Building a Digital Library of Scholarly Resources from the Developing World
An Introduction to Aluka
by Rahim S. Rajan and Heinz Rüther

In the mid-1990s, The Andrew W. Mellon Foundation launched JSTOR, a not-for-profit organization with a mission to create and maintain a trusted online archive of important scholarly journals and to provide access to these journals as widely as possible. Today, JSTOR includes the digitized back issues of more than 640 journals (over 21 million pages of scholarly literature) and is used by faculty, researchers, and students at more than 3,000 educational and research institutions around the world. With astonishing celerity, e-journals, search engines, online databases and image archives, 3D visualization techniques, and more recently, blogs have each become rich tools for teaching, learning, and the sharing of ideas. If the past decade is a portent for the future, one can anticipate this trend to continue as new tools are developed to help scholars and students acquire, interact with, analyze, and share knowledge.

As JSTOR began to provide access to its archive to institutions in the developing world, it became increasingly clear that there was a profound need to assist museums, libraries, and archives there to build capacities and expertise in the use and application of information technologies, so that they too could become active participants and voices in the “digital revolution.” Many librarians and scholars saw the need to develop cost-effective mechanisms that could level the playing field and make it easier for repositories, authors, and research institutes in the developing world to contribute to these web-based scholarly resources, especially as global access to the Internet steadily improved.

At the end of 2002, with support from The Andrew W. Mellon Foundation, the William and Flora Hewlett Foundation, and the Stavros S. Niarchos Foundation, and working in partnership with JSTOR, a new not-for-profit organization—Ithaka—was formed. Ithaka’s mission is “to accelerate the productive uses of information technologies for the benefit of... (continued on page 4)
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higher education around the world” (www.
ithaka.org). In 2004, as one of its first pro-
excts, Ithaka launched Aluka, an international,
collaborative initiative aimed at building an
online digital library of scholarly resources
from and about the developing world (ibid.).
The name “Aluka” is derived from the Zulu
verb ukulaka, which means ‘to weave’, reflect-
ing Aluka’s mission to connect resources and
scholars from around the world. Aluka is ini-
tially concentrating its efforts in Africa.

Aluka seeks to attract high-quality scholarly
content, from all academic disciplines, about
the developing world from institutions and
individuals across the globe. By contributing
their content to the Aluka platform, content
owners will have a means of offering access
to their collections to an international audi-
ence—without having to develop and support
their own technology platforms. Aluka’s web-
based platform provides powerful tools for
research, teaching, collaboration, and knowl-
edge exchange.

Aluka is partnering with educational and
cultural institutions to select and digitize a
wide range of high-quality scholarly materi-
als, ranging from archival documents, peri-
odicals, books, reports, manuscripts, and
reference works, to three-dimensional models,
maps, oral histories, plant specimens, photo-
graphs, and slides. By aggregating these mate-
rials online, the Aluka collections link content
that is widely dispersed and difficult to access,
opening up new opportunities for research,
teaching, and broader public discussion. One
of Aluka’s primary objectives is to provide
African scholars and students with access to
scholarly materials originally from Africa, but
now out of their reach. In Africa, most edu-
cational, cultural, and research organizations
will be able to license Aluka at no cost.

Aluka also works closely with partner orga-
nizations in Africa to build capacity in digi-
tization and the use of online materials for
research and teaching. In some cases this
includes setting up digital labs and providing
technical training in scanning and creating
metadata records; in others, Aluka convenes
training workshops for librarians, archivists,
faculty, and heritage professionals on topics
related to digital imaging, preservation, geo-
graphic information systems (GIS) develop-
ment and application, and the use of online
tools in the classroom. At present, three Africa-related content
areas are under development at Aluka (due to
space limitations, the first two areas are only
briefly touched upon here—for more details,
please visit www.aluka.org). New materials
will be added to the collections on an ongoing
basis and institutions and scholars are encour-
aged to contribute to these online resources.

**African Plants**

Consisting of scientific data contributed to
Aluka by the African Plants Initiative (API),

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**African Arts**

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A comparison between a digital photograph of a wall at the Djinguereber Mosque and a laser scan of the same wall.

Image courtesy of Heinz Rüther, University of Cape Town.

**Struggles for Freedom in Southern Africa**

The liberation of Southern Africa was a major political event of the twentieth century. The demise of colonial rule, the end of white-settler domination, and the dismantling of the apartheid regime had far-reaching consequences, not only for the continent, but for the global community. Aluka’s *Struggles for Freedom in Southern Africa* collection documents the liberation struggles in six southern Africa countries, with a particular emphasis on the global dimensions of these struggles. From interviews and hearings to posters and pamphlets, this collection presents the international perceptions, reactions, and realities of one of the most tumultuous eras in the continent’s history.

The content selection process for this content area is focussed on presenting multiple, contesting perspectives rather than simply retelling conventional narratives or only representing one of the perspective of groups that assumed power. With national advisory committees composed of leading scholars, archivists, public intellectuals, and activists in each participating country, as well as an international committee of senior scholars, the collection ensures both detailed documentation within a particular country, as well as content covering key events, organizations, and movements that takes into consideration a broader regional and international perspective. Aluka is initially documenting the liberation struggles in Angola, Botswana, Mozambique, Namibia, South Africa, and Zimbabwe (Isaacman et al 2005). The *Struggles for Freedom in Southern Africa* content area will be available to academic and research institutions worldwide in 2007.

**African Cultural Heritage Sites and Landscapes**

The African Cultural Heritage Sites and Landscapes content area is an ambitious endeavor harnessing the latest 3D visualization and spatial documentation technologies to place online exclusive and original spatial data, research, and contextual materials about Africa’s tangible and intangible heritage. In 2004, after an initial proposal by Heinz Rüther, chair of the University of Cape Town’s (UCT) Geomatics Division, a partnership was formed between UCT and Aluka, with funding from The Andrew W. Mellon Foundation, to use state-of-the-art technologies in laser scanning, photogrammetry, surveying, and spatial documentation to build a digital library about African cultural heritage sites and landscapes. The objective of the database is to advance research, learning, and conservation efforts, as well as to help create a permanent record of Africa’s diverse heritage and patrimony. In the database, spatial data is linked to a wide range of contextual materials, such as excavation reports, manuscripts, travelogues, maps, site plans, and scholarly research.

The database will be of interest to undergraduates, graduate students, and faculty members in the disciplines of African languages and literature, African studies, anthropology, art, archaeology, architecture, geography, geomatics, history, historic preservation and conservation, religion, and urban planning.

Working with a team of researchers and staff at UCT, and with guidance and counsel from Aluka’s academic advisors, Professor Rüther began the documentation of Kilwa Kisiwani in the autumn of 2004. At Kilwa Kisiwani—a centuries-old trading center on an off-shore island in Tanzania—the UCT team focused most of their efforts on documenting the Gereza and Mosque. In 2005, in addition to documenting two rock-hewn churches at Lalibela in Ethiopia—Beta Giyorgis and Maryam—the team managed to gather spatial and visual data for an Asante temple at Besease, near Kumasi, Ghana; Elmina—the first European trading post in sub-Saharan Africa (also in Ghana); and two adobe-styled mosques in Mali—the Grand Mosque of Djenné and the Djinguereber Mosque in Timbuktu. In 2006, the team secured permissions from the relevant authorities in Kenya, Zimbabwe, and Sudan to undertake future documentation projects in these countries. This past year, Professor Rüther and his team also documented five rock art shelters and caves in South Africa’s Cederberg Mountains; six additional churches in Lalibela; the stelae field at Axum (Ethiopia); and the Swahili town of Lamu, situated on Kenya’s northern coast.

While the database is still under development and not yet publicly available (like the other content areas, it will go live in 2007) it already includes thousands of digital objects about heritage sites and cultural landscapes in Africa, including photogrammetric images, ground plans and façade views created from laser scanning, 3D models of sites and structures, digital terrain and 3D landscape models, digital photographs of the sites and landscapes, panorama views, as well as dozens of aerial and satellite photographs. The spatial data...
are associated with a GIS for each of the sites. This GIS data will be available to the relevant antiquities departments for updating and site management. The database also offers access to contextual materials, such as rare slides and photographs from archival collections, a vast collection of images of African rock art, rare and unpublished excavation reports, manuscripts, rare nineteenth century travelogues, antiquarian maps, and to the extent possible, published scholarly research and monographs that relate to the sites and cultural landscapes.

Most of the contextual materials have been digitized in collaboration with partner archives, museums, non-governmental organizations, and library collections from Europe, North America, and Africa. These materials will appear in Aluka as part of a wider corpus of spatial and visual data about Kilwa, new and old, including recent panorama views of the ruins, mangroves, and coastal shore, GIS data, aerial and satellite images of the contiguous landscape, digital terrain models, 3D models and ground plans of various structures on the island, as well as a selection of travelogues, historical writings, scholarly articles, and monographs detailing Kilwa’s history and archaeology. The digital documentation of heritage sites and landscapes using the latest visualization technologies linked to digital versions of historical and scholarly contextual materials is ground-breaking and novel for Africa. By demonstrating the potential of aggregating these materials online, we wish to encourage many other scholars, archives, and cultural institutions to include their materials on the Aluka platform. For many, digitization will enable access to materials and resources that are simply beyond their reach and not available locally at their institution. Full text search and versatile browsing paths can also improve the planning and management of restoration efforts.

Another key component in the database is the use of photogrammetric images and GIS data. Photogrammetry itself is a well-established science and technology; two important applications are aerial photogrammetry, widely used in mapping the earth’s surface, and close-range photogrammetry, commonly used in heritage documentation and archaeology. In Aluka, photogrammetry is used to provide detailed surface data for site GISs—to complement the laser scan models of structures—and in the creation of digital terrain models. High-resolution stereo image pairs of important facades and features of a structure provide users with an opportunity to view these objects in a realistic 3D format. GIS data enables researchers and site managers to utilize software applications to present and customize spatial and geographic data for a particular site, providing them powerful site management and reporting tools.

One dramatic and potent example of this type of online educational resource is the array of spatial and contextual materials assembled about Kilwa Kisiwani. Aluka’s digital library contains views and representations of Kilwa from medieval times, in addition to an extensive and detailed oeuvre on Kilwa created by the late Neville Chittick, first director of the British Institute in Eastern Africa (BIEA), as collected during his excavations at Kilwa in the 1950s and 1960s. Chittick amassed a sizeable visual and archaeological record consisting of thousands of photographs, slides, drawings, and a dozen handwritten notebooks detailing his findings. This collection is currently housed in Nairobi, Kenya, at the BIEA. In 2006, the BIEA and Aluka commenced a pilot project to digitize the Chittick archive. These materials will appear in Aluka as part of a larger corpus of spatial and visual data about Kilwa, new and old, including recent panorama views of the ruins, mangroves, and coastal shore, GIS data, aerial and satellite images of the contiguous landscape, digital terrain models, 3D models and ground plans of various structures on the island, as well as a selection of travelogues, historical writings, scholarly articles, and monographs detailing Kilwa’s history and archaeology.

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The digital world offers students and educators new possibilities in analyzing, presenting,
and grouping knowledge. There has never been a greater need for the creative and innovative use of technologies like the Internet to promote knowledge of the world’s cultures, civilizations, and patrimony. With support and contributions from an engaged global user community, it is our hope that Aluka initiates new scholarly debates, sparks collaboration and knowledge exchange across cultural and linguistic borders, and becomes a virtual bridge between South, North, East, and West.

Rahim S. Rajan is Aluka’s collection development manager, based in New York City. Rahim works with a diverse array of advisors, scholars, libraries, governments, and research institutions collaborating together to build Aluka’s online holdings. He has degrees from the University of Chicago, the University of Cambridge, and the Institute of Ismaili Studies, London. Rahim.Rajan@aluka.org

Heinz Rüther is Senior Professor in the Geomatics Division at the University of Cape Town’s School of Architecture, Planning, and Geomatics. He is also Principal Investigator for Aluka’s African Cultural Heritage Sites and Landscapes database. In addition to having published widely in the fields of close range photogrammetry, precise engineering surveying, Geomatics education, and heritage documentation, Professor Rüther has conducted field work in Africa, Asia, Australia, Europe, and North America.

Notes
1. African Arts is a participating journal in the JSTOR digital archive. See www.jstor.org.
2. The impact technology has had in research or education is always perceived as more apparent in the physical and biological sciences rather than in the humanities. Online publishing, image databases, wikis, and blogs are beginning to correct that impression. However, even a decade ago, emerging visualization technologies were already exerting an influence in the disciplines of design and architecture. For example, the construction of the Museo Guggenheim Bilbao in Spain, designed by Frank Gehry and completed in 1997, was a direct result of innovations in 3D modeling software applications, “allowing architects to imagine, develop, and explore innovative concepts that would have proved impossibly difficult in the past” (Mitchell 1999).
3. Outside of the developing world, in order to help offset Aluka’s operating costs and sustain the digital library into the future, Aluka intends to license the digital library to educational, cultural, and other not-for-profit organizations, with fees scaled to the size of the organization.
4. The challenge of infrastructure constraints in Africa is real. We are encouraged, however, by the focused philanthropic efforts underway to help the African higher education community build the necessary infrastructure to make use of web-based technologies. Major development organizations such as the World Bank, the African Development Bank, and IDRC are significantly increasing their efforts to strengthen African universities. In the autumn of 2005, six major US-based foundations participating in the Partnership for Higher Education in Africa renewed their commitment to African higher education by pledging $200 million over five years. A project to supply cheaper and more reliable Internet access to Partnership grantees through a bandwidth consortium was announced as one of the major initiatives of the Partnership (see www.foundation-partnership.org).
5. The database is organized around the concepts of both sites and cultural landscapes. We define them as follows: Sites are places where material remains testify to past human activity. A site is a place of interest defined by contemporary perceptions of what is important in the archaeological record. Consequently, the definition of the extent of an archaeological site often changes as research questions change. An archaeological site can be anything from a small feature (a hearth surrounded by a cluster of artifacts, for instance) to a large city. A cultural landscape is a unit of space that holds sociocultural significance for a community. A cultural landscape may be of any size (ranging from a valley to a nation state, for example) and often includes living sites, cultural alterations to the natural landscape, the natural landscape as it shapes and is shaped by culture, and intangible traditions and practices that serve to situate communities in their environments. The combination of data types differ from site to site and from landscape to landscape depending on the condition and nature of the site, our ability to secure detailed permissions from the appropriate governments, our ability to digitize materials held at repositories, the input and guidance received from scholars and academics in the field, and the extent to which we have permission from authors to digitize their published research.
6. The three academic advisors to the African Cultural Heritage Sites and Landscapes database are Dr. George Abungu, chief executive of Okello Abungu Heritage Consultants and founding chairman of Africa 2009; Professor Martin Hall, deputy vice-chancellor, University of Cape Town; and Professor Susan McIntosh, professor of anthropology at Rice University, Texas.
7. Future sites and landscapes that may appear in the digital library include the ruins of Great Zimbabwe and the archaeological complex of Nyanga, located in Zimbabwe’s rolling Eastern Highlands; and the Kushite temples at Naga, and pyramids at Meroë, both in Sudan.
8. The African rock art collections being disseminated by Aluka are the combined efforts of three organizations in Africa: The Trust for African Rock Art, based in Nairobi; the Rock Art Research Institute, based at the University of Witwatersrand in Johannesburg, South Africa; and the University of Cape Town’s Michaelis School of Fine Art and Faculties of Archaeology and Geomatics.
9. A high level of metric accuracy is crucial in the design and production of effective shelters, supports, and other interventions.
10. In the latter application, aerial photographs, or if there are unavailable, satellite images, are draped over the digital terrain models to create virtual 3D landscapes.

References cited