

Digitally Preserving African Heritage

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Why am I here?

- ❑ To talk about Digital Libraries/Preservation.
- ❑ To share some research findings.
- ❑ To collaborate and develop research links.
- ❑ To inspire you to think differently.
- ❑ To convince you to preserve our heritage!



What is the Digital Libraries Lab?

- ❑ Research in technologies for research and education, specifically digital libraries:
 - African language search engines, machine translation
 - cultural heritage preservation
 - technology for education
- ❑ Teaching
 - 2 staff supervising about 20 MSc and PhD students
- ❑ Advocacy
 - a little wherever we can
- ❑ Collaboration
 - industry, academic, (govt?)

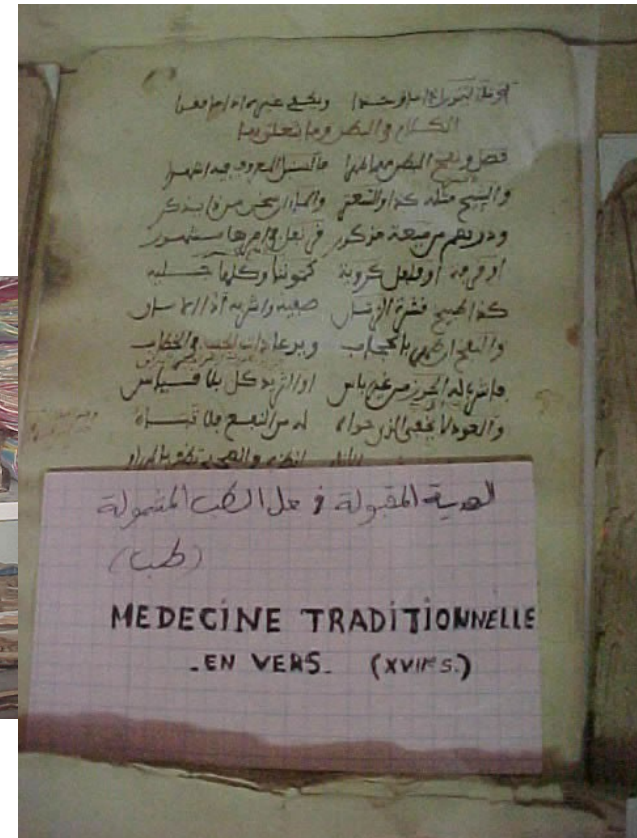
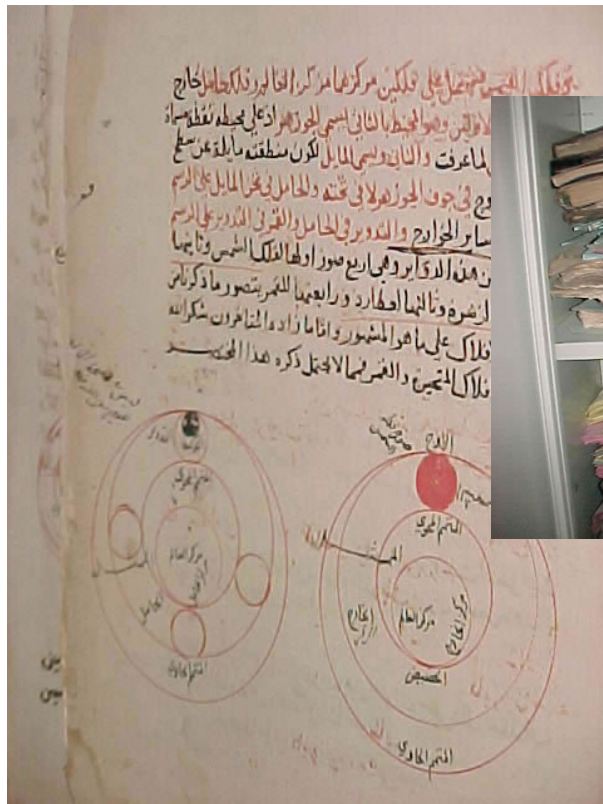


What Should We Preserve?



*Mapungubwe Collection
University of Pretoria*

What Should We Preserve?



Timbuktu Manuscripts

<http://www.timbuktufoundation.org/Manuscripts/index.htm>



What Should We Preserve?



Kirby Collection

<http://web.uct.ac.za/depts/sacm/kirby.html>



What Should We Preserve?

SPECIAL ISSUE

15th November, 1966.

WE SHALL NEVER FORGET.

WE SHALL NEVER FORGET our comrades-in-arms who have paid the supreme price for the lofty cause of freedom for our country.

WE SHALL NEVER FORGET the callous murder of MINI, KHAYINGA, MKABA, BONGCO, NGUDLE, SALOOJEE and many others; their death remains a permanent indictment against the South African Apartheid Rulers.

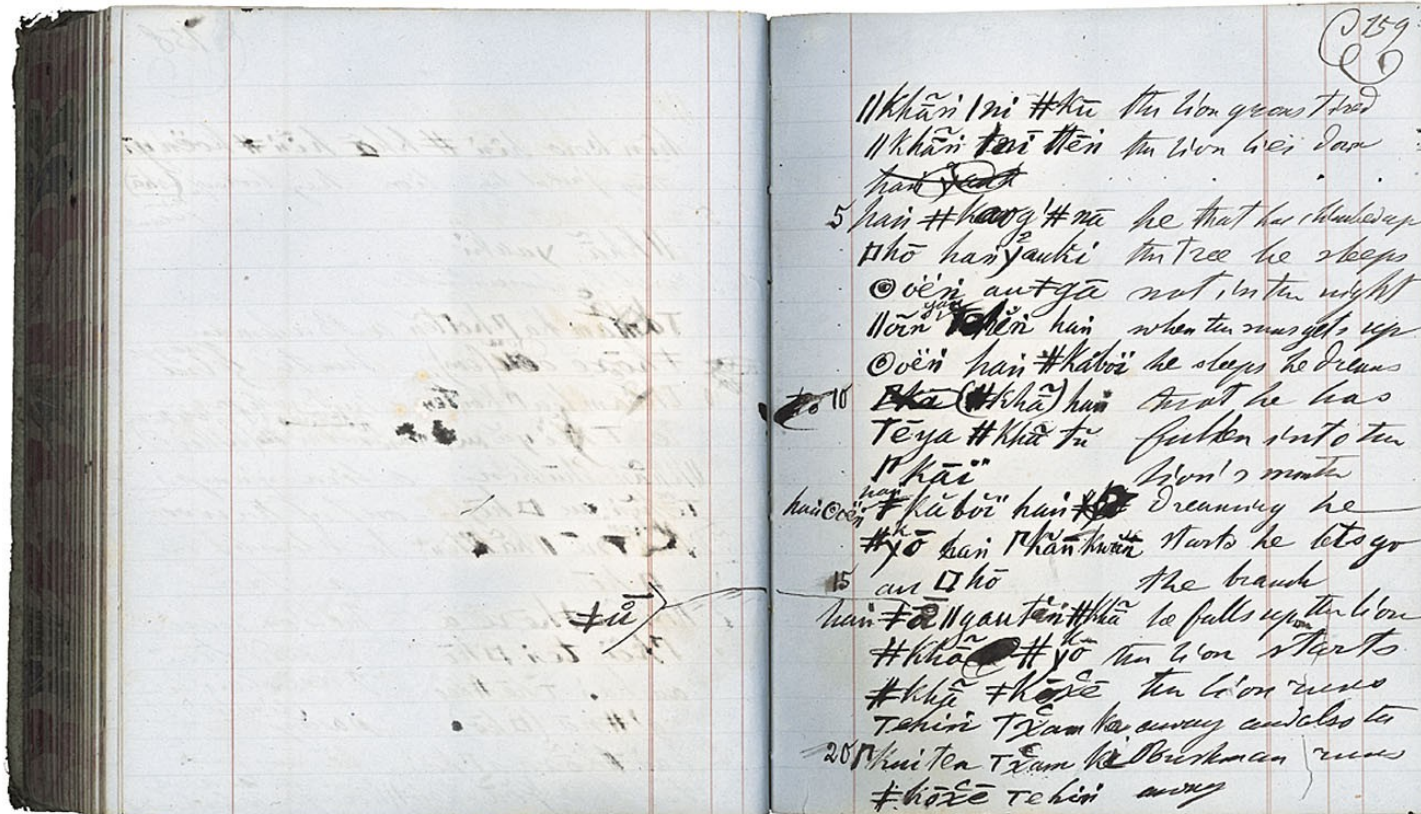
WE SHALL NEVER FORGET these comrades, who have braved Vorster's torture chambers and faced fascist brutality boldly in the face. Their sacrifices SHALL NOT BE IN VAIN.

WE SHALL NEVER FORGET our thousands of freedom-fighters who are languishing in Vorster's dungeons. These gallant sons and daughters of South Africa, whose only crime is their militant and uncompromising struggle against White Domination, symbolise the highest in morality. Some have been

Digital Imaging South Africa
<http://www.disa.ukzn.ac.za/>



What Should We Preserve?

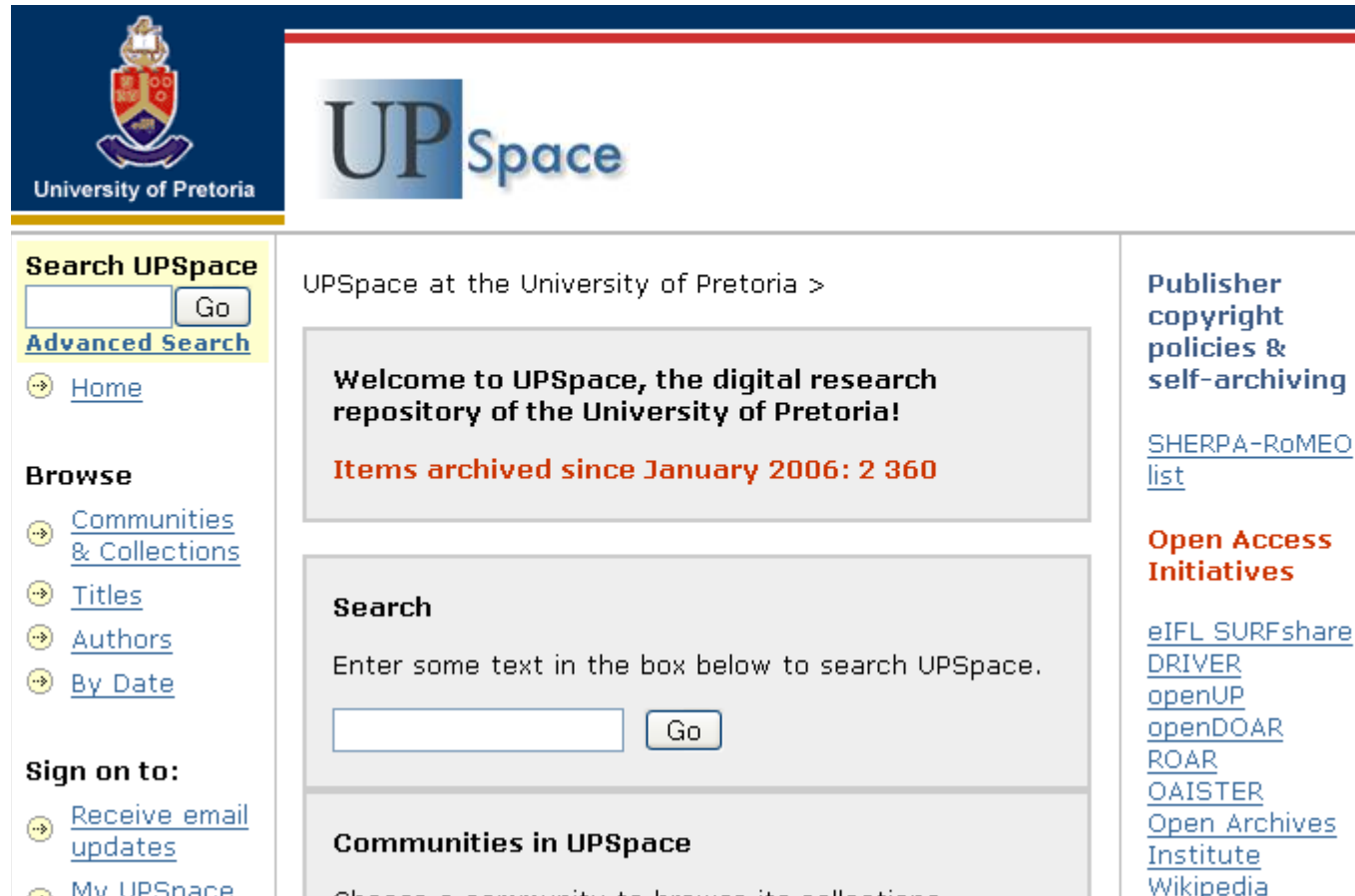


Bleek and Lloyd Collection

<http://www.lloydbleekcollection.uct.ac.za/>



What Should We Preserve?



The screenshot shows the UPSpace website, a digital research repository for the University of Pretoria. The header features the University of Pretoria logo and the UPSpace name. The main content area includes a search bar, a welcome message, and a search section. The left sidebar contains navigation links for search, browse, and sign-on. The right sidebar lists publisher copyright policies and open access initiatives.

University of Pretoria

UPSpace

Search UPSpace

[Advanced Search](#)

[Home](#)

Browse

- [Communities & Collections](#)
- [Titles](#)
- [Authors](#)
- [By Date](#)

Sign on to:

- [Receive email updates](#)
- [My UPSpace](#)

UPSpace at the University of Pretoria >

Welcome to UPSpace, the digital research repository of the University of Pretoria!

Items archived since January 2006: 2 360

Search

Enter some text in the box below to search UPSpace.

Communities in UPSpace

Publisher copyright policies & self-archiving

[SHERPA-RoMEO list](#)

Open Access Initiatives

[eIFL SURFshare](#)
[DRIVER](#)
[openUP](#)
[openDOAR](#)
[ROAR](#)
[OAISTER](#)
[Open Archives](#)
[Institute](#)
[Wikipedia](#)

UPSpace
University of Pretoria



What Should We Preserve?



Why An African Perspective?

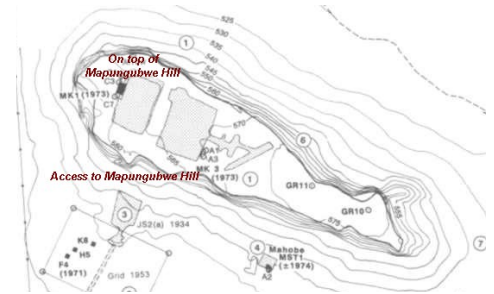
Urgency

- ❑ Some documents and storage media are rapidly deteriorating.
- ❑ Some storytellers are the last in their generations.



Why An African Perspective?

Rewriting History



- ❑ We now know there were powerful ancient civilizations all over Africa.
 - Colonial governments suppressed this information for centuries!
- ❑ History must be preserved – what little evidence we have left.



Why An African Perspective?

Skills and Education



- Typical archivists are not as highly skilled as counterparts elsewhere.
- Digital media is still not the norm.
- Education levels of general population hinders preservation – end-user data curation is very difficult.



Why An African Perspective?

Funding

- Typically, there is little.
- Many preservation projects are funded by external agencies, but with restrictions on data accessibility.
- There is a desperate need to do more with less.



Why An African Perspective?



Internet Bandwidth (Digital Divide)

- ❑ Non-existent in some places and poor everywhere else.
- ❑ Preservation projects designed for high bandwidth are not suitable.
- ❑ All online solutions must be bandwidth-friendly.



Is Africa Special?

- ❑ Definitely NOT!
- ❑ The same problems are faced by some other communities.
- ❑ Many communities face some of the problems.
- ❑ Most communities can benefit from solutions to these problems.



Solutions: Lightweight and Reusable Systems

- ▣ Simplicity
- ▣ XML
- ▣ Minimalist Archives.
- ▣ Metadata management using office suite.
- ▣ Multi-purpose software tools (repositories).
- ▣ Shared skills in common tools, e.g., DSpace



Solutions: Bandwidth

- ❑ Collections accessible over CD/DVD-ROM, local drives, network, etc.
 - Preservation by copying.
- ❑ Static collections rather than dynamic.
 - Preserve files instead of services.
- ❑ Minimal bandwidth use e.g., using AJAX



Solutions: Experience Recreation

- ▣ Storytelling in virtual environments.
- ▣ Low-cost virtual environments.
- ▣ Virtual recreation of historical districts.



Solutions: Basic Digitization

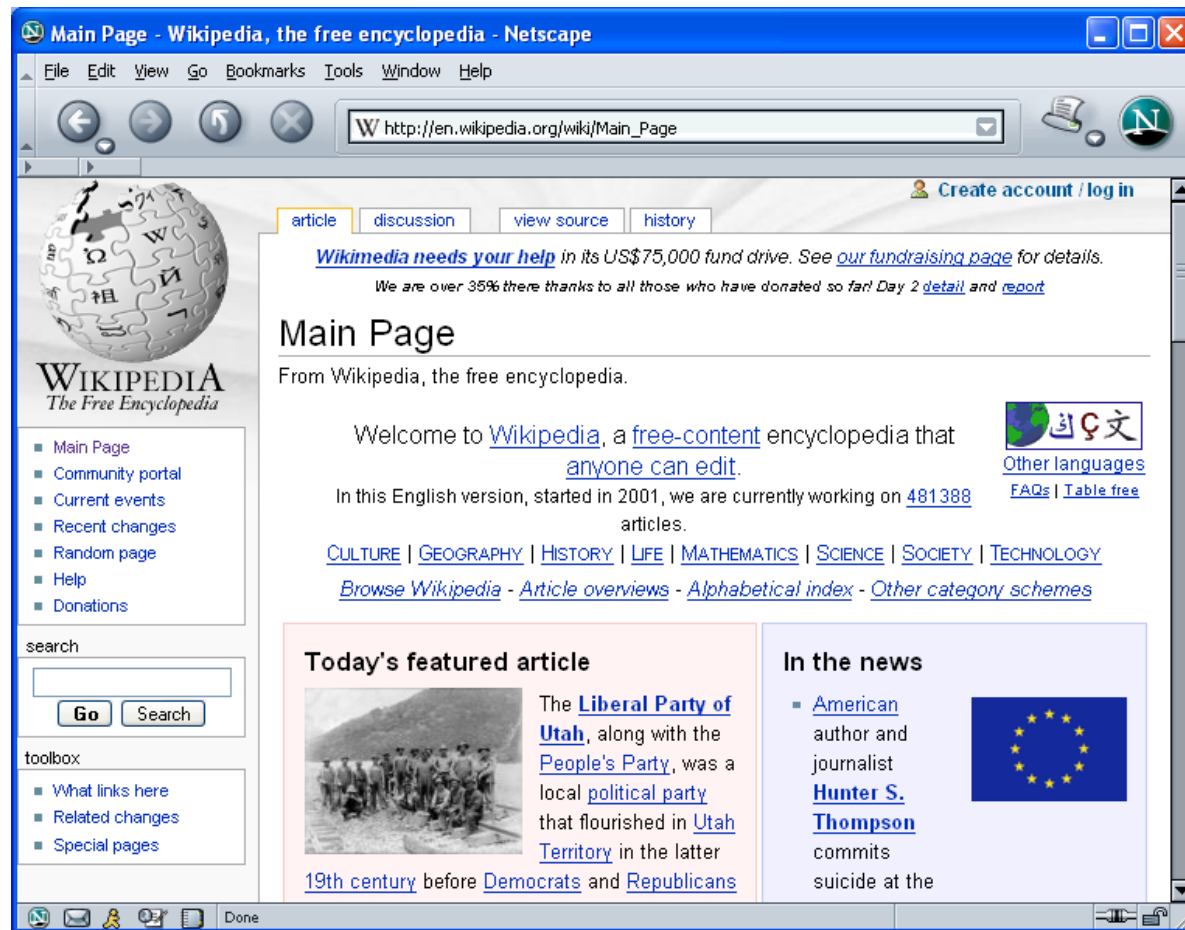
- ❑ Scan documents.
 - ❑ Take photographs.
 - ❑ Take 3D laser scans.
 - ❑ Record audio.
-
- ❑ Build **digital libraries / archives** to preserve.
 - ❑ Share and reuse information.



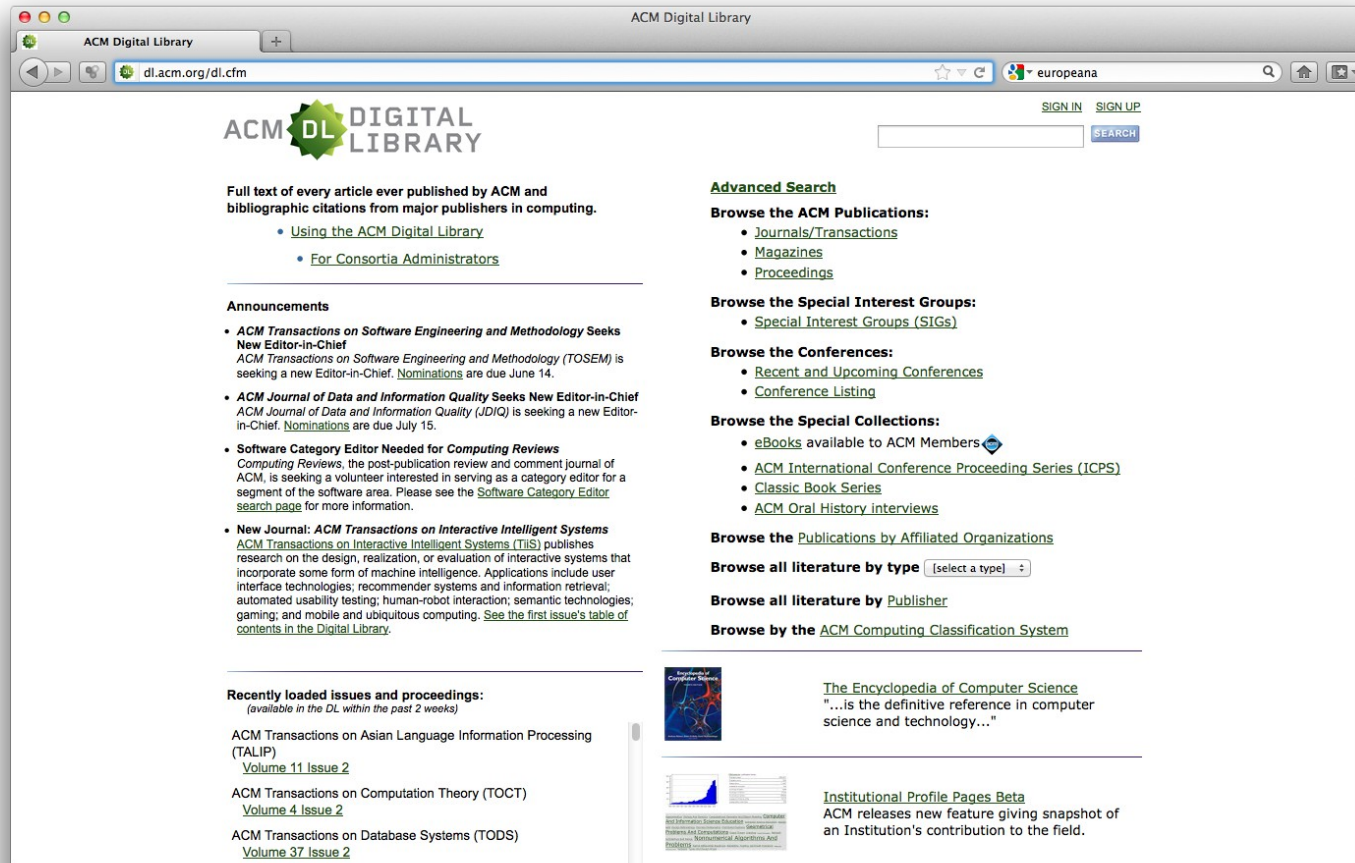
What is a Digital Library: Example 1/3



What is a Digital Library: Example 2/3



What is a Digital Library: Example 3/3



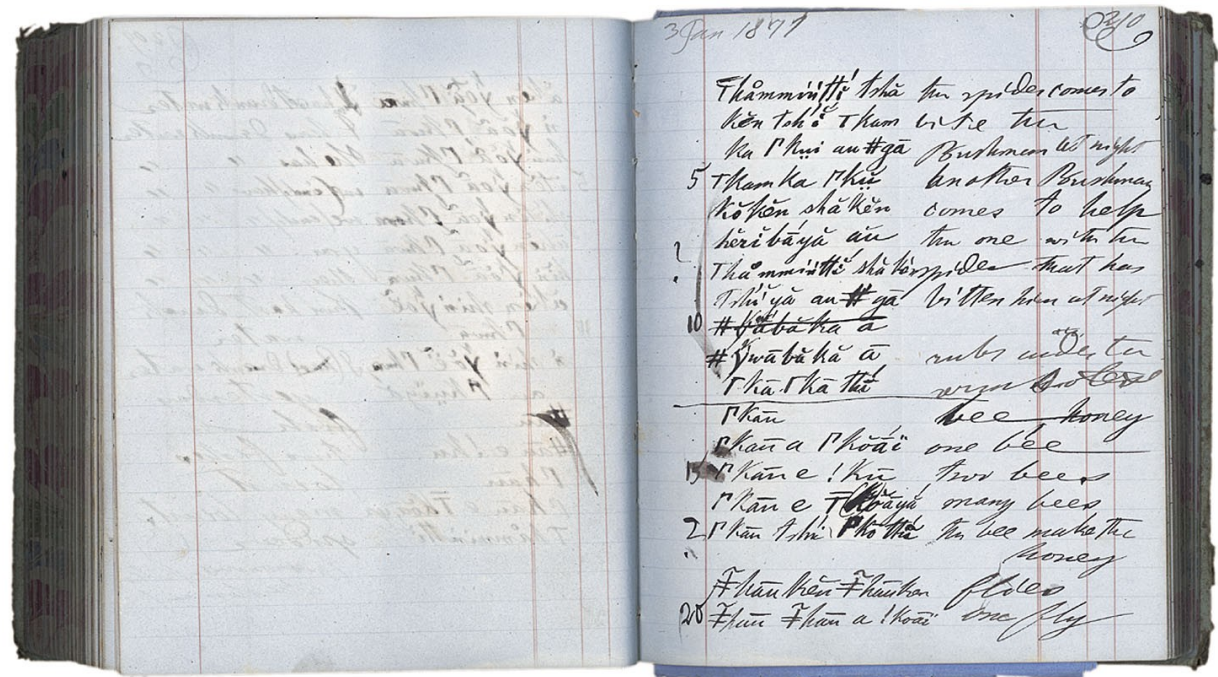
Typical DL Services

- User Management: accounts, auth, profile
- Searching: info retrieval, Google, indexing
- Browsing: categories, classification, subsets
- Submission: explicit/harvested/crawled
- Review: quality, workflow
- Annotation: reviews, ratings, discussions
- Recommendation: suggestions, collab filtering



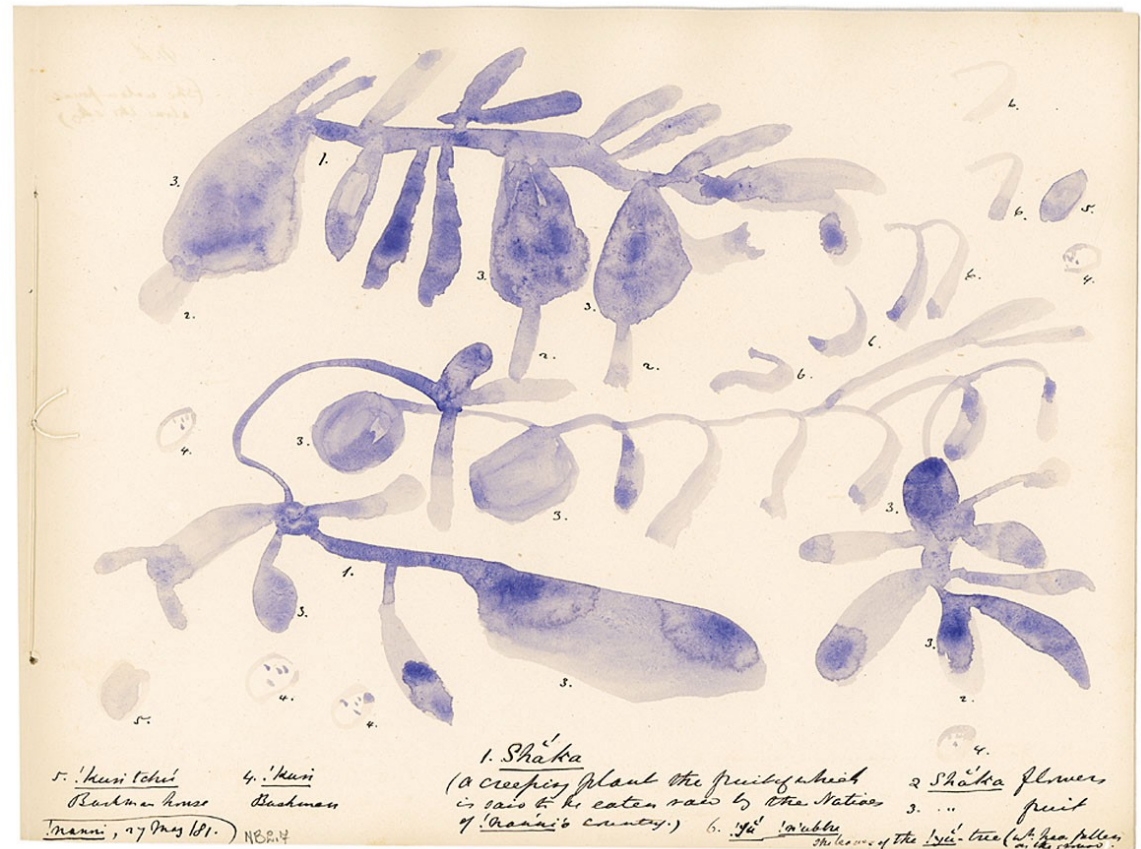
Case Study: Bleek and Lloyd Collection 1/2

- Books and drawings documenting now-extinct culture of !xam and !kun (Khoi-San?) groups.
- Documented by Wilhelm Bleek, Lucy Lloyd and others in late 1800s in Cape Town.
- ~20000 page images



Case Study: Bleek and Lloyd Collection 2/2

- ~800 drawings
- On UNESCO Memory of the World register.
- Curated by UCT/NLSA/Iziko-SAM/UNISA/...
- Digital preservation funded by Mellon, led by Michaelis School of Fine Arts, UCT



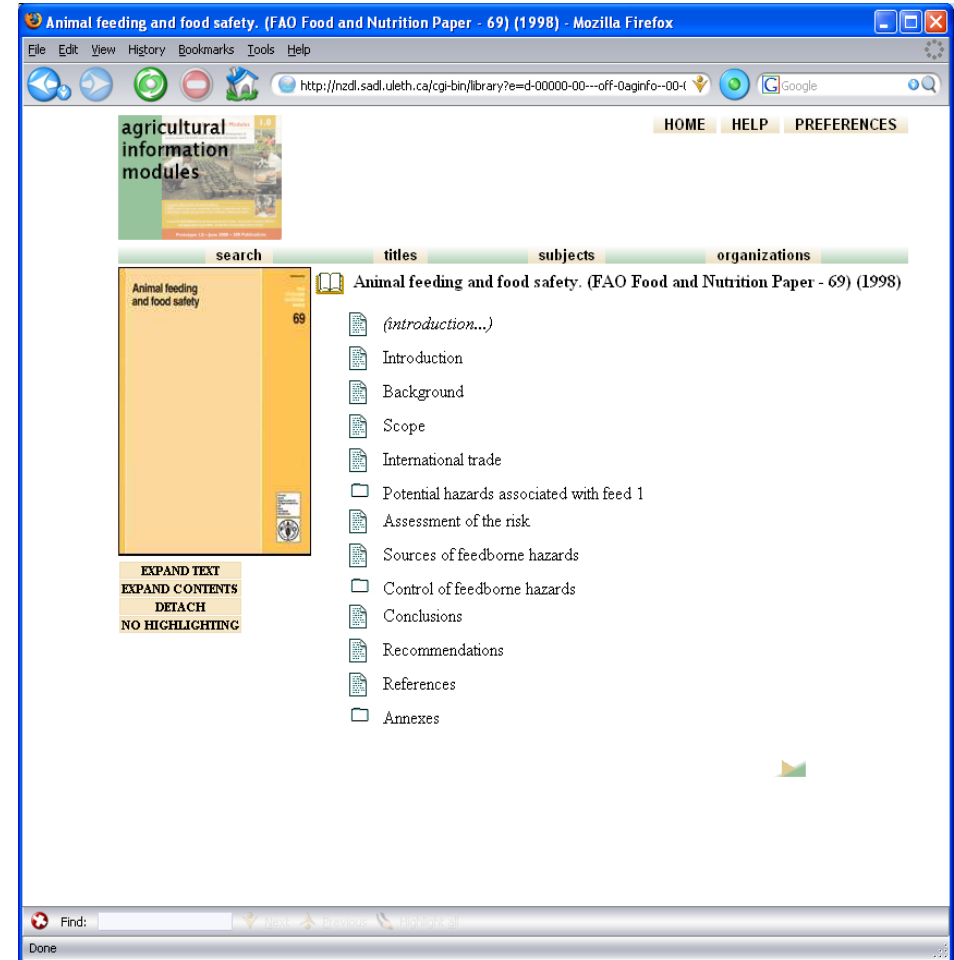
Bleek and Lloyd Core Requirements

- ❑ Make the collection accessible as widely as possible:
 - Over the Web,
 - Off a CDROM,
 - Off a network-shared drive,
 - Etc.
- ❑ Platform independence (Mac/XP/Linux/etc.).
- ❑ Low barrier to use.
- ❑ Standards-compliance.



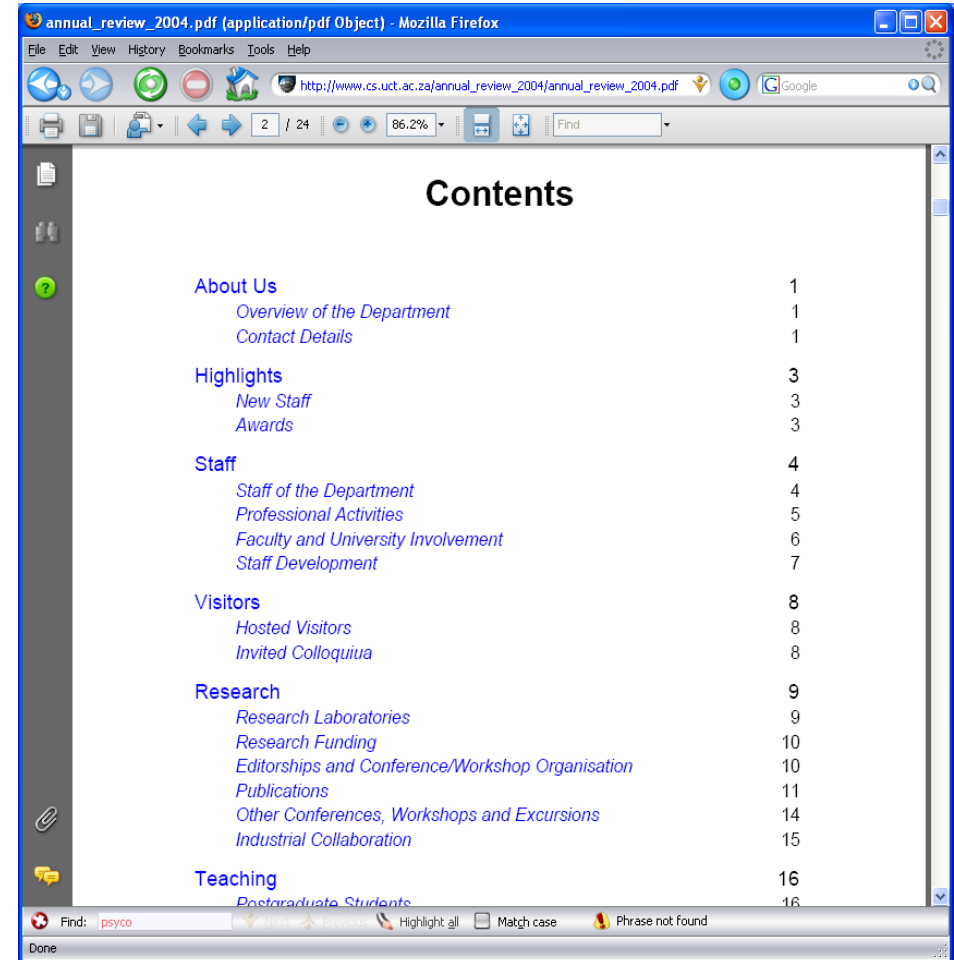
Option 1: Greenstone

- ❑ Greenstone, a digital library tool, creates standalone CDROM collections.
- ❑ It still requires software installation.
- ❑ It does not work on ALL platforms.



Option 2: XSL-FO

- ❑ XSL-FO can be used to create hyper-linked static PDFs, like books.
- ❑ Does not work for large books.
 - PDF file sizes increase dramatically...

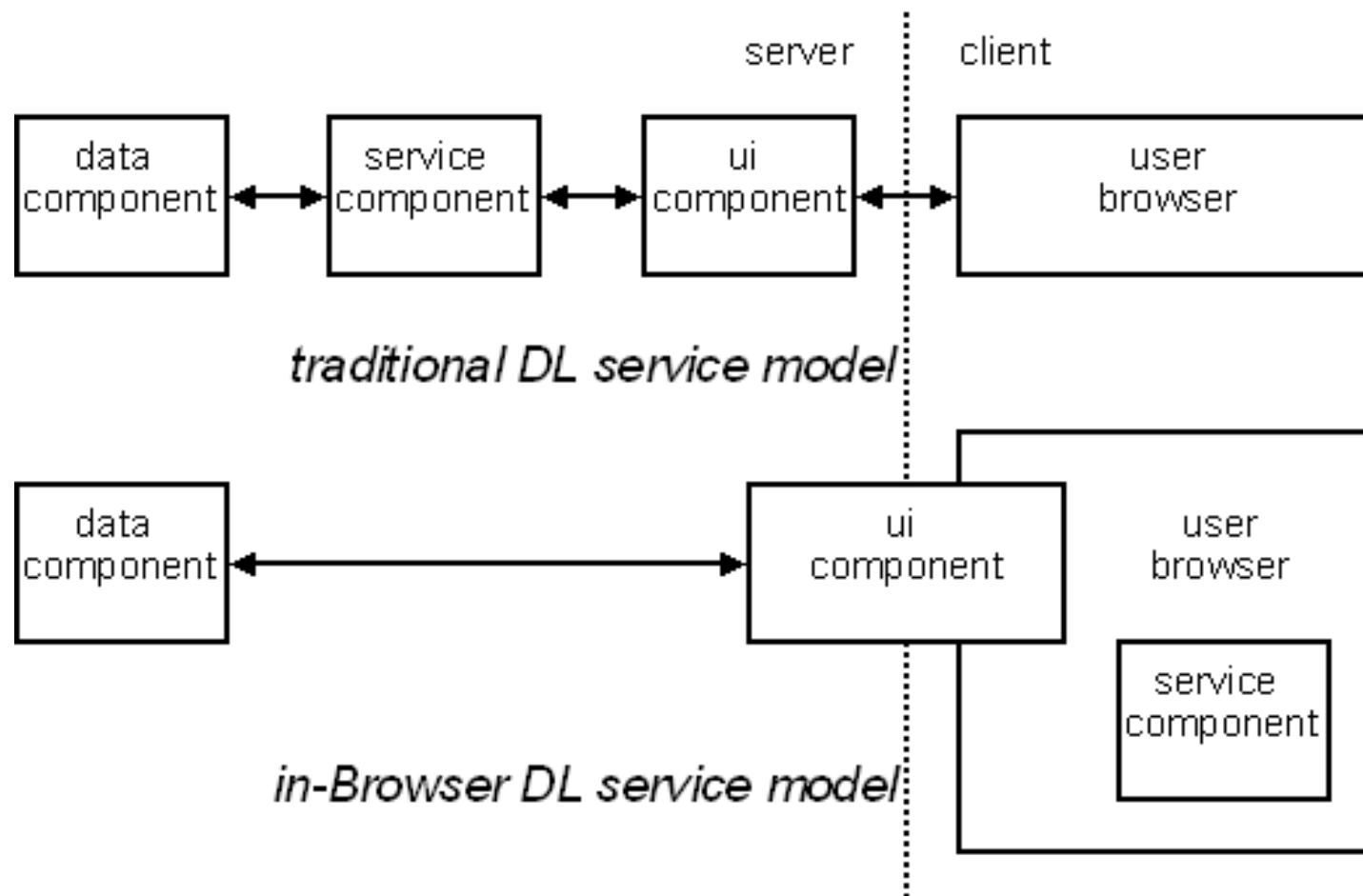


Solution 1: XML + XSLT → XHTML

- ❑ Encode all descriptive information using XML.
- ❑ Write XSL transformations to convert the XML into multiple formats, each corresponding to an HTML page view.
- ❑ Needs advanced XSLT techniques to deal with size of data.



Solution 2: in-Browser Services



This digital publication is part of a Llarec project to digitise, research and publish the Bleek and Lloyd Archive. Llarec (the Lucy Lloyd Archive, Resource and Exhibition Centre) is a University of Cape Town research centre located at the Michaelis School of Fine Art.

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University of Cape Town
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8001 Cape Town
<http://michaelis.uct.ac.za/>

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CLAIM TO THE COUNTRY



THE DIGITAL BLEEK AND LLOYD



THE DIGITAL BLEEK AND LLOYD

The Digital Bleek and Lloyd includes scans of every page of the 114 Lucy Lloyd !xam notebooks, 13 Lloyd (mostly) !kun notebooks and 28 Wilhelm Bleek !xam notebooks. It also includes Jemima Bleek's solitary Korana and !kun notebook (but excludes three Korana notebooks in the collection of the Maingard Library at the University of South Africa) and all the drawings and watercolours made by !han#kass'o, Dialkwain, Tamme, !uma, !nanni and Da. This represents the coming together of an archive dispersed across three institutions: the National Library, Iziko South African Museum and the University of Cape Town. With the scans is a 280 000-word searchable index, cross-referenced and including notes and summaries for each of the stories listed. Notes in italics are direct quotes from the reports of Bleek and Lloyd in which they detail the progress of their research.

 KEYWORD SEARCH


Books

[Cover to cover](#) | [Contributor](#) | [Story](#) | [Category](#) | [Keyword](#)



Drawings/Watercolours

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2. [BC 151 A1 4 002](#)
3. [BC 151 A1 4 003](#)
4. [BC 151 A1 4 004](#)
5. [BC 151 A1 4 005](#)
6. [BC 151 A1 4 006](#)
7. [BC 151 A1 4 007](#)
8. [BC 151 A1 4 008](#)
9. [BC 151 A1 4 009](#)
10. [BC 151 A1 4 010](#)
11. [BC 151 A1 4 011](#)
12. [BC 151 A1 4 012](#)
13. [BC 151 A1 4 013](#)
14. [BC 151 A1 4 014](#)
15. [BC 151 A1 4 015](#)
16. [BC 151 A1 4 016](#)
17. [BC 151 A1 4 017](#)
18. [BC 151 A1 4 018](#)
19. [BC 151 A1 4 019](#)

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Book: BC_151_A1_4_002

Collection: Wilhelm Bleek notebooks

Page Range: A1_4_2_00334.JPG - A1_4_2_00428.JPG



Image File:
[A1_4_2_FRCOV.JPG](#)

Story: Covers and first pages of
Bleek's Book II or



Image File:
[A1_4_2_IFCOV.JPG](#)

Story: Covers and first pages of
Bleek's Book II or
BC151_A1_4_002



Image File: [A1_4_2_00334.JPG](#)

Story: A man falls upon the
Lion



Image File: [A1_4_2_00335.JPG](#)

Story: A man falls upon the
Lion



Image File: [A1_4_2_00336.JPG](#)

Story: Jacob Nein and the
leopard



Image File: [A1_4_2_00337.JPG](#)

Story: Jacob Nein and the
leopard



Image File: [A1_4_2_00338.JPG](#)

Story: Jacob Nein and the
leopard



Image File: [A1_4_2_00339.JPG](#)

Story: Jacob Nein and the
leopard



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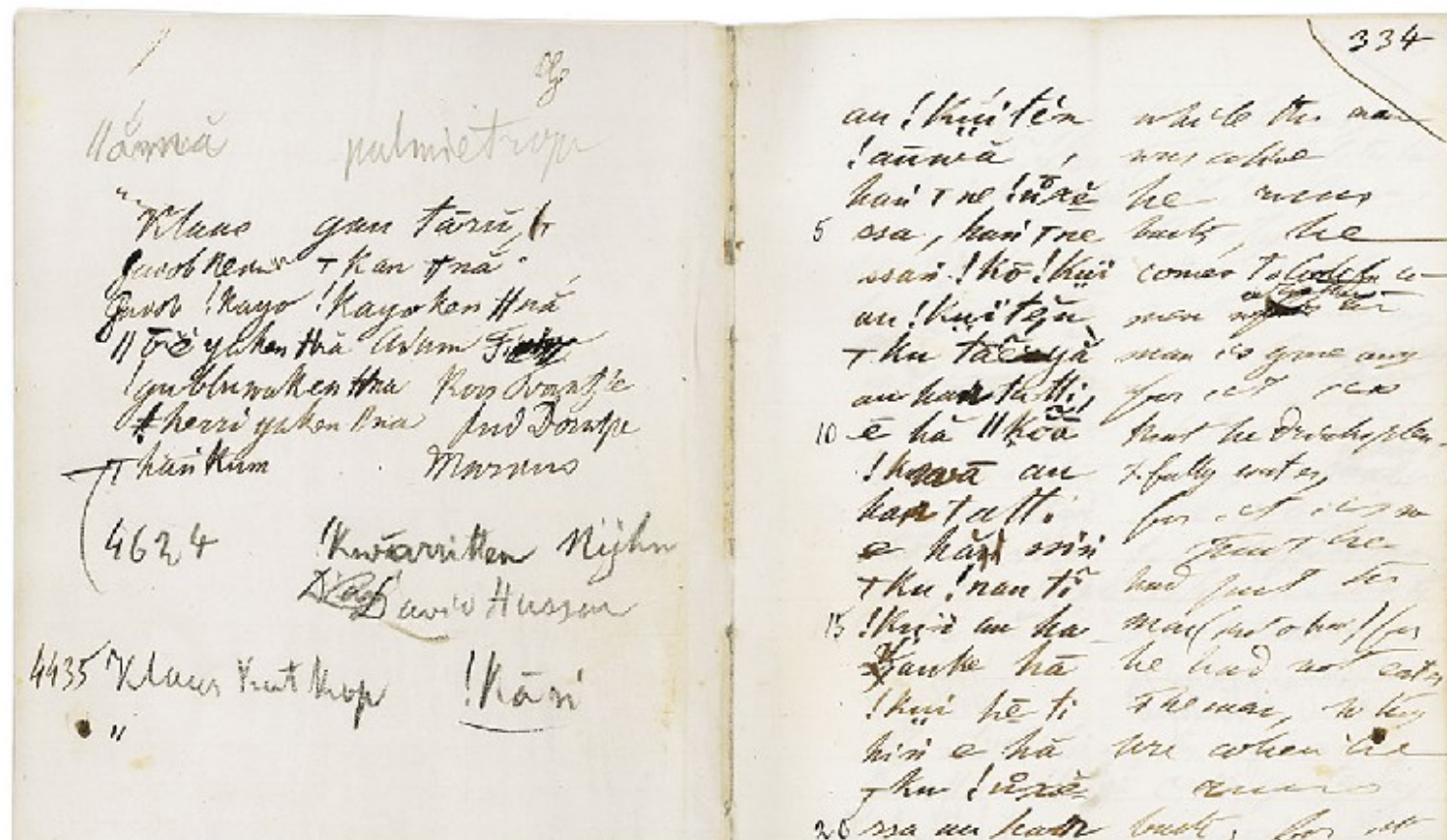
Keywords

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Page Image: A1_4_2_00334.JPG

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Previous Story Page	Story: A man falls upon the Lion	Next Story Page



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1. [Covers and first pages of Bleek's Book I or BC151 A1 4 001](#)
2. [Words and sentences \(given by Adam Kleinhardt\)](#)
3. [Word lists, including 'Bushman/Hottentot' vocabulary](#)
4. [Words and sentences \(given by |alkunta\)](#)
5. [A man falls upon the Lion](#)
6. [Woman transformed into a lion](#)
7. [Baboons take a child](#)
8. [Veldschoen](#)
9. [The spider](#)
10. [Words and sentences \(dictionary and genealogies\)](#)
11. [The Moon pierced by the Sun](#)
12. [Words and sentences: names of animals](#)
13. [Leopards, lions and phrases](#)
14. [Moon and stars: an incantation](#)
15. [The man carries away the ostrich to his home](#)
16. [The eating of jackal](#)
17. [The Lion becomes a star](#)
18. [The piercing of ears](#)
19. [The |xam and the Dutch](#)
20. [About 'seacows'](#)
21. [The |xam and the hyena](#)

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[\[a\]kunta \(Stoffel\) \(1\)](#)

Date

20 May 1871 (it is unclear whether this story was told on this date as there are others on the same page)

Categories

[History \(Early Race\)](#)

Keywords

[Lion \(a man falls on\)](#), [Lion \(chases a man up a tree\)](#), [Lion \(and a man\)](#), [man \(falls on a Lion\)](#), [man \(hides in a springbok skin sack\)](#), [hides him\)](#), [man \(falls asleep in a tree\)](#), [man \(dreams of falling\)](#), [springbok skin \(a man hides from a Lion under\)](#), [skin \(of springbok\)](#), [hides from a Lion under\)](#), [tree \(man falls asleep in and falls on a Lion\)](#), [Early Race \(a story of the\)](#), [Early Race \(a man falls upon the\)](#)

Story Pages

158-159, 334-335

Page Images



Image File: [A1_4_1_00158.JPG](#)

Book: [BC_151_A1_4_001](#)



Image File: [A1_4_1_00159.JPG](#)

Book: [BC_151_A1_4_001](#)



Image File: [A1_4_2_00334.JPG](#)

Book: [BC_151_A1_4_002](#)

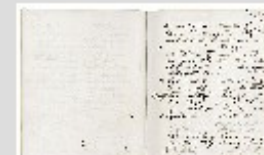


Image File: [A1_4_2_00335.JPG](#)

Book: [BC_151_A1_4_002](#)

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!khamnumup (Petros Willems)

1. [!khamnumup \(or Petros Willems\): his personal history](#)
2. [!nauxa \(or Willem\) at the Museum, 24 September 1880](#)
3. [Words and sentences: at the Museum, 24 September 1880 \(!nauxa and !khamnumup\)](#)

!kweiten ta ||ken (Rachel) (VI)

1. [A lion's story, or, The child who saved her sleeping parents from the lion](#)
2. [About maidens and how they adorn young men with ||ka or 'rooi klip'](#)
3. [Names of !kweiten ta ||ken's relations](#)
4. [Story of ||kua ka khumm](#)
5. [The Anteater's story, or, The Anteater, Springbok, Lynx and Partridge](#)
6. [The Crow's story: the Crows are sent out to search for husbands, or, The !kagen ka Kkonn's story and the |hunn ta kkonm's story \(including What happened when the !kagen found the missing men, p.3995\)](#)
7. [The Lion's story](#)
8. [The Quagga's story](#)
9. [The Rain's story, and |kannu the waterhole](#)
10. [The Water's story: more about how maidens adorn young men](#)
11. [The maiden's story, the frog's story](#)
12. [The man who went to sleep when out hunting alone](#)
13. [The story of the Leopard Tortoise](#)
14. [The story of the Springbok's kid, who was carried off by the Elephants \(an incomplete account\)](#)
15. [What is done with a 'new' maiden](#)
16. [What the man did to his wife when she was pregnant](#)
17. [Words and sentences: by !kweiten ta ||ken](#)
18. [Words and sentences: by !kweiten ta ||ken](#)
19. [Words and sentences: parts of the body](#)
20. [Xurri ko killed by a lion](#)
21. [|a khumm called by a lion](#)

!nanni (XT)

http://banzai.cs.uct.ac.za/~hussein/bleek_lloyd/data/stories/5/index.html



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[|nanni's father's dress](#)

[A drum](#)

[A necklace of reed used to cure a little child's cold](#)

[Arrow-making](#)

[Arrowheads](#)

[Cutting with stone knives](#)

[Digging sticks used by men](#)

[Elephants \(eating their hearts\)](#)

[Feathered arrows and poison](#)

[Grass in Bushmanland that resembles brushes](#)

[Heron's song \(The song of the Blue Crane\)](#)

[Horns burnt for rain](#)

[How an Elephant steals a young Springbok from |kaggen \(the Mantis\) or Pet Springbok carried off by an Elephant](#)

[How the prepared springbok's ears are tied on](#)

[Huts](#)

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[Mat sieves](#)

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[Notes on rock painting copy no. 5, no. 6. and no. 7](#)

[Notes on rock painting copy no. 8: the rain and the rain-bull](#)

[Pieces of wood for divining, or |xu](#)



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or Mason Wasp [676](#)

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and 'Aquilae's water' [690](#)

and flowers [517](#)

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is !guonni [517](#), [519](#)



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1. [Inanni](#)
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4. [Dialkwain](#)
5. [Tamme](#)
6. [han'kass'o](#)
7. [uma](#)
8. [unattributed](#)

[drawing book covers](#)

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Contributor: Inanni

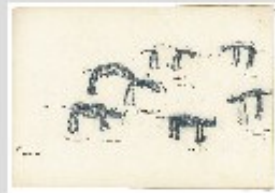


Image File:
Iziko_SAMLB_InBook1_001
Category: [plants and animals](#)



Image File:
Iziko_SAMLB_InBook1_002
Category: [plants and animals](#),
[custom and daily life](#)



Image File:
Iziko_SAMLB_InBook1_003
Category: [plants and animals](#)



Image File:
Iziko_SAMLB_InBook1_004
Category: [plants and animals](#)



Image File:
Iziko_SAMLB_InBook1_005
Category: [plants and animals](#)



Image File:
Iziko_SAMLB_InBook1_006
Category: [plants and animals](#)



Image File:
Iziko_SAMLB_InBook1_007
Category: [plants and animals](#)



Image File:
Iziko_SAMLB_InBook1_008
Category: [plants and animals](#),
[relations with](#)

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Image: Iziko_SAMLB_!nBook1_001

Contributor : [!nanni](#)

Medium : crayon/pastel/chalk (blue & some black)

Date : 16 May 1881

Size : 350x250

Category : [plants and animals](#)

Keywords : [animal](#) ([ratel](#))

Description : n|xu de, n|xu ||goo, ||hau (ratel?), ||hau, |kere de, |kere ||goo



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6. [history \(personal\)](#)
7. [personal history](#)
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9. [relations with others](#)
10. [relations with plants and animals](#)
11. [the Rain and Rain's liquid](#)
12. [transformation](#)



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Drawings/Watercolours

Contributors

Categories

Keywords

SEARCH

DRAWINGS

Keywords

!kun

'another kind of Bushman' [NLLB D Ta058](#)
called the 'Sun Bushmen' [NLLB D !n006](#)
fruit eaten by [Iziko SAMLB TaBook3 010](#)
the !na [NLLB D Ta058](#)

!nanni

and the country of the Biriko !kun [Iziko SAMLB D !n003](#)
his grandfather Karu's place and things [Iziko SAMLB D !n005](#)
plant drawn out of his head [Iziko SAMLB !nBook4 006](#)
tree in his father's country [NLLB D !n039](#)

!nanni's country

food eaten in [NLLB D !n031](#)

adornment

Makoba's [NLLB D !n064](#)
necklace [NLLB D !n064](#)
thong, roots worn by men around neck [NLLB D Ta054](#)

animal [Iziko SAMLB !nBook4 002](#), [NLLB D Ta069](#), [NLLB W Ta005](#), [Iziko SAMLB](#)

!khau lizard or Kochelman [UCTLB D Di003](#), [UCTLB D Di004](#)

"Nettson" [Iziko SAMLB D!h001](#)

'mere thing' [Iziko SAMLB !nBook2 005](#)

? [NLLB D A006](#), [NLLB D A027](#)

a bird eaten by the !kun, and one eaten by the Makoba [Iziko SAMLB TaBook3 010](#)

a bird, eaten by the !kun, which utters its own name [NLLB W u021](#)

a large bird in uma's country [Iziko SAMLB ubook1 003](#)

and its young [Iziko SAMLB TaBook1 003](#)

and Ovaherero [NLLB D Ta023](#)

and Ovambo [NLLB D !n111](#)



Keyword Search



http://banzai.cs.uct.ac.za - Search Results - Mozilla Firefox

Search Results

Query: lion

1. [Story Index Children do not say the lion's name at night](stories/1018/index.html)
stories/1018/index.html
2. [Story Index What the lion says](stories/257/index.html)
stories/257/index.html
3. [Story Index The coming of lion](stories/815/index.html)
stories/815/index.html
4. [Story Index Lion turns into a man](stories/958/index.html)
stories/958/index.html
5. [Story Index The lion's dream](stories/614/index.html)
stories/614/index.html
6. [Story Index The children taught to use another name for the lion](stories/612/index.html)
stories/612/index.html
7. [Story Index An owl believed to foretell the coming of the lion](stories/1016/index.html)
stories/1016/index.html
8. [Story Index The jackal watches the lion](stories/23/index.html)
stories/23/index.html
9. [Story Index The Lion's story, or, The Lion and the Hyena](stories/202/index.html)
stories/202/index.html
10. [Story Index The lion and the giraffe](stories/22/index.html)
stories/22/index.html
11. [Story Index The avoidance of the name of the lion](stories/610/index.html)
stories/610/index.html
12. [Story Index The lion has the power of turning itself into other things](stories/1017/index.html)
stories/1017/index.html
13. [Story Index The Lion becomes a star](#)

Principles of DL for African Heritage

- ❑ Efficient bandwidth use
- ❑ Advanced technology
- ❑ Appropriate technology
- ❑ Local relevance
- ❑ Modernization instead of Africanization
- ❑ Global applicability of solutions
- ❑ Minimalism of staff/money
- ❑ Multicultural/multilingual inclusivity



More Case Studies in Heritage DLs

recent research at UCT

- ❑ alternative archive infrastructures
- ❑ cloud computing
- ❑ multilingual IR
- ❑ heritage preservation
- ❑ visual dictionaries
- ❑ rock-art exploration using mobile device
- ❑ mobile |Xam input



Cloud-based Archives



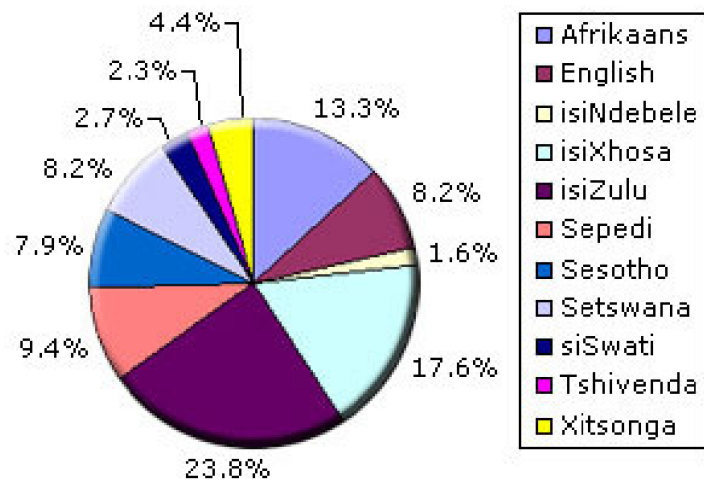
"It was much nicer before people started storing all their personal information in the cloud."

Lebeko Poulo, Lesotho
Mushashu Lumpa, Zambia

- ❑ individual services and whole archives in private clouds
- ❑ install locally
- ❑ reduces need for skilled staff
- ❑ instant archives
- ❑ shared resources
- ❑ automatic scalability
- ❑ acceptable performance, after cache priming
- ❑ user studies in progress



Multilingual Information Retrieval



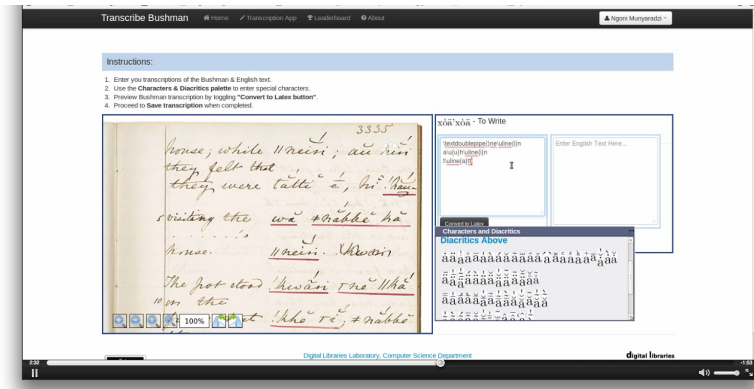
(source: SA Info)

Mohammed Mustafa Ali, Sudan

- ❑ search queries with multiple languages
- ❑ current systems biased to one language
- ❑ rerank documents by understanding query and reweighting languages/results
- ❑ better quality results found, higher up in results



Document Transcription: Bleek and Lloyd Stories



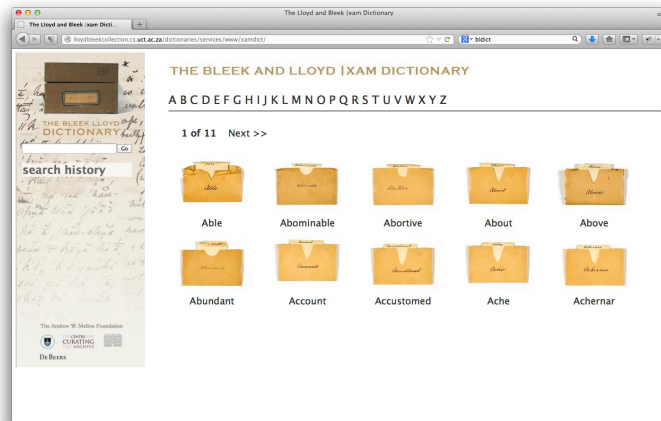
Ngoni Munyaradzi, Zimbabwe

- ❑ crowdsourced transcription application
- ❑ volunteers to convert images to text
- ❑ automated algorithms to check and assess quality
- ❑ interactive Web interface for users to enter text
- ❑ 10% better than AI approaches!



Language Preservation: Online |Xam dictionary

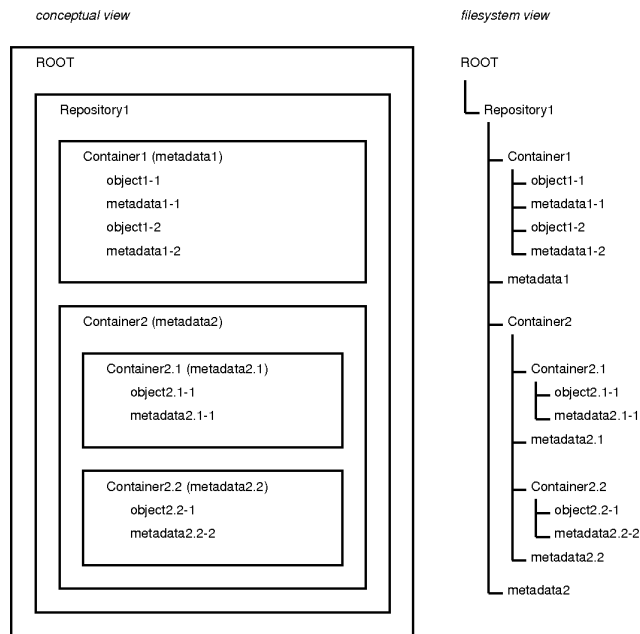
- ❑ visual dictionary of |Xam language
- ❑ simple archive foundation
- ❑ client-side processing as far as possible
- ❑ linked into Bleek and Lloyd



Kyle Williams, South Africa



simplyCT



- simple archive architecture
- performance
- understandability
- flexibility
- applicability
- good performance for small to medium collections
- easy to use and expand

Phiri Lighton, Zambia



What We Have Learnt

- ▣ Digital preservation in Africa has special problems.
- ▣ But all problems can be addressed adequately with appropriate and innovative use of current technology.



Future Challenges

- ❑ Scalability of preservation efforts.
 - How to create similar collections easily?
 - A national heritage archive?

- ❑ Tools for management and dissemination?
 - Extend Greenstone?



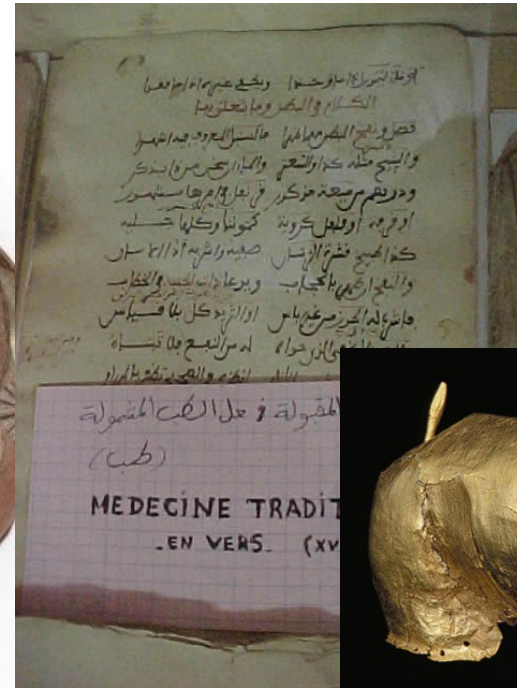
Future Challenges

- ❑ Standard tools to manage metadata/data?
 - Usability
 - Scalability
 - Extensibility
 - System independence

- ❑ Many current repository tools better suited to papers and not heritage collections.



The Future – Past Preserved



That's all Folks!



direct all questions and comments to:

hussein@cs.uct.ac.za

[Facebook/slumou](https://www.facebook.com/slumou)

[Twitter@slumou](https://twitter.com/slumou)