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Forging Islamic Science

Fake miniatures detract from the real work of early-modern Ottoman scientists.

Nir Shafir

As I prepared to teach my class Science and Islam this past spring, I noticed something peculiar about the book I was about to assign to my students. It wasn't the text—a wonderful translation of a medieval Arabic encyclopedia—but the cover illustration, which showed scholars in turbans and medieval Middle Eastern dress examining the starry sky through telescopes. The miniature purported to be from somewhere in the premodern Middle East, but something was off.

Besides the colors being a bit too vivid and the brushstrokes a little too clean, it was the telescopes that perturbed me. Telescopes were known in the Middle East after their development in the 17th century by Hans Lippershey in the Netherlands and then Galileo Galilei in Italy, but there are essentially no Islamic illustrations or miniatures depicting such an object. When I tracked down the full image, two more figures emerged: one also looking through a telescope, while the other jotted notes as his hand spun a globe—another rarely depicted instrument (*see opposite page, left*). The starkest contradiction, however, was the quill pen being used to jot the notes. Middle Eastern scholars of that era always used reed pens to write. By now there was no denying it: The cover illustration was a modern-day forgery masquerading as a medieval illustration.

This fake miniature depicting Muslim astronomers is far from an isolated case. One popular fake image floating

around Facebook and Pinterest has wormlike demons cavorting inside a molar. It claims to illustrate the Ottoman conception of dental cavities, a rendition of which has now entered Oxford's Bodleian Library and was displayed until recently as part of its collection titled "Masterpieces of the Non-Western Book." Another shows a physician treating a man with what appears to be smallpox (*see page 158*). These contemporary images are in fact not "reproductions" but "productions": fakes produced to appeal to a contemporary audience by claiming to depict the science of a distant Islamic past.

From Istanbul's tourist shops, fakes have ventured far afield and found their way into conference posters, education websites, and museum and library collections. The problem goes beyond duping tourists and the occasional academic. Many of those who study and publicly present Islamic science's history have committed themselves to a similar sort of fakery. There now exist entire museums that are filled with reimagined objects created in the past 20 years but meant to represent the scientific traditions of the Islamic world.

The irony is that these fake miniatures and objects are the product of good intentions: a desire to integrate Muslims into a global political community through the universal narrative of science. That wish seems all the more pressing in the face of a rising tide of Islamophobia. To be clear, Muslims have always conducted science, but often it wasn't visually expressed in a way that we find easy to recognize today. What happens when we start fabricating objects for the tales we want to tell? Why are we rejecting the actual material remnants of the Islamic past for their imagined counterparts? What is the image of science in Islam are we

hoping to find? These fakes reveal more than a preference for fiction over truth. They also point to a larger problem: the expectations with which the Islamic past and its scientific legacy are saddled by scholars and the public alike.

The Market for Forged Miniatures

There aren't many books left in the old booksellers' market in Istanbul today, but there are quite a few fake miniatures. Vendors sell textbooks to the students of Istanbul University nearby, but many also cater to the tourists flocking to the Grand Bazaar next door. Some of the miniatures depict images of ships or monsters, whereas others flaunt sexual acts. Often they are accompanied by gibberish Arabic written in a shaky hand (Turkish uses a version of the Latin alphabet). Many, perhaps the majority, are depictions of science in the Middle East: a pharmacist selling drugs to turbaned men, a doctor castrating a hermaphrodite, a group of men looking through a telescope or gathering around a map.

To the discerning eye, most of these miniatures are recognizably fake. The artificial pigments are too bright, the lines too rough, the subject matter too crude. Nevertheless, they still find willing buyers among local and foreign tourists. Some artists state that their images are modern creations and sign them with a recent date in the Islamic calendar. Others are more duplicitous. The forgers tear pages out of old manuscripts and printed books and paint over the text to give the veneer of old writing and paper, and even stamp fake ownership seals onto the images.

With these additions, the images quickly become difficult to recognize as fraudulent once they leave the confines of the tourist markets and make their way onto the internet. Stock

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The image on the right is perhaps the most famous illustration of early-modern Islamic science. Created in the 16th century, it depicts scholars at the Istanbul observatory of Taqi ad-Din, which stood only from 1577 until 1580. The scholars use sextants and other tools to measure the



positions of the stars. The image on the left is a forgery that was clearly inspired by the authentic illustration. The forgery is listed by an image stock agency, falsely, as a historic illustration, and from there it ended up on the cover of a recent translation of a medieval Islamic encyclopedia.

photo services in particular play a key role in disseminating these images, making them readily available to use in presentations and articles in blogs and magazines. The impression given to the publications, companies, and individuals that buy these images is that the stock agencies have vetted the images and provide a modicum of authenticity and, in the case of museum pictures, safety from claims of copyright infringement. The cover image of the book I was going to include in my course last spring followed a typical path: A photo agency supplied the image to the publisher, and both the publisher and the author assumed that the agency had verified its authenticity.

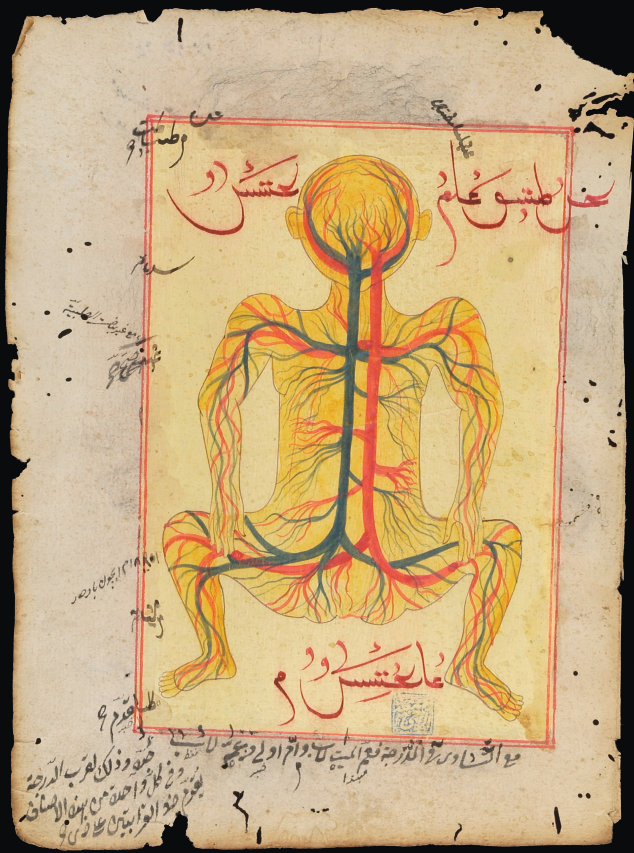
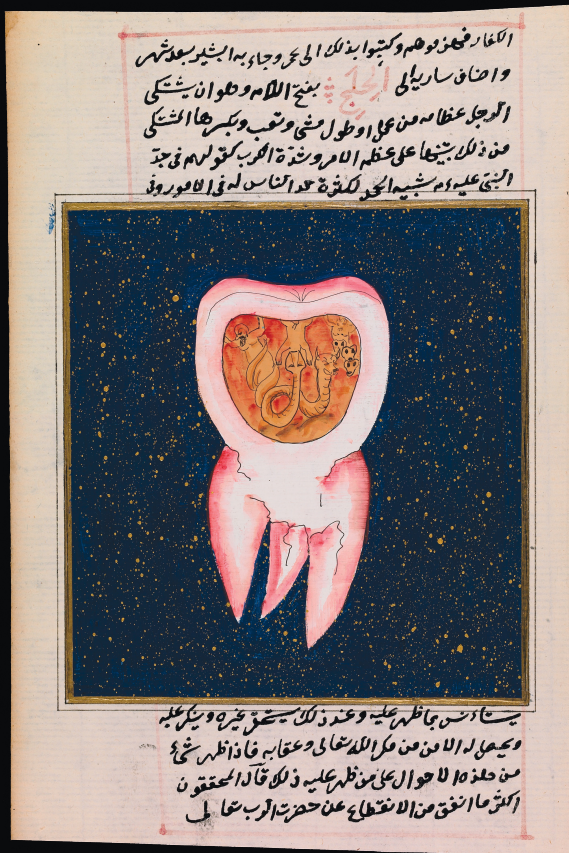
Once the images are online, through a stock photo service or by other

means, the pictures start to appear on the main platforms of our vernacularized visual culture: Instagram, Facebook, Pinterest, Google. In this digital environment, even experts on the Islamic world can mistake them for the authentic and antique.

The internet in turn has become a source of fantastic inspiration for forgers. The drawing supposedly depicting the Ottoman view of dental cavities, for example, emerged after a similar picture of an 18th-century French ivory surfaced on the internet. Other forgers simply copy well-known authentic miniatures, such as the illustration of the short-lived observatory in 16th-century Istanbul, in which beturbaned men take measurements with a variety of instruments on a table (above, right). This

miniature—reliably located in the Rare Books Library of Istanbul University—is found in a Persian chronicle praising Sultan Murad III, who ordered the observatory built in 1574; it was subsequently demolished in 1580. Perhaps the most famous illustration of early-modern Islamic science, cited and reproduced in numerous books, it is the archetypical vision depicting men at work on instruments.

Even if its imitations look crude, they still find audiences—such as those who visit the website of the 2013 *Science and Islam* exhibition at the History of Science Museum at the University of Oxford. The website, which aims to educate secondary school children, took another imitation of the above image from a similar site run



The creators of forged Islamic miniatures take their inspiration from a variety of sources. An image of a tooth demon (above, left) is said to depict the Ottoman conception of dental cavities. In fact, the forgery is based on an 18th-century French ivory carving titled “The Tooth Worm as Hell’s Demon.” An image of the human body (above, right) also took inspiration from a genuine source—a well-known Islamic depiction of the circulatory system, and the worn paper adds to the illusion of authenticity. However, the surrounding Arabic calligraphy is gibberish. Other forgeries are invented out of whole cloth. One such illustration portrays a man, suffering from what appears to be smallpox, consulting with a pharmacist or doctor (left). The vibrant colors and clumsy artistry flag this image as counterfeit.

by the Whipple Museum of the History of Science at the University of Cambridge—which in turn acquired it a year earlier from a dealer in Istanbul, according to the museum’s records. Meanwhile, another well-respected institution, the Wellcome Collection in London, specializes in objects

from the history of medicine. Their holdings include several poorly copied miniatures depicting early modern Islamic models of the body, written over with a bizarre pseudo-Arabic and with no provenance provided.

A few images, though, are imagined out of whole cloth, such as the small-

pox illustration mentioned earlier. More troubling still are the images that artists have altered to match our own expectations. The astronomy image on the cover of the book I had planned to assign to my students borrows the figures from the authentic observatory miniature held at the University of Istanbul, but

the forger easily transforms a scholar raising a sextant to his eye into a man using a telescope in the same pose. It is a subtle change, but it alters the meaning of the image significantly, pasting in an instrument of which we have no visual depictions in Islamic sources but which we today readily associate with the practice of astronomy.

The Look of Science

Many art museums feature lovely exhibits that display Islamic miniatures, but books containing such images have always been few and far between. Images of science are rarer still. For example, there are only a scant three premodern books that have illustrations portraying men at work in an observatory in the Middle East, each with only two or three images. That is why forgers need to invent new tableaux when they tire of copying or adapting the same scenes.

This relative dearth of images in societies throughout the Middle East resulted from a number of factors. Books were copied by hand until the late 19th century, and although this limitation proved to be no impediment to the creation of one of the most bookish societies in the world, it was difficult to reproduce images en masse. Books may have been everywhere, but illustrations, especially high-quality ones, were possessed only by sultans and viziers who could support workshops with painters, illuminators, and calligraphers to produce these masterpieces.

The relative paucity of images in medieval Islamic books is only part of the story. Another part is that the act of “doing science” often looked different in the past than it does today. The prototypical image, used on nearly every book cover and poster, is the aforementioned depiction of the observatory in Istanbul, which appeared in a Persian manuscript circa 1574 praising the accomplishments of Sultan Murad III. It is a favorite of forgers because it demonstrates a scene almost reminiscent of a contemporary laboratory: Men stand around tables taking measurements with quadrants,



This 16th-century miniature depicts the Persian polymath Nasir al-Din al-Tusi (1201–1274) and four other men at work in the Maragheh observatory in modern-day Iran. This illustration is an accurate depiction of how science was commonly conducted in the medieval Ottoman empire, but it does not read as obviously “scientific” to a modern viewer.

sextants, astrolabes, and, most intriguingly, a Western globe at the bottom of the frame. The other two miniatures in the manuscript depict men trying to position gigantic astronomical instruments (like those of astronomer Tycho Brahe in the Danish 16th-century observatory of Uraniborg; their size was a means of ensuring accuracy), a scene that was repeated in another source hailing the sultan’s astrological ambitions to construct a new book of planet positions. Yet the two books depicting Murad III’s particular emphasis on the instruments of science are the exception.

Science was, in a sense, everywhere in the premodern Middle East. From metal workers to midwives, artisans were constantly experimenting and tweaking nature, yet they were rarely represented as knowledge makers. Those who were depicted, though, could be found in the more representa-

tive image of the observatory built in about 1260 in Maragheh, a city in modern-day Iran (*left*). The image shows men huddled around books, their heads turned toward the Earth and not the heavens. The only instruments in the illustration are two astrolabes, neither being actively used to take measurements. Depicted here, astronomy is a bookish discipline, concerned with the accuracy of planetary locations to properly chart the horoscopes of kings, a type of work that does not fit into modern notions of “doing science.”

A similar point can be seen in a fascinating painting found in a compilation of alchemical texts most likely created in Baghdad in 1339 (*see page 160*). According to University of Chicago art historian Persis Berlekamp, the complicated illustration is intended to legitimize alchemy as a means of accessing the secrets of nature. In the painting, a woman in a window, four male observers, and nine eagles direct the viewer’s gaze toward a huge figure of a man, who resembles a Christian evangelist. This man holds a set of tablets demonstrating the hidden knowledge of alchemy.

The painting is a visual representation of scholastic knowledge making that we

have difficulty recognizing today. The work of science was unearthing secrets from ancient books, not necessarily fiddling with instruments. The illustration also demonstrates that images were not always meant to be read as literal representations or demonstrations of science but instead were intended to convey other, sometimes more complicated, layers of meaning achieved through visualization.

Recreating Islamic Science

A literal interpretation of images of early-modern Islamic science in our own time has had unintended and far-reaching consequences. In a corner of Gülhane Park in Istanbul, down the hill from Topkapı Palace and Hagia Sophia—both representations of Ottoman power that are now museums—stands the Istanbul Museum of the History of Science and Technology in Islam.



This 14th-century painting advocates for the role of alchemy in Islamic science. The allegorical work shows that images were not necessarily meant to be read as literal representations or demonstrations of science but contained other, sometimes more complicated, layers of meaning achieved through visualization.

The visitor begins with astronomical instruments: astrolabes and quadrants (though thankfully no telescopes). As one moves through the displays, the exhibits shift from instruments of war and optics to examples of chemistry and mechanics, becoming increasingly fantastical with each room. Glass cages of beakers follow alembic distillers in elaborate contraptions. At the end, one reaches the section on engineering, in which the fantastical machines of Ismail al-Jazari—a 12th-century scholar often called the Muslim father of engineering—are displayed. His contraptions resemble medieval versions of Rube Goldberg machines: Imagine a water clock in the shape of a *mahout* (driver) sitting atop an elephant.

There is only one catch: All the objects on display are reproductions or completely imagined. None of the objects is older than a decade or two—indeed there are no historical objects in the museum at all. Instead, the astrolabes and quadrants are recreated from pieces in other museums. The war machines and the giant astronomical in-

struments are models scaled to fit in a medium-sized room. The intricate chemistry contraptions, of which no extant copy has ever been found in the Middle East, were created solely to populate the museum.

By itself, this display is not necessarily problematic. Some of the pieces are genuinely rare, and others might not exist today but are useful to see recreated in models and miniatures. What is alarming is the museum's near-total refusal to address or justify the fact that its entire collection is composed of recreations. The objects are simply presented in glass display cases that state the dates and location of their originals but make no attempt to narrate them into particular moments of Middle Eastern history.

The origins of many of the museum's objects become clear as one examines the photographs behind the displays: They were recreated from illustrations in medieval manuscripts containing similar-looking devices. The most famous of these are the fantastical images of al-Jazari's elaborate contraptions, taken from his *Book of*

The act of “doing science” often looked different in the past than it does today.

Knowledge of Ingenious Mechanical Devices. Although modern engineers assure us that with some proper interpretation the machines are theoretically sound, none of these works is actually known to have survived. It could even be argued that the machines, especially the more fantastical ones that the museum recreates, were never meant to have been constructed.

Unlike the fake miniatures, the objects in the Museum of the History of Science and Technology in Islam were not purposefully constructed to dupe unsuspecting tourists and collectors. The man behind the museum, the late Fuat Sezgin, was a respected scholar who compiled and published multiple works on Islamic science. But his project does share some key qualities with the fake miniatures, in that they both create

objects that adhere to our contemporary understandings of both the function of images and the image of “doing science” itself. Both interpret images of Islamic science solely as literal and direct representations of objects and people that existed in the past.

Reframing Islamic Science

What drives the creation and spread of these reimagined images and objects is the desire to use the universalism of science to redeem Islam—as a religion, civilization, or people—from the Islamophobia of recent times. The equation of science and technology with modernity is a common trope, one that existed long before the current Islamophobic environment. Yet in a world that is too willing to vilify Islam as the antithesis of civilization, the belief in science as a project in which all the world's people participated has gained new importance today.

With these ideals in mind, it is possible to argue that the ends justify the means: Using a reproduction or a fake image to draw attention to the rich and oft-overlooked intellectual legacy of the Middle East and South Asia is a small price to pay for such an immense benefit. And, the argument continues, if the material remains of the science do not exist or do not fit the narrative we

wish to construct, then it is acceptable to reconstruct them as we imagine they would have existed. Thus textbooks and museums rush to publish proof of Muslims' scientific endeavors, wittingly and unwittingly propagating the images they see as exemplifying the idealized vision of Islamic science we want for our own time: those telescopes, clocks, machines, and medical instruments that whisper and occasionally scream "modernity" even to the most casual or skeptical observer. This argument is one root of a creeping and paternalistic tendency to reject the real pieces of Islamic heritage for their reimagined counterparts.

Still, something is lost when we reduce the history of science in Islamic lands to a few recognizably modern objects. We lose sight of important traditions of learning, whether artisanal or scholastic, that were not visually depicted, and we leave out major endeavors now deemed irrational or unmodern, such as alchemy and astrology.

This choice is a question not just of preferences but also of resources. Instead of spending millions of dollars to build and house these reimagined productions, these museums could have bought, collected, and gathered actual objects. The problem is not that there is no material to collect and present. A purposeful decision has been made to ignore existing objects because they do not lend themselves to the narrative that these museums wish to tell. Perhaps the museums worry that actual remnants of the Islamic scientific past simply cannot arouse our wonder and tell us in the starkest terms that Muslims, too, created works of recognizable genius. But what is lost is an important opportunity to remember that what counted as genius, inspired wonder, or reflected Muslim greatness in the past was not quite the same as what does so today. This flattening of time and space impoverishes audiences, even while posing as enrichment.

We are still left with the question, though, of the harm done by the proliferation of these reimagined images and objects. One could argue, as some colleagues have when I raised this question, that even if these works are inauthentic, they still invite students to learn about the premodern Middle East. But as the false or reimagined images and objects slowly circulate, they start replacing the original images, transforming our baseline notions of the science of the past.



Ismail al-Jazari (1136–1206) was a Muslim polymath and engineer who wrote *The Book of Knowledge of Ingenious Mechanical Devices*, published in 1206. The book described fantastical devices, including its famous elephant clock (left). A basin of water hidden inside the model elephant fills and drains in half-hour intervals, which are marked by the *mahout* (elephant driver) banging a drum. There are no extant physical examples of the device from the 13th century; however, there are several modern reconstructions, including working versions in the Ibn Battuta mall in Dubai, United Arab Emirates, and at the Institute for the History of Arab-Islamic Science in Frankfurt, Germany. The Istanbul Museum of the History of Science and Technology in Turkey also displays a model of the elephant clock (right).

In the case of the fake miniatures, many are painted on the ripped-out pages of centuries-old manuscripts to add to their historicity, literally destroying authentic artifacts to craft new forgeries.

In all these cases, it is never quite clear who bears responsibility for the deception. We often wish to discover a scheming mastermind behind every act of forgery, exploiting the social bonds of our trust, whose fraud can only be rectified by a greater authority. The responsibility to establish truth, however, does not lie solely in the hands of the critics and forgers but also in our own actions as consumers and disseminators. Each time we choose to share an image online or patronize certain museums, we lend or withhold credibility. To reach a solution we may have to go further than a simple reassertion of our commitment to truth over fiction, to facts over lies. After all, works of history are also in part acts of fiction in their attempt to recount a past that we can no longer access.

What is ultimately missing from the Istanbul Museum of the History of Science and Technology in Islam and

from the fake miniatures are the lives of individuals. Refusing to collect and display actual historical objects, and instead championing their reimagined counterparts, effaces the people of the past, making it impossible to reach their lives, however tenuously.

An intellectually honest project has to commit to displaying actual historical objects and images and to narrating the stories of the students, jurists, midwives, herbalists, and astrologers who built science in the Islamic world. The narrative of Muslim genius might not be so pronounced, and we might have to abandon the sexy and shareable images of the telescopes and fantastical machines that our image-obsessed present currently requires. We would have to adopt instead a different vision of science, a subtler one that does not reduce scientific practice to a few emblems of modernity. This reframing is part of cultivating a new sense of wonder, one that elicits marvel not from elaborate mechanisms or civilizational achievements but from the lives of women and men in the past. ■