Overview of the Scientific Publishing in Armenia

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The National Academy of Sciences (NAS) of the Republic of Armenia (RA), with its 30 research institutions is a leading producer of scientific publications in Armenia. Within NAS, **activities of the research institutions are coordinated through the** d**ivisions of: Mathematical and Technical Sciences; Physics and Astrophysics; Natural Sciences; Chemistry and Earth Sciences; Armenian Studies and Social Sciences.** The Fundamental Scientific Library (FSL), founded in 1935, has been operating since 1943 under the direct supervision of the Presidium of the Academy as one of the NAS research institutions. Through the international book exchange programmes, FSL is disseminating NAS publications among the partner libraries all over the world.
In this article we will give a general overview of the modern scientific publishing system in Armenia, analyse existing problems and present the joint efforts of academic community and librarians on mobilising the republic's scientific knowledge in a digital technologies world.

Historical overview

The first Armenian book was printed in Venice in 1512 by Yakob Meghapart (Jacob the sinful)[1]. Between 1512 and 1513 he printed five titles: "Urbatagirk"[2], "Parzaytumar"[3], "Pataragatetr"[4], "Altark"[5] and "Tagharan"[6]. The first Armenian journal "Azdarar"[7] was published in 1794 in Madras. The first Armenian map "Hamatarac asxarhacoyc"[8] was published in 1695 in Amsterdam. In 1920, after establishment of the communist regime, science, education and culture became the Armenian Governments' top priorities. For the economic rebirth of the country and for satisfying the increasing needs of the industry it was necessary:

- to establish a well functioning University system with large subject area coverage;
- to create a network of academic institutions for organising research and supplying industry with the appropriate models and solutions;
- to implement a scientific publishing system;
- to build a network of academic libraries, for assisting scientific and educational organisations in their daily work.

To achieve these goals, and to coordinate the scientific work and research activities, the Armenian National Academy of Sciences was established in 1943. For masters- and doctoral-level education within NAS the University is responsible. Today NAS is publishing 13 peer-reviewed academic journals[9]:
1. *Astrophysics*, established in 1965. The articles are accepted in English and Russian. Currently this journal is distributed by the Springer Publishing Company. The journal is abstracted and indexed in Astrophysics Data System, Chemical Abstracts Service, Meteorological and Geoastrophysical Abstracts, SCOPUS, and Web of Science.

2. *Reports of the National Academy of Sciences*,[10] established in 1944.
3. *Proceedings of the National Academy of Sciences – Earth Sciences series*, established in 1948. The articles are accepted in Armenian and Russian.
4. *Proceedings of the National Academy of Sciences – Mathematics series*, established in 1966. Since 1979 the cover-to-cover translation of the Proceedings has been published by Allerton Press, New York, under the title *Journal of Contemporary Mathematical Analysis (Armenian Academy of Sciences)*. This journal is distributed by Springer.
5. *Proceedings of the National Academy of Sciences – Mechanics series*, established in 1966. The articles are accepted in Armenian, English and Russian.
6. *Reports of the National Academy of Sciences and the State Engineering University of Armenia – Technical Sciences series* [11], established in 1948. The articles are accepted in Armenian and Russian.
7. *Proceedings of the National Academy of Sciences – Physics series*, established in 1966. The English translation of the Proceedings is published by Allerton Press, New York, as *Journal of Contemporary Physics*. This journal is distributed by Springer and is abstracted and indexed in Physics Abstracts.
8. *The Bulletin of Social Sciences*, established in 1940.
9. *Medical Science of Armenia*, established in 1961. Until 1995, the journal was published as *Experimental and Clinical Medicine*.
10. *Biological Journal of Armenia*, established in 1948. The articles are accepted in Armenian, English and Russian.
11. *Chemical Journal of Armenia*[12], established in 1957. Abstracted in Chemical Abstracts (USA) and Chemical Abstracts Journal (Russia).
12. *Historical and Philological Journal*, established in 1958.
13. *Neurochemistry*, established in 1982, is a joint publication of the Armenian and Russian Academies of Sciences. The electronic version of the journal is available from the Nauka/Interperiodica site, at http://www.maikonline.com.
Yerevan State University publishes two peer-reviewed journals with an international reputation: *EPH gitakan texekagir*,[13] established in 1925 and *Banber Yerevani hamalsarani*,[14] established in 1967.
After a difficult period in the 1990's (the collapse of the Soviet Union, economic and social problems due to transition to a market economy), Armenia faced the challenges posed by independence. Deterioration of the social and economic situation of the country has considerably affected the entire academic and educational systems. State budget allocations were curtailed; the renovation and maintenance of the NAS institutions were drawn to a minimum; the academic publishing system is in financial straits. Although scientific work in the institutions is active, and there are collaborative partners in different EU and US funded projects, researchers are not satisfied with the existing scholarly communication system, which is mainly based on the approaches and managerial mechanisms dating back to the 1970's. The main reasons for such a situation could be ascribed to: a) miserable state allocations to the Sciences, b) academic institutions are not well prepared for the challenges of the Knowledge Society, c) scientists and publishers are not familiar with modern trends in using ICT tools for scholarly communication, and d) paper based publication mechanisms are becoming obsolete and must be replaced by electronic ones.

From paper based publishing models to the hybrid solutions

The academic publishing system in Armenia is searching for new publishing mechanisms and information dissemination tools. Due to the financial problems journals are being published with delays, dissemination takes a long time; library users are surprised that these journals are not available as an electronic version. Besides, the present system of scholarly communication, based on commercial peer-reviewed academic journals, is far from ideal, and modern technology offers enormous possibilities for improvement. In 2008, The Fundamental Scientific Library (FSL) was awarded a grant from the Open Society Institute Assistance Foundation to introduce the open access (OA) publishing model to the Armenian academic community. Two OA journals, *Armenian Journal of Mathematics* and *Armenian Journal of Physics* are already online, both are registered in the Directory of Open Access Journals. These two journals can also be accessed from the FSL home page.[15] Three National Academy of Sciences (NAS) institutions expressed interest in producing their own OA journals and have asked FSL for technical help and advice. The authors are confident that the OA movement will find more and more supporters in Armenia, and FSL will continue advocating the OA philosophy amongst the academics. Yerevan State Medical University started to publish 'The New Armenian Medical Journal' in 2007, and the electronic version is available from http://www.ysmu.am/Eng/publication.htm.
Starting from 2003, the National Academy of Sciences publishes a peer-reviewed *Electronic Journal of Natural Sciences* (two issues per year), for which a paper version is also available. All issues of this journal are available from the EBSCO Academic Source Premier Publications database.
One of the largest collections of Armenian rare books (printed during 1512-1800) and 18th to early 20th centuries Armenian periodicals is held in FSL, and is a unique source for scholars from multiple disciplines. All collections are very fragile, and intensive usage of the FSL rare books is accelerating the paper destruction process. Through the British Library "Endangered Archives Programme" the library has obtained iCAM modular imaging cameras. Digitisation is in process, which will allow better preservation conditions for the originals and will make these collections accessible to the world academic community via the surrogates. Later it is planned to start digitisation of NAS journal publications going back to the first issues.
Electronic publishing models are already introduced to the Armenian academic community, and the success is not in question. This is a continuous process and during the coming years more and more publishers will produce research papers in electronic format.

Look into the future

As a conclusion, we can state that the scientific life in Armenia is again on rise. The National Academy of Sciences with more that 3,000 scholars, librarians, and IT specialists is in a vanguard of building new infrastructure for research and development. Most important developments are:

- Launching of the supercomputing GRID 'ArmCluster[16]' with a top performance of 523.4 GFlops and 2 GByte memory per node. The main goal is creation of a high-performance computation infrastructure and provision of efficient information resources to the research in Armenia and South Caucasus region.
- Black Sea Interconnection (BSI) project[17], which is being implemented under 7th Framework Programme of European Commission. The BSI project will develop a high-speed backbone network among the research organisations of the South Caucasus countries and enable connectivity to the pan-European research and education GÉANT2 network.

- Building the South-Eastern European eInfrastructure for regional eScience[18], co-funded by European Union. This initiative is committed to ensuring equal participation of the less-resourced countries of the region in European trends.

In order to ensure that Armenia will not lag behind in world science, to fulfill increased demands of the scientists, and to be able to produce and present the results of the research in an appropriate and acceptable way, it is important to prepare a new generation of the librarians, fluent in European languages and competent in information management. During the years 2009-2011, a new curricula on Library and Information Science, in line with EU LIS faculty standards, will be prepared and introduced. This means that in a near future Armenia will have enough well educated specialists in the library and information science fields, and these specialists in their turn will assist academic community on building digital repositories and on creating e-content.

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[1] In 2012 Armenia will celebrate 500 anniversary of printing the first Armenian book.
[2] Friday Book.
[3] A Simple Calendar.
[4] Missal.
[5] An astrological treatise.
[6] Song book.
[7] The Monitor Monthly.
[8] Large World Map: the two hemispheres.
[9] Within the Soviet Union the dominant language for scientific communication was Russian.

[10] Electronic versions for some issues are available at http://elib.sci.am (accessed February 21, 2009).
[11] Electronic version of some issues is available at: http://www.seua.am/srd/iss_eng/Web%20Page/ZZPUBLIC.htm (accessed February 21, 2009).
[12] Electronic version of some issues is available at: http://chemjournal.sci.am/index_eng.html (accessed February 21, 2009).
[13] The Scientific Bulletin of YSU
[14] Courier of the Yerevan University
[15] http://www.flib.sci.am/eng/?q=node/55 (accessed February 21, 2009).

[16] http://cluster.am (accessed February 21, 2009).
[17] http://www.blacksea-net.eu/ (accessed February 21, 2009).
[18] http://www.see-grid-sci.eu/ (accessed February 21, 2009).