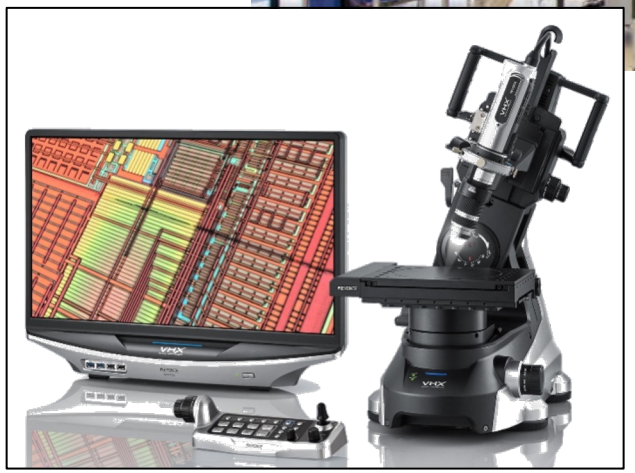
How you want and how you can !!

Be pragmatic

Depends on:

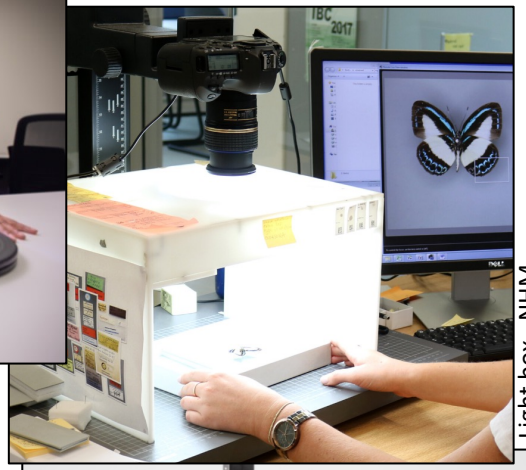
- PURPOSE
- collection size & type
- 2D
- 3D
- external/internal
- unit size
- time
- resources

Conveyor Belt - Picturae



Digital microscope - Keyence

3D surface scanner - Artec



Light box - NHM

CT-scanner - GE

Archivscanner-Museumsscanner - Walter Nagel

How?

How you want and how you car

Be pragmatic

Depends on:

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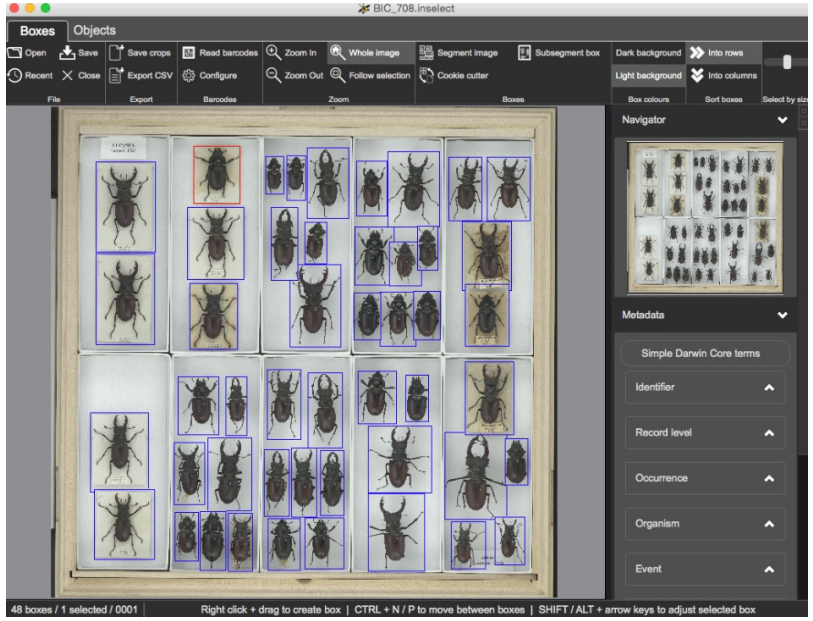
Inselect

Open source



PLOS ONE

OPEN ACCESS PEER-REVIEWED

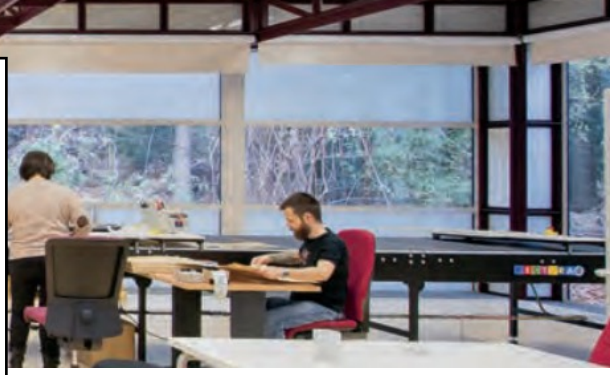
RESEARCH ARTICLE

Inselect: Automating the Digitization of Natural History Collections

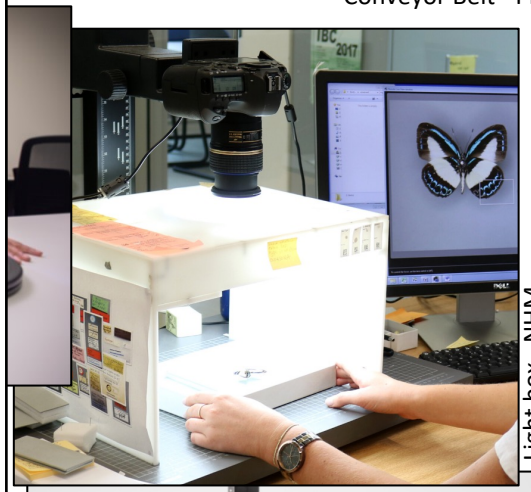
Lawrence N. Hudson, Vladimir Blagoderov, Alice Heaton, Pieter Holtzhausen, Laurence Livermore, Benjamin W. Price, Stéfan van der Walt, Vincent S. Smith

Published: November 23, 2015 • https://doi.org/10.1371/journal.pone.0143402

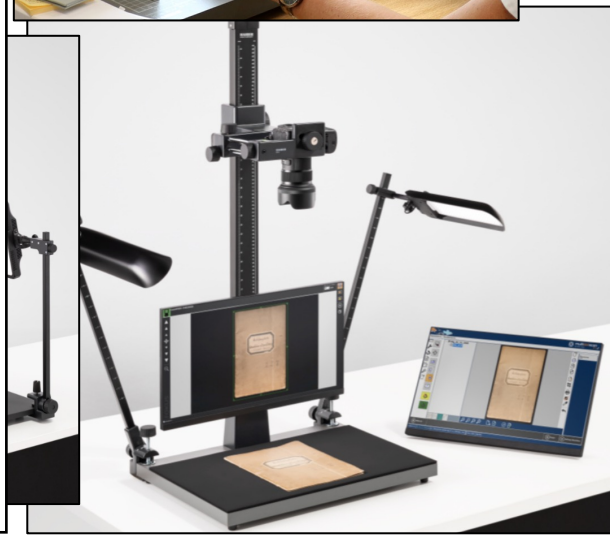
https://naturalhistorymuseum.github.io/inselect/



Conveyor Belt - Picturae



Light box - NHM



Archivscanner-Museumsscanner - Walter Nagel

Technical recommendations

For 2D static images

at least 300 ppi
RAW or TIFF (JPEG)

capture data (don't do art)
stack for depth when possible

image labels (600 ppi)

homogeneous background
(adapted to object colour)

scalebar / colour chart

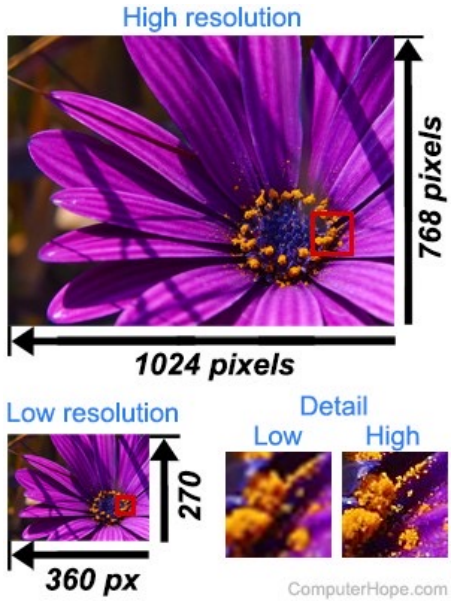
light box when possible
(Colour Rendering Index >95)

Licence CC/Rights holder

For whole-drawer imaging

try bar-coding the drawers
(before)

try homogeneous pictures

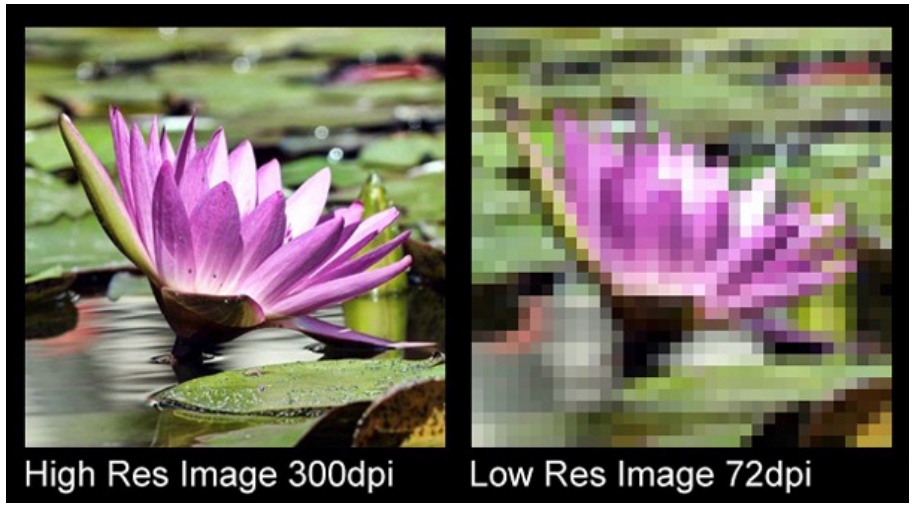


For 3D images

OBJ or PLY (STL)

DICOMs (TIFF) for CT

record scanning resolution
(add info file as attachment)



For videos & audios

MOV or MPEG-4 (h.265)

MP3 or WebM

Licence CC/Rights holder

Database fields

Just a proposal – feel free to do as you want!

Synthesis from **DarwinCore – AudubonCore – DublinCore – ABCD**

class	MachineObservation / Multimedia Object				
class	Image Object	StillImage	MovingImage	Sound	Text
definition	visual representation	static image representation	visual representation with motion	resource to be heard	image with text
properties	title				
	creator				
	date *(e.g., 2022-01-02T12:56:33.000+00:00)*				
	licence *(e.g., http://creativecommons.org/....)*				
	accessrights *(e.g., not-for-profit use only)*				
	rights holder / suggested citation				
	capture equipment *(e.g., canon EOS 5D, lens EF 50mm / GE Phoenix nanotom / Artec 3D space spider)*				
	url				
	height (px)	height (px)	height (px)	duration time (s)	
	width (px)	width (px)	width (px)		
	image resolution (ppi)	image resolution (ppi)			image resolution (ppi)
	file size (MB)				
	file format				
	OBJ, PLY, STL...	RAW, TIFF, JPEG...	MPG, MOV, AVI...	MP3, WAV, WMA...	RAW, TIFF, JPEG

Database fields

class					
class	Image Object				
definition	visual representation				
properties					
	date *(e*				
	licence *(e*				
	accessrights *(e*				
	rights holder / suggested citation				
	capture equipment *(e.g., canon EOS 5D, lens EF 50mm / GE Phoenix nanotom / Artec 3D space spider)*				
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	height (px)	height (px)	height (px)	duration time (s)	
	width (px)	width (px)	width (px)		
	image resolution (ppi)	image resolution (ppi)			image resolution (ppi)
	file size (MB)				
	file format				
	OBJ, PLY, STL...	RAW, TIFF, JPEG...	MPG, MOV, AVI...	MP3, WAV, WMA...	RAW, TIFF, JPEG

Image Object

Class

Class to describe an image.

More information

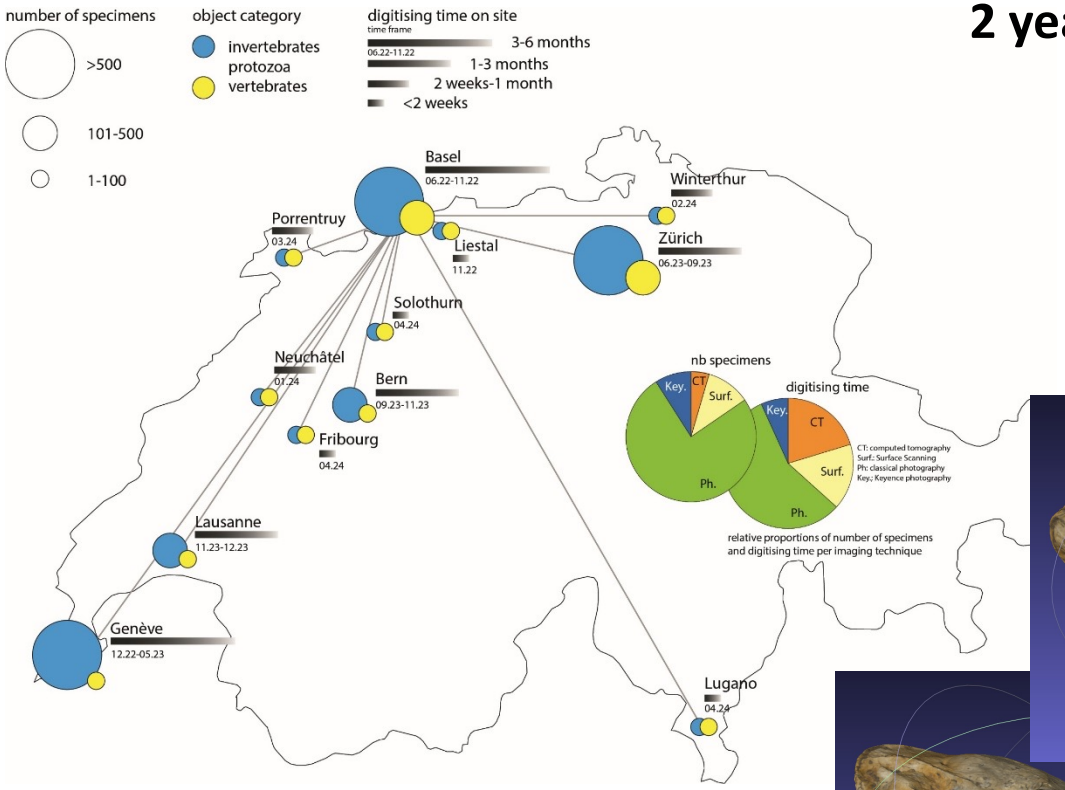
Associated Properties:

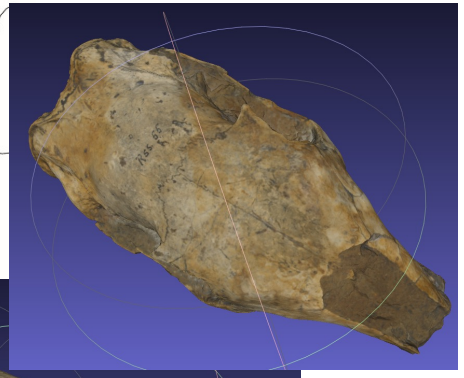
width, height, imageResolution, colorSpace, lensModel, lightSource, color, thumbnailURL, fNumber, focalLength, focalLengthIn35mmFilm, flash, flashEnergy, whiteBalance, digitalZoomRatio, contrast, saturation, sharpness, gamma, exposureTime, exposureMode, spectralSensitivity, photographicSensitivity, isoSpeed, shutterSpeed, brightness

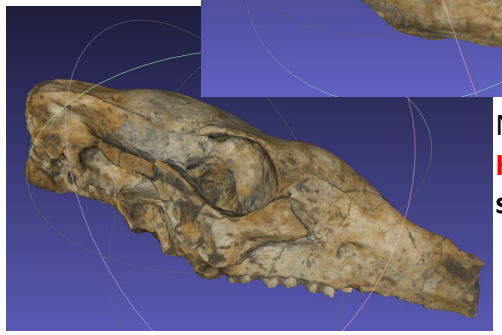
Case study

Imaging reference fossils

About 10’000 specimens
12 institutions
2 years

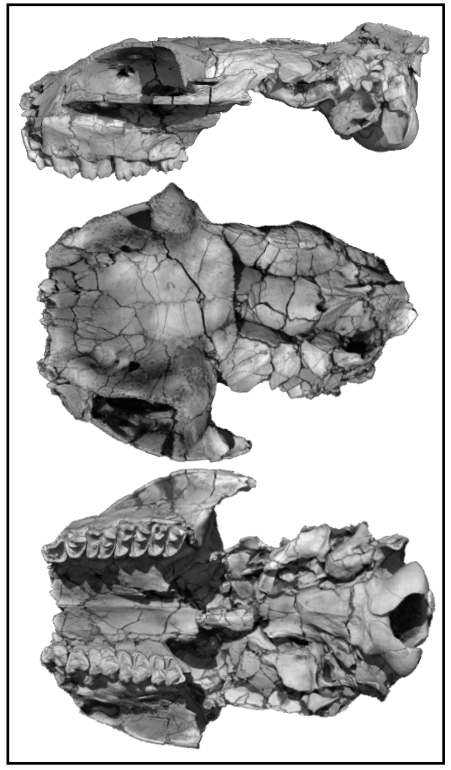


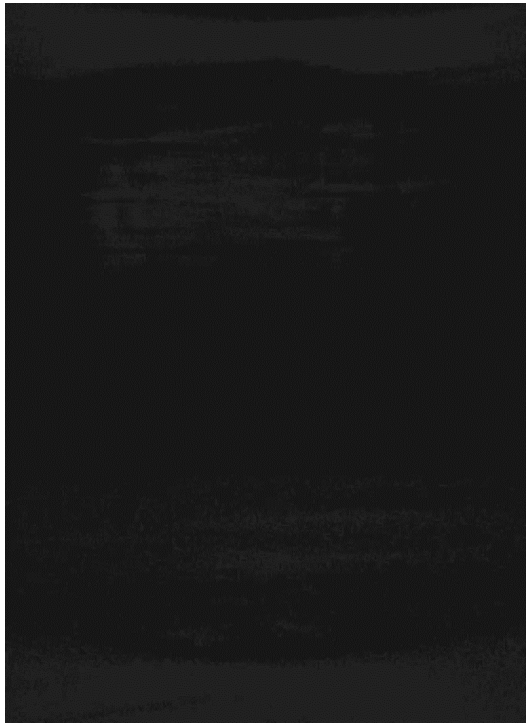




NMB Rss.55
HOLOTYPE
surface scan

NMB Ef.43
HOLOTYPE **dig. microscope**





NMB Sth.833
PUBLISHED
CT-scan

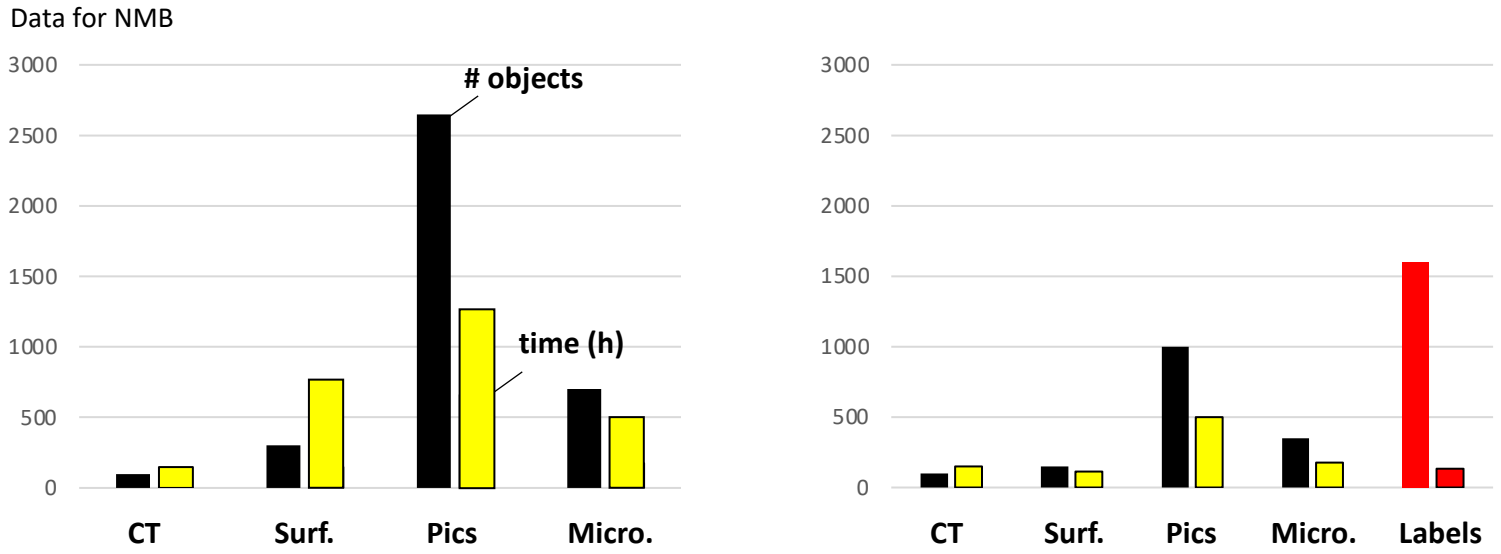
Difficulties

TIME

- Mass production
- Very heterogeneous objects
- 4 different techniques
- Databasing
  (when data not yet available –
  taxonomy-publication records etc)

STORAGE

- Average 1.55 GB / object
  - 350 objects
  - 550 GB
  - 81’500 files



Recommendations

be pragmatic & flexible
  e.g., be happy with 1 good image (reduce to 1 view)

be less optimistic for time as you usually are ☺
  e.g., count a total of at least 30 minutes per object

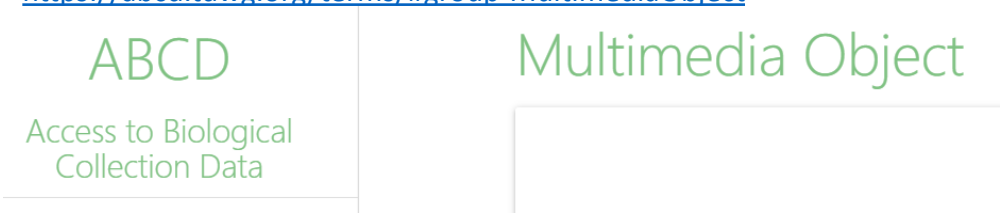
book 20% of your time for databasing

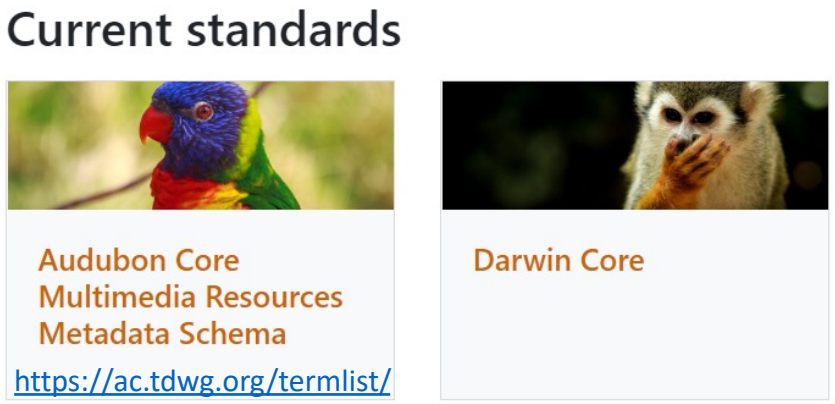
References

https://www.museumsbund.de/wp-content/uploads/2022/12/handreichung-digitale-grunderfassung.pdf

Access Right
https://www.fieldmuseum.org/field-museum-natural-history-conditions-and-suggested-norms-use-collections-data-and-images

https://abcd.tdwg.org/terms/#group-MultimediaObject





Taxonomic Database Working Group – Biodiversity Information Standards
https://www.tdwg.org/standards/