

brought from outside by Genghis Khan and by some European powers.

As stated by Bediuzzaman Said Nursi, a great 20th-century Muslim scholar, "History testifies that whenever Muslims as a whole have adhered to their religion, they have advanced in relation to the strength of their adherence,"¹ that is, they were simultaneously strong in their state of knowledge, intellect, worldly affairs, and tolerance toward non-Muslims. But, wrote Bediuzzaman, "whenever they have lost their firmness in religion, they have declined."

According to Hoodbhoy, some "enlightened" Islamic scholars claimed that the Qur'an "tells us how to go to heaven, not how the heavens go." However, Bediuzzaman stated exactly the opposite: "Qur'an and science are like wings of a bird; if you cut one of the wings, the bird will fall and eventually die." He also strongly encouraged all Muslims to cooperate with the great legacy of Western physical sciences. Bediuzzaman emphasized harmony and moderation between faith and knowledge by stating that a person with faith but without knowledge tends toward bigotry and fanaticism, while a person with knowledge but without faith tends toward atheism and materialism. The trend of faith without pursuit of knowledge is what we often observe in many regions of the present Muslim world, whereas the trend of seeking knowledge with limited attention to faith has been seen in some Western societies for the past 200 years or so. Interestingly, Albert Einstein was a devout religious person who once made a statement similar to Bediuzzaman's: "Science without religion is lame, religion without science is blind."²

In addition to the criteria listed by Hoodbhoy to measure Muslim scientific progress, it is also crucial to stress the importance of how much attention Muslim governments currently give to boosting literacy rates and quality of secondary-school education in their countries. For instance, according to The World Factbook from the US Central Intelligence Agency, the seven Muslim countries having the highest literacy rate are former communist-bloc countries: Kazakhstan, Tajikistan, Uzbekistan, Turkmenistan, Azerbaijan, Kyrgyzstan and Bosnia-Herzegovina.³ Those countries, along with Turkey, Iran, and Indonesia, have led all other Muslim countries in the numbers of gold, silver, and bronze medals their high-school students have won in international science and mathematics

Olympiads over the past 10 years. Many observers see students' drive to participate in these contests as a strong indication of their future in science careers.

Religious moderation and constructive secular humanism, which are inherently compatible with common sense and the principles of logic and reason, are viable options for wise governance and progress in the Muslim world, as anywhere else.

Moreover, the diversity of cultures contributing to science is quite important today. Many bright Muslim scientists are active in non-Muslim countries, just as many non-Muslim scientists are active in Muslim countries. With increasing globalization and cultural diversity, science also transcends the boundaries of any specific state, religion, or culture, so it is difficult to evaluate the specific scientific contributions made by a people of a given state, faith, or culture. Science, now and in the future, is not just shared by Muslim, Christian, Jewish, Hindu, or Buddhist scientists. Science is a universally human treasury that belongs to everyone. The important task at hand is to preserve its achievements for future generations.

References

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2. A. Einstein, "Science and Religion," talk presented at the Conference on Science, Philosophy, and Religion in Their Relation to the Democratic Way of Life, New York, 1941; available at http://www.update.uu.se/~fbendz/library/ae_scire.htm.
3. US Central Intelligence Agency, *The World Factbook*, <https://www.cia.gov/library/publications/the-world-factbook/geos/xx.html>.

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As a Jew living in Israel who believes any real progress and betterment of the lives of the surrounding population, our cousins, is to be applauded, I was very interested in the article on science in the Islamic world, and in the news report on a new research university in Saudi Arabia (PHYSICS TODAY, August 2007, page 33). I think the Saudi university report was fair, but Pervez Hoodbhoy's generally excellent article needs some comment, both on specifics and on general philosophy. I claim to represent not one but myself with these comments.

First, as Hoodbhoy notes, at times Israel did help Hamas against the Palestine Liberation Organization, and at

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times Israel helped the PLO against Hamas. In all cases those were local military antiterrorist decisions and not a policy of the Israeli government. If foreign countries funded terror by one of those groups while withholding funds from the other, Israeli military personnel could often buy the cooperation of the deprived terrorists. Since the 1993 Oslo Accords, Israel has often tried to help the PLO. Sometimes that help was used against Israel, but Hamas was then defined as an enemy because it has never yet recognized the legitimacy of Israel's existence.

Second, did Hoodbhoy meet with the scientists, the wealthy donors, or the religious authorities working on the breeding of a "red heifer"? Mainstream rabbinic Judaism has always taught that the temple will be restored only through peaceful means. The red heifer program may signify a greater understanding of both real Islam and real Judaism than Hoodbhoy acknowledges, and the peace between those two religions may be restored to what it was during the Golden Age. A reading of Leviticus 19:33–34 and the Qur'an's Jonah 93 suggests that religion can be a positive force toward peace between the two peoples.

The great question of why Islamic science declined has a simple answer. Before 1915 Islam was generally a tolerant religion—toward secular humanism, toward Judaism, and toward Christianity. Jews and Christians could and did visit Mecca, the center of Islam. The land now called Saudi Arabia had no blanket prohibition against construction of a church or synagogue, only the requirement that the building's height not exceed that of a neighboring mosque. After 1915 a desert tribe that had served British interests by attacking Turks was given the oil and Mecca; that tribe's intolerant version of Islam has spread. It is not Western imperial greed but the desire for cheap and dependable oil that has fueled the spread of this Islamic distortion and its terrorism.

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I have a few comments on the themes raised in Pervez Hoodbhoy's article.

The table on page 52 of Hoodbhoy's article compares data on the number of physics and science papers produced by the seven most scientifically productive Islamic countries and by some selected non-Islamic countries, namely Brazil, India, China, and the US. The countries he lists have very different

Country	Physics papers per million people	Science papers per million people	GDP per capita (dollars)
Pakistan	5	50	2 100
India	25	190	2 900
Malaysia	29	480	9 000
Saudi Arabia	32	559	11 800
Iran	36	376	7 000
Egypt	40	345	3 900
Morocco	47	310	4 000
China	58	332	5 000
Turkey	73	1284	6 700
Brazil	101	699	7 600
US	686	9327	37 800

populations. It may be more meaningful to compare their scientific productivity normalized by their populations. The table above is modified to present the number of papers per million people as well as the gross domestic product (GDP) per capita for those countries, based on 2005 statistics.

Using these modified data, we may extract a few additional points.

► In addition to religious causes, scientific productivity appears to be influenced by some measure of economic activity such as GDP per capita. The lowest numbers of papers per million people are produced by Pakistan and India, the two countries with the lowest GDP per capita among the countries considered. Muslims make up only a small portion of the Indian population.

► The religion factor becomes most noticeable with Saudi Arabia and Iran. The two countries lag behind in scientific productivity despite having relatively larger GDPs per capita, primarily from oil income. They are also two of the most ideologically rigid Islamic states.

► Turkey ranks highest in the number of publications (adjusted to population) among Islamic countries and non-Islamic India and China. Part of that ranking may be attributed to Turkey's democratic form of government and secular constitution. Muslims make up 99% of the population of Turkey. However, religion and state are clearly separated. Turkish Islam is also much more moderate in scope than Islam as practiced in Saudi Arabia and Iran.

I completely agree with the assertion that the effect of religious extremism on scientific thinking is not limited to Islam but is alive and well in all three monotheistic religions.

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Using the analytical skills he undoubtedly acquired as a distinguished physicist, Pervez Hoodbhoy hits the nail on its head with his elegant analysis of a complex societal issue not readily susceptible to logical exploration.

I agree with everything Hoodbhoy wrote except one item in which he appeared to dismiss the lack of democracy as a primary reason for science's decline in the Islamic world. Hoodbhoy did mention in the same paragraph how denying freedom of inquiry or dissent can cripple science. He also countered the argument by correctly stating that science survived and perhaps even thrived under Adolf Hitler and Joseph Stalin. The apparent contradiction is readily explained by differentiating between two types of dictators: those who grandiosely fancy the expansion of their virtual or physical territories, and those who focus their wrath on their own people.

Islam's Golden Age in the 9th–13th centuries coincided with the empire's rapid expansion. Emperors and khalifs who aspire to conquer typically pay attention to science and technology as means to strengthen their armies. On the other hand, contemporary Islamic dictators, with few exceptions, care only about prolonging their rotten, corrupt, inefficient, brutal regimes. They do not care if their people are healthy, happy, and prosperous, or even if their countries are strong, as long as they stay in power. So science and technology are lowest on the dictator's list of priorities. In those cases lack of democracy is a prime suspect for the decay of science, and of everything else in the society. Common people are busy feeding their families and attending to their day-to-day miseries. The people are in a deep state of apathy, and science and even education in general are the least of their problems. And no one, includ-