

All Things Made New:
Media, Research, Libraries, and the Idea of Culture

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The Alexander Turnbull Library Endowment Trust Lecture
The National Library of New Zealand
21 February 2019

Kia ora. He mea nui ki tenei ao te toro ki tetahi whenua ataahua me te iwi e pai ana.

It is rare in this world to visit a land so beautiful and a people so welcoming, and such a great privilege to return to New Zealand and Wellington for this presentation (*slide 1*).

The overarching theme this evening is the interaction of culture and technology, and what this interaction may require of us as stewards of our cultural heritage. Gathering today in the magnificent National Library of New Zealand is significant and apt. 'Culture' is defined as the variety of behaviors that defines human societies – this includes the way we create our identities and refine our selfhood--and also the expressive forms like art, architecture, music, dance, and literature: social organization and knowledge organization generally. The 'technology' cited is mostly the digital technology that has become so integral in our lives, but also high energy physics, spectral analysis, and other investigative methodologies.

The lecture is divided into three parts:

Media: how technology facilitates and helps shapes our social constructions, helps shape the concept of self, with a brief look at the information generated by this social behavior; and some of its consequences.

Research: how different technologies assist in the interpretation of cultural artifacts, focusing also on the new discoveries and methodologies these technologies can foster.

Libraries: how digital technology preserves and makes accessible a vast amount of knowledge, much of it under threat: building eventually at a planetary scale, and the community necessary to sustain that.

A final section looks at the challenges, responsibilities, and new investments needed to assist our cultural stewards – predominantly libraries, archives, museums and the profession of humanities-- as they necessarily evolve and assume new roles in response to these sweeping phenomena.

Everything discussed this evening represents an expression of our humanity, and in that respect this is a lecture in the humanistic tradition. Another characteristic of all of these examples is the theme of revelation or extrapolation of hidden meaning. It is our nature to delight in seeing text swim into view for the first time in a thousand years that has been hidden underneath by other words written over them, or to be able to search for pattern similarities in objects that were originally found in societies that span millennia and now reside in the database of a global

digital library. As the title suggests, unprecedented change is pervasive – who we are and what we know are continually made new.

But first, a contemplative pause (*slides 2-5*). These captivating images are cave drawings from Chauvet and Lascaux in southern France, and Altamira in Spain, dating from 35,000 years ago. They remain a mystery, the intent and meaning of the images perhaps forever lost to the modern world. They appear here because of the remarkable fact that these and images much like them were drawn repeatedly until near the end of the last ice age: about 11,000 years ago. These thus represent cultural icons of expression that were understood by humans for nearly 25,000 years. It is believed that someone transported through time 25 millennia would likely recognize the drawings 800 generations distant and understand their symbolic meaning to society.

Media

So now we jump to the present day (*slides 6-10*), which is in some respects the perfect antithesis to the ancient cave drawings.

Here are some examples of the pervasive culture of re-mix and mashup, meant to emphasize the profound contrast to the rock images that survived with slight modification for so long. We find ourselves in a world today that shifts and morphs seemingly hour to hour; forms of expression change ever so swiftly as well. Ours is a popular culture of porous boundaries, theft, mashups, and genre stretching, sharing qualities both soothing and sinister. The term re-mix comes from the music industry and describes what DJs do (the slide is a DJ's remix tableau. Think also of Spotify: an audio sharing platform that has access to 40 million tracks. It has a feature that allows listeners to reshuffle music tracks as they wish. This introduces another facet of our contemporary culture: non-linearity.

(*Slide 7*). This is a virtual hash of iconography: including the Mona Lisa, Edvard's Munch's The Scream, Vermeer's Girl with a Pearl Earring, all against a Van Gogh sky. Playfully, Mona Lisa is taking a selfie. Pastings like this touch upon our understanding of image and image culture – what makes these items iconic? – here plastering them in an irreverent pile on that disrupts the original paintings' narrative and, like Spotify, dissolves a sense of linearity.

The British artist and provocateur Banksy has a brilliant understanding of contemporary culture. Two examples here:

- a. Masked guerilla soldier throwing – flowers (*slide 8*)
- b. Girl with balloon (*slide 9*). This was up for auction last October, placed on a table. It sold for over a million pounds. Upon the point of sale, a motor started, and the table was revealed to be a shredder, and the painting proceed to be cut into ribbons. The epitome of the contrast to the images in Lascaux. Aggressively impermanent. A painting and not a painting; an expensive work of art or worthless? Or does it accrue value as a spectacle?

Whereas the supple lines and deft coloring of the ancient bison and deer persevered for 800 generations, Banksy's Girl with Balloon lasted about 8 minutes. Following its drop through the shredder, the painting/object/what's left if it is called "Love is in the Bin."

The popular culture manifestations are often humorous, clever, and provocative. One example is another take on Vermeer's *Girl with a Pearl Earring* (*slide 10*), here holding a smart phone and presumably taking a selfie. This is poignant, in that the painting is interpreted as possibly drawn from the perspective of the girl looking into a mirror, briefly admiring the earrings that may not belong to her. Vermeer is painting as if from the other side of the mirror, removing the silver plating and capturing the lovely, if furtive, pose. This qualifies as a 17th century selfie of sorts, and the re-mix captures that nicely.

The juxtaposition of the samurai with Star Wars imagery similarly evokes a clash that also instills a continuity: great sword play is great sword play, whether in Japan or a distant Tatooine. Loyalty and discipline are also evoked.

This human proclivity to mash up and re-imagine the world has serious manifestations as well. Wikipedia, and its parent Wikimedia (*slide 11*), and Google earth (*slide 12*) are projects that sort and pull together millions of images and hundreds of thousands of encyclopedic descriptions to serve as a new, open, and continually edited lens on our world. These are socially constructed media: thousands of individuals entering information, thousands more editing and reviewing, millions of us, hour by hour, referencing these sites and reusing the information found there. Solid patchwork on a grand scale.

Social media also is based on accumulation and editing at vast scales (*slide 13*). Compared to socially constructed media like Wikipedia, these are the wild frontier.

Facebook: 2.2 billion monthly active users
Instagram: 1 billion monthly active users
Twitter: 350,000 tweets per minute
Spotify: 207 million active monthly users

Often overlooked as a major example of personal expression is email: 215 billion per day. This represents exobytes of our historical record. (*slide 14*)

Challenges to the library, archives, and museum professionals, scholars, and really challenges to everyone in this room:

Scale:

what do you do with this? How to you make sense of –catalog or organize– 215 billion emails a day? Or capture billions of tweets and Facebook posts that are ephemeral, shared, deleted, redone?

Authenticity:

What is real? Instagram has dozens of apps that re-render any photograph – most of which are already artificially cropped to be posted – cool, nostalgic, provocative. Sepia (19th c) look; burnt edges; brighter lighting: shopped, refitted, remade. Facebook we now know has identified and removed hundreds of thousands of fake accounts; there are likely many more.

Authority:

Returning to Facebook: What are the rules of this online society, who has responsibility for this? Until recently, there was little visible evidence of oversight or quality control. But we know now there were rules in effect, many rules, they just were not in sight.

Algorithms (*slide 15*) . The darker side of social media. We are just beginning to learn the scope of this surveillance. Facebook and its billions: cute pictures of cats, food preferences, movies liked, circle of friends, addresses, books read: innocuous on one hand, but to a powerful search engine: gold. We become commodities advertised and sold to with sharp precision. (Facebook made US\$55 billion in 2018 selling our information to companies and advertisers)

More disturbing still, this information, with sophisticated inference engines in service to subvert democratic governments: also gold. Hundreds of data points of millions of potential voters across key geographic regions: well, you know the story, as it gets more troubling and consequential.

Think about the layers of interaction – all now appropriate to understanding the cultural record of the 21st century-- astonishing: hundreds of billions of data points, kind of fun and sweet, then manipulated to commodify much of the human race, then manipulated to disrupt and sow lies that corrupt our trust in traditional institutions, purposefully undermining the concept of truth. Now lately a spate of books, studies, research, and examinations of these phenomena – a meta analysis – talk about a mash-up-- of innocence, marketing, cyber invasion, and possibly treason – all because of a digital platform about 10 years old (Facebook started to achieve positive revenue in 2009). We'll return to this later.

Research

Pictured is the linear accelerator at Stanford University in California. We'll come back to it in a minute (*slide 16*). All the projects in this category are international in scope, involve librarians, archivists, conservators, scientists, and humanities scholars.

Walseemueller Map. 12 panels, each 2 x1.5 feet. (*slide 17*)

1507. Of 1000 copies, only one is complete, now housed in the Library of Congress. Fenella France, a New Zealander, is head of the Preservation directorate at the Library of Congress in Washington, D C. and has worked extensively on this map. A good deal of her focus on its watermarks to determine how and where it was assembled and revised. Watermarks, revealed through special photography, put together create a narrative of the map's history.

Another of Fenella's projects: Bartok's final concerto for orchestra (*slide 18*). You can see the spectrometry involved: the manuscript is examined under various light spectra and the original notes are made visible: those which Bartok write over.

A major scientific/humanities/ collaboration, in this instance with art historians (*slide 19*), was on display last year in Vienna. A Pieter Brueghel the Elder (1525-1569) exhibit last year at the Kunsthistorische Museum used high resolution photography, x-radiographic analysis, and infrared imaging to expose sections of a painting that Brueghel had originally drawn and then covered in paint and changed the subject, often dramatically.

Here (*slide 20*) you can see the version visible to the human eye; to the right the eerie specter of the original: a corpse. What was a coffin became a trough with dirt and some vegetables; what

also appears to be a woman in the original staring more directly at us – a gesture of significance, drawing the viewer into the scene – was replaced by a peasant man who looks down and away.

The Stains project (*slide 21*). The humble stain. The focus of this project are Medieval medical manuscripts. Principal investigators study material stains on manuscripts to determine what compounds or substances were being used at the time of referral. This gives us a window into correlation of recipes (formulas) and how they were used. You can see the spectral analysis of the soiled page on the right.

For a summary of the project, see <https://penntoday.upenn.edu/news/stains-alive>

One of the marvelous results of this project has been the discovery of a new antibiotic, a mushroom based compound that was discovered by a team of scientists and medievalists. It has been informally tested, and a patent has been applied for with the intent to make this compound freely available. It is not a stretch to say that this is an example of multidisciplinary research that will save lives.

The Syriac Galen Palimpsest (*slides 22-24*). This is a manuscript purchased in 2002, and rumored to be a palimpsest, a parchment of an overtext (visible to the eye) and an undertext, invisible, that was written over. Preliminary research proved it is indeed a palimpsest: the visible writing is Syriac, a liturgical compilation of religious texts and hymns written down in the 11th century, probably at a monastery near Antioch. The undertext is a Syriac translation of Galen's *On the Mixtures and Powers of Simple Drugs* (e.g. plants, minerals animal parts), an extraordinarily rare and valuable treatise.

(For a succinct summary of the project: <https://www.alc.manchester.ac.uk/classics-and-ancient-history/research/projects/syriac-galen-palimpsest/>

The monks would likely have applied an acidic solution to the original, which made the ink water soluble that they would wash off. The parchment would then be treated – rubbed with pumice and coated in calcium carbonate. Upon drying, the new text would have been written down. Recovering the lost texts is delicate and time consuming, but successful. You can see the original text that has been hidden for nearly one thousand years. The images, metadata, and other results of the scanning are all publicly available.

Libraries (*slide 25*)

Two projects are highlighted, and we will conclude with some recommendations.

Digital Library of the Middle East (*slide 26*)

The circumstances that instigated the DLME are sadly familiar to all of us: the widespread destruction of culture in the Middle East by ISIS and other militant groups. This included smashing of ancient statuary (*slide 27*) the burning of the public library of Mosul (*slide 28*); and book burning in general (*slide 29*).

This onslaught included the loss of human life, and the greatest displacement of human populations since WWII. A refugee camp is pictured (*slide 30*). The average stay in these camps is 14 years, with little hope of either returning home or pursuing a career if/when one leaves the camp.

The DLME is defined as:

- a compelling, dynamic, reusable, extensible, sustained, open source, and customizable platform for the discovery of the objects (including information objects) and artifacts of significant cultural and historical importance for MENA national heritages as well as world heritage;
- a means by which to track the provenance, history, transaction records, and legal status of all cultural objects federated/represented/gathered in its database;
- a federation of hundreds of digitization efforts and resources, in cooperation and collaboration with similar institutional activities in the region and around the globe;
- a source of rich, detailed, and linked inventory information/metadata for each object; and
- ultimately, a stand-alone organization that will provide significant funds for on-site digitization and digital capture of artifacts currently at risk and, post conflict, artifacts of significance to the MENA region.

Through international support, which we expect will include grants funds, sovereign funds, corporate contributions, and individual donations, the DLME will:

- incorporate the most advanced open source and cost effective tools and applications available; and
- serve as a model for national and international cooperation: an exemplar for similar undertakings in other regions of the world.

The DLME will:

- have the advantages of the considerable benefits of digital technology, which include manageable costs; minimal space requirements; ubiquity of access, including through mobile devices; multilingual search and discovery; and digital preservation of cultural heritage;
- serve as a means to train skilled professionals, create new jobs, and strengthen local economies by providing a platform that is ideal for hands-on learning and use in undergraduate and graduate programs, apprenticeships, professional development courses, and fieldwork in areas such as Information Science, Art History, Archaeology, and other cultural heritage fields;
- serve as a means to educate a very wide audience on the importance and sophistication of Middle Eastern cultures;
- help to instill respect for and deeper understanding of this imperiled record of our culture, framed by the belief that our shared heritage plays a critical role in revealing the complexity and achievement of our humanity; and
- bridge generations, providing an invaluable resource for contemporary populations as well as those who will come after us.

But we believe there will be a post conflict period, and that is when the DLME will further flourish, its data and content and tools used for teaching and research (*slide 31*). The original intent of the DLME, preserving threatened culture, will evolve, it is hoped, to accommodate

post conflict needs such as teaching and research, an open source library that can be continually augmented.

A few more relevant points: working in the region with many countries and dozens of collecting institutions; many of the countries involved do not normally work with each other.

Of the hundreds of people we have approached to work with the DLME, no one has declined.

We need to think of a digital library perhaps more in diplomatic terms: a separate environment or ecosystem that transcends border, national interests, and politics.

Pangia (*slides 32-33*). The term 'Pangia' is a play on the geological term Pangaea, an ancient supercontinent: a coherence of all present day continents into a single landmass (approx. 335mya-175mya). The 'i' in Pangia is meant to represent 'information', and the appropriated term signifies the desire and feasibility of bringing together current and future digital library projects to accelerate their machine learning functions and making them interoperable in a way that the collections can be federated as if a single functional resource at a planetary scale, providing an unprecedented ecosystem for research, teaching, new discovery, and the enrichment of human capacity.

Current digital library landscape; representative projects currently in discussion about Pangia:

Digital New Zealand
Trove
Europeana
National Digital Library of India
Digital Public Library of America
National Library of Japan
DLME
Tainacan (Brasil)
Qatar National Library
Digital Mexico
National Library of China
National Library of Korea

There are several large scale digital libraries across the world in different states of maturity and development. From mature digital libraries such as Europeana, Trove (Australia), the World Digital Library, and Digital NZ, to maturing projects that include the Digital Public Library of America (DPLA), Tainacan (Brazil), the Korean and Chinese Digital Libraries, as well as emerging projects like the Digital Library of the Middle East, the Qatar National Library digitization programs and the National Digital Library of India. Each digital library project tends to have a particular strength, e.g. Australia has a solid model for revenue income and sustainability; the National Digital Library of India is focused on pedagogy and the democratization of knowledge across all social and ethnic strata. Europeana is strong in setting standards, and DPLA's efforts in new educational models is well respected. In aggregate, these efforts will comprise over time 100,000,000's of digital assets.

Over the last 3-4 years there have been some cooperative exchanges of information and knowledge. These have proven to be beneficial but active development of frameworks for

cooperation and technical coordination across continents and co-development of technology has not been formally pursued.

Phases 1 and 2

Phase 1

There seems to be room for an acceleration of the work that we are all doing by intensifying the relationships, allowing for a more structured exchange of information. Additionally, the prospects of a global scale digital library that federates and promotes the management, sustainability, and augmentation of these projects as a collectively engineered system is deemed feasible, fulfilling a dream that has floated since the 1980s. In order to achieve this a formalized structure and agreed upon practices and protocols is requisite.

Pangia is proposed as the program and product of an exchange of knowledge, technical platform design, and governance to instantiate a global digital library of digital libraries, insuring long term cooperation and significantly reduced costs, in service to a universal good. Phase 1 will provide a proof of concept for a new digital platform and demonstrate the efficiencies and relative ease of building Pangia.

Phase 2

The Context of Climate Change (*slides 34-36*). In Phase 2, the project is further contextualized, with attendant urgency, as a response to the threats of climate change. World-wide cooperation with attendant efficiencies of scale and cost is intuitively attractive; this coalition of effort is now catalyzed by the predicted, often devastating, loss of our human and natural heritage due to dramatic and increasingly harsh shifts in the global climate. The loss includes erasures of our culture, including languages, built environments, and plastic artifacts; significant diminishing of diversity of species; loss of scientific and other research data that is crucial to better understanding and resolving our predicament; and the massive displacement of humanity and the loss of individual freedom of movement, access to education, and loss of personal property and over time personal history it represents.

Pangia will attempt to capture as many of these threatened aspects of our roiled planet as is feasible. While initially a project that logically focuses on large scale national and international efforts, Pangia will be architected to allow for easily federated data and information from small, obscure, and remote digital projects, such as field studies; archeological sites; linguistic repositories; data repositories and individual laboratory files; records of extinction; native and indigenous archives; and histories of refugees. In this respect Pangia will serve as a universally accessible record of life on earth through a global community of contributors, a robust and ever augmented chronicle of what is passing, has passed and, as a platform for advanced research, new forms of human expression, and sophisticated modeling, what may come.

A summit meeting to discuss next steps is planned for The Hague next month. From NZNL, Fiona Fieldsend and Rachel Esson will attend; Bill Macnaught has also been involved with all of the current discussions. A following summit is scheduled later this year in Doha, and the third and final world meeting will be here, in Wellington, in 2020. At that meeting we hope to have ample evidence in hand of the value of a global library effort, the efficiencies its will entail, some idea of its governance, proof of a new, functional technical platform, and the way forward to build it. We are informally referring to the Wellington Statement as the document that will embody these aspirations and a more detailed workplan.

Stonehenge (*slide 37*); another contemplative pause as we near the end of the talk. Stonehenge grabs your attention; stunning, striking, mysterious. When I was there a few years ago traffic was stalled on the local roadway because of smart phone photography. This is the image everyone responds to. But it is a very small piece of the whole. The complex at Stonehenge covers many acres (*slide 38*), and includes other lost henges, perhaps a few villages, sacred roads, raised ditches, river landing sites, and many barrows. The bigger picture is an astonishing achievement, and really needs to be better understood as the context of the alluring rock circles. So toward the bigger picture:

Strategic Investments (*slide 39*)

There are many areas to consider as sound investments; a few are noted here.

Education

This really entails lifelong learning. The technologies discussed this evening may be mechanistically neutral, but their effects and influence when they become tools of social and material culture are anything but neutral. We need to more rigorously understand what we are doing, and why, and what the tradeoffs, costs, and compromises are, as well as the benefits. Curricula should be developed to explore these issues, which pertain largely to social culture, but also accrue to building planetary scale digital libraries. There is an air of being duped by giant technology companies, which strongly suggests we need to be much better informed about technology and our social constructions.

I had the pleasure to meet recently with graduate student Margaret Kawharu, in the School of Information Management at Victoria University, Wellington.. Her PhD thesis is on Twitter and firestorms; she is compiling data on how firestorms arise on Twitter, the scale of them, and the consequences. The outcomes of these viral compilations attest to an array of possibilities: more limited social engagement can be seen, for instance, in some of the many video/tweets focused on United Airlines, a perennial target of twitter's ire. More fundamentally, consider the contribution of Twitter firestorms and related tweets for the #metoo movement. Margaret will help us understand and better manage this new phenomenon.

Infrastructure

investments in new technologies, bandwidth and digital delivery can always be improved. Concomitantly, training new professionals to guide and develop these networks, applications, and architecture in service to our cultural heritage is also essential.

Humanities

Custodians and interpreters of the cultural heritage; programs in NZ and elsewhere focusing on digital humanities – continuing the tradition of humanistic inquiry in a digital age, with all the complexities and opportunities suggested this evening, would be prudent. I also had the privilege to meet recently with Prof. Sydney Shep, Reader in Book History at Victoria University Wellington. Among several projects, she is working with molecular biologists, who study the process of transformation in genes that drive evolution, her research involves working with the biologists is to see if some mathematical modeling of gene transformation can be applied to the evolution of descriptions of events and topics in 19th century media, particularly the way newspapers pick up and revise popular stories. The prospects of prediction methodologies that work for the body and the mind would be groundbreaking.

Collaborative projects

We should ponder the proliferation of projects, and the long history of funding predominantly individual projects and programs. These remain valuable, but strength is in numbers, collaboration, and continuity. Large scale projects of many contributors, increasingly international in scope, have an economy of scale if done smartly, and foster wider communities of shared practice and adopted standards, which in turn makes future projects and enrichment of resources more efficient and less risky. Positing one nation's contribution as part of a wider consortium empowers everyone in the chain of service providers. Someone providing metadata to an indigenous digital library in a remote town is important; when that knowledge can become part of an international effort, with wide exposure and new interests, the work becomes essential to human society writ large.

Multidisciplinary research

At the risk of droning on, in this brief presentation the professions and areas of expertise the highlighted projects benefited from and were essential to their success include; librarians, archivists, curators, catalogers, conservationists, data curation specialists, codicology experts, information technology developers; software specialists; historians, medievalists, Renaissance scholars, linguists, religious leaders; musicologists, cartographers; Middle Eastern language and culture experts, diplomats, politicians, anthropologists, sociologists, archeologists; fields represented also include quantum mechanics; particle physics; material scientists; spectral analysis; chemists; historians of medicine; historians of science. Those electric moments of revelation would not be possible in a standard model of university organization.

Conceptual reconsiderations

Which leads to the final observation. Woven through all of these projects is a salient set of characteristics: they are not siloed by discipline or institution. None of them could function if limited in scope by a particular disciplinary focus or single institutional agenda. Rethinking 'culture' as multifaceted and enormously complex would open new frameworks of research and investigation, and likely lead to new kinds of discovery, knowledge delivery, and a more accelerated enhancement of our human capacity than a more traditional concept. Far more than extensive funding, what is needed is leadership, vision, and a commitment to better understand the new cultural manifestations we are creating for us and for generations to come. (slide 40)

Coda

The stewardship of our cultural heritage is a natural impulse; we are a symbolic, creative, and curious species, and we express ourselves in an astonishing variety of media. We are obliged, as a kind of social contract, to shepherd our heritage over time, providing the coming generations with ever richer resources, content, and interpretive tools. To accept this responsibility to maintain and augment our heritage is, to re-mix Shakespeare and Wordsworth, an elegant means of holding a mirror up to ourselves to see more deeply into the life of who we are.