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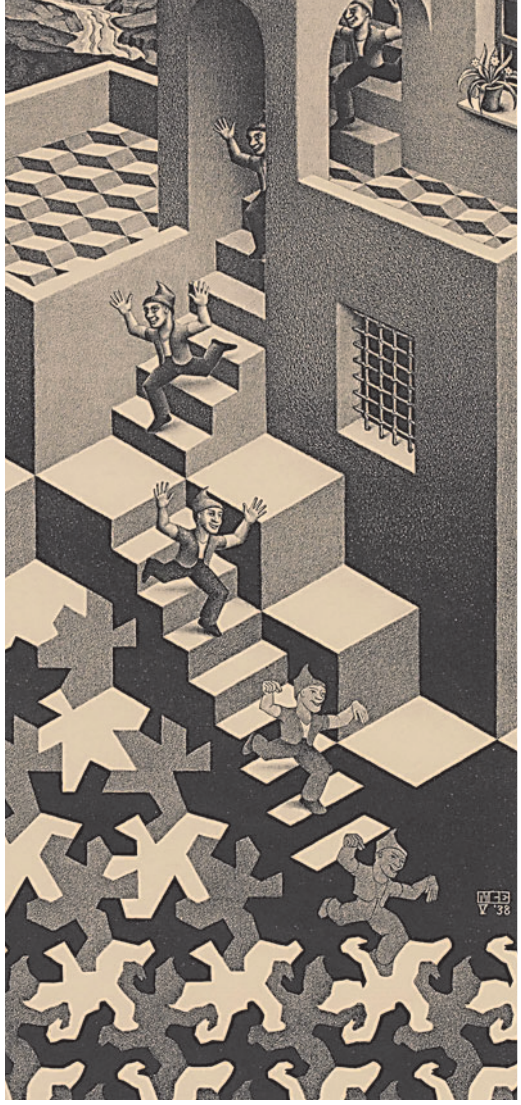
We distribute *AramcoWorld* in print and online to increase cross-cultural understanding by broadening knowledge of the histories, cultures and geography of the Arab and Muslim worlds and their global connections.

FRONT COVER Contemporary Arabic calligraphy of a famous sixth-century CE poem helps emphasize the cross-disciplinary approach of "Hijrah: In the Footsteps of the Prophet." Art by Hind Alghamdi. Photo courtesy of Ithra.

BACK COVER Samples by Hungarian vocalist and zither virtuoso Alexandra Berta are among those of more than a dozen artists recorded by Remix-Culture and offered online. Photo courtesy of Remix-Culture.



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FIRST LOOK

Soaring off Ambon Island

Photo by Hengki Koentjoro

I love the sport of diving, especially in my country Indonesia, the largest archipelago nation in the world—with more than 17,000 islands extending more than 5,100 kilometers from east to west. This photo was taken off Ambon Island, East Indonesia, in 2010. It is one of my favorites, illustrating the free-spirited nature of the children in the rural archipelago. While some children in the big cities may stay inside and play computer games, the children in Ambon with easy access to the water see the ocean surrounding their village as their playground.

To create the picture, I dove under the water and gestured to some children nearby to get close to me. I did not direct them at all. They acted naturally. I can tell they really enjoyed the moment because they have probably never seen a diver taking photographs while they played under the water.

To me, black-and-white photography evokes strong emotions. It allows you to explore the borderlines of light and shadow, the yin and yang. Celebrating complexity in the minimalist. Diving into the spiritual in the physical. This silhouette conveys to me the very spirit of minimalism and simplicity.

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Shir Yakheh Gulab (Rose and Pistachio Ice Cream)

Recipe by Durkhanai Ayubi

Photograph by Alicia Taylor

Shir yakh is a traditional ice cream from Afghanistan.

During the hot summer months, ice-cream shops, called *shir yakh feroshees*, would sell an assortment of ice creams and other cold desserts. My sister Fatema remembers going into beautiful little shops after school to buy shir yakh. They were colorful and decoratively tiled and had Bollywood music playing in the background.

The shir yakh, with rose and pistachios, is a favorite at Parwana, one of her restaurants.

(Serves 8)

4¼ cups (1 liter) heavy whipping cream

2 cups (500 milliliters) condensed milk

1 teaspoon cardamom pods, crushed with a mortar and pestle

1 tablespoon rosewater

½ cup (70 grams / 2 ½ ounces) pistachios, crushed

Slivered pistachios and rose petals, to serve

Process the cream, condensed milk and food coloring in a food processor for 3-4 minutes, or until stiff peaks form.

Transfer the mixture to a clean bowl and add the cardamom, rose water and pistachios. Fold through gently to combine well, then transfer to a large airtight container.

Cover the entire surface of the ice cream directly with plastic wrap to avoid the formation of ice crystals. Cover the container with a lid and freeze for at least 10 hours before serving, scattered with slivered pistachios and rose petals.

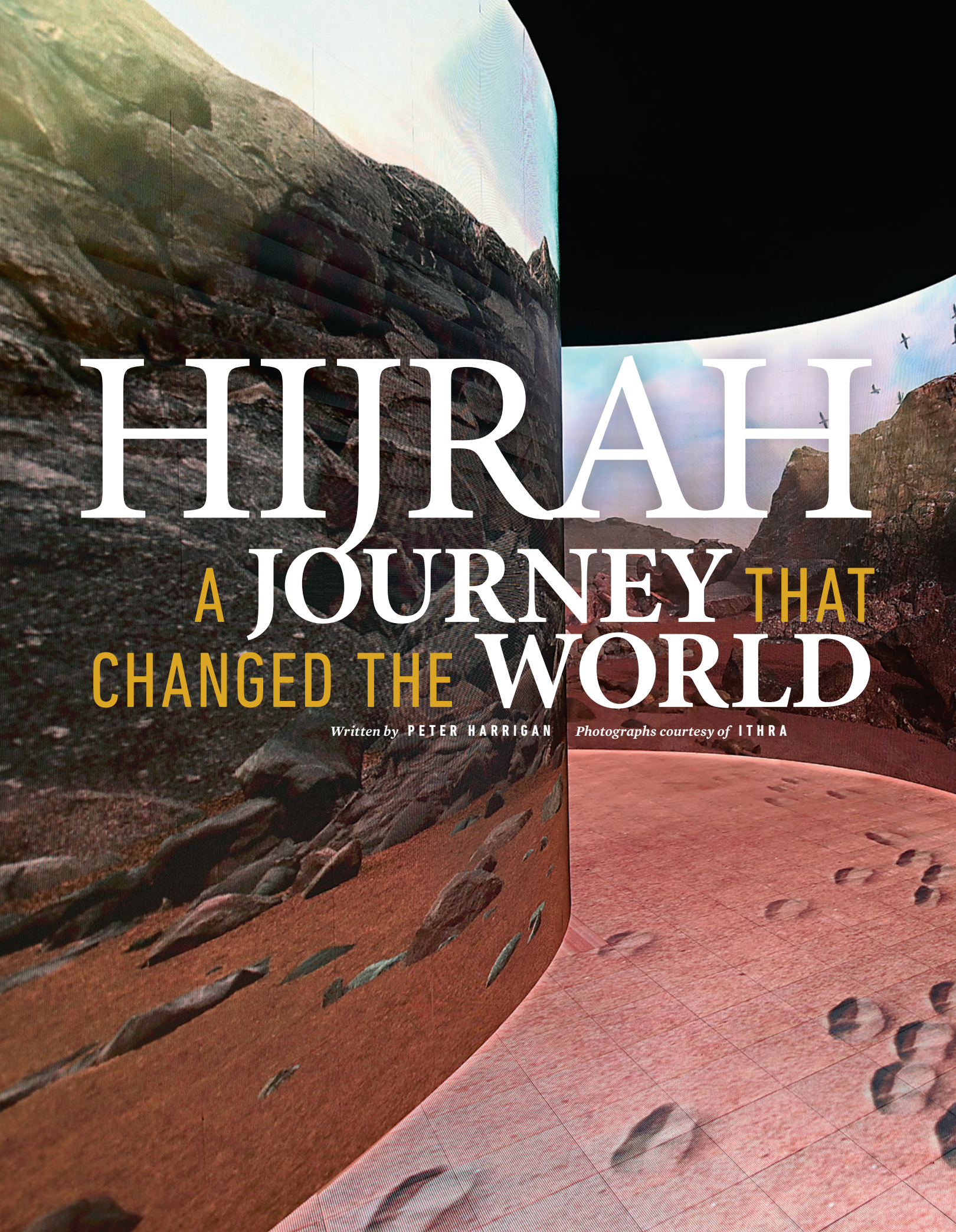
Reprinted with permission from

Parwana: Recipes and Stories From an Afghan Kitchen

Durkhanai Ayubi.
Interlink Books, 2021.
interlinkbooks.com.

ALICIA TAYLOR

Freelance food writer and restaurateur **Durkhanai Ayubi** is involved in day-to-day responsibilities of two family-run eateries in Adelaide, Australia: Parwana and Kutchi Deli Parwana. She has written for several international newspapers and websites. Daughter of Afghani refugees Zelmai and Farida Ayubi, she tells her family's story from her own perspective while passing along memories and recipes from her parents. *Parwana* is also the title of her first book and won the 2021 Art of Eating Prize.



HIJRAH

A JOURNEY THAT CHANGED THE WORLD

Written by PETER HARRIGAN *Photographs courtesy of* ITHRA

Qifa.
(Stop.)

The word appears in flowing strokes of gold Arabic verse arranged in a circle on black fabric four meters square by contemporary artist Hind Alghamdi. Despite the liquid complexity of her calligraphy, the piece feels spare, even meditative. Idries Trevathan, Ph.D., curator of Islamic art at the Ithra Museum in Dhahran, Saudi Arabia, admits it is an incongruous word to hang at the entrance of an exhibition about a journey. All the moreso when the journey is one as epochal as this: the *Hijrah* of the Prophet Muhammad 1401 years ago from Makkah to Madinah in what is now western Saudi Arabia.

He explains that qifa is the first word of a full poetic verse Alghamdi has rendered, which is the opening of "Standing at the Ruins," widely regarded as the most iconic of the pre-Islamic Arabic *qasidas,* or odes, attributed to sixth-century-CE poet Imru' al-Qays. In it, the poet reflects on a silent, abandoned campsite: "Stop, oh my friends, let us pause to weep over the remembrance of my beloved…" So celebrated was the full qasida that in its own time its verses were among those woven in gold and hung on the Ka'aba in Makkah, which even before Islam was regarded as a holy city.

While this emphasizes the Hijrah as a bridge from pre-Islamic Arabia, the word works also to invite those not familiar with the tradition to pause to consider the relevance of the Hijrah to the wider world. Ithra Director Abdullah Al Rashid notes that the Ithra exhibition, "Hijrah: In the Footsteps of the Prophet," is comprised of 14 zones spread over 1,500 square meters with installations,

Simulating and symbolizing the winding journey of the Prophet Muhammad and his followers from Makkah to Madinah in 622 CE that came to be known as the Hijrah, or migration, the exhibition "Hijrah: In the Footsteps of the Prophet," was produced at Ithra in Dhahran, Saudi Arabia. **TOP** Artist Hind Alghamdi's 2022 "Standing by the Ruins" hangs near the first gallery.

ABOVE In one of the exhibit's trio of cinematic dramatizations, filmmaker Ovidio Salazar and director Ebrahim Hajjee produced "The Bounty Hunter" to evoke the tale of Suraquah ibn Malik ibn Ju'shum al-Kinani, who tried to apprehend the Prophet Muhammad en route but "came away from the encounter repentant and transformed," writes Salazar. **TOP** Two *sitarah* textiles represent one of the ways rulers across Islamic lands have honored the Hijrah and the Prophet since shortly after the Prophet's lifetime in the seventh century CE. The fabric at left dates from the 17th century and shows an Ottoman *tughra*, or sultan's seal, surrounded by Qur'anic verse; hanging to its right, this Egyptian sitarah was embroidered in 1909.

calligraphy, artifacts, manuscripts, cinematic productions, photography and even song assembled to bridge space, time and cultures.

"As befits the Hijrah's significance in world history," he says, the exhibit is "one of the most detailed studies ever of the history and topography of the journey." Taking advantage of new studies and research, he adds, "we have deliberately taken a cross-disciplinary approach which looks at the history and legacy of the event from different perspectives, including science, history, theology, [and even] art and cultural memory."

To artist Alghamdi, the first verse of the qasida is more than historical. It also evokes themes that today are finding new life with Arab creatives across media, she says. "As an artist interested

Contemporary works on display included, **ABOVE**, a marble carving by Mohammed Siddique Bhati of India and a trio of prayer rugs by the Kerki Producer Group of Turquoise Mountain in Acha, Afghanistan. **LEFT** "Brotherhood," by Zahra Alghamdi, uses fabric and clay to express both hardship and connection among the *muhajirin*, or migrants of the Hijrah, and the *ansar*, or helpers of the Prophet, on his safe arrival in Madinah.

"This is a story that addresses universal human themes of courage, duty, loss, companionship, persecution, migration, community and freedom."

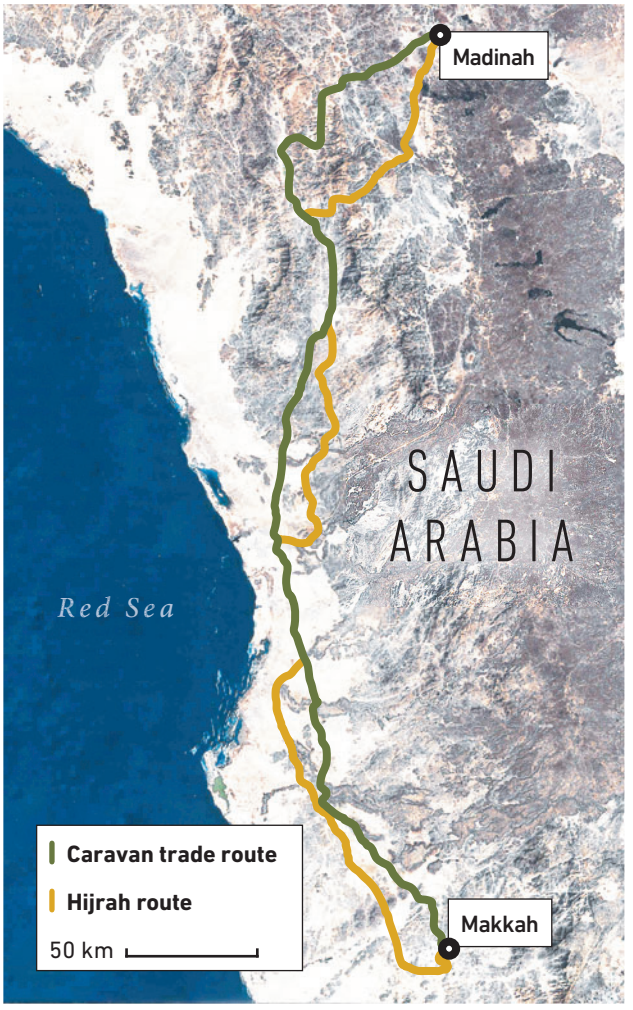
—IDRIES TREVATHAN

in contemporary Arabic calligraphy, writing out these verses is special because I believe they represent the height of Arabic poetry and embody the spirit of the Arabic language even today," says Alghamdi.

"Most Muslims know about the Prophet's migration from Makkah to Madinah in a religious context, but few know about the journey of eight days that marked the beginning of the Islamic calendar and reshaped the Arabian Peninsula socially and politically," says Laila Alfaddagh, director of the National Museum in Riyadh, which will host the exhibition later this year.

The Arabic word *hijrah* translates in English best as migration or departure. Last year marked the 1,400-year anniversary of what was, in the moment, an uncertain, clandestine and potentially fatal flight of the 53-year-old Prophet Muhammad from his birthplace in Makkah north to the oasis town then known as Yathrib (now Madinah). It is one of the world's great quest stories, standing among those

TOP: WALEED DASHASH



Rising like a cluster of watchmen, an outcropping of stones marks a hilltop along the route of the Hijrah. **LOWER** Research by Abdullah Alkadi produced the most authoritative map to date of the route of the Hijrah, which largely avoided the well-traveled caravan route that follows the west coast of the Arabian Peninsula along the Red Sea. The route linked not only Makkah and Madinah but also points south and with others to the north including Egypt, Syria and Turkey.

of others such as Gilgamesh, Noah, Odysseus, Abraham, Moses, Buddha and Jesus.

In 638 CE, Muhammad's second successor as head of the community of Muslims, Umar Ibn al-Khattab al-Faruq, considered the Hijrah so important that he established it as the inaugural moment of the Islamic, or Hijri, calendar.

Much about the Hijrah is considered well-documented, handed down through hadith (words and deeds of the Prophet as recounted by his companions) as well as early biographical accounts known as Sirah. We know the background story, some of the episodes that occurred along the way and what ensued after his welcome in Yathrib, which was soon renamed Madinah as the first city to be identified as Islamic. But there has, says Al Rashid, "always been substantial debate about parts of the route, as well as certain aspects of tradition which seemed difficult to square with the facts on the ground."

Some of these gaps have now been filled by the exhibition's research. "We have collected, salvaged and created new accounts in cooperation with more than 70 researchers and artists from over 20 countries," says Trevathan. For example, he points out that one of the exhibit's centerpieces is a contemporary tent of goat and camel hair woven by Amazigh artisans in Morocco to represent the tent of Umm Ma'bad, the site of a crucial encounter on the second day of the Hijrah. Similarly, he adds, the museum worked with artists and artisans from more than a dozen countries and sought guidance from half a dozen universities and institutions.

MAP: ABDULLAH ALKADI

Woven in Morocco by artisans using goat and camel hair, this interpretation of the tent in which the Prophet Muhammad and his followers received hospitality during the Hijrah from the tribeswoman Umm Ma'bad was erected in the center of one of the exhibition's 14 galleries.

Trevathan reflects on the challenge of how to present the Hijrah in a way that went beyond the literal, canonical or prosaic and extended to the archetypal and experiential. That was where contemporary art came in: "Some of the spirit of the journey is best captured and expressed by way of the poetry, art and culture of what people have created of the story," he says.

Entering the exhibition, past Alghamdi's calligraphy, the visitor walks into an interpretation of the city of Makkah during the half century of Muhammad's life leading up to the Hijrah in 622 CE. Here artifacts associated with the city's rituals and practices point to the polytheism that prevailed there alongside the presence of monotheistic Jews and Christians as well as the small but growing number of Muslims. On loan from the National Museum are clay and stone findings from archeological excavations at sites in the western Arabian Peninsula such as Qaryat al-Faw, Mada'in Salih, Tayma and al-Rabadhah that include statues, anthropomorphic stelae and altars for offerings and sacrifice. An incense burner with astral symbols and a clay figurine of a camel carrying jars are also typical artifacts that reflect the time.

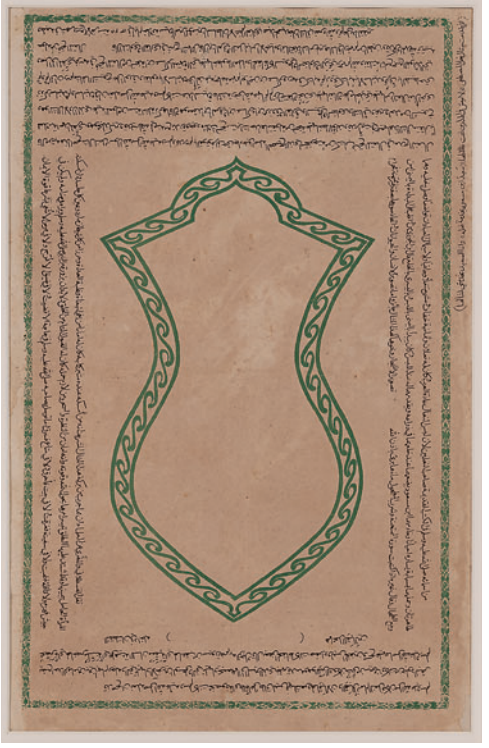
The exhibition's co-curator, Kumail Almusaly, Ph.D., who is responsible for traveling exhibitions at Ithra, observes that in those times, life in Makkah was mostly "harsh, unjust and dictated by reckless and extreme behavior." The powerful mercantile Quraysh tribe dominated the city and "capitalized on Makkah's ancient reputation as a place of pilgrimage by encouraging visiting tribes to use the Ka'aba as a shrine for their idols, thus turning the city into a center of both trade and idol worship." Muhammad sought to end such practices and turn Arabia to a monotheistic path.

As Muslims in Makkah increased in number, the Quraysh began subjecting the Prophet and his followers to "social isolation, economic boycotts, persecution and torture," says Almusaly. Some had already migrated across the Red Sea to Abyssinia (now Ethiopia). The Quraysh feared that if Muhammad left Makkah, he could set up a new rival base elsewhere, most likely in Yathrib.

> The Hijrah was a journey that "represents an isthmus separating two historical worlds."
>
> —ASHRAF FAQIH

Pressed to resolve this threat, the Quraysh nobles gathered in the *Dar al-Nadwa* (town hall) and agreed on an assassination plot. The exhibition screens a two-part cinematic reconstruction of this plan, which involved the recruitment of a dozen assassins from various clans and tribes in order to spread the responsibility. But the attempt failed, and it led the Prophet to risk an escape from Makkah that became the first steps of the eight-day Hijrah.

Professor Abdullah Alkadi has spent four decades in field studies, research and study of the Prophet's journey. He is the first researcher to personally walk its entire length, collecting data, identifying landmarks and looking to literature, historic documents, folk memories as well as geospatial technologies to fill out the story of the precise route and locations of events along the way. His



Artist Ayesha Amjad's neotraditional "Hijrah Memory Map" **RIGHT** depicts the route of the Hijrah using roses, a symbol used for centuries in connection with the Prophet Muhammad. **ABOVE** This simple design, produced in 1901 in Morocco, represents one of the Prophet's sandals, and it would have been carried by its owner as a symbol of protection.

research proved crucial to the accuracy of the Hijrah story from this point on.

After the attempted assassination, Almusaly says, Muhammad left Makkah in secret together with his close friend Abu Bakr al-Siddiq, who later became the first caliph, or successor as head of the Muslim polity. Reckoning their persecutors would assume they were heading north to Yathrib, the pair instead headed south and hid for three days in a cave on the peak of Mount Thawr.

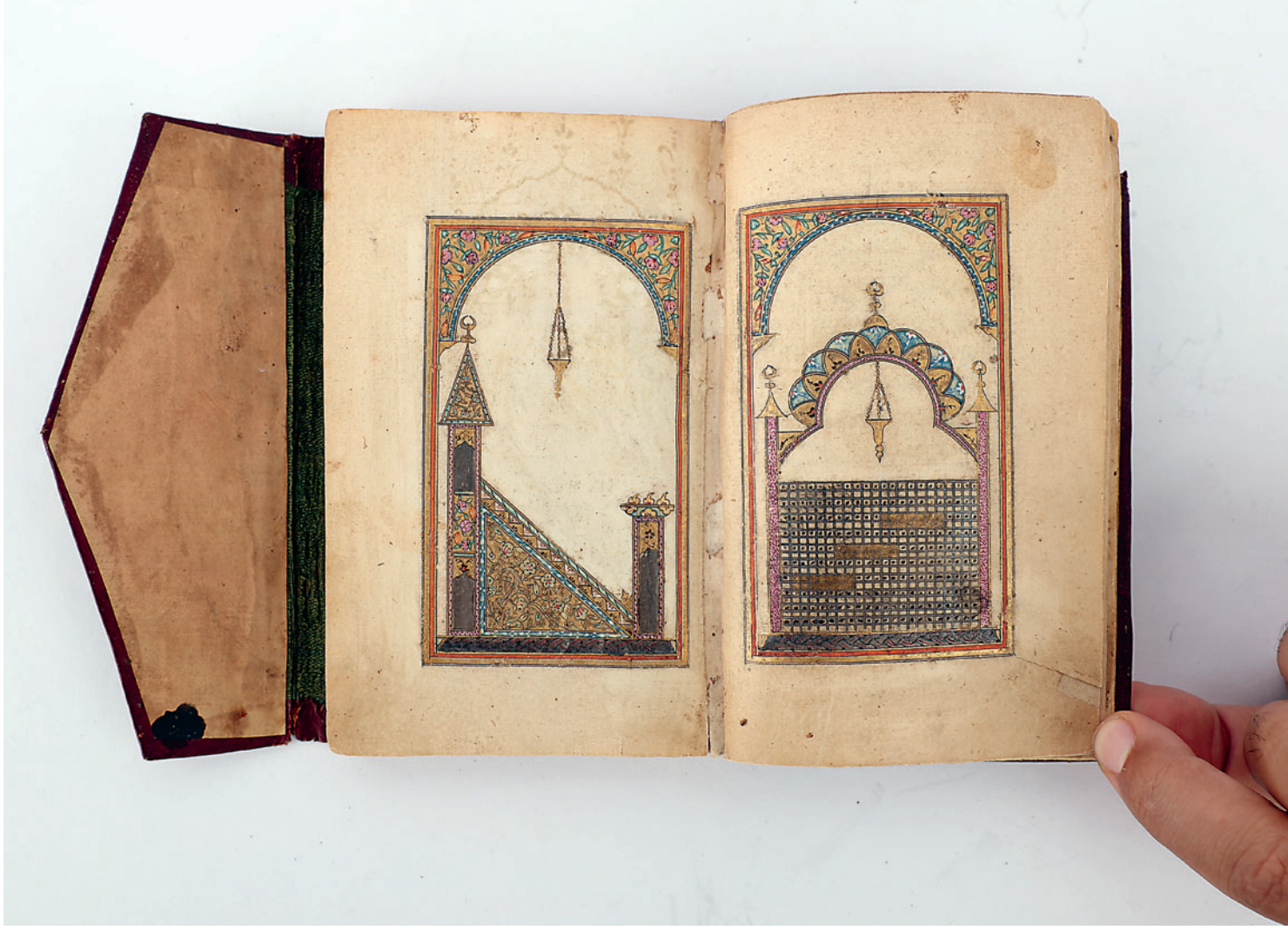
After narrowly avoiding capture there, they set off west toward the Red Sea coast. Then, led by their guide Abdullah bin Urayqit, they turned north. "It's important to remember that they did not use the main route between the two cities," says Almusaly. "They took trails that meandered between mountains and along secluded valleys" in order to avoid being spotted.

Each day of the Hijrah is given a zone in the exhibition, each one incorporating large-scale panoramic projections of the territory they traversed: Most of it is rocky, rugged, shadeless and scant of water. The landscape films, along with three dramatic reconstructions and four mini-documentary films, are all by award-winning filmmaker Ovidio Salazar. In the exhibition, he says, they can "act as aids to contemplation for those willing to give more than a cursory glance."

Important to the story of the Hijrah are Salazar's landscapes. The film crew, he says, "literally followed in the Prophet's footsteps, trying to imagine the journey he undertook 1,400 years ago and the circumstances surrounding it." This included shots using near-infrared filtration to evoke the light of the waxing moon that lent itself to an enduring *nasheed* (Islamic song) marking the Prophet's eventual arrival in Madinah, "*tala'a al-badru 'alayna*" ("The Full Moon Rose over Us"). This nasheed has become so celebrated and ubiquitous that there are few Muslims who cannot sing its lines, and it is a testament to the Hijrah story's endurance over generations. Legendary Egyptian singer Umm Kulthum recorded the most famous version in 1966, and 10 years later it was used as the score in the film *The Message*. Yusuf Islam (formerly Cat Stevens) sang it in 1995, and in 2015, 300 schoolchildren in Ottawa sang a version to welcome refugees fleeing war in Syria. In the "Hijrah" exhibition, visitors can use headsets to listen to eight versions.

> "Some of the spirit of the journey is best captured and expressed by way of the poetry, art and culture of what people have created of the story."
>
> —IDRIES TREVATHAN

The exhibition's silent projections use 15 screens to emphasize aerial sequences that range over the daunting



ABOVE This small book of prayers opens with illustrations depicting the Prophet's *minbar* (pulpit) and a wall screen inside the Prophet's Mosque of Madinah, circa 1734 CE. **LEFT** Produced in Cairo in 1416 CE, this elaborate frontispiece graces a volume of hadith, or sayings and actions of the Prophet Muhammad.

landscapes, each screen nearly the size of those in commercial cinemas. To Salazar, these "encourage the viewer to participate in the narrative on its own terms," evoking not just the beauty of the terrain "but allowing the mind to wander, contemplating what the experience of the migration might have entailed."

The projections also help amplify the theme evoked by Alghamdi's calligraphic installation, known generically as *atlal*, the ruins motif. Trevathan explains that this expresses a larger and more complex vision of how pre-modern Muslims imagined and engaged with land by "embracing notions of melancholy, desolation, loss, sorrow and seeing in the landscape a reminder of a longed-for past." This makes the atlal motif "both empty and replete," says Trevathan, or, as it was described by American scholar of myth Joseph Campbell in his 1949 classic *The Hero with a Thousand Faces*, "an unadorned vacuum into which the imagination of the beholder can pour."

In its reappropriation of the atlal, says Trevathan, the exhibit aims to connect the role of memory as a device for structuring the experience of the Hijrah-as-story through landscape. "Nowhere is this remembering more powerfully invoked, and the memory of Prophet Muhammad more strongly bound up with natural landscape, than along the Hijrah migration route. The story of this journey has a special place in the collective memory of the Muslim world and connects a sacred

While filming researcher Abdullah Alkadi's exploration of the Hijrah route, members of the Alsaidi tribe assisted Alkadi and photographer Ebrahim Hajjee, and Hajjee made these portraits. **RIGHT** In centuries after the Hijrah, traffic to Makkah grew along several routes across Arabia, and milestones were inscribed and placed at intervals to guide travelers: The stone at top was placed by the Baghdad-based Abbasid dynasty along the Darb Zubayda, the route connecting Makkah with Iraq; the lower stone marks the building of a road in 899 CE near Madinah.

landscape with one of the most significant episodes of the Prophet's life and a foundational narrative in Islam."

Trevathan stresses that as well as remembering and celebrating the landscapes of the Hijrah, the exhibition remains anchored by collections, works of artists, master artisans, poets and sound recordings as well as historical objects. One particularly intriguing example is the calligraphic art form of *hilye*. Since figurative representations of the Prophet remain prohibited in Islam, portrait-by-narrative—hilye—described the Prophet's appearance and personality in ornately written and illuminated panels.

One of the most famous descriptions arose from the second day of the Hijrah, when the travellers stopped at the tent of a Bedouin family where a woman, Umm Ma'bad, offered hospitality. The description of the Prophet attributed to her is considered among the most eloquent and detailed that exist.

Inside the recreated goat- and camel-hair tent stands a stylized, cinematic triptych depicting Umm Ma'bad, played by actor Ghadeer Yamani, looking into the camera while a narrator recites her description as another panel shows film of the remnants of a desert encampment—a reference again to the atlal—and the third panel depicts calligrapher Nuria Garcia Masip creating a hilye with Umm Ma'bad's words.

Almusaly notes that there was another portentous, now-famous incident on that same day, which is also represented prominently in the exhibit. According to the account of 14th-century scholar and historian Ibn Kathir, soon

This evocation of the iconic green dome of the Prophet's Mosque in Madinah closes "Hijrah: In the Footsteps of the Prophet" with video from inside the mosque, which includes the house of the Prophet with its own doors decorated in elegant calligraphy.

after leaving Umm Ma'bad's tent, the travellers spotted a lone horseman bearing down on them: the bounty hunter Suraqah al-Kinani. Motivated by an offer from the Quraysh of 100 camels to capture or kill Muhammad, he tracked them down. But as he approached, his horse fell and then sank in the sand. He became frightened and, impressed that Muhammad was being protected by divine force, vowed no harm and rode off: Salazar turned the encounter into a short film styled along the lines of American Westerns.

After eight days the *mujahirin* (migrants) neared the oasis of Yathrib and the fields of sharp black lava and volcanic cones surrounding the city. Their arrival marked the founding of Islam's second holy sanctuary after Makkah and the first city that entirely identified with Islam. Subsequently renamed Madinah with its epithet al-Munawarah, the Radiant, it also took the name of Dar al-Hijrah, or Abode of Emigration.

Accounts about this moment recorded from al-Bara' bin 'Azib tell how those people of Yathrib who welcomed and sheltered the Prophet and his followers, and were already Muslims or later embraced Islam, became known as *ansar,* the helpers. Ultimately it is the unity between muhajirin and ansar that is the defining feature of the Hijrah story, and it has contributed to the ethical principles relating to the treatment and protection of foreign and migrant communities ever since. The epic journey formed a historical rift between the time before the flight and the time after. Ashraf Faqih, former programs manager for Ithra and a popular author of contemporary science fiction and historical fiction, writes that the Hijrah was a journey that "represents an isthmus separating two historical worlds that are distinct and different in character, discourse and the language of obligation." For these reasons he adds "the Hijrah has rightfully cemented itself as a pivotal moment."

Speaking to the role of the ansar, eighth-century historian and biographer Ibn Ishaq of Madinah recorded that, eager to host the Prophet in their homes, some of the ansar tried to lead his camel, named Al-Qaswah. Reluctant to show favor to one person or another, the Prophet asked that Al-Qaswah be left to wander to choose a place to rest. She stopped and knelt at a place for drying dates, and there, Muhammad and his fellow muhajirin joined the ansar to use mud brick, palm wood and fronds to build a small structure: the Prophet's mosque.

With that, the Hijrah was complete, an event in history that became one of the world's most influential stories of revelation, separation, trial, refuge and transformation.

Peter Harrigan (harrigan@fastmail.fm) is founding director of Medina Publishing and managing editor of Arabian Publishing, both imprints based at Cowes on the Isle of Wight, where he lives. He is a frequent contributor to *AramcoWorld.*

Related articles at aramcoworld.com
Milestones of the Hijrah: November / December 2021
Hajj routes: January / February 2004

For further reading:
Hijrah: In the Footsteps of the Prophet, Idries Trevathan et al. 2022, Hirmer Publishers.

THIS PAGE AND OPPOSITE, TOP: WALEED DASHASH

RECORD REMIX REPEAT

Written by KAY HARDY CAMPBELL *Photographed by* DAVID H. WELLS

Hatim Belyamani is grinning as he and nine other musical artists take their places on the small stage to the applause of a sellout, standing-room-only audience of some 200 people at Public Records, a state-of-the-art music hall in Brooklyn. Shaking off nerves, Belyamani slides behind his digital mixing board, grips the mic and introduces his fellow performers for the musical journey they have prepared and called Tanfis, an Arabic word describing a spiritual release and renewal akin to releasing a long-held breath. All has been made possible by the nonprofit Remix-Culture, which he founded to record, film, digitally remix and disseminate the sounds of musicians playing within underrepresented acoustic traditions around the world.

OPPOSITE Taking direction from Remix-Culture recording engineer Tyler Wood, ensemble Deqqat Assif ou Aqellal gets ready to record a video of another song in Tamegroute, Morocco, in April 2014. Remix-Culture's releases include not only full songs but also digital components of them known in digital composition as samples, which it makes available to composers who agree to share any revenues both with Remix-Culture and the original artists. **ABOVE** Hatim Belyamani, who grew up in Morocco and founded Remix-Culture in 2012, performs in March at Littlefield Performance and Art Space in Brooklyn.

"After three months of working together, we collectively designed what tonight's experience is going to be," he says.

He pauses, the slightest hesitation. If all goes well, this collaboration among acoustic musicians, DJs and remix artists drawing on music from Southwest Asia and North Africa will yield a compelling blend of live music, electronic dance and immersive videos that will envelope the room, triggering catharsis. Or this work, a culmination of sorts for Remix-Culture's years spent collecting and remixing overlooked folk music for shows just like this one, could lead to himself and nine players alone by the end of the night. A deep breath, another smile. "This is really a co-creation of all 10 of us and we really hope you stay for the full three hours," he tells the crowd.

The Egyptian DJ Myyuh sets the mood by reading a 14th-century Persian poem, and then the music begins, a heartbeat of frame drumming sampled from some of Remix-Culture's various recording sessions. Soon one of the two percussionists in the group joins in, followed by strains of qanun, *kaval* and bass. Videos of musicians playing the pieces being sampled flicker on a wall while Belyamani, going by the stage name HAT in his artist role as a self-described "orchestra conductor from the future," continues remixing the original recordings. Notes from *'ud*, kaval and *ney* (end-blown flutes) soar over a rhythmic groove as Belyamani interplays with what his fellow live performers are creating on stage.

As the music grows more energetic, Belyamani watches people's reactions. Although this is a far cry from the traditional *Gnawa* music (described by some as Moroccan blues) that first inspired Belyamani's work, if the audience connects with Tanfis (the show title is an Arabic word describing a spiritual process of release and renewal akin to releasing a long-held breath), the end-result will be the same as that experienced at a *Gnawa lila*, a night of communal prayer, healing and release through rhythmic chant, music and dance. In the audience, the music begins to take hold. People, rapt, begin to dance, bodies pulsing along as the beat grows more intense and slowing when the rhythm grows faint.

This show is a direct correlation to Remix-Culture's ongoing mission to "explore the ties between acoustic and electronic music,

between the ancient, the past and the future, between the deep ancestral wisdom and the future of all possibilities," Belyamani says.

It has been more than 10 years since Belyamani started what would eventually become Remix-Culture, his New York-based nonprofit organization focused on creating awareness of underrepresented musical genres and subgenres from around the world.

The idea is to make these forms of music more accessible to new listeners, musicians, and remixers by sharing the recordings and videos on the nonprofit's website. Remixers, like Belyamani himself, in fact, can also download and sample these recordings for their own use, as long as the original artists still get credit and receive a small royalty fee if a recording sample makes it onto a commercial record.

Now, as both founder and executive director of the organization, in many ways Belyamani is Remix-Culture.

It all goes back to his childhood in Casablanca, he explains, when he was growing up in a music-loving family. He was as likely to come home to his parents spinning the smooth tones of famed Egyptian singer Abdel Halim Hafez as he was to wake up to the orchestral fury of Rachmaninov, the pop harmonies of The Beatles or the swinging rhythms of Duke Ellington's jazz. "My ear and my brain were exposed to all of that from an early age," he says. "We also listened to Moroccan music, but it was a small, narrow spectrum," he said in a 2019 interview with *The Cedar*.

His clan also gravitated toward performance. Belyamani's father, a radiologist, regularly pulled out the 'ud at parties and family gatherings. Belyamani and his two brothers, who all started learning piano as children at Casablanca's Conservatoire de Musique, became skilled enough to compete in classical piano playing contests. As a teenager Belyamani won prizes for his classical playing while also learning to play jazz and guitar—but he casually dismissed most Moroccan music. It took seeing a video of former Led Zeppelin lead singer Robert Plant in Marrakesh singing a Gnawa tune to get teenaged Belyamani to start thinking about his own culture's music and how it fit in with the music he was raised with. "Even in high school I was writing about creating some new form of universal music where you could recognize the different traditions somehow, but together they would create something new, something unifying," he says.

A top student at the Casablanca American School, Belyamani graduated as valedictorian and was accepted to Harvard University

Among Remix-Culture's international live recordings are Suya in Beijing **TOP** and the band Coco Trupe in Arcoverde, Brazil, **LEFT**.

"Even in high school I was writing about creating some new form of universal music where you could recognize the different traditions somehow, but together they would create something new, something unifying," says Belyamani, who produces his videos from a home studio.

in 1995. Once he started college, Belyamani was pursuing a bachelor's degree in social studies, but he gravitated toward music, taking classes in jazz, ethnomusicology and composition. Composing music thrilled him—until his sophomore composition class where, after writing and scoring a piece for a full orchestra for the final project of the semester, the performance was cancelled because of a snowstorm. Realizing that writing for orchestras meant needing to have orchestras at his disposal, Belyamani left the class discouraged.

At around the same time, however, his roommate introduced him to electronic music, compositions created on a computer using a MIDI interface and banks of sound samples. "I realized I could hear my music without needing an orchestra at all," he says. "This kind of music was like having a conversation with the orchestra that never played my composition. I didn't have to ask, 'Can you play that? Can you make that louder?' I could just do it."

But electronic pop left him cold. Until, that is, like many college students of the era, he first heard Icelandic singer Bjork's heavily electronic 1997 album, *Homogenous*. "For me, music needed to have more breadth. It's more about humanity, about imperfections," he says. Bjork's use of computers to create "rhythms that were alive and that blended seamlessly with string sections and with live vocals so the electronic and acoustic were harmonious. I'd never heard anything like it."

Although he knew he wanted to make music his life's work, after graduation in 2000 Belyamani ended up moving to Silicon Valley, landing at Apple in 2003. But Apple was his day job. His new goal? To try and make music with the same ethos as Bjork's but drawing on his own culture. Meanwhile, as his years in the United States ticked by, Belyamani increasingly found himself seeking out Moroccan music, even Gnawa and other styles that he didn't know much about, to feel closer to home. But eventually even connecting with Moroccan diaspora through music was no longer enough for him. In 2012, tired of the demanding schedule and longing for home, he quit Apple and went back to Morocco. "I've always known music is the most important thing for me," he says. "When I quit my job, I had a very strong sense that I needed to reconnect with my family, with my home country, with my community there. I felt so disconnected in the US and that feeling extended to my music."

> Remix-Culture exists to "explore the ties between acoustic and electronic music, between the ancient, the past and the future."
>
> —HATIM BELYAMANI

Once he was in Casablanca, he borrowed his mom's car, grabbed a couple of microphones and a camera he'd brought with him and set out for Khenifra, a northern central city surrounded by the Atlas Mountains. The destination was not random. His younger brother, Amino, a professional musician who plays in a Gnawa band, had been issued an

Using music production software, Belyamani organizes Remix-Culture's dozens of digital audio sample packets—from loops and single sounds to multi-instrumental clips—that are all available online free to anyone who commits to sharing part of their profits with both Remix-Culture and the recording artists.

invitation to meet famed Amazigh singer Mohamed Rouicha. Rouicha had died earlier in 2012, but family members furnished Belyamani with contact info for the people who could put him in touch with other folk musicians in the region. In Khenifra, Belyamani started with a local music shop owner. He'd hoped the man would simply point him toward the musicians Belyamani hoped to record, but this was out of the question, the man told him. Instead, he gave Belyamani a crash course, not only on the music but also the Amazigh culture that had created it. Once the shop owner was certain Belyamani knew enough to begin to understand it, he introduced Belyamani to a local group of players to film and record.

The shop owner's education was a turning point, Belyamani says now. "That cultural introduction process really helped instill the core values of what I was trying to do, and those values are now very much a part of Remix-Culture: this mandate to honor the source and the context behind the music, that it's not just about the music alone," he says.

Upon returning from Morocco, Belyamani landed in New York City and impulsively applied for a small grant to create an art installation at Priceless, an annual multi-day music and arts festival held in Belden, a small town tucked into the Sierra Nevada foothills of Northern California. He was shocked to discover he'd won the grant. Tasked with creating something that would engage passersby for the 2012 festival, Belyamani drew on his Khenifra recordings and photos to design an interactive music and image program that allowed people to play with the recordings and images to create their own remixes of the original songs. The concept was a hit with the festival crowd, and suddenly the germ of an idea was planted.

Soon he was back in Morocco seeking out more musicians around the country to film and record. "I realized I left Apple to do this, to follow my heart, to be who I want to be," he says. "If I'm not going to do it now when I have the resources and I have made the time, then when?" So he committed, bringing along a small recording and video team that he paid by drawing on his savings.

Tyler Wood, a college friend who worked as a sound engineer on that trip, says he was amazed by how open people were to being recorded and filmed, but they had to be ready to start at any time. "No one wanted to do a second take," Wood says. "We didn't ever really do a sound check. Even when we went to check the mics a group would start up and do a 20-minute, mind-blowing performance, and you had to just capture that. They weren't going to do it again."

That was only the first trip. Over the next few years, Belyamani footed the bill to film about a dozen groups from around the world until he established Remix-Culture as a nonprofit in 2016. In addition to Morocco, the team ventured to Brazil, China, Hungary, Lebanon, Serbia and Romania, among other places. Back in the US, Wood mastered the audio that Belyamani and other team members paired with visuals to create short clips remix artists could use for free. Eventually, they started posting these clips online.

> "I am so grateful for their commitment to ... providing artists like myself with the tools to create and express ourselves in new and exciting ways."
>
> —KHALIL MOUNJI

Khalil Mounji, a Moroccan remix artist and Gnawa performer who used samples to

Warming up for his performance at Littlefield, Belyamani checks the venue's audio and video settings. The video, he explains, brings the audience closer to the sources of the music and follows from Remix-Culture's "mandate to honor the source and the context behind the music."

create his 2021 single, "Asunfu," found himself enamored by the samples Remix-Culture offers. "Their website is a treasure trove of creativity," he says. "I am so grateful for their commitment to preserving and celebrating the beauty of cultures from around the world, and for providing artists like myself with the tools to create and express ourselves in new and exciting ways."

The pandemic curtailed Remix-Culture's globetrotting beginning in 2020, but it also made Belyamani realize that Brooklyn is packed with musicians from around the world, gathering locally-based groups that play traditional and folk music in small venues and recording spaces only miles from his New York home.

Turkish violinist Eylem Basaldi participated in a recording done in a Brooklyn art space last year. "It was like a few friends coming together and just playing," she says. Basaldi also appreciates the care that was taken in the recording session has extended through the process of getting the samples on to the website. "I really believe in what he's trying to do, and if I can be part of it, even in little snippets, that's great," Basaldi says. "I think it's important to get this music out into the world and to make it available, and they do that with these samples that are put together with a lot of thought and awareness."

That's also a crucial part of the intentions behind Tanfis.

As a drummer snakes his way through the crowd that November night, Belyamani grins again before plunging himself into the gyrating audience. The show has come off without a hitch, and even though he can't determine if anyone else has experienced a spiritual release, Belyamani is ecstatic.

After all, not only has he found a way to show people the possibilities to be found in using Remix-Culture's samples, he has also realized that long-held dream of finding a way to blend many different types of music into a unified experience.

Although this was the first Tanfis performance, the crowd's reaction assures him it won't be the last. The possible ways to use Remix-Culture's sample archives keep expanding and the nonprofit is proving adept at garnering support—in May the organization won a $25,000 National Endowment for the Arts grant to fund more projects and performances. "We've come a really long way," he says. "I feel like something is different now, too. For the first time, Remix-Culture is building something solid, and we're poised to be able to go further and deeper into our work."

A former resident of Saudi Arabia, freelancer **Kay Hardy Campbell** writes often about Middle Eastern culture. **David H. Wells** is a multimedia photojournalist based in Rhode Island and a regular contributor to *AramcoWorld*; he also publishes a photography-education forum at www.thewellspoint.com.

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GOTHA'S LIBRARY *of* Forgotten Islamic Wonders

Written by KEN CHITWOOD *Photographed by* FABIAN BRENNECKE

Often brushed aside by locals and largely ignored by tourists, the city of Gotha—population 45,000 in the heart of central Germany—might not look like much today, but in the 17th century, it was arguably at the center of the world. Or at least it was aspiring to be.

When Europe's Thirty Years' War over dynastic and territorial rivalries ended in 1648, the region's top aristocrat, Duke Ernst I, wanted to build an official residence atop the rubble of a castle razed during the conflict, which had stood on Gotha's highest hill. The result was Friedenstein Palace, a sprawling, royal residence that today is considered one of the best-preserved examples of early Baroque architecture in Europe. In naming the new palace "Stone of Peace," Ernst signaled his hope that his reign over the duchies of Saxe-Gotha and Saxe-Altenburg would be a time of tranquility.

As a testament to this intention, Ernst filled his new palace's western tower with books, thus establishing the Gotha Court Library in 1647. It was, says the library's current director, Kathrin Paasch, "a place of princely representation and collecting pleasure."

Today the Gotha Research Library holds about 1 million objects, including nearly 362,000 books, manuscripts and print materials. Among them are 800 years of Islamicate scholarship, comprised of 3,500 manuscripts in Arabic, Turkish and Persian, including manuscripts taken as booty during the looting of Tunis in 1535 by the Habsburg Empire of Charles V and its allies. The collection features reams of legal, literary, grammatical, philosophical, geographic, theological and other texts. These sit side-by-side on floor-to-ceiling shelves with works by paragons from the history of Europe, including a 1520 first edition of Protestant Reformation leader Martin Luther's *On the Freedom of a Christian*.

ABOVE Part of Friedenstein Palace, the Gotha Research Library includes more than 1 million objects and manuscripts, including the extensive collection from the Levant and Arabian Peninsula of the 19th-century German physician Ulrich Jasper Seetzen.

Each text tells a story: from a collection of hadith (sayings and acts of the Prophet Muhammad) reputed to have been pulled out from under a corpse during the siege of Buda in 1684 to a Turkish account of the life and exploits of Alexander the Great that depict in rich colors the Greek conqueror's mythical "flying machine"—a set of gryphons chained to a throne with rods of meat above. With such oddities and *orientalia* on offer, scholars across the globe travel to Gotha to explore its treasures.

One of the first scholars to be drawn to the collection was Ulrich Jasper Seetzen, who came in 1802. A physician from northern Germany, Seetzen was attracted to Gotha by the reign of Duke Ernst II, who fashioned himself an Enlightenment ruler, expanding the library's scientific holdings and building a cutting-edge astronomical observatory with the finest instruments of the day.

Driven by their mutual interest, Ernst II commissioned Seetzen to travel to Africa via the Ottoman Empire in search of new specimens, artifacts and books to add to his ever-expanding library and—as what later became museums were called in the day—his *Wunderkammer* ("cabinet of curiosities"). Having studied medicine and natural history at the University of Goettingen, Seetzen was no adventurer. But according to Achim Lichtenberger, professor of archeology at the University of Muenster, he was insatiably curious. "He was a classic polymath," says Lichtenberger. "During his studies, Seetzen branched beyond the natural sciences to learn from explorers, anthropologists, and famous writers," such as

ABOVE "Across the world, scholars are bringing new questions to old sources," says Feras Krimsti, curator of the Oriental Manuscript Collection at the library. **RIGHT** Written and illuminated by hand, books such as this copy of the *Iskandar-nâma* (*Alexander Romance*) are among the library's more than 360,000 texts.

the world-renowned Alexander von Humboldt (1769-1859), who counted among Seetzen's friends.

With the duke's support, Seetzen set out in 1802. He made his way through Leipzig, Prague and Vienna before taking a ship down the Danube through the Balkans to Istanbul, capital of the Ottoman Empire, where he arrived in 1803. He then journeyed by caravan to Izmir in western Turkey and south to Aleppo in Syria. In his 2002 book about Seetzen, *Among Monks and Bedouins: Voyage in Palestine and Adjoining Countries, 1805-1807,* Lichtenberger wrote that Seetzen spent nearly two years in Aleppo, where he learned Arabic before continuing through the Levant and the wider Middle East. Like no European before him, Seetzen explored Syria, Lebanon and Palestine in detail, getting to know Maronite and Druze minorities and identifying biblical sites like Gadara, Philadelphia and Jerash—the latter of which he wrote, "it is impossible to explain how this place, formerly of such manifest celebrity, can have so long escaped the notice of all lovers of antiquity." Seetzen continued through the Sinai and Egypt, and crossed the Red Sea to Jiddah, Makkah and Madinah in 1810. In Jiddah, Lichtenberger says Seetzen became a Muslim so that he could make the Hajj, or pilgrimage, to Islam's holy cities and there make measurements and sketch plans of the sacred precincts, which had never been done before.

Reading the letters and journal entries Seetzen recorded along the way, it is clear he was not an adventure-seeker but a scientist, Lichtenberger says. Seetzen's detailed records describe what the weather was like, what the soil conditions were, what time he woke and when he went to sleep, as well as his unlucky encounters with camels, lice and fleas. A German-Lutheran by birth, Seetzen dressed in traditional Arab clothes, ingratiating himself to Catholic, Orthodox and Muslim hosts. "He wanted to adapt to the people and the country he was traveling in," Lichtenberger says, "to make himself as similar as possible to the people in his company." Accordingly, Seetzen also wrote quasi-ethnographic accounts of conversations, collaborations and disappointments with locals he encountered. He spoke highly of Bedouins' fierce sense of honor and loyalty, and he noted similarities among the people of southern Syria and northern Jordan and Bavarians back home.

Over the course of nine years, Seetzen also gathered an

extensive collection of manuscripts and objects for the duke's collection. Mostly through mass purchases from personal collections in Aleppo and Cairo, Seetzen acquired some 2,700 Arabic, Persian and Turkish manuscripts. The sheer magnitude and variety of these acquisitions made the ducal collection one of the most important of its kind and helped give rise to the field of "Orientalism" in the German-speaking world, which still influences studies of the Middle East in Germany, Austria and beyond. Had Seetzen made his planned, further journeys in Africa, and returned to write the book he envisioned, Lichtenberger says Seetzen could have very well become globally celebrated alongside others such as Humboldt.

But it was not to be. Seetzen died in 1811 under mysterious circumstances, possibly poisoned on the command of Sana'a's imam near Taizz, Yemen. It was back in Gotha, where news of his death did not arrive for two years, that Seetzen's legacy would live on, surviving alongside the library and its many lives over the next two—often violent—centuries.

After Ernst II's reign, the Gotha Library remained one of the largest and most important collections in Europe, says Paasch, even if its universal aspirations dimmed. Through the 20th century, however, the library and its Oriental Collection barely survived. After World War I and the dissolution of Germany's formal aristocracy, Paasch says the library sold off books in the 1930s and 1940s, during the cash-strapped years of Nazi rule and World War II. After the war, some 350,000 volumes were looted as war spoils by the Soviet Union. For 10 years, the library existed in exile. Once the bulk of the plundered holdings were relocated to Gotha in 1956, Paasch says the authorities of the East German Republic (DDR) gave it little regard, and researchers outside the country were only granted limited access.

After the fall of the Berlin Wall, the library was integrated into the University of Erfurt, a city some 34 kilometers east of Gotha, and in 1999 it came under Paasch's directorship. Today she says it supports a globally networked research community using its manuscripts, books, maps and archival materials to better understand worlds past and present. Paasch says she is proud the library "has survived in its original location, is part of Gotha's cultural heritage, and is of European standing as an international center of exchange and encounter."

Boris Liebrenz, who works with the Biblioteca Arabica project in Leipzig and conducted research at the library in 2012 and 2013, says that while there are other libraries in Berlin and Munich with larger collections, Gotha's is unique because it is a small library with an idiosyncratic selection. "Seetzen's collection continues to surprise us," Liebrenz says. "He saw as worthy of acquisition what others in his day and age would not. He brought us things that maybe would not have survived without his purchase and collection." These include rare finds like a book with intricate, hand-painted illustrations of flowers pasted into the manuscript, reflecting the importance of flora in Ottoman court culture, and a travelogue from a French missionary complaining of heretics and beseeching the Vatican for help in reaching people in Baghdad, Basra and Isfahan. There is even a copy of Seetzen's own notebook from when he was learning Arabic, with locals' handwritten lines on the left and Seetzen's detailed, German translations on the right.

Working more as a scientist than an adventurer, Ulrich Jasper Seetzen **RIGHT** spent nine years traveling, collecting and learning Arabic, all under the patronage of Gotha's Duke Ernst II, but he died in 1811 before he could return to Germany. **ABOVE** One of Seetzen's notebooks in which he recorded proverbs, phrases and songs in Arabic on the left and his German translations, as well as travel notes, on the right.

> "We are asking questions about these documents' provenance and pedigree, tracing the routes they took to end up here."
>
> —FERAS KRIMSTI

One of the scholars who made the trek to Gotha for research was Feras Krimsti, who was born and educated in Aleppo. He came to Germany in 2005 to continue his studies in the cultural and intellectual history of the Ottoman Empire's Arab provinces. The following year, he came across the

LEFT Also among the collection of handwritten books is this artful *Şükûfe-nâme* (*Flower Book*), in which illustrations of flowers are pasted in. **LOWER** *The Book Of Forty Hadiths* is a collection of sayings from the Prophet Muhammad compiled by Imam al-Nawawi.

Oriental Collection's three-volume compendium of the Arabic, Persian, and Turkish works on its shelves. Krimsti was hooked. "I just knew there was so much to discover," he says. After conducting his own doctoral research at the library, Krimsti was appointed as the collection's curator in 2020.

Over the last 20 years, scholars like Krimsti have been at the cutting edge of a renaissance in the study of Middle Eastern manuscripts. "Across the world, scholars are bringing new questions to old sources, not only studying the manuscripts themselves, but their lives and histories—the people who wrote them, held them, bought them and sold them," Krimsti says. "We are asking questions about these documents' provenance and pedigree, tracing the routes they took to end up here." By doing so, he says they are learning more about how places like Gotha, Europe and the Orient are connected, "as well as the different cultures of writing and knowledge that existed between them." In his own research, Krimsti came across two Maronite brothers from Aleppo, Arsaniyus Shukri and Hanna al-Tabib, who traveled through the Ottoman Empire and Catholic Europe in the 18th century for the purposes of archeological tourism and to solicit alms for the Maronite order in Lebanon. Both travelogues are among Gotha's holdings.

For her part, Leonie Rau, a doctoral student at the University of Tübingen, hopes to dive into some of the collection's cookbooks. Enthralled by a 13th-century Syrian cookbook with recipes for apricot drinks, pistachio chicken, and melon crepes alongside preparatory perfumes and after-meal hand soaps, Rau was euphoric when she actually saw the layout of its pages and took in the 600-year-old materials with her own eyes. "It may sound silly, but it was surreal to travel on the train through a bunch of villages I couldn't place on a map, walk up through the palace park, come into the castle, and find a treasure trove of Middle Eastern gems," Rau says. "It makes you question how these documents wound up in such a place."

Therein lies Gotha's particular power, Krimsti says. He believes the collection "can spark conversations about how places like Gotha and Aleppo were not only connected in the past, but remain bound to one another today," through immigration, politics and joint scientific inquiry. So, when Gotha's residents look up the hill and catch sight of the castle from the market square below, Krimsti says he hopes they might rethink their relationship to other parts of the world.

"Like every other library, we are working hard at not only preserving the treasures we have but making them more accessible and using them to connect people across the globe," he says. "It's an ongoing project."

Ken Chitwood, Ph.D., is an award-winning writer on religion, travel and culture based in Germany. He is a Senior Research Fellow with the Muslim Philanthropy Initiative, journalist-fellow with the University of Southern California's Center for Religion and Civic Culture, and Editor of *ReligionLink*, a resource for journalists reporting on religion. **Fabian Brennecke** is a documentary photographer based in Berlin who specializes in social and cultural documentaries as well as portraiture.

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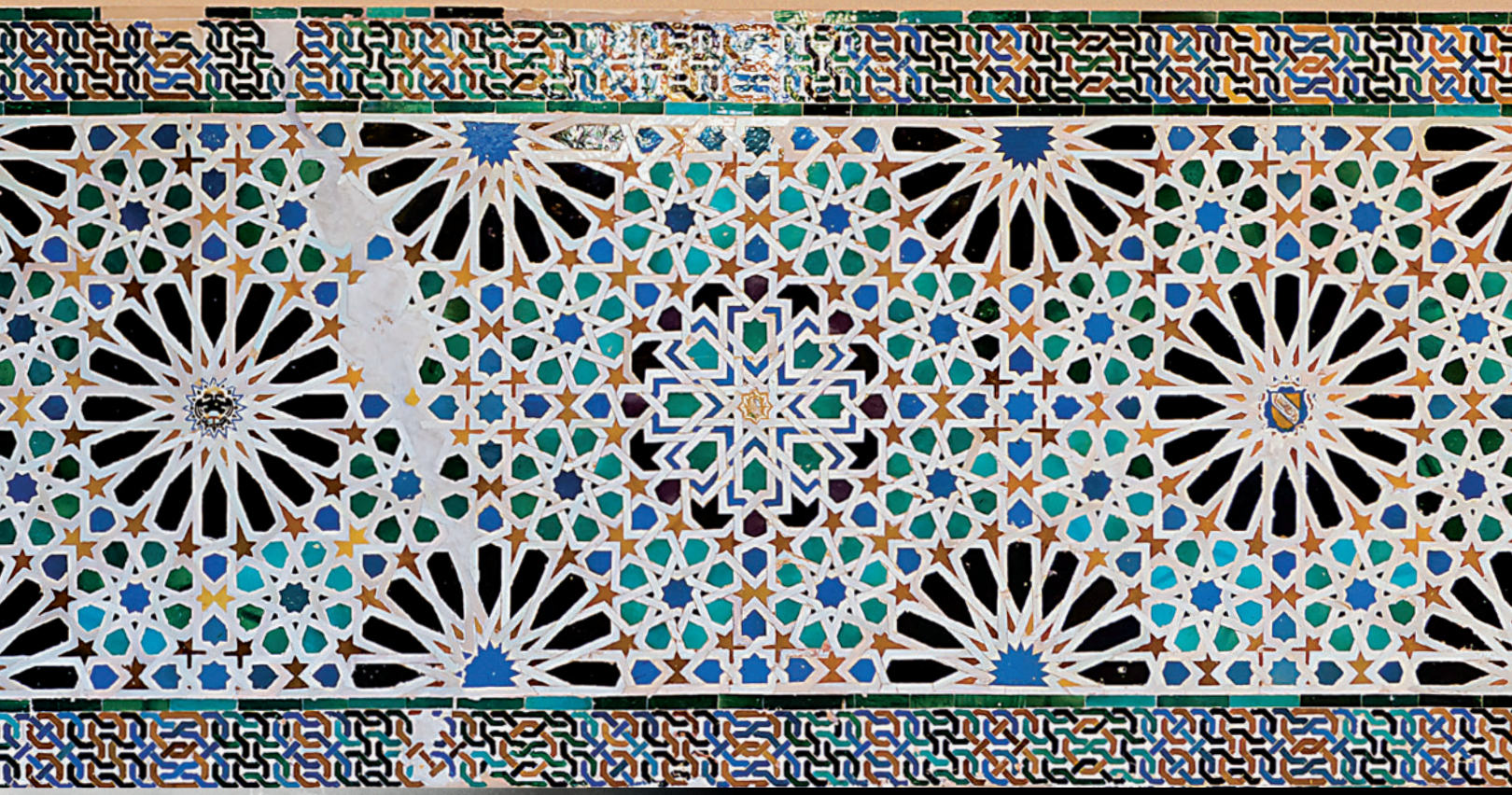
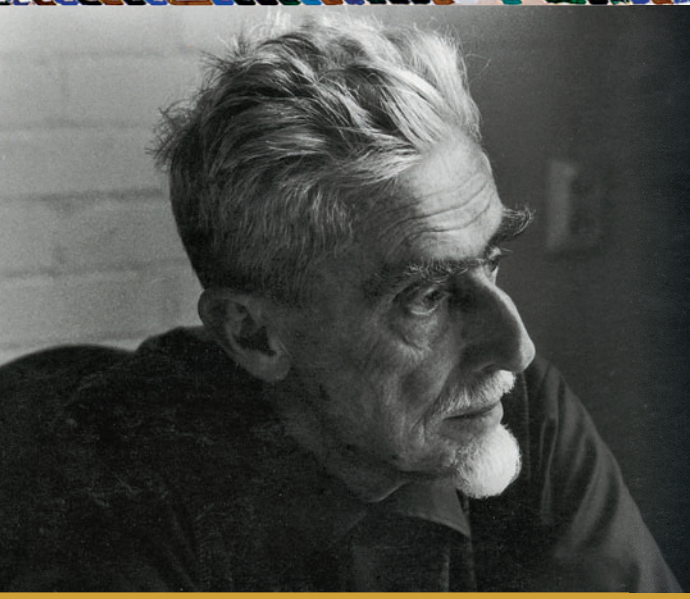




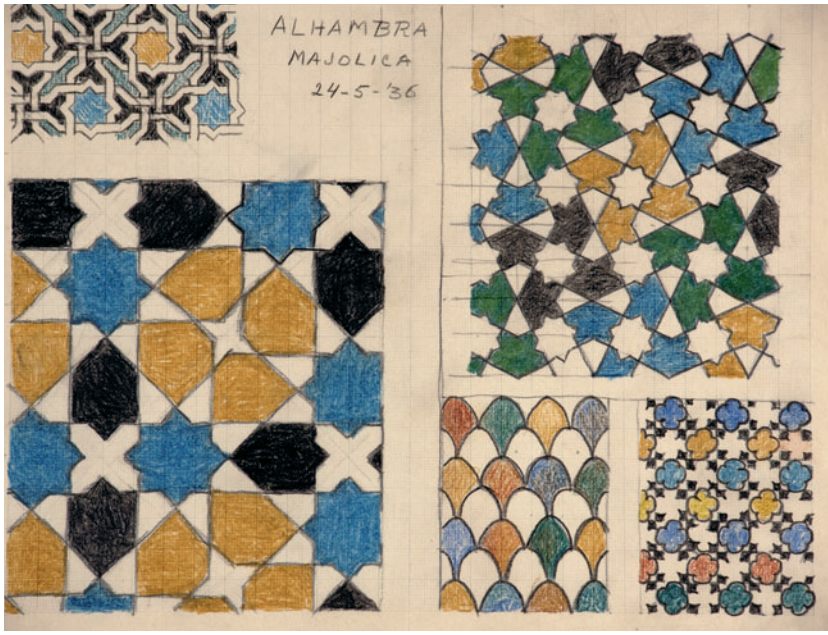
Escher + Alhambra = *INFINITY*

Written by ANA M. CARREÑO LEYVA

Art courtesy of THE M.C. ESCHER COMPANY

"I can't say how my interest in the regular division of planes originated and whether outside influences had a primary effect on me. My first intuitive step in that direction had already been taken as a student ... before I got to know the Moorish majolica mosaics in the Alhambra, which made a profound impression on me."

—M.C. ESCHER, 1941



ABOVE LEFT Maurits Cornelius Escher copied this 16-point star pattern from the wall tiles in the Alhambra's Mexuar Hall, **OPPOSITE TOP**, in October 1922. **ABOVE** In 1936 he returned to the Alhambra and filled pages of his sketchbook with more patterns that informed his designs for the rest of his career. Referring to the interlocking symmetries of the patterns before him, he exclaimed in his journal, "How come no one has seen it before!"

One evening just more than 100 years ago—October 19, 1922, to be exact—a 24-year-old artist from the Netherlands named Maurits Cornelius Escher sat down in the 14th-century meeting hall of the Alhambra palace in Granada, Spain. There he began to sketch the patterns of the tiles that filled its walls. He later wrote in his travel diary that he was so spellbound he spent the entire evening there copying an intricate, 16-point star mosaic, and that he did not stop until he had completed it with watercolors the next day. "It was amazingly oriental," he wrote. "What strikes me is the remarkable richness of its decoration (stucco low relief) and the great dignity and simple beauty throughout the place ... What is strange in this decoration is the complete absence of any human or animal shape, even of any vegetal form; this is maybe what gives it strength." Later he reflected, "I became more and more intrigued by the fitting together of congruent figures."

Fourteen years later, this was to be the reason of his return to Granada for three days in May 1936, this time together with his wife, Giulietta, or Jetta. He and Jetta both filled pages with notes and sketches. He marveled at how "the Moors were masters in the art of filling a plane with similar, interlocking figures." The sketches from this trip inspired increasingly complex experiments with repetitive patterns of human- or animal-shaped figures that he later extended into three dimensions through use of hyperbolic (curved) planes.

Rafael Pérez-Gómez, a professor of mathematics at the University of Granada and an expert on Escher, points out that despite Escher's lack of formal training in mathematics or any field of science, he remains the artist most admired by mathematicians. He explains that Escher "found in the Granadan monument the same universe he intended to create for himself though the endless combination of geometrical forms."

Escher's interest was entirely practical, Pérez-Gómez explains. He was fascinated by how the artisans of the Alhambra had found solutions to representation that avoided empty spaces without using figurative images while, at the same time, "conveying the unity of divine presence in the universe, as well as its endlessness." Nonetheless, tiling and tessellation—the filling of a space with an infinitely repeatable pattern—was a subject of less interest to Escher at the time than the still lifes, townscapes, book designs and illustrations that were helping him earn a living to support Jetta and the couple's two sons. He was not interested in classifications or categorizations; rather, he wanted to get to know what governed the patterns in the Alhambra so he could create his own ways to apply regular

OPPOSITE, TOP: RAFAEL PÉREZ-GÓMEZ

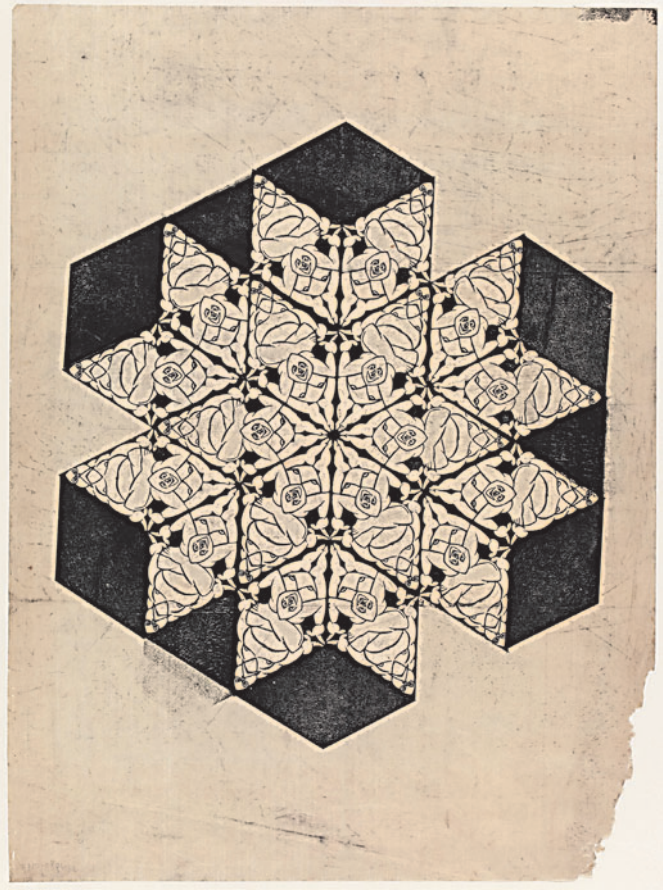
divisions to a graphic plane.

This fascination with the regular division of a plane remained like a plant that was inadvertently growing, one he would not fully recognize and cultivate until the latter 1930s. Then it became his leading source of inspiration, and he nurtured it by practicing, drawing, experimenting and experiencing—a process of pure persistence he carried on for decades.

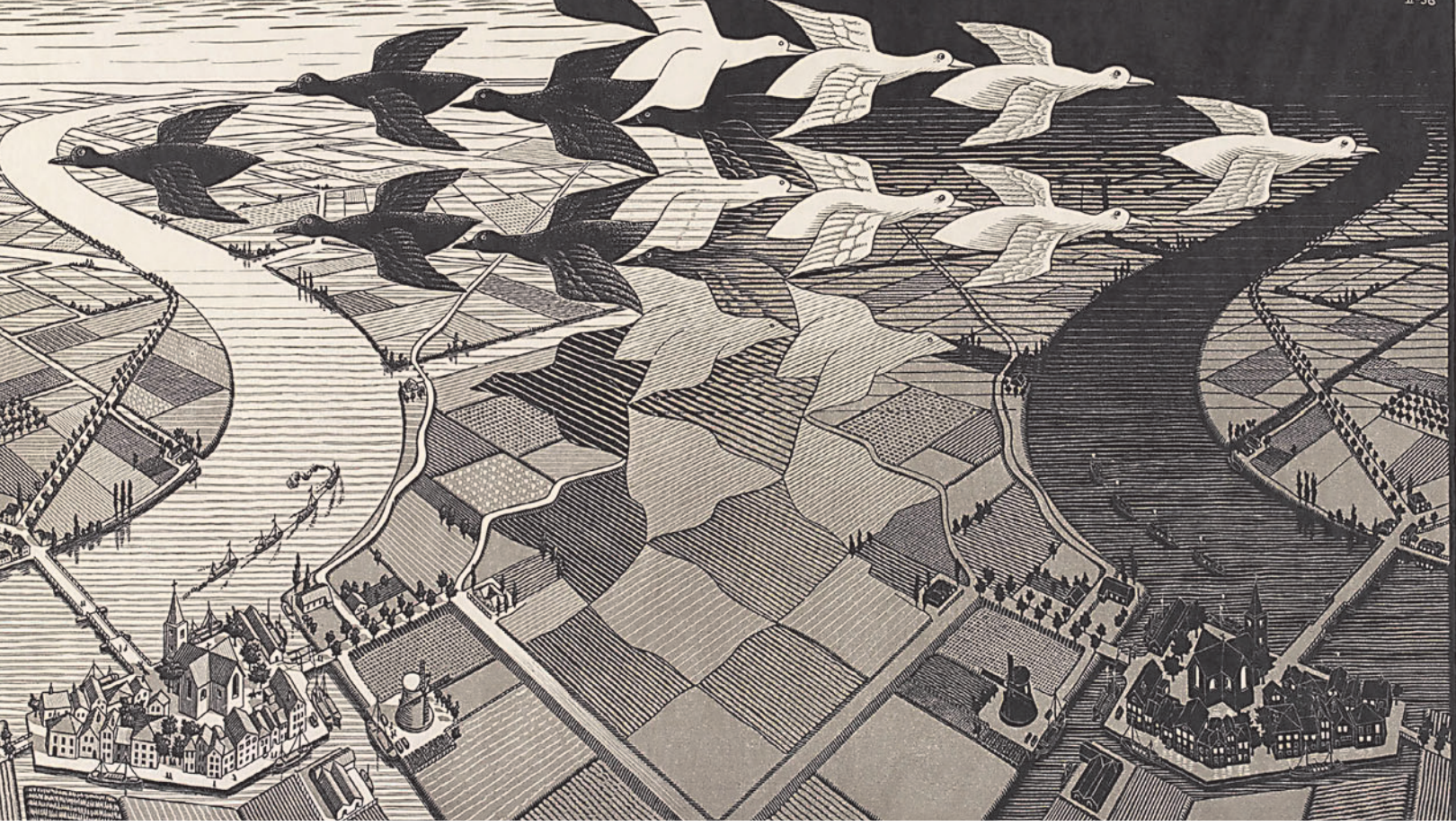
As he played with combining and twisting parallelogram grids and interlocking polygons shaped as humans, lizards, fish, birds, frogs, monkeys and more, he also began to develop landscapes that integrated such figures into perspectives that were impossible from a rational, physical point of view. He also had taken note of how the Arab artisans and mathematicians of the Alhambra had used color to enhance the symmetry of their designs: "It has always been self-evident for the Moors to compose their tile scenes with pieces of majolica in contrasting colors. Likewise, I have never hesitated myself to use color contrast as a means of visually separating my adjacent pattern components," wrote Escher in 1941.

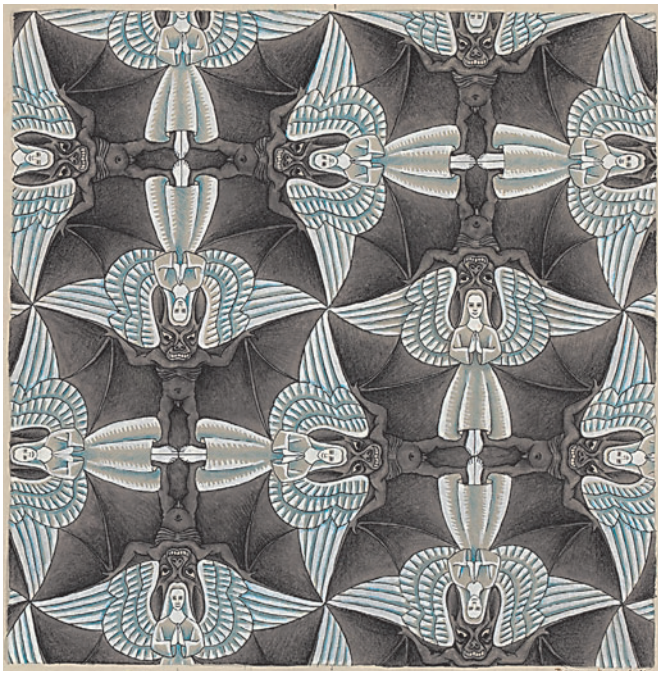
Escher began his experiments with repeatable patterns as early as 1920, **LOWER**, and he produced his print "Eight Heads" **RIGHT** shortly before his trip to Spain in 1922. **LOWER RIGHT** "Procession in a Crypt," 1927: The interior space of infinite naves marked by columns and vaults evoke both Christian churches and Muslim mosques and mark Escher's interest in 3D patterns, which later led to complex constructions of endless stairs, Möbius strips and impossible figures. **OPPOSITE** Mathematician Rafael Pérez-Gómez of the University of Granada points out the "tacas" motif on the lower wall of the Alhambra's "Throne Room," which Escher copied into his sketchbooks in 1936 and later that year used to structure his "Weightlifters" drawing **LOWER RIGHT** and, in 1957, included at the top right of this compilation of six patterns **LOWER LEFT**.

Escher did not come to his passions in isolation. Born in 1898, he was imbued by the experience of sciences within his family from childhood. In one of his letters, Escher admitted, "my father and three of my brothers were all trained in the exact sciences or engineering, and I have always had an enormous respect for these things." Most notably it was his brother Berend, a professor of geology and later rector of the University of Leiden in the Netherlands, who in the later 1930s introduced him to



TOP: RAFAEL PÉREZ-GÓMEZ





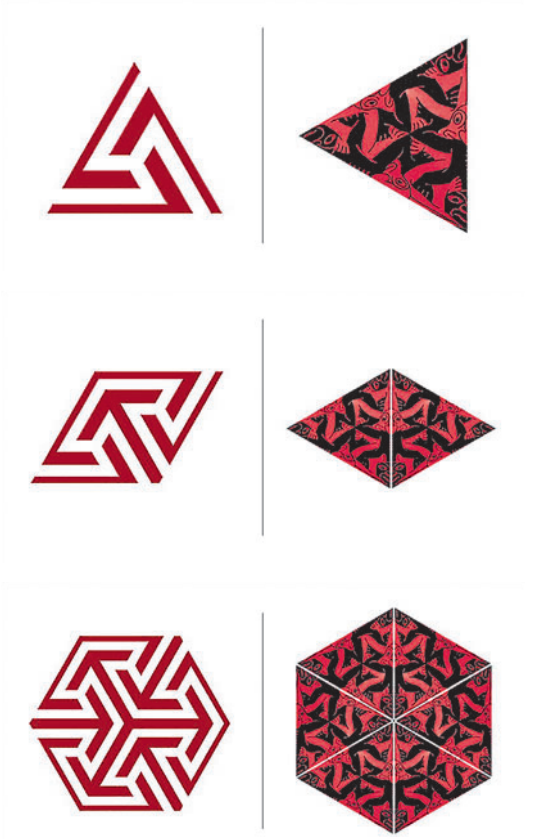
ABOVE Pérez-Gómez points to the pattern Escher used as a foundation for "Angels and Demons" **LEFT**, and one of his most famous lithographs, "Day and Night" **TOP**, produced in 1938. "The 'discovery' of such a pattern that, according to a certain system, repeats itself rhythmically and as such depends on unbreakable laws, has always been and continues to bring me great joy," Escher wrote in 1936. "It offers the sensation of approaching something both ancient and eternal."

crystallography, the field that studies the structures of crystalized minerals.

But Escher himself struggled as a young student. "I had, and still have," he wrote in 1941, "great trouble with abstractions of numbers and letters. Things went a little better in geometry when I was called upon to use my imagination, but I never excelled in this subject either while at school."

Escher was 21 when, in September 1919, he enrolled at the Haarlem School for Architecture and Decorative Arts. Encouraged there by the noted Dutch graphic artist Samuel Jessurun de Mesquita, Escher began making woodcuts in which dual images interlocked by means of quarter- and half-rotations. In 1922, months prior to his trip to Spain, he made a black-and-white woodcut he titled "Eight Heads" that prefigured much about his later work. It was his first flat newspaper design.

Escher enhanced his self-training by reading and studying scientific articles on the regular division of the plane, too. In crystallography he was inspired by the figures developed by Hungarian mathematician George Pólya, "Über die Analogie der Kristallsymmetrie in der Ebene" ("On the Analogy of



This pattern of equilateral triagles, found in the Alhambra's Puerta del Vino, **LOWER RIGHT**, became in 1942 a building block for a print Escher captioned "triangle system. 2 motifs, symmetrical, II A2 type 1*" in a process shown **ABOVE** prepared by Pérez-Gómez. Escher's enthusiasm for the Alhambra's motifs was more interpretive than literal due to his personal preference for rendering the geometric through the organic. That Muslim artists of the 14th-century Alhambra had not done likewise, he wrote, "is hardly believable, for *recognizability* is so important to me that I could never do without it."

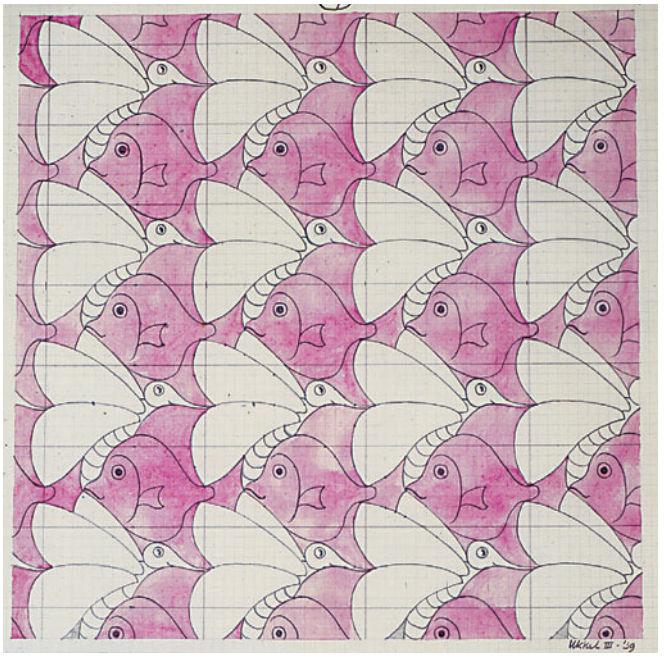
Crystallographic Symmetry in the Plane"), which categorized 17 flat periodic mosaics whose symmetries corresponded to the 17 Planar Crystallographic Groups. It was then that Escher began associating these natural patterns with those he had seen not only in the Alhambra, but also in the mosque of Córdoba, the Reales Alcázar in Seville, as well as at sites in Italy.

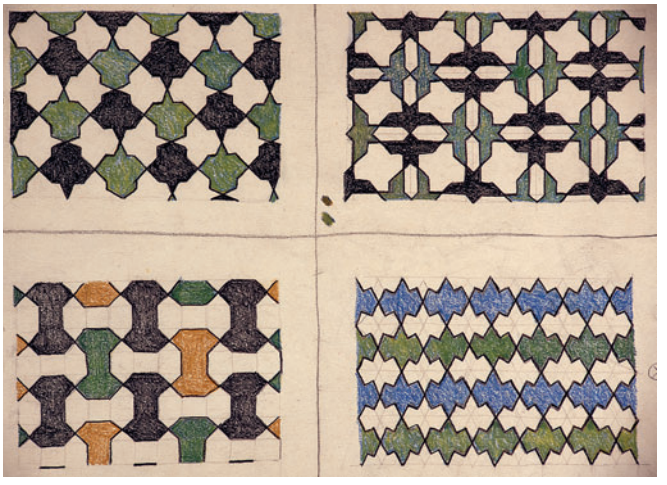
Pérez Gómez points out that all 17 of these crystallographic patterns appear in the designs at the Alhambra. "The hidden keys to decipher the Moorish designs of the Alhambra are basically found on the following bases, established on three points," he says. "First, the existence of a basic lattice that extends throughout the plane by the action of a crystallographic group; second, the basic grid can be designed in infinite ways, keeping only the area invariant; third, the size of the basic grid is related to the number of colors in the tile."

As a prolific engraver, Escher produced a massive number of lithographs, woodcuts and myriads of drawings and sketches. His journey through the

"I often have wondered at this, for an artist, unusual mania of mine to design periodic drawings. Over the years I made about 150 of them ... I was simply driven by the irresistible pleasure I felt in repeating the same figures on a piece of paper. I had not yet seen the tile decorations of the Alhambra, and never heard of crystallography; so I did not even know that my game was based on rules that have been scientifically investigated."

THIS PAGE (8) AND OPPOSITE, LOWER RIGHT: RAFAEL PÉREZ-GÓMEZ



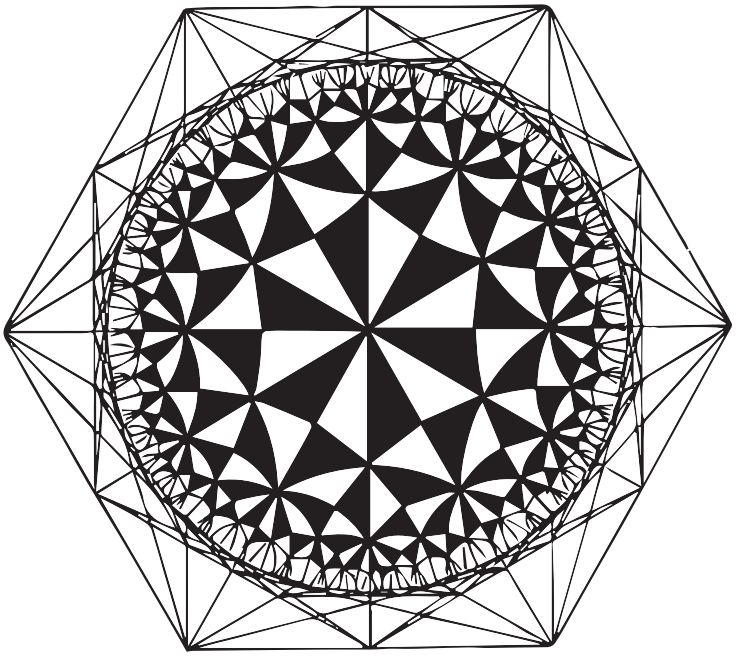


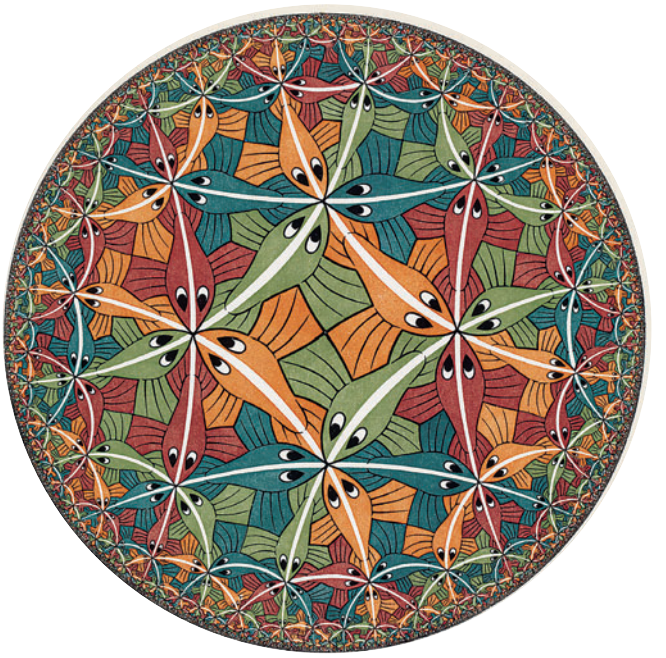
LEFT Four patterns from the Alhambra Escher copied into his sketchbook in 1936 were among the visual stimuli that helped Escher create more than 150 flat-plane drawings and prints, including the two **ABOVE**, in 1939 and 1942 respectively. Writing about the role of color in such patterns, Escher noted in 1964: "It has always been self-evident for the Moors to compose their tile scenes with pieces of majolica in contrasting colors. Likewise, I have never hesitated myself to use color contrast as a means of visually separating my adjacent pattern components."

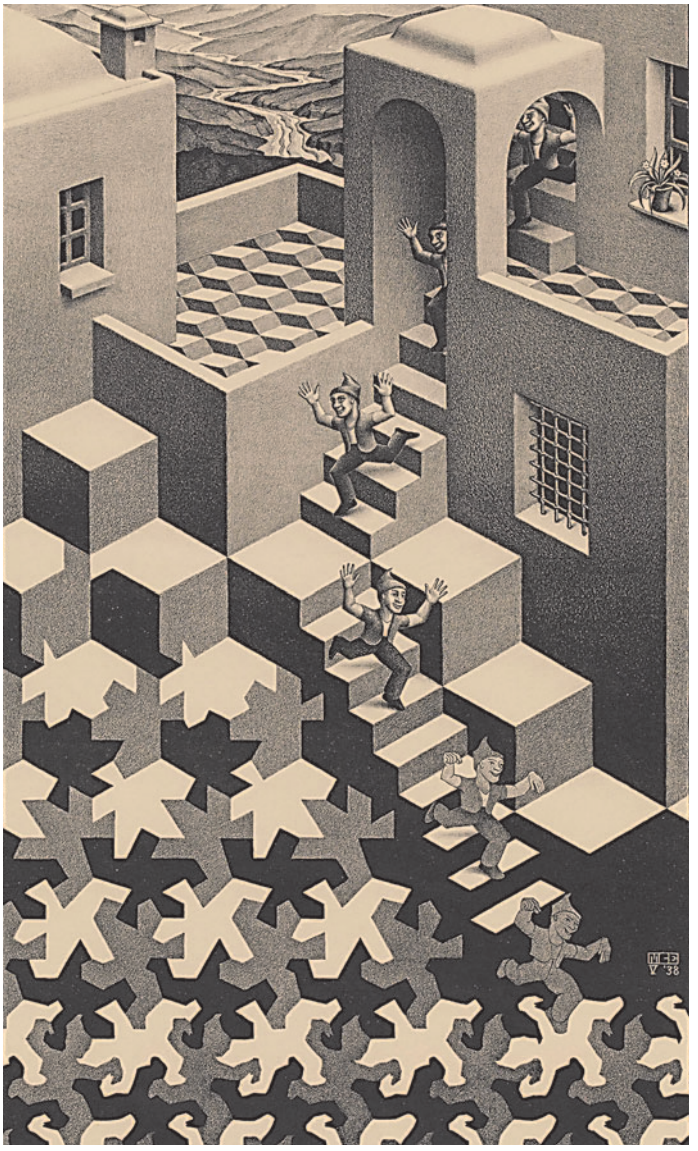
dynamic geometry of the plane continued, Pérez-Gómez says, "until he made the regular division of the hyperbolic plane using the Euclidean model given by the French mathematician Henri Poincaré. Escher saw an image that caught his attention in an article by Canadian mathematician Harold Scott Coxeter, "Crystal Symmetry and its Generalizations," and Escher wrote to him asking about its geometric construction. In 1954 Escher met Coxeter in Amsterdam at the International Congress of Mathematicians, and the artist and the mathematician maintained a friendship until Escher's death in 1972. Coxeter was instrumental to Escher's understanding of how a hyperbolic-plane geometric model can be constructed: The result was Escher's *Circle Limit* series. For example, "Circle Limit IV" is equivalent to the earlier, flat-plane pattern "Angels and Devils," but made on the model of the hyperbolic plane with right triangles with angles of 30 degrees, 45 degrees and 90 degrees. With these angles, these triangles are only possible in hyperbolic geometry since their angles add up to more than 180 degrees. "It is more than surprising to think that its origin is in the tiled mosaic of the Alhambra," as is one of Escher's best-known images, "Day and Night," says Pérez-Gómez.

What makes Escher's "extra-logical realities" so compelling? Is it the search of equilibrium amid the duality of infinity versus limited space, enhanced through black and white dichotomies? Is it symmetry by means of rhythmic repetitions and a combination of colors that made figurative shapes appear kinetic and vibrant? Both were strategies to the contrary yet complementary along with the potential for infinity just outside our perception of the physical world. He kept them in balance by using the same proportions of colors, so as not to have one steal prominence but for each to boost the others. By playing with space and time, he suggests the ways reality may surpass our senses, how by a trompe l'oeil of geometry our perception of reality can be manipulated. In his own words, he assured his viewers that he was not interested in "reality" and that his aim was not to express any feeling nor transmit any message; his medium was not in the humanities, but in the abstract language of mathematics used to pose paradoxes and offer up spatial mysteries.

Escher's work has been an object of academic study that has generated more than a dozen lines of investigation in mathematics as the so-called "Escher algorithm": patterns that arise from triangles, quadrilaterals and hexagons whose shapes change while they maintain their areas in ways similar to the periodic mosaics in the Alhambra.







Escher began to draw on a hyperbolic plane, which creates the illusion of design on a three-dimensional, spherical surface, after seeing the figure **ABOVE LEFT** published in 1957 by mathematician Harold Scott Coxeter that inspired Escher to produce a series of prints including "Circle Limit III" (1959) **ABOVE RIGHT**. Another of Escher's most well-known lithographs, "Cycle" (1938) **LEFT** shows both three-dimensional perspective as well as transformational progression of geometrically based organic forms. "My subjects are often playful," he wrote in 1964. "I can't keep from fooling around with our irrefutable certainties."

From his early interests in patterns to his systematic study of the Alhambra, the mosque at Córdoba, he took crystallographic geometry toward spatial infinity and later, through hyperbolic planes, pushed practical geometry into the fourth dimension of time. This put his works well within the framework of 20th century European vanguardist art movements as Dadaism, Surrealism and Op Art, with the result that his drawings have been endlessly reproduced in popular culture, from vinyl LP covers to wall posters and fabric designs.

Escher's works invite our eyes to travel never-ending landscapes and to walk spaces with no beginnings and no ends, where horizons fold into foregrounds. We are left awe-struck by seemingly impossible complexity, born deep within the imagination of an "artist who painted the infinite," says Pérez-Gómez—one whose inspiration was forever stimulated by patterns designed six centuries before his lifetime on the walls of the Alhambra.

Ana M. Carreño Leyva lives in Granada, Spain, where she is a translator of modern languages and a free-lance writer who specializes in the cultural heritages of al-Andalus and the Mediterranean region.

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INNOVATION • INGENUITY • 4

PISTACHIOS' HISTORY OF GRAFT

Written by LEE LAWRENCE

Satisfyingly dense with a subtle flavor that hints at forests and tree sap, the pistachio never overpowers like, say, cashews might with sweetness or hazelnuts with crunch. This makes them highly versatile: Chefs chop them to encrust filets of fish or meat, toss them in salads and pastas, infuse and scatter them in desserts from baklavas and macaroons to mooncakes and ice cream. Since the late 1990s, pistachios have also been garnering nutritionists and health gurus. It began with studies touting all nuts as good sources of fiber, protein, vitamins, antioxidants and heart-healthy fats, but more recently, pistachios have been singled out for delivering all this at a comparatively lower calorie count.

ABOVE In the foothills of Pamir mountains in eastern Uzbekistan, where once the Silk Roads brought heavy caravan traffic, a pistachio orchard grows along a terraced hillside. It is one site among many scattered across southern Central Asia and northern Iran where archeobotanists now believe pistachios were first cultivated some 3,000 years ago. **LOWER** This 2,000-year-old pistachio was found in the remains of a wicker basket at the bottom of a Roman-era well in North Yorkshire, England: It shows the vast distribution of the nut even long ago.

Global pistachio production has doubled over the past 20 years, according to worldwide statistics compiled by the US Department of Agriculture, which also estimates that this year people will consume more than 760,000 metric tons of this formerly exotic, hard-to-come-by delicacy. Every one of these commercially grown pistachios—whether by farmers in Turkey, Iran, the United States, or on the Italian island of Sicily—are a single species: *Pistachia vera*, which exists thanks to other farmers who, some 3,000 years ago, engaged in some ingenious bioengineering.

This is the story that is emerging from the work of a team of archeobotanists headed by Robert N. Spengler III, director of the Paleoethnobotany Laboratories of the Max Planck Institute for the Science of Human History and author in 2020 of *Fruit from the Sands: The Silk Road Origins of the Foods We Eat*.

Unlike walnuts, chestnuts, hazelnuts and pecans, pistachios are technically not tree nuts. They are the seed of a pinkish fruit that grows in bunches. In this respect, they are like almonds, except that the pistachio tree is smaller, shrubbier and biologically more complex. Pistachios are the only dioecious tree nut—which is to say it has male and female trees. Whether wild in a forest or cultivated in an orchard, the optimal male-to-female ratio is one to between 10 and 12. In addition, points out Basira Mir-Makhamad, a doctoral researcher on Spengler's team and lead author of a 2022 peer-reviewed paper on the domestication and dissemination of *Pistacia vera*, "It's very important to keep in mind that *Pistacia* are wind-pollinated plants." This is less effective, and less controllable, than pollination by bees. It is riskier as it quite literally depends on which way the wind blows during precisely the handful of days female trees are in bloom. To further complicate matters, male pistachio trees can sometimes be out of sync, blooming up to a full month ahead of the females.

This means there is "a high chance that they will be not pollinated in a proper way," says Mir-Makhamad. In that case, farmers have to pollinate the trees artificially—something people in Mesopotamia figured out. She points to ninth-century BCE Assyrian bas-reliefs of winged genies shaking a cone over a flowering tree and to historian Strabo's first-century BCE descriptions of people hand-pollinating dates. "How people got the idea to sometimes take a male flower and shake it over the females to pollinate them," she exclaims, "it's genius."

They would only be called to do this, however, once they had a forest or orchard of *Pistacia vera*. This would not occur naturally because pistachios do not reproduce true to type. For example, plant a peach, apricot or lemon seed, and you'll get a plant with the same characteristics as that parent plant. Not

TOP: ROBERT N. SPENGLER; LOWER: HIGHWAYS ENGLAND; OPPOSITE: STUART MINZEY / GETTY IMAGES

so with many other fruits, including most apples, cherries, pears—and pistachios. So the first appearance of the pistachio we know and love today came about randomly. Then humans intervened. A farmer recognized the qualities of this new variant, says Spengler, and figured out that the only way to keep the supply coming was by grafting branches of this tree onto other trees. As he describes it, farmers lopped off the top of a pistachio tree with undesirable fruit, and then lashed a branch from one with tasty nuts onto the severed trunk. The next step was to wait as the tree knitted together the vascular systems of trunk (or rootstock) and branch (scion).

It is impossible to know how and where the idea of grafting arose, says Mir-Makhamad. Perhaps it was through trial and error, or perhaps people were emulating what they saw in nature. "Sometimes it happens that trees are growing so close to each other that they graft," and the two trees merge into one. The ingenuity here lies in farmers realizing that grafting was a way to have more trees with this same nut, or, as archeobotanists put it, "to lock this variety in place."

"It's cloning," says Spengler. As the grafted scion grows from branch into a full tree canopy, it isn't just the same species and variety as the favored tree, "it's the same individual." Geneticists are showing some clonal varieties last centuries without changing. "It's a completely different way of thinking about an organism," he adds. "It's really amazing that humans figured all this out 3,000 years ago."

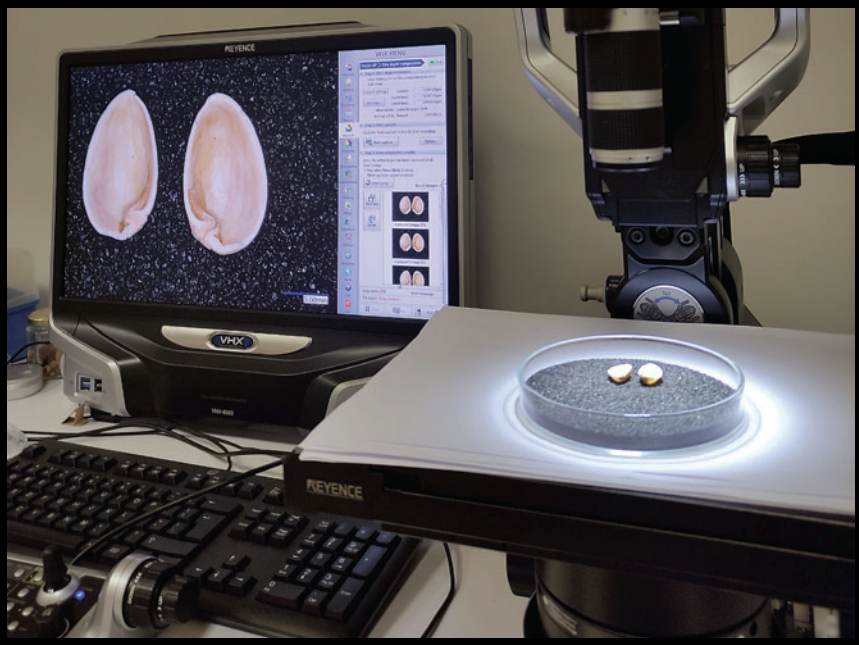
Equally impressive is how scientists today are piecing together what happened. While traditional archeologists search for artifacts to shed light on economic, cultural, religious, and social aspects of human history, archeobotanists like Spengler and Mir-Makhamad illuminate the interactions people have had with plants. While others search for vessels, coins and other man-made artifacts, "I actually look for the carbonized seeds," he says.

What at first looks like unremarkable bits of debris can be, to her trained eyes, pieces of potential evidence. "When plants are burnt," Mir-Makhamad explains, they become "just a piece of charcoal," no longer subject to biological decomposition. Or as she puts it, "fungi and bacteria have no use for them." So at archeological sites like Paykend and Panjakent, ancient commercial hubs in Uzbekistan and Tajikistan, respectively, she zeroes in on trash pits, fireplaces and ovens. When one turns out to be particularly rich, "I don't have self-control," she says. "If we don't take as much as possible right now, they will just remove everything and just throw it away." Typically she collects 20 to 30 liters, although she remembers once hauling off a sample of 400 liters.

At the camp laboratory, she pours the sediment by the cupful into a tank of water, gently swishing it in a process referred to as flotation. Stones and other heavy materials sink to the bottom while carbonized seeds and the like, being very light, "they go right up to the top," she says, almost in a whisper. "Then, with the hand, we slowly help it to move through [a series of] sieves." Those with 2-millimeter meshes catch the carbonized seeds, "our black diamonds," which Mir-Makhamad sets out to dry in a shady spot, carefully arranged on a cotton cloth. She also sifts through the silt at the bottom lest she misses a shell fragment or other treasure.

Back at the Max Planck Institute, Mir-Makhamad studies each

LEFT At this site in Penjikent, Tajikistan, archeologists in 2021 and 2022 recovered more than 3,000 seeds from ashy layers, hearths and trash pits. **CENTER** Collecting samples, Basira Mir-Makhamad digs in a settlement in Juuku, Kyrgyzstan. She then filters her samples using a flotation system, **RIGHT**, in which seeds rise to the surface, where she can skim them off, and shell fragments, such as the one shown **ABOVE**, sink to the bottom: This fragment has been dated to the 11th-12th centuries CE, and it was recovered at Afrasiab, north of the Silk Road city of Samarkand in present-day Uzbekistan.



Once samples are collected in the paleoethnobotany laboratory at the Max Planck Institute for Geoanthropology in Jena, Germany, they are separated, measured and studied to determine their origins.

BASIRA MIR-MAKHAMAD (2) OPPOSITE: BASIRA MIR-MAKHAMAD (3); OPPOSITE RIGHT: PERRY A. TOURTELLOTTE

of the specimens, identifying and cataloguing their genus and, within that, their species and variety or cultivar. For her paper on pistachios, she also collated the findings on pistachios by fellow scientists and reviewed historical records. Everything, she says, points to farmers having domesticated the pistachio during the first millennium BCE "somewhere within its wild range," which spanned southern Central Asia, including Tajikistan, Uzbekistan as well as northern Iran and northern Afghanistan. As they cultivated and developed what we now call *Pistacia vera* into a local cash crop, merchants disseminated it through markets along Silk Road trade routes.

By the first century CE, for example, the Greek physician Dioscorides was proclaiming this nut as a remedy for stomach ailments in his *De Materia Medica*. By the seventh century, Silk Road pistachios had fans in India and China. And in his 943 CE history of Bukhara, the Sogdian scholar Abu Bakr Muhammad ibn Jafar Narshakhi described bazaars devoted solely to pistachios and tradesmen who specialized in shelling these nuts. But, even then, cultivation was not widespread.

In her study, Mir-Makhamad cites the paucity of seeds found in *Pistacia vera*'s native habitat as evidence that cultivation of the tree spread gradually and slowly. Farmers in Syria may have led the way by the end of the start of the first millennium CE, but even into the 1500s or so, cultivation remained restricted. Part of this stems from the tree's complex biology. She cites accounts of pistachios being cultivated in Spain after the Arab conquest of 711 CE, for example. "But it was unsuccessful because of insufficient pollination."

During the first millennium CE, farmers across the Mediterranean and as far away as China chose local and well-adapted pistachio species as rootstocks … a common practice today on pistachio farms from Turkey to California.

As with other grafted fruit trees, "when people start to move *Pistachia vera*, it's difficult," says Mir-Makhamad, "because it faces different environmental conditions." This required farmers first to identify local pistachio species to use as rootstocks, then to know how to graft branches or buds of *Pistacia vera* onto them, then to have sufficient land to accommodate the appropriate male-to-female ratio and, finally, to have nearly generational patience. It takes between 15 to 20 years before the tree reaches its full maturity, with yields that are high one year, low the next, all in a range from about nine to 20 kilograms of nuts. By comparison an almond tree yields 23 to 30 kilos, and a walnut gives up 30 to 160.

Supply and demand is no doubt one reason pistachios stand today among the most expensive nuts on the market. But their popularity continues to grow: Who can resist a good nut whose shell splits into a smile when ripe? But think of the ingenuity that made a finnicky Central Asian tree nut into a worldwide sensation. For there would be no meeting of demand without farmers who, beginning 3,000 years ago, resorted to graft.

Based in Brooklyn, New York, **Lee Lawrence** (leeadairlawrence.com) writes frequently on Islamic and Asian art for *The Wall Street Journal* and cultural affairs for *The Christian Science Monitor*.

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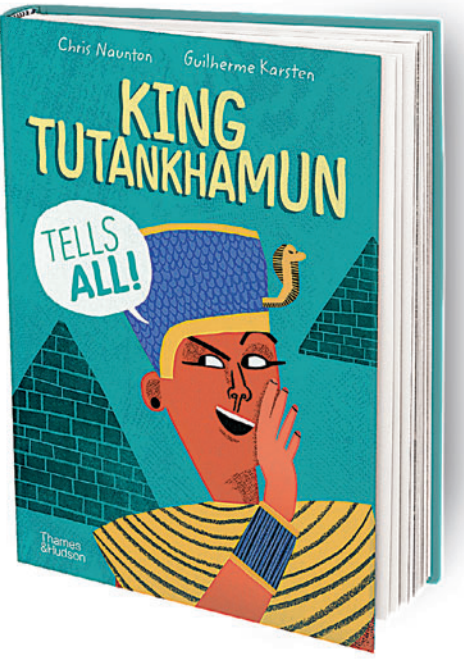
REVIEWS

"I was just enjoying my afterlife ... until Howard Carter broke in and caused a commotion. I was not pleased."

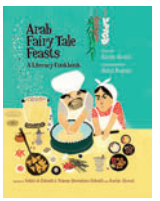


King Tutankhamun Tells All!

Chris Naunton, Guilherme Karsten. Thames & Hudson, 2021.

Written with sly wit by British Egyptologist Chris Naunton and rendered in vivid colors by Guilherme Karsten, an award-winning illustrator, this engaging children's book details the life—and afterlife—of the famed boy king. Reigning during the 18th dynasty from roughly 1334 to 1325 BCE, Tutankhamun presided over Egypt from when he was 9 years old until his early death in 1323 BCE at just 18 years old. Buried in the Valley of the Kings, located in Upper Egypt just west of the Nile where pharaohs and powerful nobles from the New Kingdom rest in elaborate tombs, Tutankhamun's tomb had remained undisturbed until British archeologist Howard Carter discovered it in 1922. Since then, his mummified remains have traveled the world, fascinating the public. With Tut as the narrator, the book takes the reader through the pharaoh's lavish lifestyle and interminable hereafter, and includes theories on how he died and why his tomb was lost for so long. —DIANNA WRAY

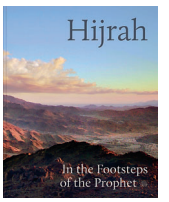
Without endorsing the views of authors, the editors encourage reading as a path to greater understanding.



Arab Fairy Tale Feasts: A Literary Cookbook

Karim Alrawi. Il. Nahid Kazemi. Crocodile Books, 2021.

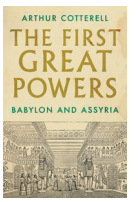
Parents, cooks, children, and those who like to cook, will all enjoy this colorfully illustrated cookbook/collection of fairy tales featuring simple, nutritious (zero junk food) recipes for dishes such as shish taouk (chicken kebabs), mamoul (date-filled cookies) or shorbit adas (lentil soup). Some of the roughly two dozen recipes, such as qamaruddin (apricot sheets, which will appeal to children who enjoy dried fruit snacks), might take a while (up to nine hours in a low oven) to prepare. But that leaves plenty of time to enjoy the accompanying stories, which, like the recipes, come from a wide variety of Arab-speaking countries. There is the account of the Gazan fisherman, a fabulist whose granddaughter teasingly calls out his tall tales, or the Saharan story of how boastful pride robbed the ostrich and chicken of their ability to fly. Many of the stories focus on food, along with moral lessons, nourishing both mind and body. —TOM VERDE



Hijrah: In the Footsteps of the Prophet

Idries Trevathan, ed. Hirmer Publishers, 2022.

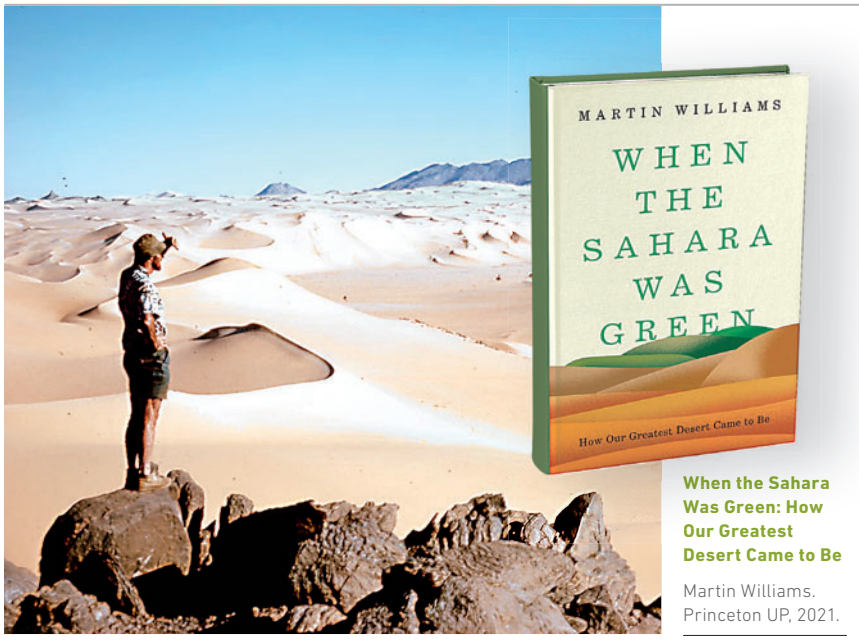
This coffee-table book, packed with stunning visuals, captures a major exhibition at Saudi Aramco's Ithra cultural center that is the first ever to document the details of the Prophet Muhammad's historic eight-day, 450-kilometer migration in 622 CE from Makkah to Madinah, along Arabia's Red Sea coast. The work begins with a contribution by Abdullah Alkadi, the world's leading authority on the Hijrah, who describes his own trips along the Hijrah route and other travel paths of the Prophet. Dazzling color illustrations take us along these journeys. Other chapters help retell the Hijrah story through literature and geography, surveying a wealth of Qur'anic and Hadith sources and exploring the many interpretations of the Prophet Muhammad's migration. Among the book's illustrations are both historic and contemporary works of art, including Qur'ans, textiles, calligraphy and multimedia works, all of which echo the spirit and reality of the Hijrah. —ROBERT W. LEBLING



The First Great Powers: Babylon and Assyria

Arthur Cotterell. Hurst, 2019.

Noted historian Arthur Cotterrell brings the long and complex history of Mesopotamia to life in this survey of one of the first great civilizations. This history begins in the fourth millennium BCE on the Euphrates River with the founding of the world's first city, Uruk, in Sumer, where it is thought Sumerians began to inscribe symbols on tablets, thereby creating cuneiform, the earliest form of writing. Progress in the sciences, particularly mathematics and astronomy, soon followed, paving the way for the rise of Babylon and later Assyria, which used both respectively to control their economies and to foretell the future. Cotterrell describes the roles played by kings and gods throughout Mesopotamian society, and how advances in warfare allowed some nations to advance and create power centers over time—successfully administrating large tracts of land. This brought diverse peoples together into a unified whole, thereby creating a civilization not so different from our own. —JANE WALDRON GRUTZ



When the Sahara Was Green: How Our Greatest Desert Came to Be

Martin Williams. Princeton UP, 2021.

Desert Dreams: A Conversation With Martin Williams

Interview by DIANNA WRAY

He was just a British kid looking for something to read one lazy summer day in 1950s Paris when images of the Sahara's vast expanse on a magazine cover grabbed his attention. The story, about the fossils that had then just been discovered in the Sahara's valleys, fascinated him. "I thought, I'm going to go and see those for myself one day," Williams recalls. Williams, now professor emeritus of geography at the University of Adelaide, was in his early 20s when he made his first trip to the desert. He'd also begun to suspect it hadn't always been the Sahara we know today. Since then Williams has spent his decades-long career working to understand how this space, now more than 9.2 million square kilometers of sun and sand, morphed from a verdant savannah of greenery and wildlife to the stark landscape we know today, a quest he documents in his new book, *When the Sahara Was Green*. Williams recently spoke with *AramcoWorld* about his work, discoveries, writing process and what spending time in the desert is really about.

It's not easy—or necessarily cheap—to explore the Sahara. How did you manage to get your first job that took you there?
I'd just received my graduate degree from Cambridge specializing in geography—I focused on gem pathology, soils, salt, climate and so on—and I was out caving in Derbyshire when my mother received a call from one of my lecturers, Dick Grove, asking if I would like to join a British Army expedition leaving next week for southern Libya where they were going to be updating maps that hadn't been revised since World War II. I'd be working in the middle of summer in temperatures over 100 degrees Fahrenheit doing whatever needed doing, whether that meant keeping these young royal engineers and officers interested in the work, running up and down mountains or making maps. I called him back and enthusiastically said yes.

What was it during this first sojourn in the Sahara that was most surprising to discover?
I was making this geological map, a geomorphic map, and all the way down and back up on this one mountain, there were these wonderful rock paintings with scenes of domesticated cattle and scenes of chaps with bows and arrows, of dogs, of mothers and babies. There was all this evidence of human life, and it didn't resemble the life that people now live in the desert. If you looked, you would find stone tools, and fish bones, and even fragments of alligator bones, hippo bones, enormous perch. It all indicated a land that had little resemblance to the one I was standing in. I was fascinated.

What did it feel like finally finding yourself in the Sahara?
It was September 1962 and I was 21, and in a place that felt like standing on the surface of the moon but clearly it had once been a much wetter climate. So, I asked myself when was it wetter? Could it become wetter again? I started working to find the answers. And over the years I began to piece together the history.

How have you approached answering those questions?
You know, for any competent scientist, what you're trying to do is discover, not whether you are right or wrong. It's about revealing truths that were already there but hadn't been discovered yet. So, it's essentially a process of asking yourself questions, answering them and then trying every way you can to tear those answers apart, without ego.

Is there any evidence that human activity caused the desertification of the Sahara?
No, those claims don't hold up scientifically. This business of the Sahara being a green and pleasant place was going on for a couple hundred million years with great hordes of dinosaurs roaming through it and vast forests spanning it—until the desiccation began and turned the land into a savannah that drew elephants, rhinos and then prehistoric humans who didn't have the ability to make much of an impact on the climate. There were a whole series of independent factors all operating around the globe to make this land mass dry out. So, the Sahara isn't our fault. But at the same time, the changes it has undergone through countless millennia are not evidence that we should now be off the hook when it comes to changes in our climate today. We can have an impact now.

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EVENTS

Highlights from aramcoworld.com

Please verify a venue's schedule before visiting.

CURRENT / JULY

Water features masterpieces from the museum's collection that explore the importance of this life-giving source by examining its applications and representations in Islamic art and literature—from intricate ceramics and paintings to architectural elements and metalwork. It reflects on the significance of water and the measures pertinent to maintaining a healthy environment for future generations. Aga Khan Museum, **Toronto**, through July 15.

The Mashrabiya Project is a community-focused, shared experience that links the heritage of the mashrabiya, a wooden screening technique traditional to many Islamic lands, to responses in art and design that reflect considerations of space and seeing in contemporary life. The project is the first in the US to examine the mashrabiya as both an architectural object and a locus of metaphor. It presents an opportunity for dialog and connection across cultural and geographic borders, with programs circulating around the creation of a wood-turned mashrabiya in the museum's public space. With its artful geometry and elaborate, perforated designs, the mashrabiya became a defining element of Islamic visual culture and ornament. All visitors are invited to participate. Museum for Art in Wood, **Philadelphia**, through July 23.

CURRENT / AUGUST

Life and the Afterlife: Ancient Egyptian Art from the Senusret Collection focuses on what objects can tell us about daily life, sacred life and the hereafter in ancient Egypt. The displays include amulets and jewelry designed for both beauty and protective power; votive statuettes that acted as donors' proxies for divine favor; stela and reliefs; and burial items that provided for the eternal needs of the deceased. Michael C. Carlos Museum, **Atlanta**, through August 6.

CURRENT / SEPTEMBER

Woven Wonders: Indian Textiles from the Papria Collection reflects India's range of regional traditions, including singular pieces that showcase the extraordinary aesthetic and technical diversity of Indian textiles. Ranging from folk to sophisticated court textiles, the objects date from the 14th to the early 20th century. The collection illustrates the preeminence of textile arts produced in India throughout history with examples of hand-painted and hand-block-printed cotton, embroidery, ikat, tie-dye, brocade, and tapestry. MFAH, **Houston**, through September 4.

Women Defining Women in Contemporary Art of the Middle East and Beyond presents 75 works by women artists who were born, or live in, what can broadly be termed Islamic societies. Their art depicts a breadth of often ideologically conceived women's imagery, bearing witness to rapidly shifting political developments and often accelerated social transformations taking place in lands extending from Africa to Western and Central Asia, as well as in diasporic communities. Across generations and working in different media, the artists share a common sense of identity not exclusively "Middle Eastern" but certainly female. LACMA, **Los Angeles**, through September 24.

CURRENT / NOVEMBER

Mona Hatoum: Early Works presents a selection of documented performances and videos from that formative stage of Hatoum's career. Early in her career, British-Palestinian artist Mona Hatoum (b. 1952, Beirut; lives and works in London) used a combination of media to pointedly reflect on power and how it is used. Among Hatoum's key concerns are the politics imposed on women's bodies, the relationship between spectators and subjects, and connections among globally marginalized communities. This exhibition, which includes highlights from the MCA collection, revisits the early practice and foundational works of a prolific artist 25 years after the MCA hosted her first solo exhibition in the US. MCA, **Chicago**, through November 26.

Readers are welcome to submit event information for possible inclusion to proposals@aramcoamericas.com, subject line "Events."

Earthly Praxis is one of five exhibitions that inaugurate the reopening of the museum following nearly three years of repairs and restorations after it was devastated in 2020 by the explosion in the port of Beirut. *Earthly Praxis* brings together works by Marwa Arsanios, Ahmad Ghossein and Sabine Saba that together probe dominant paradigms of private property and propose paths towards a renewed understanding of our environment—by looking at these mediations more closely and proposing alternative examples of contemporary land struggles as well as experimentations around traditional modes of agriculture. Sursock Museum, **Beirut**, through November 12.

Ahmad Ghossein, "The Last Cartographer of the Republic," 2017, digital video.

COURTESY OF MARFA' AND THE ARTIST

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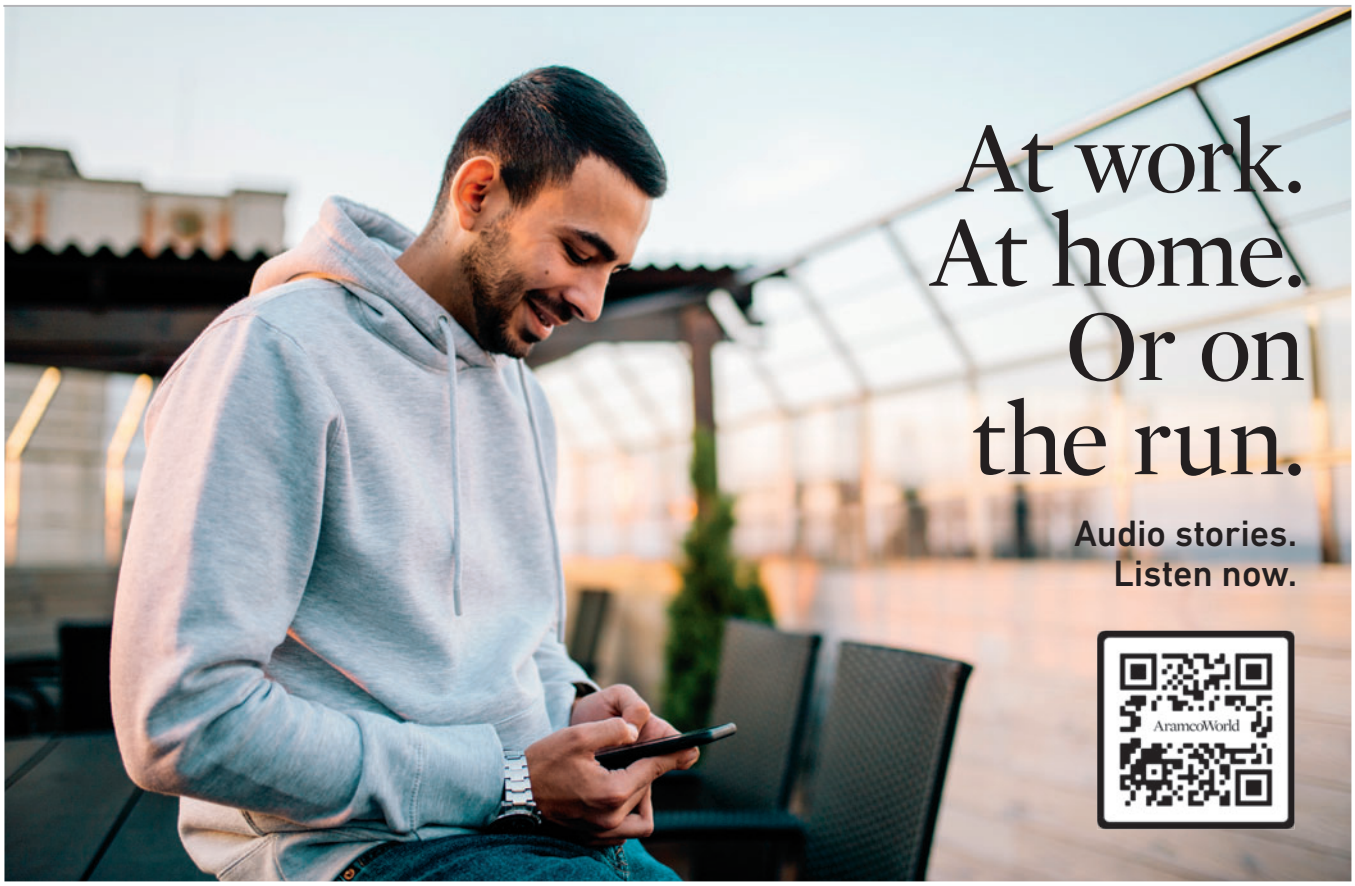

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