By Noha Adly

Bibliotheca Alexandrina: A Digital Revival

Founded in the beginning of the third century B.C., the Ancient Library of Alexandria was a major center for scholars and scientists for centuries. It was the world's hub for human knowledge and the largest and most famous center of learning and excellence in the ancient world. When it was destroyed, a glorious era of human knowledge was demolished as well. In 2002, the new Library of Alexandria—the Bibliotheca Alexandrina (BA, http://www.bibalex.org)—was built in almost exactly the same spot, intended to recapture the spirit of the ancient library and to inherit its goals while keeping pace with the world's most advanced technological developments.

The International School of Information Science (ISIS, http://www.bibalex.org/isis/) a research institute affiliated with the BA, aims at furthering the BA's goals of being a leading institution in knowledge dissemination and, specifically, promoting research and development related to the digital libraries. Toward that goal, ISIS has embarked on an array of ambitious projects, in partnership with world-class institutions. These include hosting a mirror site for the Internet Archive, participating in the Million Book Project, organizing the digital archive of the Gamal Abdel Nasser collection, digitizing 113 years of *Al-Hilal* magazine, presenting the first-ever complete digital version of *Description de l'Egypte*, conducting advanced research such as the Arabic component of the UN-sponsored Universal Networking Language computerized multi-language translation program, and offering the most advanced 3D virtual imaging techniques in a virtual immersive environment for science and technology applications. Thus, despite being barely seven years in existence, the BA already has a substantial record of achievements.

These and other digital initiatives are ongoing. The BA has built its own digital laboratory equipped with state-of-the-art technologies offering specialized digital services. A staff of 120 highly trained members work seven days a week, two shifts per day, digitizing various media including slides in multiple formats, negatives, books, manuscripts, pictures, and maps. The laboratory is equipped with the necessary tools for indexing, archiving, and managing digital media, thus allowing for centralized digital control of the entire workflow. The building of the laboratory was an essential starting point toward digitizing the BA's collections as well as the collections of other international libraries that are interested in pursuing the goal of universal access to human knowledge.

The Digital Assets Repository (DAR, http://dar.bibalex.org) was developed at the BA to create and maintain digital library collections and to preserve them for future generations. Public access to the digitized collections is provided through web-based search and browsing facilities. DAR is also concerned with the automation of the digitization workflow and its integration with the repository. The management tools developed within DAR help the BA preserve, manage, and share its digital assets. The system is based on evolving standards for easy integration with web-based, interoperable digital libraries. In April 2009, BA announced the inception of the largest Arabic Digital Library worldwide, as part of DAR. To date, the digitized collection of Arabic books totals 130,000 searchable books and is increasing in number daily—a significant contribution to the limited Arabic content on the Internet.

Another project is the Memory of Modern Egypt digital repository (http://modernegypt.bibalex.org), which contains more than 60,000 objects of various digitized material pertaining to the last 200 years of Egypt's history. The collection spans 14 different media types of 470 GB and is growing rapidly. What distinguishes this digital repository is the extensive multidimensionality of its database and the interrelation of the different forms of material (e.g., documents, pictures, videos, audios, maps, articles, stamps, coins) with specific themes. The repository is designed in a user-friendly interface with the appropriate browsing tools and search facilities.

The same is true for the other digital archives developed by ISIS—for example, the archive of all the materials pertaining to the presidencies of the late Egyptian Presidents Gamal Abdel Nasser (http://nasser.bibalex.org/) and Anwar El Sadat (http://sadat.bibalex.org/) and the archive documenting the history of the Suez Canal, the first canal to link the Red Sea and the Mediterranean (http://suezcanal.bibalex.org). Similarly, digitizing the 200-year-old masterpiece *Description de l'Egypte* was considered quite an achievement (http://descegy.bibalex.org). This represented a precious contribution from the BA to the World Digital Library (http://www.wdl.org), which launched in April 2009.

To empower science educators worldwide, the BA is working with a team of

specialists, in partnership with the University of Pittsburgh, to launch the first science SuperCourse, comprising thousands of PowerPoint lectures made available for free to teachers and lecturers, who can use the lectures as they see fit in their teaching of science. The SuperCourse has been effectively implemented in the area of Public Health and Epidemiology, with a network of 65,000 scientists in 174 countries, providing more than 3,500 lectures in 31 languages. The BA maintains a mirror site of SuperCourse (http://www.bibalex.org/supercourse), which receives an average of one million hits per month, and is working on setting up a similar course in all fields of science.

The BA, which aspires to be a worthy heir to the ancient Library of Alexandria, is dedicated to being a leading institution in the digital age. But its ICT infrastructure does much more than provide electronic catalogues or digital databases and journals. The infrastructure allows visitors to use the BA facilities to undertake cutting-edge research in many fields, in collaboration with colleagues worldwide. To that end, the BA infrastructure includes four mutually reinforcing components to provide a wide array of services to researchers.

First, the BA provides *high-bandwidth connectivity* to its users. Although 155 Mbps bandwidth is small relative to Western standards, it is extremely high in this area of the world. The BA is among the first few organizations—and is the only nonprofit institution—in Egypt with STM-1 connection. Also, the BA is exercising major efforts to establish massive links with Internet2 and GÉANT2, which would allow researchers from Egypt, Europe, Japan, or the United States to simultaneously work online on live databases in Europe and elsewhere.

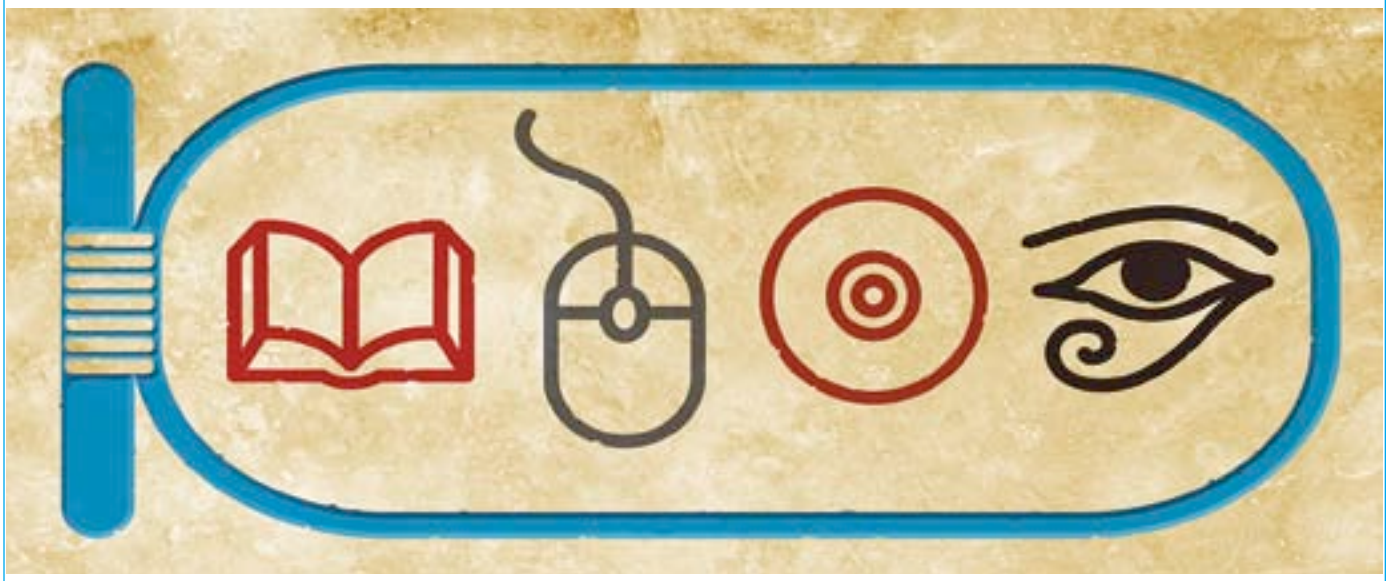
Second, the BA maintains a *fully operational data analysis facility*, termed the VISTA (Virtual Immersive Science & Technology Applications). It is a 3D virtual-reality simulation tool aiming at providing researchers in Egypt and the region with state-of-the-art analytical immersive virtual reality that could be applied in many disciplines. It is a powerful tool, one that allows researchers to test out ideas in virtual reality, trying many combinations and permutations before actually touching the complex, fragile, or expensive real (physical) experiment.

Third, *mass storage devices* are available for storing enormous amounts of data, reaching 3.7 PB. The archival facility holds the web collections of the Internet Archive from 1996 through 2008. The archival material is digitized within the BA but is open to hold massive datasets necessary for research.

Fourth, *a supercomputer facility* has been established to allow for massive data analysis and problem-solving. The High Performance Computing cluster, with 11.8 TFLOPS at peak performance, offers a new scope for scientific research at higher education levels. The supercomputer presents a new dimension for research: it accommodates a computational ability at a rate equivalent to trillions of operations per second, an incredible speed that can make quite a difference in domains and applications such as bioinformatics, data mining, computer vision, image processing, physics simulation, weather forecasting, finite elements, oil and underground exploration, astrophysics, and cloud computing.

The BA is thus providing a platform for the collaboration between scientists from Egypt and the region with their peers in Europe and elsewhere. It will allow special operations such as developing pattern searches through the vast web collections or undertaking historical research using the web archive or developing data-mining techniques to enable the use of the huge storage resources to be used for a particular purpose.

The BA is committed to pursuing its mission of being a center of excellence for the production and dissemination of knowledge and of being a leading institution in the digital age. With the simple credo of "Access to all information, for all people, at all times," the Bibliotheca Alexandrina deploys the new technologies to honor the past, celebrate the present, and embrace the future.



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