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EWIC Staff Report: Topical Note: Women in Science: Muslim World

The Muslim world is responsible for many of the foundational tenets of modern science. Scientific, technological, and medical advancements proliferated following the rise of Islam in the Middle East. Advancements in science, astronomy, engineering and medicine made in the Muslim world during the 7th century far surpassed those made in the West during the same era. Major steps were taken in mathematics, pharmacology, optics, chemistry, botany, and physics. A few examples: Muslim astronomers around AD 830 calculated the diameter of the earth's circumference.[1] Ibn al-Haytham (965-1040) is considered the forefather of optometry; his revolutionizing work on science of vision used discoveries from math to psychology. His text was translated into Latin and used widely in the Middle East and the West. Muslim doctors were renowned for their fine surgery skills; performing cataract surgery was part of their repertoire. [2] Az-Zahrawi, mastered the skills of tracheotomy and lithotomy, the first person to correctly identify and describe ectopic pregnancies, breast cancer and hemophilia.[3] Muslim physicians discovered mercuric chloride, a chemical which was applied as a disinfectant for cleaning wounds. [4]

Young people continue to push the boundaries of scientific and technological advancement in the Muslim world today; the number of women pursuing science degrees is higher than that of men in the same fields. [5] Young women are investigating ovarian cancer; agronomy; energy consumption; environmental engineering; health; computer science; stem cell research and bioethics to list a handful. In recognition the US State Department's Middle East and North Africa Environment, Science, Technology, and Health Office initiated a "Women in Science Hall of Fame." Women from Egypt, Bahrain, Lebanon, Morocco, Tunisia, Israel, U.A.E., Oman, Jordan, Yemen, Palestine, Saudi Arabia and Iraq have been appointed to the hall of fame. [6] The UNESCO "UIS Factsheet" on Women in Science found that in 2007 36.2% of Egyptian scientific researchers were female, in Kuwait (2009) 37.1% and in Iraq (2009) 31.2%. In comparison in Germany (2009) only 24.9% of scientific researchers were female. [7]

In Saudi Arabia Hayat Sindi, medical scientist, biotechnologist and CEO founded the i2nstitute of Imagination and Ingenuity, http://www.i2institute.org/?language=en, a leading nongovernmental organization focused on the scientific innovation in the Arab world. Dr. Sindi encourages young Saudis and especially young women to pursue degrees in the sciences. Dr. Sindi is an appointed member of the Shoura, the formal advisory body of Saudi Arabia. In 2012 Dr. Sindi was named by Newsweek as one of the 150 women who "shook the world, "by Arabian Business as the 9th most powerful woman in the Arab world and the 19th most influential Arab in the world. [8] [9]

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[1] http://www.pbs.org/wgbh/globalconnections/mideast/themes/science/
[2] http://www.pbs.org/wgbh/globalconnections/mideast/themes/science/
[3] http://www.fasebj.org/content/20/10/1581.full
[4] Maillard, Adam P. Fraise, Peter A. Lambert, Jean-Yves (2007). *Principles and Practice of Disinfection, Preservation and Sterilization*. Oxford: John Wiley & Sons. p. 4. ISBN 0470755067.
[5] http://www.uis.unesco.org/Education/Pages/women-higher-education.aspx
[6] http://www.whitehouse.gov/blog/2012/03/05/women-advance-science-and-technology-middle-east-and-north-africa
[7] http://www.uis.unesco.org/FactSheets/Documents/sti-women-in-science-en.pdf
[8] http://power500.arabianbusiness.com/power-500-2012/profile/15217/#.Uh04gKxcV3s
[9] http://www.voiceamerica.com/guest/13488/hayat-sindi

When the Smithsonian Magazine interviewed Dr. Rana Danaji, assistant Professor and Director of the Center of Studies at the Hashemite University in Jordan she noted that many of the challenges faced by female scientists are the same the world over. However, while studies show that women in the United States are less likely than their male colleagues to be considered for promotion or academic tenure due to the implied unreliability that comes with motherhood, Middle Eastern women are seen as being more reliable, dedicated workers than the male counterparts.[10]

According to a 1996 survey by the Egyptian Academy of Scientific Research and Technology women make up 43% of the labor force in non-university research organizations. Female scientists with Ph.Ds. are joining the labor market either in private or governmental institutions, the National Research Center, Petroleum Research Institute, and National Institute of Astronomical and Geophysical Research being a few examples.[11]

On an international scale young women in the Middle East are more likely to succeed in scientific careers than their Western counterparts. The New York Times (2012) ran an interactive piece on girls in science. The research cited by the Organization for Economic Cooperation and Development (O.E.C.D.) indicated that girls in the United States, the United Kingdom and Canada lag behind boys in scientific testing abilities and career choices. This is not the case in the Middle East where girls and young women lead their male counterparts in science and engineering. The New Times cited the example of Jordan, where girls score on average 8 percent higher in science programs than boys. [12]

Young scientists often leave their homelands to pursue higher education abroad and have not always returned. Egypt has lost a great number of its skilled researchers, more than any other country in the region. Egyptian universities, and NGOs are creating, "state-of-the-art research facilities" to entice young scientists either stay in Egypt or to return to Egypt after completing graduate work abroad. Newly developed research institutions and facilities in nanotechnology, renewable energy, biotechnology, medicine and microelectronics are all working toward this goal. [13]

Increasingly outreach geared toward young female students has been rising across the Middle East. Conferences, workshops and industry events provide support, mentorship and encouragement for young female scientists. Some examples include: Stars of Science http://www.starsofscience.com/sos/en/ Science, and Community Development, http://www.qf.org.qa/, and the TechGirls Exchange Programme http://exchanges.state.gov/non-us/program/techgirls. Dr. Hayat Sindi's the i2nstitute of Imagination and Ingenuity is a great example of mentorship. [14]

The Arab Science and Technology Foundation (ASTF) http://www.scidev.net/global/capacity-building/news/arab-women-scientists-launch-initiatives.html launched the inaugural Arab Women in Science Conference in 2013. The conference brings female scientists from across the Middle East together. The Egyptian Branch of the ASTF is creating a system for, "virtual collaboration and contact among women working in science and technology around the Middle East." The ASTF website will include a research database designed to draw attention to the scholarship and discoveries of female scientists in the region. [15]

In 1998 L'Oreal and UNESCO joined together to form the Women in Science Partnership http://www.loreal.com/foundation/Article.aspx?topcode=Foundation_AccessibleScience_WomenExcellence_U. The partnership supports women in science and research on a global scale. The Foundation annually honors five women (each from a separate continent) for their contributions to science. The 2013 award will focus on research in Physical sciences ranging in topics from climate change to research on neurodegenerative diseases and alternative and new energy sources. [16]

[10] http://blogs.smithsonianmag.com/smartnews/2012/11/in-the-middle-east-female-scientists-face-different-challenges/

[11] http://www.sciencemag.org/content/290/5489/55.full

[12] http://www.nytimes.com/interactive/2013/02/04/science/girls-lead-in-science-exam-but-not-in-the-united-states.html

[13] http://royalsociety.org/uploadedFiles/Royal_Society_Content/policy/projects/atlas-islamic-world/Atlas_Egypt.pdf

[14] http://www.managementthinking.eiu.com/sites/default/files/downloads/Women%20in%20science%20and%20technology%20WEB.pdf

[15] http://www.scidev.net/global/capacity-building/news/arab-women-scientists-launch-initiatives.html

[16] http://www.unesco.org/new/en/natural-sciences/priority-areas/gender-and-science/for-women-in-science-programme/2013-awards/