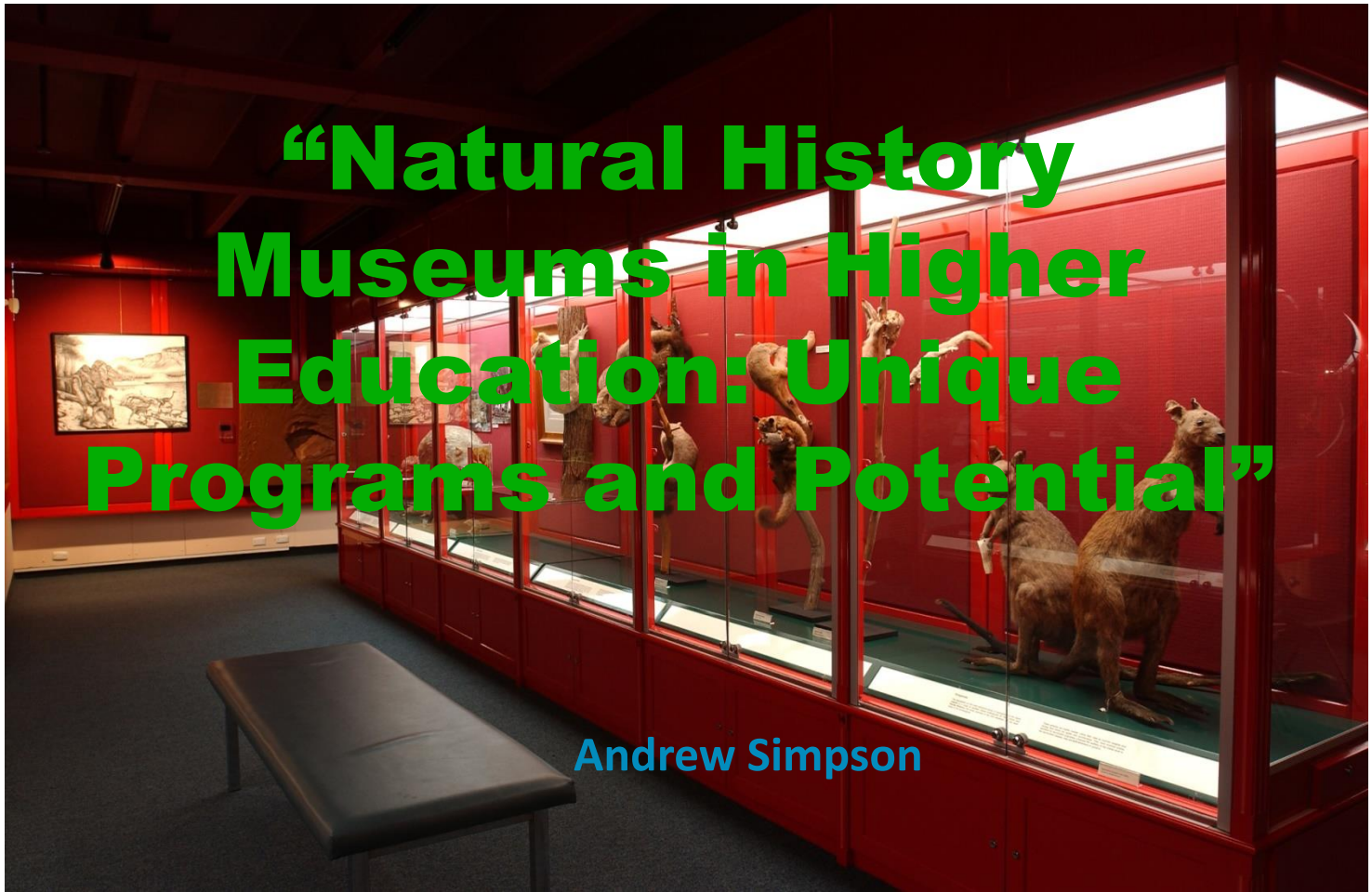
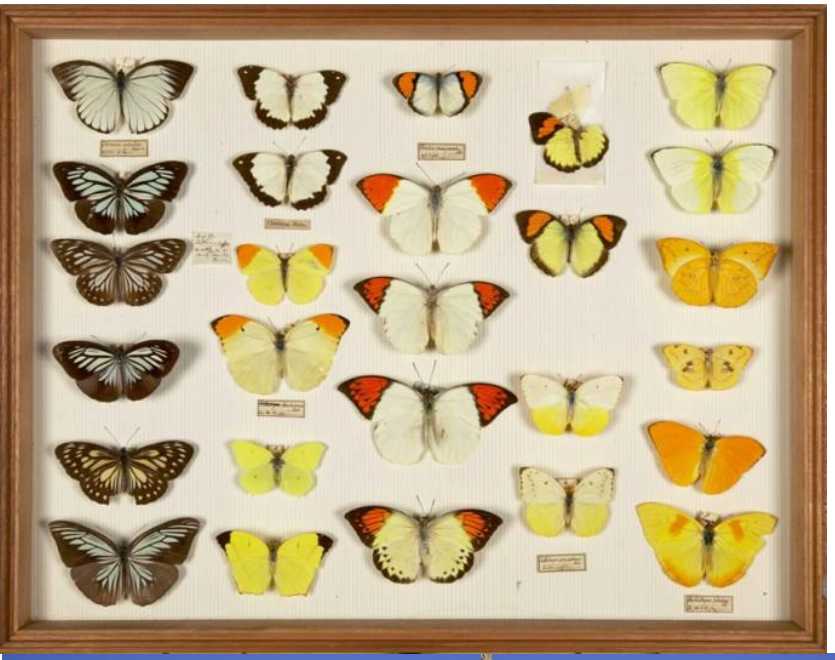


“Natural History Museums in Higher Education: Unique Programs and Potential”

Andrew Simpson

Natural history museums



Natural history museums

"A museum that collects specimens from the natural world and studies and interprets their make up and relationships to each other"

Cabinets of curiosity

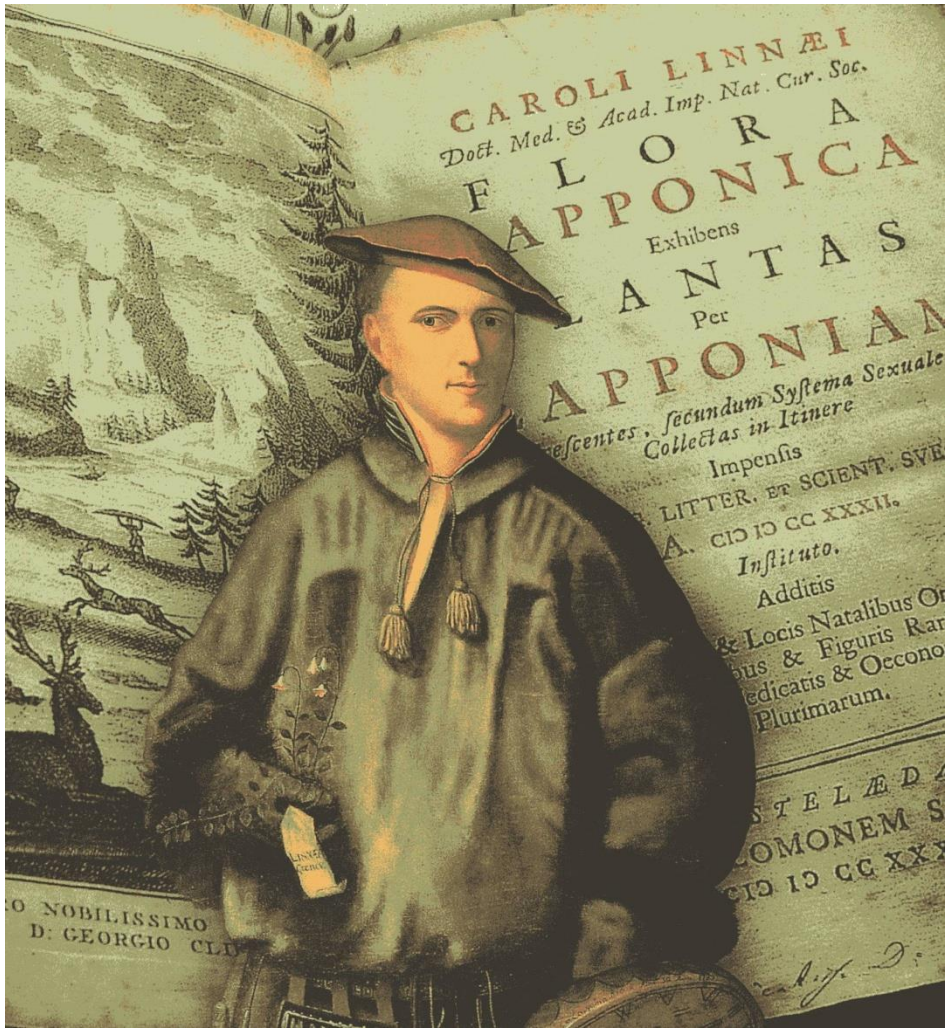
Cabinets of curiosity

- Unicorn horns
- Bones of giants
- Egyptian mummies
- Giant snake tongues

Modern systematics

Carl Linnaeus (1707-1778)

- Field work in Sweden and Lapland
- Faculty of Upsala University
- 1/3 of his students died in the field



Natural history collections include:-

- Herbaria
- Aquaria
- Arboreta
- Zoological collections
- Zoological gardens - zoos
- Biological science collections


FETOGENESIS PERIOD (in week
EMBRYOGENESIS PERIOD (in weeks)
INTRAUTERINE GROWTH RETARDATION, MINOR BIRTH DEFECTS, MENTAL R
MAJOR BIRTH DEFECTS
ABORTION
EARLY DEVELOPMENT
FACIAL FEATURES INCLUDING EARS
TEETH
PALATE
EXTERNAL GENITALIA
TESTES/OVARIES
ARMS
LEGS
HANDS
CENTRAL NERVOUS SYSTEM
NATURAL HISTORY
NATURAL HISTORY
The fetal shrink

- Departmental Museum
- Developed 40 years ago
- Distinctive Design
- Teaching function
- Didactic approach
- Little funding
- Small school & community linkages
- Highly vulnerable
- Inwardly focussed

Rethinking the Museum

Elements in the mix!

- Visual nature of the Biological Sciences
- New high tech teaching laboratories to be built
- Sustainability
- Museum Studies program
- Campus location, green suburban fringe
- Social media

Form a working Party!!

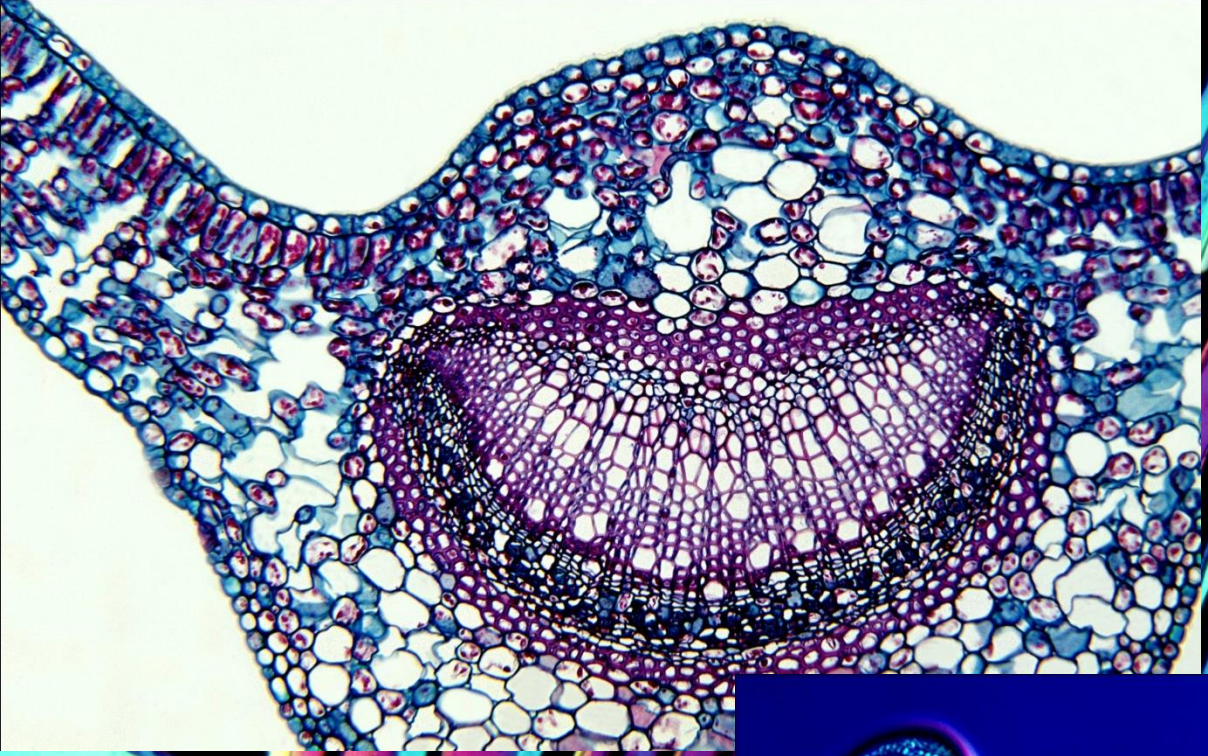

LIFE THROUGH THE AGES

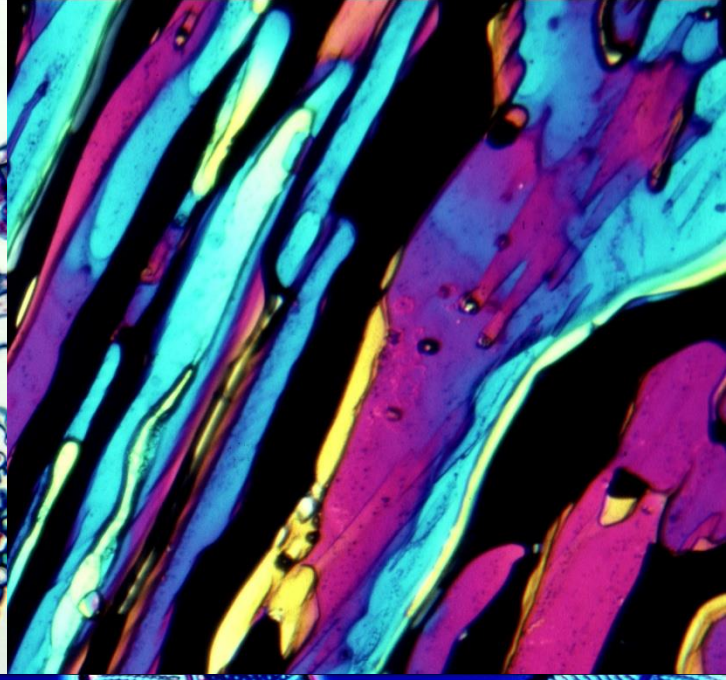

Planolites isp.
Turimetta Head, Mid Triassic
Planolites consists of overlapping straight burrows probably used for feeding by an annelid. In this case the burrows have filled with more resistant sediment and the original surrounding rock has eroded away. The burrows were formed in a fluvially dominated brackish marine environment, probably a coastal lagoon or estuary.

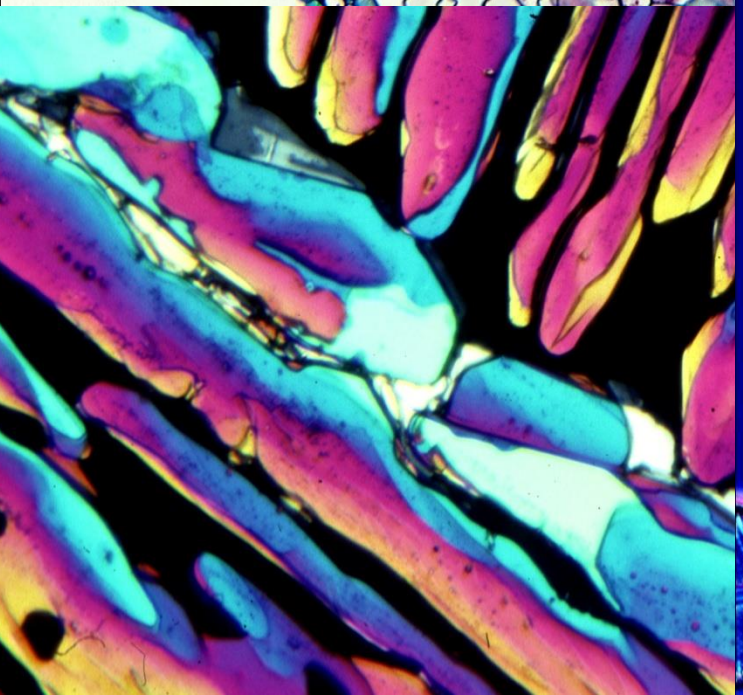

FLOWERING PLANTS AND FERNS
NEW SOUTH WALES
PART I.
1007

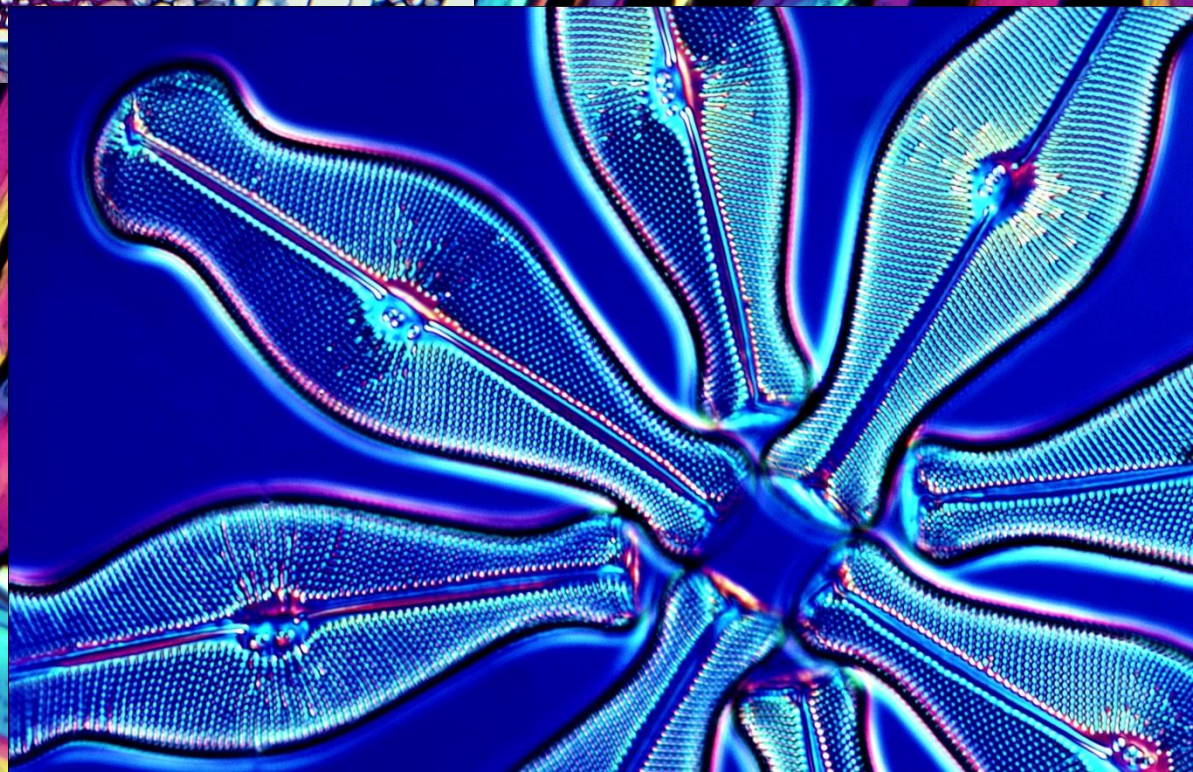

Barbara Rice
and
Hibiscus riceae
For more than 25 years, botanist and ecologist Dr. Barbara Rice has made substantial contributions to the Department of Biological Sciences at Macquarie University. Her research interests have taken her Australia wide, and include the taxonomy of Triodia (Spinifex).
In 2005, Hibiscus riceae from Arnhem Land in the Northern Territory, was named after Barbara. The citation from the paper describing the new species reads:
"The species is named in honour of Barbara Louise Rice. Barbara's plant collections from the McArthur River area, Gulf of Carpentaria and from the Koongarra area of the Alligator River region, have contributed significantly to the documentation of the flora of these two floristically interesting areas."
(LA Craven, JD Wilson and PA Fryxell 2005. A taxonomic review of Hibiscus sect. Furcaria (Malvaceae) in Western Australia and the Northern Territory. Australian Systematic Botany 16:183-210).
1010


Lime flavoured terrestrial gastropods

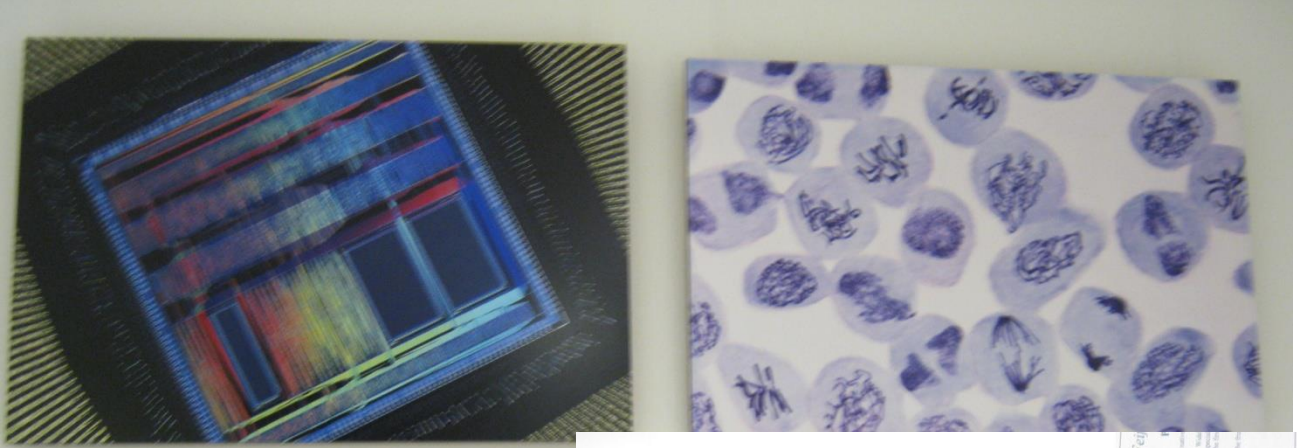











Diploglottis campbellii
Small-leaved Tamarind
Family: Sapindaceae
Origin: NSW.
Qld (rainforest)

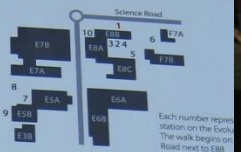
Arboretum

Plant Evolution Walk

1. Diversity from Evolution

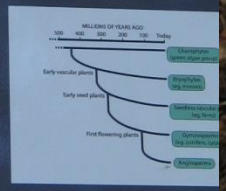
Look at the diversity of plants here – an amazing range of shapes and sizes of leaves, flowers and bark – all products of **evolution**. Natural selection is a key mechanism of **evolution** and occurs as a consequence of two processes. First, the traits of an individual are partly inherited from parents to offspring. Second, these traits influence the chance that an individual will survive and produce offspring. Traits that enhance the survival and reproductive success of an organism will be selected in a population over many generations. Over time this process can result in specialised adaptations and may even result in the emergence of a new species.

Today, 450 million years after plants first colonized the land, there are over 350,000 species of land plants! Most plants featured on this walk have remained relatively unchanged for millions of years; they look almost identical to very old fossils. The walk provides an opportunity to explore plant **evolution** through extant (still living) plants. The walk moves from plants with the most ancestral (oldest) forms to the most recently **evolved**, highlighting significant advances in form and function.



Each number represents a station on the Evolution Walk. The walk begins on Science Road next to E8B

Above: This *Agathis jurassica* fossil (left) from Talbraga fossil beds is very similar to the tree (*Wollemia nobilis*) (right) which grows in the Blue Mountains, 150km from Sydney.
(Fossil from Macquarie University Palaeobiology Collection. Images courtesy Julia Cooke)



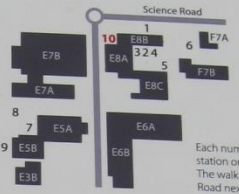
Above: A simplified diagram of plant evolution showing some of the major steps featured in this walk.

MACQUARIE UNIVERSITY

Arboretum

Plant Evolution Walk

10. Evolution Here and Now

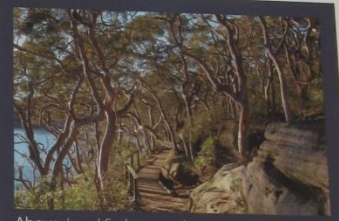


Each number represents a station on the Evolution Walk. The walk begins on Science Road next to E8B

The **evolution** of plants is an amazing process. During this walk we have seen how plants have adapted their form and function over very long periods of time. The **evolutionary** journey we have just followed produced plants that are uniquely adapted to particular environments and conditions.

The Australian flora has some of the most wonderful examples of this process. You might think that Australian plants growing on poor soils an odd choice for exploring diversity and evolution. Actually the greatest plant diversity is often found on the poorest soils, and surprisingly, the biodiversity hotspots in the south-west of Western Australia and South Africa exceed the diversity of areas like the Amazon on a per metre basis.

Look around at the other plants on campus and the local Sydney flora. Try to deduce the **evolutionary** significance of features in the diverse flora you see around you. If something unusual catches your eye, see if you can guess what function it serves and how it **evolved**!



Above: Local Sydney sandstone vegetation featuring the beautiful Sydney Red Gum, *Angophora costata*.
(Image courtesy of Daniel Falster)

Above: Why did these crazy flowers evolve? The local bearded orchid (left) and duck orchids (right) have evolved extraordinary floral shapes (and smells) to attract specific pollinators. Both lure male insects by mimicking the female!
(Images courtesy of Julia Cooke)

MACQUARIE UNIVERSITY

Education Programs

Calendar for Schools
Upcoming events and temporary exhibitions for teachers and students.

Education Programs

Booking an education group

Charges for education groups and how to book an excursion to the Australian Museum. Bookings are essential.

Education Programs

Museum Educator-led Programs

A Museum expert leads students on their excursion.

Education Programs

Museum in a Box®
Museum in a Box is an exciting outreach program for educational institutions across Australia. There are over 30 different boxes containing real museum specimens, casts, artefacts, dioramas, images, DVDs, CDs, books and resources.

Education Programs

Australian Museum Science Festival

Celebrate National Science Week at the Australian Museum Science Festival, Australia's biggest school science festival.

Education Programs

Museum2you

Museum2you is a resource rich, science-based community environmental education program for councils, libraries, regional museums, community groups and organisations across NSW.

Education Programs

Video Conferencing
Schools access the Museum's collections and staff through a selection of video conferences.

Education Programs

Evolution of Australian Biota Study Days

These full-day programs are run by educators from the Australian Museum, Royal Botanic Gardens & Domain Trust, Taronga Conservation Society Australia, and North Coast Regional Botanic Garden.

Education Programs

Exhibition Resources by Topic
Activities and information for teachers and students doing a self-guided excursion.

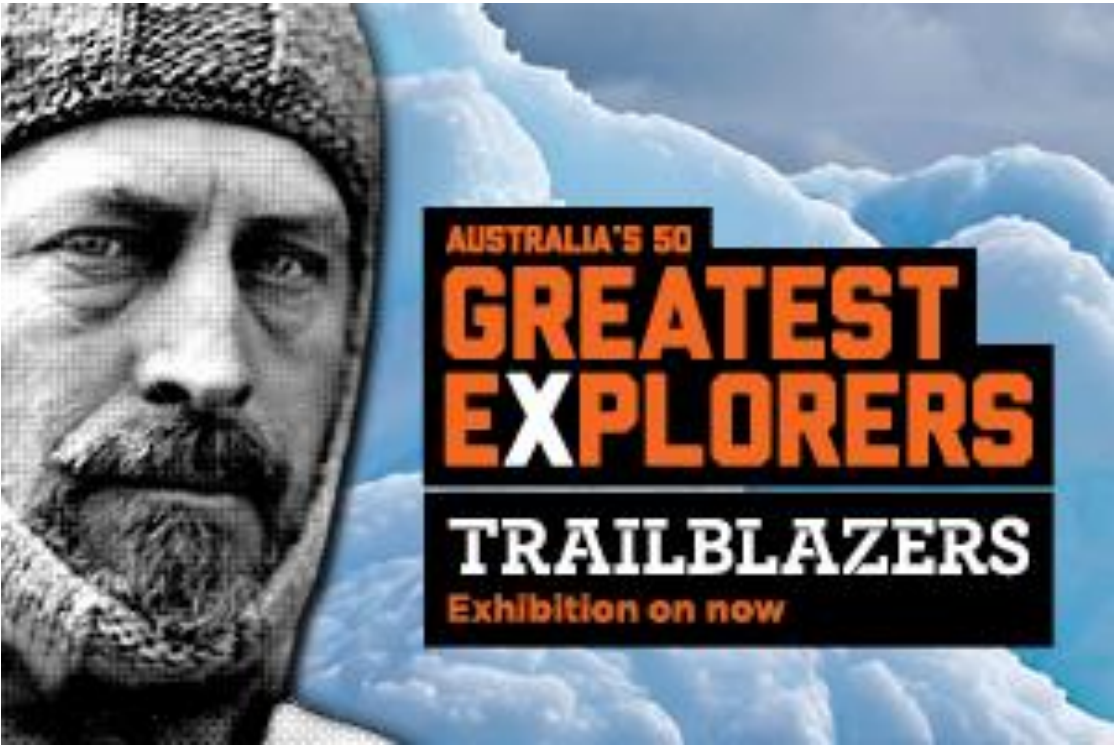
Education Programs

Learning Resources by Topic
Education resources on their website organised by curriculum topics.

Education Programs

Streamwatch
A citizen science water quality monitoring program that empowers community groups to monitor and protect the health of local waterways.

Education Programs



Trailblazers exhibition
Australia's 50 greatest adventurers and explorers

Syllabus links:
History,
Geography,
Science,
Visual Arts

University Museums and formative experiences in natural history

UMAC ***Engaging the Community*** andrew.simpson @ mq.edu.au

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University Museums and formative experiences in natural history

Four pertinent questions????

- Why do people get interested in natural history?
- How does interest translate into lifelong passion?
- What sustains a lifelong passion?
- Where do museum educators fit in this equation?

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University Museums and formative experiences in natural history

"In its encounter with Nature, science invariably elicits a sense of reverence and awe. The very act of understanding is a celebration of joining, merging, even if on a very modest scale, with the magnificence of the Cosmos"

Carl Sagan

ecospiritualism

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University Museums and formative experiences in natural history

As natural history museums have engaged more broadly they have evolved from:-

Systematic collection-based displays

Holistic ecological dioramas

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University Museums and formative experiences in natural history

Some formative experiences

- An inspiring book
- An inspiring television experience
- An inspiring museum visit
- An inspiring speaker
- An inspiring field experience
- An inspiring web site?

- An inspiring early field experience

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University Museums and formative experiences in natural history

Some formative experiences

- An inspiring book
- An inspiring television experience
- An inspiring museum visit
- An inspiring speaker
- An inspiring field experience
- An inspiring web site?

- An inspiring early field experience

Cumulative experiential learning is the key to sustained passion for natural history

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University Museums and formative experiences in natural history

Why are these questions important?

- We need citizens scientifically literate in issues of biodiversity and ecological sustainability
- Those not exposed to field experiences develop cynicism towards environmental issues
- Opportunities for formative field experiences are becoming rare
- Experiential learning, reflective practice and critical thinking counteract a "*nintendo learning culture*"

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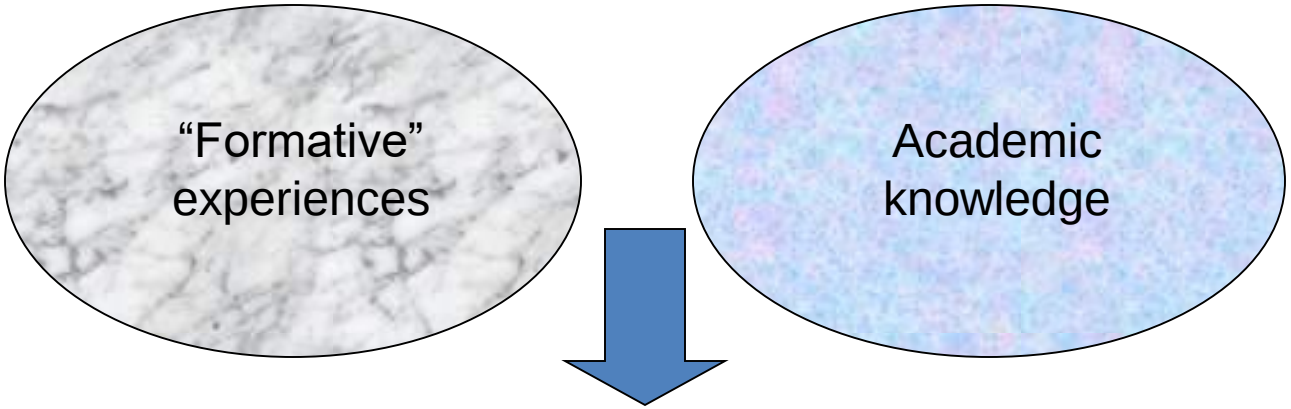
University Museums and formative experiences in natural history

What can university museums do about this that others can't?



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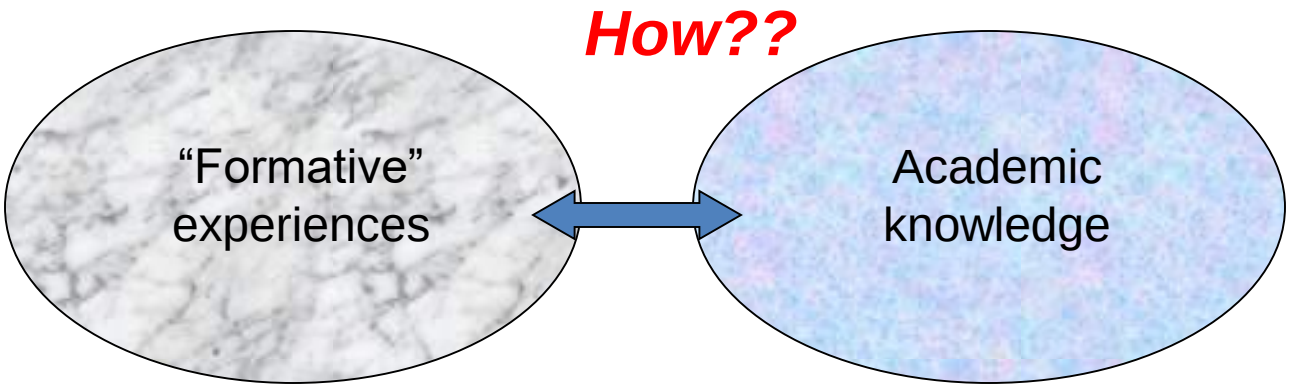
University Museums and formative experiences in natural history

What can university museums do about this that others can't?



- Using the whole campus environment as extended learning laboratories
- Adapting open-ended investigations into education programs
- Education officers as a facilitator rather than a teacher
- Academic knowledge and practice as a reference framework

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University Museums and formative experiences in natural history

Modified environments

- Earth Sciences Garden
- Biological Sciences teaching garden
- Fauna Park

Original environments

- Macquarie University ecology reserve

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University Museums and formative experiences in natural history

Modified environments – Biology Teaching Garden

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University Museums and formative experiences in natural history

Modified environments – Earth Sciences Garden

Plants with Laurasian affinities

Plants with Gondwana affinities

Wallace's Line

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University Museums and formative experiences in natural history

BioTrack™

The basis of biodiversity informatics

- Students design their own field investigation
- Specimens collected from ecology reserve or other area

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University Museums and formative experiences in natural history

4 phase open ended investigation

- Planning discussion
- Sampling
- Documenting data
- Laboratory analysis

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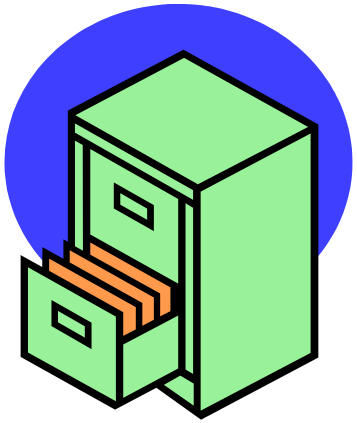
University Museums and formative experiences in natural history

BioTrack™

Barcoded

Imaged



Database

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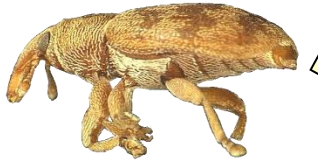
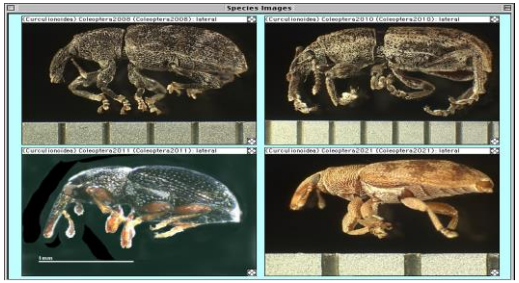
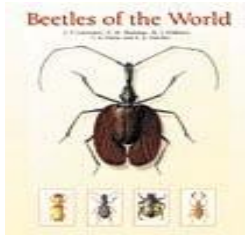
MACQUARIE UNIVERSITY ~ SYDNEY

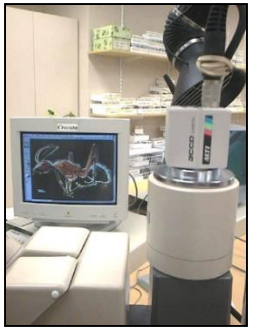
University Museums and formative experiences in natural history

BioTrack™









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University Museums and formative experiences in natural history

Good learning
experiences for all ages!!

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University Museums and formative experiences in natural history








Some friendly and not so friendly Australiana from our Biology Museum

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University Museums and formative experiences in natural history

Grey kangaroo

We believe you're never too young to engage with Nature!!

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Palæographia
An exhibition blending art and science
Rhonda Davis, Andrew Simpson & Kirri Hill
MACQUARIE
UNIVERSITY ~ SYDNEY

Palæographia

An exhibition blending art and science

- **Developed for the First International Palaeontological Congress (IPC2002) held at Macquarie University**
- **Juxtaposition of interpretive artwork, scientific specimens, models and illustrations**
- **Designed to give a different "sense" of the Australian fossil record**
- **Designed to illustrate links between scientific reconstructions and artistic interpretations**

Palæographia

An exhibition blending art and science

Fossils by
Fiona MacDonald
1989

Palæographia

An exhibition blending art and science

Purpose built display:-

"*Minmi*" Australia's only known ankylosaur

Palæographia

An exhibition blending art and science

Pottery by
Nora Moelle with
fossil motifs

Palæographia

An exhibition blending art and science

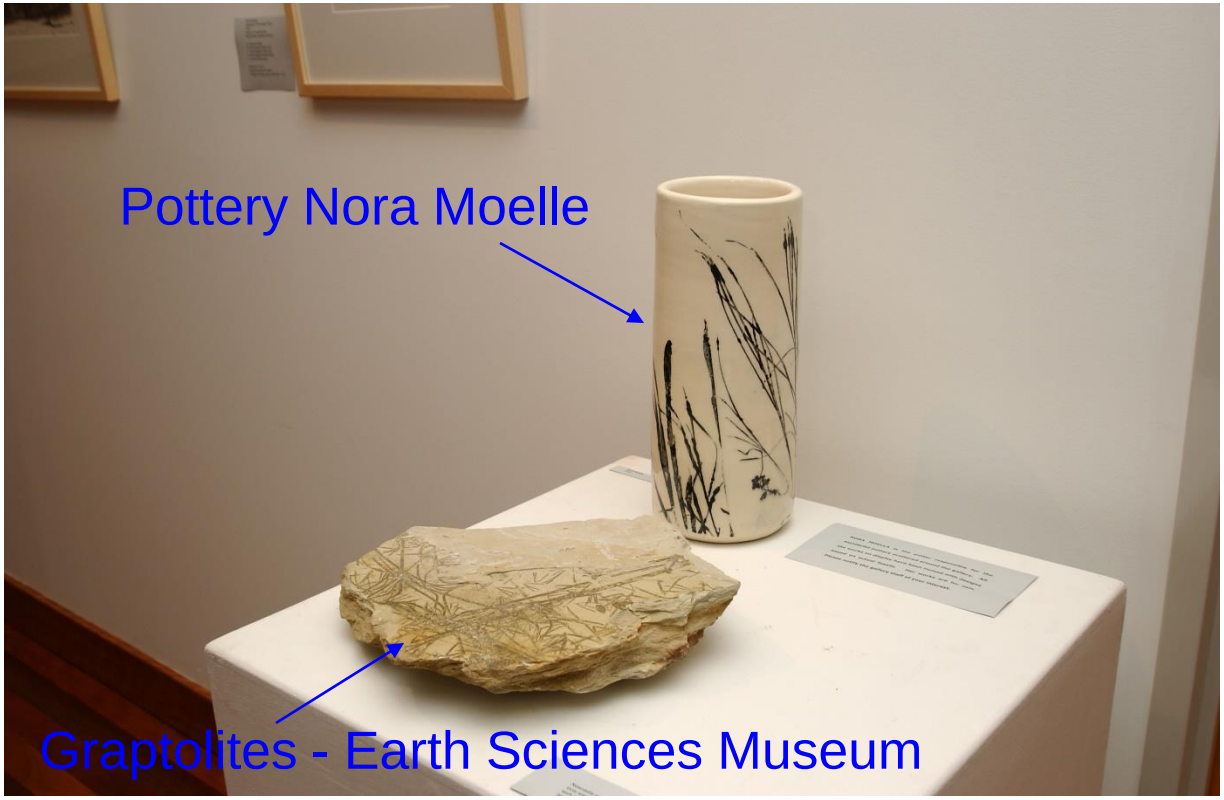
Winton Dinosaur Trackway

Juxtaposition of:-

- Trackway
- Model
- Artwork

Palæographia

An exhibition blending art and science



Juxtaposition of:-

- Pottery
- Specimen

Palæographia

An exhibition blending art and science

Jurassic
Fossil Ferns

Juxtaposition of:-

- Specimen
- Artwork

“The Spiral Principle” - Pip Stokes

Palæographia

An exhibition blending art and science

Juxtaposition of:-

- Specimens
- Artwork

Palæographia

An exhibition blending art and science

← *Glossopteris* specimens

Juxtaposition of:-

- Specimens
- Pottery
- Artwork

"Gondwana concept"

"Java Leaf - Tiwi Leaf" - John Wolseley

Palæographia

An exhibition blending art and science

"The Art of Taxonomy"

"Desert Herbarium" - Isobel Davies

"Gondwana" - Pip Stokes

Juxtaposition of artworks to highlight scientific methodology

Promotional postcards

Palæographia

An exhibition blending art and science

"Fossils" - Fiona MacDonald

Australia's oldest fossil feather - Koonwarra

Conodonts - Windellama

"Diprotodon" - Anne Musser

Palæographia

An exhibition blending art and science

Opening night

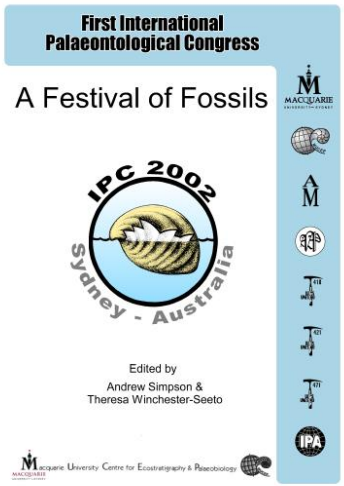
Palæographia

An exhibition blending art and science

Opening night

Palæographia

An exhibition blending art and science



Education programs - Science

Special program for science teachers as part of IPC2002 with educational activities that be transferred to the classroom

Palæographia

An exhibition blending art and science

Education programs - Science & Art

Floor talks, work sheets and group discussions

Palæographia

An exhibition blending art and science

Education programs - Art

Art workshops with a natural history theme

Palæographia

An exhibition blending art and science

Acknowledgments

- Vice-Chancellor's Office Macquarie University
- Macquarie University Art Gallery
- Macquarie University Centre for Ecostratigraphy and Palaeobiology
- Division of Environmental and Life Sciences, Macquarie University
- Earth Sciences Museum, Macquarie University
- Biological Sciences Museum, Macquarie University
- The Australian Museum
- New South Wales Department of Minerals and Energy
- School of Design, University of Newcastle
- Artbank
- Ian Potter Foundation
- Roslyn Oxley Gallery
- Museum of Victoria
- Grafton Regional Gallery
- National Dinosaur Museum
- The Perth Mint

Palæographia

An exhibition blending art and science

Comments from the Visitor's Book

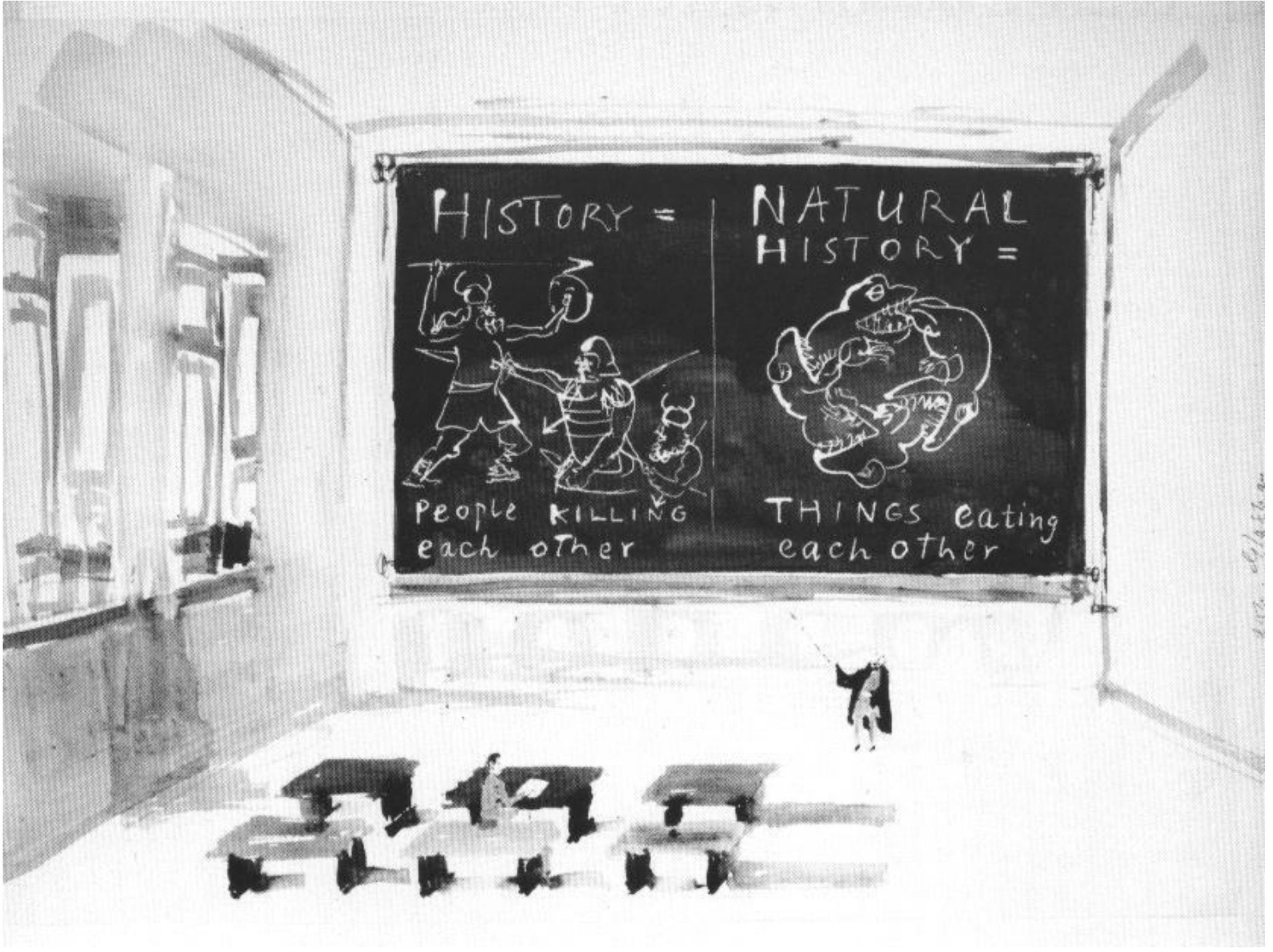
- ***"Beautiful blend of science and art"***
- ***"A pleasant and interesting exposition on the past"***
- ***"Great right brain left brain stuff"***
- ***"Inspiring combination of the ancient and modern"***
- ***"Art as a vehicle of knowledge"***
- ***"The influence of the ancient on creative works was conveyed powerfully"***
- ***"Fantastic - more please"***

Palæographia

An exhibition blending art and science

Conclusions

- **Project introduced a new type of audience to the gallery experience**
- **Audiences are very receptive to a science/arts mix**
- **Provided an opportunity to develop innovative education programs**
- **Universities are good places for cross disciplinary projects**
- **Good example of how a University gallery can promote the activities of the institution's scientists**


HISTORY =
People KILLING each other
NATURAL HISTORY =
THINGS eating each other

Break for questions or comments ??

Some things to consider for all university museums

Benchmarking University Museums and Collections

UMAC

MACQUARIE University
SYDNEY·AUSTRALIA

Macquarie University - Mu...

www.mq.edu.au/about/campus-services-and-facilities/museums-and-collections

Most Visited | Getting Started | Latest Headlines | MQ gmail | Fairholme Quilters | Jobs Desk — Universit... | Optus - Webmail | Macquarie University | Recipes, recipes and re... | Real Estate | Wholefood pantry sta... | Trials to Trek | "I will le... | Mail - Andrew Sim

MACQUARIE University

STUDY RESEARCH CONNECT ABOUT

Museums and collections

ABOUT

- Study
- Research
- Connect
- **About**
  - About the University
  - **Campus services and facilities**
    - Library
    - Hospital and clinics
    - Sport and recreation
    - Museums and collections

Explore the unique and interactive side of the arts, history and science through our diverse collections and museums. Find out about our tours, workshops and other special events.

Quicklinks

Art Gallery
Australian History Museum
The Biological Sciences Museum
The Downing Herbarium
The Lachlan Macquarie Room
Museum of Ancient Cultures
Macquarie University Sporting Hall of Fame Museum

How to locate us

Museums and Art Gallery map

HOW MANY OTHER MUSEUMS AND COLLECTIONS ARE THERE AT YOUR UNIVERSITY?

- Museums?
- Collections?
- Other cultural spaces?

HOW IS YOUR MUSEUM PRESENTED ON THE WEB?

- Not presented?
- Presented separately from other university museums?
- Presented collectively with other university museums?

PROFFESSIONAL NETWORKS AND GROUPS OF VALUE TO YOUR WORK?

- At your University?
- Collective of Universities?
- Outside of your University?

Museums and collections serve a number of different purposes and represent, individually and collectively, a significant asset.

The main purposes are:

1. a resource for research
2. a resource for teaching
3. a resource for community engagement

MUSEUM PROFILING

Can you estimate what percentage of the work of your museum goes towards the main purposes?

1. Research ?%
2. Teaching ?%
3. Engagement ?%

UMAC

Shanghai Jiao Tong Academic Ranking of World Universities 2013								
Rank	Name	Museums?		Art	Science	Other	Total	Note
		Yes	No					
1	Harvard University	√		4	8	2	14	Recent major investment in museum upgrades
2	Stanford University	√		2			2	New 130K museum opening in 2014. Funded by university
3	University of California, Berkeley	√		1	5	1	7	Berkeley science museums are research focussed, not open to public
4	Massachusetts Institute of Technology	√		4		1	5	
5	University of Cambridge	√		2	3	3	8	Recent major investment in museum upgrades
6	California Institute of Technology	√			1		1	
7	Princeton University	√		1			1	
8	Columbia University	√		2		1	3	
9	University of Chicago	√		2			2	
10	University of Oxford	√		2	2	2	6	Recent major investment in museum upgrades

Great Universities have great Museums!

Great Universities invest in culture through their Museums!

University Museums are / can be:-

- Integral to all three missions of the university
- A training ground for future professionals
- Use the diversity of intellectual endeavour available
- Places of experimental and innovative museums practice
- Template for interaction with the broader museum community

UMAC

Links to reading

Beyond visitor statistics: value propositions and metrics for university museums and collections.

http://www.researchgate.net/publication/311296587_MMC_beyond_visitor_stats

Reframing the small university museum

http://www.researchgate.net/publication/314151969_Reframing_the_small_university_museum

University Museums from Home: observations on responses to the impact of Covid-19

https://www.researchgate.net/publication/348863584_University_Museums_from_Home_observations_on_responses_to_the_impact_of_Covid-19

Why Academic Museums Matter: Four Frameworks for Considering Their Value

https://www.researchgate.net/publication/338229210_Why_Academic_Museums_Matter_Four_Frameworks_for_Considering_Their_Value

UMAC

Museums and Collections, Epistemic Convergence and Higher Education

https://www.researchgate.net/publication/337858266_Museums_and_Collections_Epistemic_Convergence_and_Higher_Education

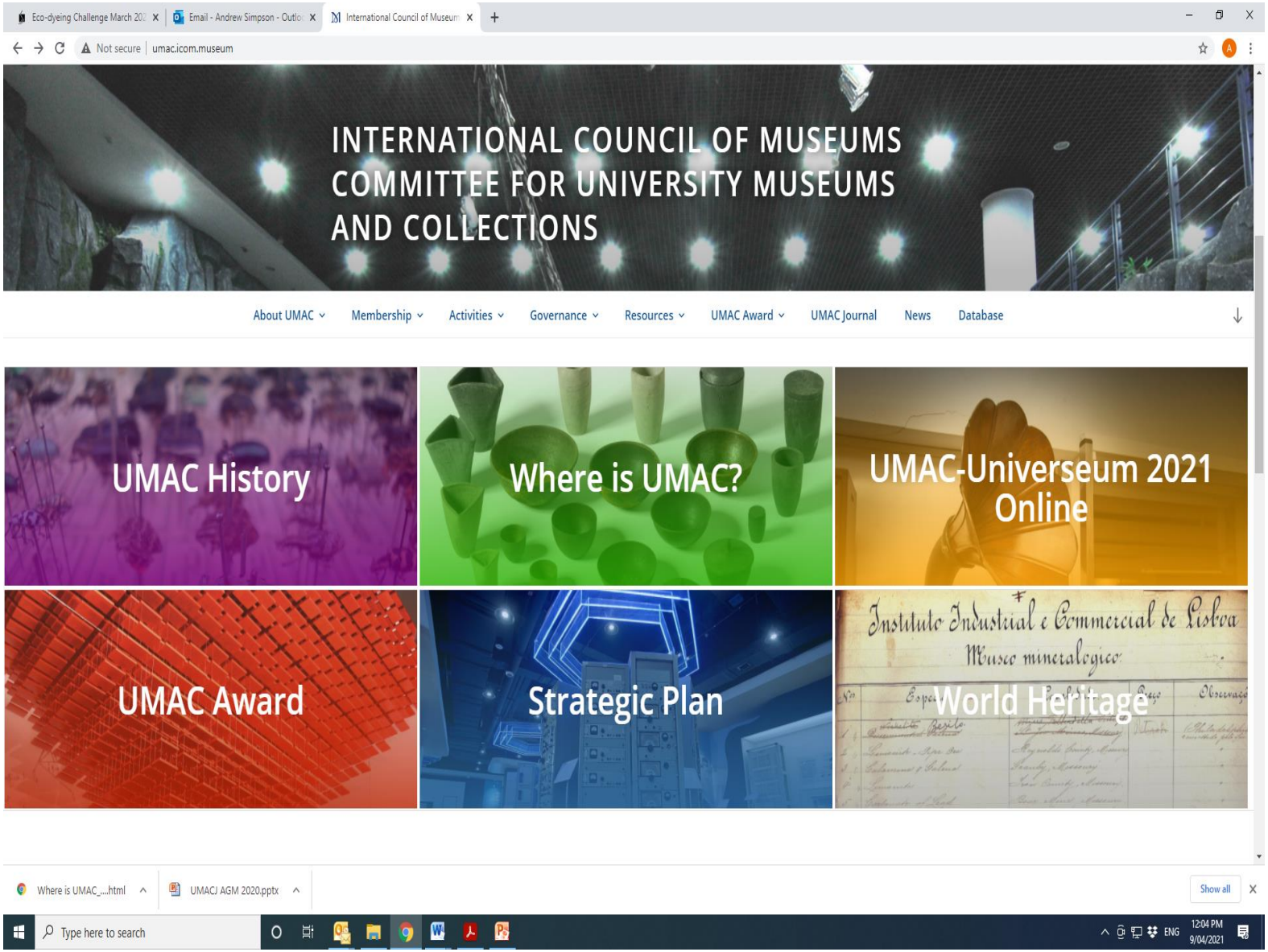
UMAC ICOM international committee for university museums and collections

- It was created in 2001 (one of the younger ICOM committees).
- An IC focused on institutional setting.
- Represented 61 countries.
- UMAC Award, annual conference, UMAC Journal, UMAC database, working groups

Mission

UMAC is the global advocate for higher education museums and collections of all disciplines. UMAC's mission is to contribute to society, for the benefit of all, by sustaining the continued development of university museums and collections as essential resources devoted to research, education, and the preservation of cultural, historic, natural and scientific heritage.
UMAC fully upholds the values and principles enshrined in the **ICOM Code of Ethics** (2013) and the **Magna Carta Universitatum** (Bologna, 1988).

http://umac.icom.museum/



UMAC ICOM international committee for university museums and collections

RESOURCES & TO

SOCIAL MEDIA

- Journal *UMACJ*
- Publications, Reference Documents
- Consulting: Mailing-list UMAC-ML (you can subscribe to the list without being a member!)
- Social Networks: Facebook, Twitter, Instagram, WeChat
- **World Database of University Museums and Collections**
  http://university-museums-and-collections.net/
- **UMAC AWARD – nominations now open for 2022!**
  http://umac.icom.museum/umac-award/