LAST LAKES of the GREEN SAHARA

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May/June 2014 Published Bimonthly Vol. 65, No. 3



Relics of what were once tributaries to a vast, prehistoric inland sea, the 18 Lakes of Ounianga count among them the only permanent freshwater desert lakes in the world. Photo by George Steinmetz.

Print Design

and Production Graphic Engine Design

Digital Design

and Production

eSiteful Corporation

Address editorial

The Editor

ISSN

1530-5821

correspondence to:

Saudi Aramco World Post Office Box 2106

Houston, Texas

77252-2106 USA

Printed in the USA

RR Donnelley Houston

Publisher

Aramco Services Company 9009 West Loop South Houston, Texas 77096 USA

President Nabeel M. Amudi

Director Public Affairs Ali M. Al Mutairi

Editor Richard Doughty

Assistant Editor Arthur P. Clark

Circulation Edna Catchings

Administration Sarah Miller



"It's the beginning. We're seeing the ecosystem happening," says Samih Toukan, founder of Maktoob.com, the first major Arabic-language Internet provider. "We're seeing more and more examples of innovation not only for the region but that can be global." Photo by David Degner.

Saudi Aramco, the oil company born as an international enterprise more than eighty years ago, distributes *Saudi Aramco World* to increase cross-cultural understanding. The magazine's goal is to broaden knowledge of the cultures, history and geography of the Arab and Muslim worlds and their connections with the West. *Saudi Aramco World* is distributed without charge, upon request, to a limited number of interested readers.



2 Hayy Was Here, Robinson Crusoe

Written by Tom Verde

Marooned, but later enlightened by the experience: The first fictional character of this genre appeared in the 12th century, named Hayy Ibn Yaqzan by his Arabicspeaking author in southern Spain. Later translators helped make his tale a 600-year best-seller that influenced the emergence of European rationalism and empiricism. Among its admirers was likely Daniel Defoe, whose 1719 classic *Robinson Crusoe* follows much of Hayy's philosophical trail.



Written by Katarzyna Jarecka-Stępień, photographed by Aga Luczakowska

One woman's discovery of her Tatar Muslim heritage has helped rekindle interest in a cultural history that links northeastern Europe with Central Asia—beginning in a quiet village of 160 souls along Poland's border with Belarus.

12 Last Lakes of the Green Sahara

Written and photographed by Sheldon Chad

Buried in the layered sediments of an anomalous group of lakes in northern Chad are scientific treasures that may help modern climatologists understand the most dramatic climate-driven event since the last Ice Age: the transformation of once lush northern Africa into the Sahara.



Written by Habib Battah Portraits by David Degner

Welcome to the new ecosystem: Where would you like to incubate? In a region with deep historical roots in trade and innovation, a new generation is leading the Middle East's youngest, fastest-growing and most promising economic sector: tech.

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From crocuses and carnations to tulips, hyacinths and hollyhocks, Europeans brought color and fragrance to their lands by transplanting from the Islamic East many of today's most popular flowers.

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Written by TOM VERDE

The story is so familiar it has become a genre: One man, marooned on a desert isle, learns to survive by his wits and his mastery of the island's resources. After years of isolation, he encounters a native from a neighboring island who



Many of the hundreds of illustrations produced since the 1719 publication of *The Life and Strange Surprizing Adventures of Robinson Crusoe*, including this one published in a 1740 edition, emphasized adventure, but like the life of his predecessor Hayy ibn Yaqzan, Crusoe's solitary life ultimately stimulated philosophical thought.

becomes his companion and pupil, and together they form their own literally insular society.

uch was the tale titled *Hayy Ibn Yaqzan*, written in the 12th century by a philosopher from al-Andalus, or southern Spain, named Ibn Tufayl. He was known to the medieval West as Abubacer, on account of his full name: Abu Bakr Muhammad bin 'Abd al-Malik bin Tufayl al-Qaisi. Some six centuries later, scholars believe that English author Daniel Defoe looked to Ibn Tufayl's book along with accounts of real-life castaways for inspiration when writing his classic *Robinson Crusoe*.

Defoe's attraction to Hayy was more than plot-deep. Ibn Tufayl's novel is an allegory in which his character, named Hayy ibn Yaqzan ("Living, son of the Wakeful One"), grows from infancy without human contact or instruction, and yet comes to comprehend both the physical world and the Divine. This he does through self-taught knowledge, or "autodidacticism," as later scholars put it.

It was a rational, empirical approach to understanding the universe, one that resonated not only with Defoe, but also with many of his fellow European Enlightenment-era thinkers, poets and writers. Bacon, Milton, Locke and others all dipped their quills, so to speak, into the inkwell of "Arabick" learning, literature and philosophy as they formulated their views on science, religion and the human condition. By the time Defoe sat down to write what would become his most famous novel, Ibn Tufayl's *Hayy ibn Yaqzan* had been a best-seller for centuries, captivating Elizabethan "natural philosophers" (scientists), Renaissance humanists and medieval Jewish theologians, all of whom looked to the plot and philosophy of the book as a road map for what scholar Majid Fakhry, in his study *A History of Islamic Philosophy*,

described as the "natural progression of the mind towards truth." After Defoe, the book also inspired the likes of Spinoza, Voltaire and Rousseau. Early Quakers recognized in Hayy's story seeds of their emerging doctrine.

How Ibn Tufayl's 60-page volume—his only surviving book—became part of the DNA of the European Enlightenment and a source for one of the most enduring genres in fiction is itself the story of a journey: a journey that begins with the travels of Ibn Tufayl himself and stretches from the medieval think-tanks of al-Andalus and Morocco to the palaces of Renaissance Italy, the universities of Oxford and Cambridge, and the coffeehouses of Defoe's London, all across a span of some 500 years.

y own journey along it began with a phone call to Avner Ben-Zaken, author of *Reading Hayy Ibn-Yaqzan: A Cross-Cultural History of Autodidacticism* and an auth-

ority on the history of science. He regards Ibn Tufayl's book as a groundbreaking contribution to epistemology, or the study of knowledge.

"For the first time, in this fabulous philosophical novel, we have a coherent claim for how firsthand experience can be the basis from which we extract evidence, facts and then, finally, philosophical principles. This was completely different from previous views [of epistemology] that ascribed the acquisition of knowledge to an authority," said Ben-Zaken. The novel's theme of autodidacticism, he maintained, is "the most important principle of modernity."

Admittedly, quite a weight on the shoulders of a solitary chap trying to get by on a tropical island. Yet Ibn Tufayl's protagonist proves up to the task.

As Ibn Tufayl relates it, Hayy's story begins on "a certain equatorial island, lying off the coast of India," where just the right atmospheric blend of sunlight, heat and moisture "cause[s] human beings [to] come into being without father or mother." While Sri Lanka is a logical candidate, in some translations Ibn Tufayl names this fabulous setting as the legendary island of Waqwaq, which scholars have sometimes identified with Sri Lanka. First mentioned in an eighth-century Chinese text, Waqwaq figures in several medieval Arab geographies and Persian adventure narratives, all of which include descriptions of the "waqwaq tree," a plant that bears human beings as fruit: At the moment they ripen, so to speak, and fall to the ground, they cry, "Waq-waq!"

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While Ibn Tufayl was aiming more for allegory than geography, either a mythical or an actual location would have suited his purpose track "the development of a child's



The seminal empiricism Ibn Tufayl expressed in *Hayy Ibn Yaqzan* was rooted in both classical and Muslim sources. It helped inspire not only Narboni, della Mirandola, the Pocockes and Defoe, but also authors, philosophers and scientists who all drew on his and related ideas to debate and define modernity, up to the present.

tion would have suited his purposes. In such a setting, he could track "the development of a child's mind from a *tabula rasa* to that of an adult, in complete isolation," according to Mahmoud Baroud of the Islamic University of Gaza and author in 2012 of The Shipwrecked Sailor in Arabic and Western Literature: Ibn Tufayl and His Influence on European Writers. Under such circumstances, Baroud explained, Hayy "was free to learn through

sensory experience, reasoning, and contemplation."

Ibn Tufayl did have one problem, however. Spontaneous generation conflicted with the orthodox premise of God as sole creator. Thus, Ibn Tufayl gave Hayy his own alternate backstory: On a nearby island, the sister of a king marries without her brother's permission and gives birth to a child, whom she places in a "tightly sealed ark" (like the infant Moses). A strong current and a gentle tide deposit the seaborne crib on an island. A mother gazelle hears the baby's cries, frees him from the ark and begins to suckle him. The gazelle becomes Hayy's foster mother and "constant nurse, caring for him, raising him, and protecting him from harm."

As he grows, Hayy learns the vocal sounds of the creatures on the island "with amazing accuracy"—much as did Kipling's 1894 Mowgli and Edgar Rice Burroughs's 1912 Tarzan, two more literary descendants of Hayy, according to Baroud and others. Hayy covers himself with feathers and, recognizing that most animals have appendages useful for defense—horns, beaks, claws fashions spears and cutting tools from sticks and stones.

When Hayy is seven, the gazelle dies. At first grief-stricken, Hayy ultimately dissects her, in hope of finding the source of her pain. Failing to bring her back to life, he nonetheless learns the basics of anatomy: the mechanics of the lungs, the circulatory system, the chambers of the heart and more. When he discovers one heart chamber filled with clotted blood and the other empty, he determines that what he was searching for "was [there] but left." Catching and similarly dissecting other animals, he deduces that the heart

must contain each creature's individual spirit-in short, its soul.

seven seven-year segments, up through age 49. Ibn Tufayl re-

Ibn Tufayl divides the story of Hayy's autodidacticism into



With the Sierra Nevada as a backdrop, the hills of Ibn Tufayl's native Guadix region have been dotted with cave-dwellings since at least the eighth century.

lates how, after learning the life sciences, his hero moves on to the study of physics, investigating such questions as why smoke rises, what causes objects to fall and how water turns to steam. Observing that fire's light rises towards the brightness of the stars, Hayy concludes that its origins must be heavenly, and he further speculates that it follows the same path as the soul departing the body, just as heat rises and dissipates from dead organisms. This directs his attention to the stars, moon and planets. He mimics their movements by traversing the circumference of his island on foot, and he accurately calculates their orbits, thus learning mathematics and astronomy. He concludes that the

universe is "in reality one great being." This leads him to the eternal question: "whether all this had come to be from nothing or always

Hayy's enlightenment while meditating in a cave recalled not only God's revelation to the Prophet Muhammad in the Qur'an and Plato, but also Ibn Tufayl's own childhood.

nothing, or ... always existed."

He then retires to a cave to fast and meditate, where he determines that "the world must have a non-corporeal cause," that is, a causal being who exists beyond the physical world, outside of time and beyond human imagination. Hayy realizes that such a power must be "the Cause of all things," an instigating entity that Aristotle 14 centuries earlier, and Thomas Aquinas a generation or so hence, identified as the "prime mover." His contemplative journey, in other words, leads him to the realization of God.

When Absal, a resident of a nearby island, arrives and discovers Hayy, he teaches Hayy human speech and later brings him back to his own island. There, Hayy is exposed to society. He closely observes the customs, with particular attention to the manners of worship. However, he finds the religious authorities close-minded, petty and "engulfed in ignorance." Turning his back on what he regards as corrupt, Hayy returns to his island, accompanied by Absal, where the two remain until death.

Educated readers read Ibn Tufayl's novel not as a mere adventure tale, but as an allegorical examination of the tension between empirical philosophy and religious orthodoxy. Ibn Tufayl himself made this clear in his introduction. After acknowledging the influence of Aristotle's logic on Islamic thought, he critiques previous Muslim philosophers Al-Farabi and Ibn Bajjah (a fellow Andalusian) who sought to resolve the search for truth with the certainty of faith. He further acknowledges his indebtedness to physician Ibn Sina, dubbing him "prince of philosophers." Yet foremost in his inventory is the man he simply calls "our teacher," al-Ghazali.

One of Islam's most influential philosophers, al-Ghazali lived in the late 11th century, a time when Sunni Islam was being challenged by various factions from within. There were those such as Ibn Sina who advocated *falsafa*, a clinical rationalism that drew heavily (a bit too heavily, charged critics) on Aristotelian logic and esoteric metaphysics to explain creation, existence and revelation that left little room for miracles. At the other end of the spectrum were Sufi mys-

tics who sought unmediated, transcendental understanding of God, beyond reason and the earthbound customs of daily Islamic life.

Al-Ghazali proposed a middle ground. While finding value in *falsafa*'s systematic approach, he refuted several of its conclusions. Regarding mystics, he concurred that knowledge can come through contemplation, yet he stressed the centrality of the Prophet Muhammad and God's revelations in the Qur'an.

Ibn Tufayl largely followed al-Ghazali's line of thought, explained Stefan Sperl, senior lecturer in Arabic at London's School of Oriental and African Studies. "He disapproved

> of superstitious practices and the naiveté of the kind of person who is totally uninformed and lacking in the intellectual tradi-

tion," said Sperl. In Ibn Tufayl's own words, those who remain "ignorant in the Sciences" make false claims to "experiencing" the ultimate truth."

This doctrine later appealed to generations of progressive, intellectual movers and shakers across Europe—Muslim, Christian and Jewish—who would look to *Hayy ibn Yaqzan* for inspiration. Chief among them are 14th-century Catalonian philosopher/physician Moses Narboni, a rabbinical scholar and commentator on both Ibn Rushd and Maimonides; Giovanni Pico della Mirandola, a fair-haired poster boy of the Renaissance whose Humanist manifesto, *On the Dignity of Man*, set the Roman Catholic Church on its ear; and Oxford don Edward Pococke, an early advocate of the study of "Arabick" and in 1636 Oxford's first chair in the subject.



t first blush, Daniel Defoe and his "children's adventure classic" may seem out of place in this intellectual company. Yet this is because popular editions of *The Life and Strange Surprizing Adventures of Robinson Crusoe* often have been

whittled down to their bare, adventure-story bones, stripped of the philosophical passages in which Defoe's hero ponders the natural world, asks what it means to be a Christian and examines his own relationship to God. Few readers today also realize that *The Life and Strange Surprizing Adventures* was but the first in a trilogy of Crusoe novels that included *The Farther Adventures of Robinson Crusoe* and *Serious Reflections of Robinson Crusoe*. In these, Defoe detailed Crusoe's fortunes after being rescued, as well as his hero's spiritual development. By the last chapter of *Serious Reflections*, Crusoe is no longer concerned with building rafts and scratching the sandy soil of the island for food: He is ruminating on the ascent of the human mind "to the highest and most distant regions of light." Much like Hayy ibn Yaqzan.

As scholar Samar Attar observed in 2007 in *The Vital Roots* of *European Enlightenment: Ibn Tufayl's Influence on Modern Western Thought*, both men are adrift on desert islands where they learn to survive without human help or intervention. Both rely on reason and the scientific method of observation and experiment, trial and error, to gain knowledge of their natural surroundings. From there, they "progress to supernatural and divine matters." Both question religious extremism, and both eventually befriend transplants from nearby islands—Crusoe's Friday and Hayy's Absal—who become protégés.

Attar was hardly the first to draw such comparisons. Bibliographies of works published over the last half-century on the topic, and more specifically on Ibn Tufayl's influence on European thought, run to multiple, single-spaced pages. Most of these modern studies trace their pedigrees back to Antonio Pastor's *The Idea of Robinson Crusoe*, published in 1930. Head of the Spanish department at King's College London, Pastor stated in his summary opinion of *Hayy ibn Yaqzan* that "without exception, no Oriental work of fiction has left more remarkable traces in modern European literatures."

Even in Defoe's own day, literary cognoscenti were identifying Crusoe with Hayy. Alexander Pope, writing to his friend Lord Bathurst in September 1719—five months after Defoe published *Robinson Crusoe* jokingly compared Bathurst's isolation at his estate in Gloucestershire to that of "Alexander Selkirk, or the Self-taught Philosopher." Selkirk was a real sailor, marooned on an island off the coast of Chile from 1704 to 1709, whose story is commonly cited as a

WO.

contemporary inspiration for *Crusoe*, while "the Self-taught philosopher" was the title of a 1708 English translation of *Hayy ibn Yaqzan*, a translation Pope is known to have had in his library.

"The book may have been written in Arabic, but it was not an alien product within the Mediterranean and European culture," said Sperl.

In short, it was clear that Ibn Tufayl's story had what journalists refer to as "legs." I set out to discover why.

"If you are going on such a journey, you must begin in Guadix, in the eastern part of Andalusia, where Ibn Tufayl was born," Ben-Zaken advised me. "I think there, you will find a very important piece of the puzzle." mong Europe's highest peaks, the snowcapped Sierra Nevada mountains embrace the city of Guadix, an hour's drive northeast of Granada, like a mother polar bear sheltering her cub. I rode there with Guadix native Ana Carreño, former editor of *El Legado Andalusi*, a magazine about Muslim heritage in Spain and the Mediterranean.

"Do you see the chimneys?" she asked, pointing to the whitewashed, bullet-shaped protrusions that studded the landscape like a legion of cartoon ghosts. These, she explained, belong to cave houses, all carved from the soft, ochre-stained soil. Several hundred of Guadix's 25,000 residents live like this, where they enjoy cool comfort during the summer and insulated warmth through the winter. While Guadix is one of Spain's oldest settlements, its caves date only to the eighth century, she explained, when it was an Arab trading city known as Wadi 'Ash, from which is derived its modern Spanish name, pronounced "wah-deeks."

Over a rustic snack of olives and roasted peppers drenched in golden Spanish olive oil, Carreño introduced me to Manuel Aranda, owner of vacation rental caves in a nearby village and

> mayor ("I'm Spain's only mayor who lives in a cave," he delighted in pointing out) of El Valle del Zalabi, a municipality that includes Exfiliana, which according to best accounts is the actual birthplace of Ibn Tufayl, whose name has been Hispanized locally to "Abentofail."

"Certainly, the name of Abentofail is well known here," said Aranda, as are those of many writers, poets and painters throughout history who drew inspiration from this landscape.

"We are 1000 meters above sea level, in this unique and dramatic natural setting, surrounded by mountains, fertile plains and desert. Even the light seems different here," he observed.

Such a setting, added Carreño, naturally invites contemplation.

"Growing up here, you always wondered what was on the other side of the mountains," she mused. "It is a place that is so inviting to meditation that it's hardly surprising it influenced so many poets and philosophers."

Later, we looked up modern poet Antonio Enrique, founder of Guadix's monthly Abentofail Poetry Workshop. He believes it is no coincidence that Hayy ibn Yaqzan finds his enlightenment in a cave. The setting recalls not only Ibn Tufayl's childhood hometown, but also both the Prophet Muhammad's revelation in the cave at Mt. Hira, near Makkah, and Plato's allegorical cave, in which the idealized philosopher comes to understand the true nature of reality.

"The predominant Andalusian thought at that time was Platonism," said Enrique. Existence was regarded as emanating from a single source, the "One," with whom the soul, through the intellect, may be reunited.

"Just as Plato's philosopher ascends from the darkness of the



"Just as Plato's philosopher ascends from the darkness of the cave and emerges into the light, so too Hayy ascends through various stages of understanding, through experimentation and contemplation, to arrive at an understanding of God."

-Antonio Enrique

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"Dixit Abubacher" ("Abubacer [Ibn Tufayl] said") begins a passage of this copy, now in the library at the University of Genoa, of the first Latin translation of *Hayy Ibn Yaqzan*, produced in 1493 by either Pico della Mirandola or his teacher, Yohanan Alemanno.

cave and emerges into the light, so too Hayy ascends through various stages of understanding, through experimentation and contemplation, to arrive at an understanding of God," said Enrique.

How Ibn Tufayl came to know and write about such lofty concepts had to do not only with Guadix, but also with his family background, education, the times into which he was born, and a bit of historical luck. A descendant of the prominent Qais tribe that harked back to the Arabian Peninsula, Ibn Tufayl was born around 1116. While details of his education are scant, much of what is known about him comes from the pen of the 13th-century Moroccan historian Abdelwahid al-Marrakushi, who wrote that Ibn Tufayl "studied under a number of those most accomplished" and was among al-Andalus's "most versatile scholars." He also had interest "in reconciling [the fields of] philosophical

knowledge and [religious] law."

Ibn Tufayl's first big break came in 1147—he would have

recently turned 30—when he traveled to Marrakesh with Ibn Milhan, former ruler of Guadix. Both an able administrator and a skilled engineer, Ibn Milhan had been summoned by the Almohad caliph 'Abd al-Mu'min to supervise construction of the irrigation system for the royal gardens. Why Ibn Tufayl tagged along is unclear, but while at court, he impressed the caliph, who appointed him personal secretary to his son Abu Sa'id. After al-Mu'min's death in 1163, Ibn Tufayl returned to the court as a personal physician for the succeeding caliph, Abu Ya'qub Yusuf, a post he held until the caliph's death in 1184. During this time he gained a reputation in science, mathematics and medicine.

In the last years of his life, wrote al-Marrakushi, his "preoccupation ... was with spiritual knowledge at the expense of all else, and he was anxious to reconcile philosophy and religion." He began writing *Hayy*, and it was at the right time and in the right place, but only just.

Under the Almohads, philosophy was, in general, frowned

upon. Fortunately for Ibn Tufayl, Abu Ya'qub Yusuf was altogether unlike his two predecessors. "He continually gathered books from all corners of Spain and North Africa and sought out knowledgeable men, especially thinkers, until he gathered more than any previous king in the west," wrote al-Marrakushi. So taken was the caliph with Ibn Tufayl "that he stayed with him in the palace, night and day, not coming out for days at a time."

Abu Ya'qub Yusuf relocated his Andalusian capital from Córdoba to Seville and there, today, Rafael Valencia is a professor of Arab and Islamic Studies at the University of Seville, where the broad and timeless themes of *Hayy ibn Yaqzan* make it required reading.

"What you find in *Hayy ibn Yaqzan* is not only Muslim knowledge or Arab knowledge, but universal, human knowledge," Valencia said.

Beyond the allegorical text of *Hayy ibn Yaqzan*, another major symbol of Hayy's journey—and thus of Ibn Tufayl's philosophy—can be understood by looking up inside one of Spain's most treasured bits of historic real estate, located east, in Granada: the Alhambra.

Walking in the company of art historian José Miguel Puerta Vilchez, a founding member and vice president of the Almeriabased Fundación Ibn Tufayl de Estudios Árabes (Ibn Tufayl Foundation for Arabic Studies), I had my eyes opened to the symbolism crafted into the building's textured walls and ceilings. As we entered the Hall of the Comares (known also as The Throne Room), Vilchez drew my attention to the ceiling.

"There is an astral dimension to this ceiling, which evokes

the order of the cosmos," said Vilchez, pointing to the lacelike, geometric pattern of 8,017 polygonal pieces of red, green

Ibn Tufayl's predominant idea was that human wisdom can come to apprehend its own divine source.

> and white painted wood panels that are arranged in seven concentric corbels, culminating in an octagon with a center of the purest white, outshining the rest.

"Ibn Tufayl relates the story of Hayy in a series of seven sevenyear periods, so the number seven is very present and important in his work," said Vilchez. "Here in the Comares ceiling, we can find not only the seven heavens, but also the Neo-Platonic theory of emanation that was so central to *Hayy ibn Yaqzan*."

Though constructed two centuries after the publication of *Hayy ibn Yaqzan*, the deeply symbolic architectural poetry of the Alhambra, said Vilchez, nonetheless represents an earthly expression of the book's predominant idea: that human wisdom, through a process of determined self-awareness and self-examination, may come to know the divine source of that wisdom.

In 1492, the Alhambra and Granada fell to the armies of Ferdinand II of Aragon and Isabella I of Castile. Muslim Spain, al-Andalus, was no more. Yet even as these Christian armies marched south, the ideas behind Ibn Tufayl's little novel were migrating north, seeding the intellectual garden of late medieval Western thought.

arcelona's historic "*call*," or Jewish quarter, is a concentric warren of medieval stone, as tightly packed and self-contained as a set of Russian dolls. A stroll through its narrow streets, wedged between towering, gray, blank-faced facades, is a soothing change of pace from the frenzy of the city's famed pedestrian walkway, La Rambla, just a few blocks west. But during the mid-14th century, these streets—even in the best of times—were anything but quiet or peaceful.

"There was lots of activity here. The *call* had many butcher shops, bakeries, fishmongers, weavers, merchants—all serving the needs of Barcelona's Jewish community, which was the largest in all of Aragon," said Eulalia Vernet, an educator with the Call Interpretive Center.

"But the centers of ritualistic life, and the settings for intellectual debates, were the synagogues," Vernet said, as we paused beside the site of the call's smallest, the aptly named Sinagoga Poca ("Small Synagogue"), now a Christian chapel.

Among the more contentious debates that rocked this and other synagogues during the 14th century was the so-called *Controversia de Maimonides*, or Maimonidean controversy. Named for the 12th-century Córdoban Jewish philosopher and rationalist Moses Maimonides, the controversy posed questions that bore striking similarities to those raised by Ibn Tufayl: To what extent is rationalism an acceptable path to understanding God, and at what point does it spill over into heresy? On one side were advocates of Maimonides, many centered to the north in Perpignan, in what is now southern France, who sought to harmonize Judaism with Aristotelian rationalism. On the other were orthodox supporters of Barcelona's chief rabbi, who shared the concern that such thinking led Jews astray from faith.

Joining this controversy was a Jewish philosopher and doctor from Perpignan, Moses Narboni. He arrived in Barcelona in 1348, entering the call through its eastern gate, a hundred meters (yards) or so from where Vernet and I stood. Fluent in Latin, Castilian and Provençal French, reading both Hebrew and Arabic, Narboni began studying Maimonides at age 13, pursued medicine and wrote Biblical and philosophical commentaries. He refuted Maimonides's Neo-Platonism in favor of Aristotle's scientific doctrines. His arguments followed lines familiar to both Ibn Tufayl's predecessor, Ibn Bajjah, and successor, Ibn Rushd. In a later commentary on Ibn Rushd, Narboni declared his intention to write a commentary on *Hayy ibn Yaqzan* in order to examine "the regime of solitude" as a means to "communion with God."

Some scholars have attributed the first Hebrew translation of *Hayy* to Narboni, although others question the proficiency of his Arabic. In either case, he worked from a Hebrew translation that might well have been readily available in the city that, during the mid-14th century, was one of several havens for Andalusian Jewish scholars fleeing the persecution that, under the Almohads, stood in stark contrast to the tolerance they had experienced under the previous Almoravid regime.

"To Catalonia and Provence, to Barcelona, Girona and Narbonne, came many Jewish intellectuals from Andalusia who translated the works of the Arab physicians, philosophers and astronomers into Hebrew," said Silvia Planas, co-author of A History of Jewish Catalonia. It was not surprising, Planas told me, that Narboni would choose Barcelona as the place to write his commentary, which he called Yehiel Ben-Uriel (Long Live God, Son of the Vigilant God).

In it, Narboni beseeched God to metaphorically "conduct him to the isle of felicity"—mean-



Learned in Greek, Roman, Jewish and Islamic sources, Florentine humanist Giovanni Pico della Mirandola saw in *Hayy Ibn Yaqzan* a compact allegory for the essential roles of self-discipline and observation in the search for truth.

ing Hayy's island. In his estimation, *Hayy ibn Yaqzan* provided an "explanation of the nature of the apprehension achieved when man's [earthly] intellect is conjoined with the active [eternal, Divine] intellect." He concluded that Ibn Tufayl proved that such "conjunction" was possible if the person seeking it can, by reason and methodical effort, drown out the clamor of society.

Yehiel Ben-Uriel became something of a best-seller in Narboni's own lifetime and thereafter, considering that more copies of it survive than any of his other works. Among them is a heavily marked-up edition that belonged to an Italian Jewish humanist from Constantinople named Yohanan Alemanno, who found himself in Florence in the late 15th century. Like many teacher-scholars of his generation, he was in search of employment, scrounging for crumbs at the tables of the fabulously wealthy Florentine banking families. Among Alemanno's pupils was Giovanni Pico della Mirandola, a handsome young aristocrat and a favorite of the city's ruler and patron of the arts, Lorenzo de Medici. One of the earliest of the Renaissance humanists and philosophers, Pico shared many interests with his teacher, including a fondness for a book to which Alemanno introduced him: Hayy ibn Yaqzan.

ain pelted the streets of Florence as I orbited Il Duomo, the city's landmark cathedral, a symphony of jade and ivory marble rising to the terra-cotta crescendo of Brunelleschi's famous dome. Crossing the neighboring Piazza della Signoria, I gave the replica of Michelangelo's *David* a nod (the original was moved indoors in 1873) on my way to another of Florence's attractions, the Ufizzi Palace and Gallery.

I was searching for the Ufizzi's portrait of Pico. Hanging nearly out of sight at ceiling level, across the hall from one of the museum's star attractions, Botticelli's *Birth of Venus*, Pico doesn't attract many admirers these days. But at one time, this youth with chestnut locks tumbling from his cherry-red, felt



The first Latin translation of *Hayy Ibn Yaqzan* in England was published in 1671 in this volume of facing Latin-Arabic pages by Edward Pococke, Jr., using an Arabic volume acquired in the 1630's in Aleppo by his father, Edward Pococke, Sr. It would appear in English in 1703, just 16 years before Defoe's *Crusoe*.

cap commanded the attention of popes and princes, some of whom considered him a genius; others, a heretic.

The son of a northern Italian feudal lord, Count Giovanni Pico della Mirandola was born in 1463. A child prodigy, he began studying canon law at age 10 in Bologna, followed by a classical, Scholastic education—Latin, Greek, Plato and Aristotle—at the best schools and universities of Padua, Rome and Paris. Eager to expand his horizons, he added Ibn Rushd, as well as Arabic and Hebrew.

In the opening sentence of his most famous work, *De Hominis Dignitate* (*Oration on the Dignity of Man*), he blended his humanistic devotion to the classical Greek maxim that "man is the measure of all things" with his respect for Islamic learning: "I have read in the records of the Arabians, reverend Fathers, that Abdala the Saracen, when questioned as to what stage of the world, as it were, could be seen most worthy of wonder, replied 'There is nothing to be seen more wonderful than man.'"

Although it was Pico's reputation as a humanist that endeared him to his patron, Lorenzo, in 1486 the *Oration* raised eyebrows at the Vatican for its sympathetic recognition of a wide range of religious beliefs, from Islam to the occult. Only Lorenzo's influence kept Pico out of prison, and it wasn't until 1493, a year after Lorenzo's death, that Pico was officially pardoned. This same year, he produced—or perhaps he had Alemanno produce—the first translation of *Hayy ibn Yaqzan* into Latin.

A contemporaneous copy of this original, written in a spidery hand, its ink faded brown with age, now resides at the University of Genoa, which I visited the next day. Carefully turning the creaking, parchment leaves, I noted the Latin phrase, "*Dixit Abubacher*" ("Abubacer [Ibn Tufayl] said"), prefacing numerous paragraphs.

Later, I dropped by the office of Stefano Pittaluga, professor of medieval and humanistic Latin literature. He told me that Pico's desire to read and own a book like *Hayy ibn Yaqzan*, with its heady blend of Neo-Platonic, scientific and mystical themes, made perfect sense during an age when human knowledge, creativity and intuition occupied center stage.

"In the second half of the 15th century, there was a strong interest in sapientistic texts," said Pittaluga. "Of all the humanists, Pico was one who was most interested in trying to find connections between kabbalah, or mysticism, and Christianity."

This is where Alemanno stepped in. An authority on kabbalah, he also wrote a "supercommentary" (a commentary on a commentary) on Narboni's edition of *Hayy ibn Yaqzan*, from which Pico's Latin text was translated. So inspired was Alemanno by *Hayy* that he mimicked its theme and title in his own magnum opus, *Hai ha-Olamin (The Immortal*), which explored the attainment of perfection, or union with God, through a study of Arab and Jewish science and philosophy. (In the autobiographical section of the text, he paid further homage to *Hayy* by dividing the story of his own life into seven-year cycles.)

Alemanno's influence—and thereby Ibn Tufayl's—can also be read in Pico's *Heptaplus*, a commentary on the Biblical book of Genesis. Here, he concluded that humans—after living lives of rigorous scientific and spiritual reflection—are destined to rise above this world and enjoy reunion with the Divine.

"This is our whole reward," he declared, employing the same Neo-Platonic terminology as Ibn Tufayl, "that from every imperfection ... we are brought back to unity by an indissoluble bond with him who is himself the One."

While's Pico's own path to divine reunification in 1494 may have been less than blissful (rumors persist that he was poisoned by jealous rivals), his impact, and thereby Ibn Tufayl's, soon extended beyond Florence and the Italian peninsula.

n England, philosopher and statesman Thomas More looked to Pico's fascination with Hayy as he developed his own theories on mankind's relationship to God, nature and society. Some have identified analogous, autodidactic themes in More's 1516 classic Utopia, a political and philosophical tale of an ideal civilization, which he just so happened to set on an island, cut off from corrupting influences from the outside world. Meanwhile, England's Francis Bacon, regarded as the father of empiricism, also conceived of a mythical island in his own utopian novel, New Atlantis. With an eye to both Heptaplus and Hayy, Bacon envisioned an insular society in which the religiously devout inhabitants are also devoted to the pursuit of pure, scientific knowledge. Located at the "very eye of this kingdom" is "Salomon's House," an institution that anticipated the modern research university, and in 1660 inspired the establishment of England's Royal Society of London for Improving Natural Knowledge. The Society, among whose early presidents was Isaac Newton, chose as its motto a shorthand version of one of Pico's favored, autodidactic advisos of the Roman poet Horace, "Nullius in verba." Rough translation: "Don't take anyone's word for it."

In France, the father of rationalism, René Descartes, born in 1596, was distilling Ibn Tufayl when he famously declared that existence existed because he did: "I think, therefore I am." A generation later, Voltaire chose an Edenic paradise as the birthplace of his naïve optimist Candide. The eponymous hero of his novel Zadig, a pioneer of the scientific method, also bears resemblance to Hayy, while the plot is derived from a Persian tale set in none other than Serendib, another early name for Sri Lanka, the suggested model for Hayy's island.

In Spain, the protagonist of Jesuit philosopher Balthasar Gracian's allegorical novel Criticon (The Critic), published in

the mid-1650's, is nursed by a "beast" and spends the first half of his life isolated in an island cave, ignorant of human civilization. He later finds society vapid, and he relies instead on nature to reveal God's truths. While modern critics have debated to what degree Gracian actually drew upon Hayy's story, English historian Paul Rycaut, who in 1681 translated the Criticon into English, conjectured that "the Author of this book might originally have deduced his fancy from the History of Hai Ebn Yakdhan wrote in Arabick by Ebn Tophail." (Nineteenth-century German philosopher Arthur Schopenhauer would later credit Criticon as a major influence; that in turn would trickle down into the writings of his own intellectual descendants: Friedrich Nietzsche and Albert Camus.)

"No matter how much these thinkers differ," observed Attar, "it is clear that they ... inherited some basic formulations" from Ibn Tufayl, in laying the

foundations for what Europe would later call its Age of Enlightenment. It was an age, as Immanuel Kant wrote, when mankind, like Hayy, gained "the courage and determination to rely on one's own understanding." It was also the age of Daniel Defoe.

efoe was not a gentleman, but he longed to be one. Born the son of a London butcher around 1660, Daniel Foe later added the "De" to his family name, claiming some vaguely aristocratic ancestry. The Foes were "Dissenters," also known as Puritans or "nonconformists," Protestants

who rejected the Church of England's hierarchy along with some doctrines, and this affiliation further rendered Defoe an outsider. After a dismal career as a merchant (his books were rarely balanced), a rockier one as a journalist (his radical writing landed him in jail) and a spy for whichever side (liberal or

conservative) was in power, he turned in his late 50's to writing fiction. Pandering to his social-climbing



Almost as good a publicist as he was a scholar, the senior Edward Pococke sent his son's translation to all and sundry among Europe's educated elite, creating a best-seller.

The house is now gone, as I discovered. It has been replaced by a 19th-century series of brick flats and storefronts on the corner of the High Street and what has been named "Defoe Road." His only other connection with the location is an English Heritage blue plaque on the building—not counting the eponymous pub across the street and the tire store

around the corner.

Though he lived in what was then countryside as he wrote Robinson Crusoe, published in 1719, Defoe still kept his ear tuned to the buzz from London, which was not hard to hear. Much of it concerned the ongoing religious strife between Dissenters and conservative Anglicans, and the contentious Acts of Union of 1707, joining the hitherto separate governments of England and Scotland (a story that Defoe covered as a journalist). Another hot topic was the wariness of the English monarchy and mercantile class toward the encroaching political and economic power of the Ottoman Empire in southern and eastern Europe, even as they sought diplomatic and trade relations with Istanbul. A popular venue for these discussions was a recent commercial enterprise with roots in that rival empire: the coffeehouse.

"Just like today, you went there to drink coffee, but primarily to talk to other

people and read newspapers," said Markman Ellis, author of *The Coffee House: A Cultural History* and professor of Eighteenth Century Studies in the English Department at Queen Mary University of London. "They were also absolutely essential to the commercial function of the city. Lloyd's of London, for example, began as a coffeehouse, where proprietor Edward Lloyd posted news of the arrivals of ships for his customers interested in shipping and marine insurance. News of the Ottoman Empire would also have been central because of the siege of Vienna in 1683. So the question of the empire's continued expansion would have been on people's minds."

Of equal importance, Ellis told me, was the desire to know how the empire became so rich and powerful.

"There was a geopolitical aspect to their interest," he observed. "They wanted to know more about the Ottomans, and this included curiosity about Islam and Islamic knowledge."

Among the scraps of such knowledge was a book published

in Oxford in 1671. Printed in Latin and Arabic on facing pages, its cumbersome title read (in part), *Phi*-

To men like the Pocockes, exposure to Arabic texts helped create necessary bridges between East and West.

ambitions, and with a large family to support, he bought a manor house on the outskirts of London in Stoke Newington, a sanctuary for wealthy nonconformists whose religious beliefs barred them from owning property inside the city. There, he sat down to write his first and most famous novel. His plot: A castaway on a tropical island whose isolation and intuition lead him to religious truth. losophus autodidacticus, sive, Epistola Abi Jaafar ebn Tophail de Hai ebn Yokdhan (The self-taught philosopher, or Epistle of Abu Ja'afar Ibn Tufayl concerning Hayy Ibn Yaqzan). The subtitle spelled out the nuts and bolts: "In which it is demonstrated by what means human reason can ascend from contemplation of the inferior to knowledge of the superior."

The book was translated by Edward Pococke, under the



There is no firm evidence that the commercially and socially ambitious Daniel Defoe actually owned a copy of Ibn Tufayl's tale. Yet it stands to reason that at the very least, he would have been conversant with the book that was an Enlightenment-era equivalent of an Oprah selection. father, esteemed Oxford Arabist Edward Pococke. The senior Pococke had encountered the text 40 years earlier, when he purchased a 14thcentury Arabic copy of Hayy in Aleppo, while serving as chaplain there for the Levant Company, an English trading outfit chartered by Queen Elizabeth I. Pococke lived in the company's regional headquarters, a *funduq* in Arabic, that had a "sizeable library ... [where] the chaplains had ample time to devote to research, to exploration and to collecting manuscripts and

supervision of his

other antiquities," according to scholar Alastair Hamilton in his essay "The English Interest in the Arabic-Speaking Christians." Indeed, as Hamilton observed, "Some of the first English collections of Arabic and Syriac manuscripts were made by men who had worked at Aleppo."

In addition to gratifying his own appetite for Arabic literature, Pococke snapped up *Hayy* and other books at the behest of his friend and benefactor William Laud, Archbishop of Canterbury, who was also the man who later appointed him to the Arabic chair at Oxford. In a letter to Pococke in 1631, Laud asked his friend to buy "such manuscripts, either in Greek or the Oriental languages as in [your] judgement may best befit an university library."

The university library Laud had in mind was Oxford's Bodleian, where Pococke's donations are today among the institution's rich assort-

ment of Middle Eastern and Islamic manuscripts. Its curator, Alasdair Watson, was kind enough to exhume the medieval copy of *Hayy* together with Pococke Jr.'s first edition, and he let me thumb through both. In that 14th-century original, the hand is meticulous, marred only here and there by a later reader's accidental smudge and the elder Pococke's notations.

"It is in a very fine, beautiful script, not careless in any way," Watson remarked. Equally well preserved was the *Philosophus autodidacticus*, with its verso Latin and recto Arabic pages lying opposite one another, quite like the cultural regions of the medieval world the languages themselves represented.

To men like the Pocockes, exposure to Arabic texts helped create necessary bridges between East and West.

Demand for texts, and for knowledge of Arabic, as Laud's request indicated, was already building. As scholar G. A. Russell observed in The 'Arabick' Interest of the Natural Philosophers in Seventeenth-Century England, the primacy of the Bible "as the source of doctrine" among Protestants "led to the importance of textual accuracy for theological interpretation," which meant being able to read Hebrew as well as Arabic, its close grammatical and lexical cousin. For secular scholars, access to ancient Greek medical, scientific and technical texts translated into Arabic during the Middle Ages was also essential. Lastly, as any Levant Company merchant stationed in Aleppo, Istanbul, Cairo or elsewhere in the Middle East would attest, proficiency in Arabic was simply good for business. A generation later, Simon Ockley, fifth chair of Arabic at Cambridge and a student of the elder Pococke, scolded: "Shame on us, a nation famous throughout the world for our pursuit of learning, that we should have so few scholars dedicating themselves earnestly to these studies."

The publication in England of *Hayy ibn Yaqzan* was about to change all of that. Almost as good a publicist as he was a scholar, Pococke wasted no time in circulating his son's book among his fellow Orientalists on the Continent. He also sent it to members of the Royal Society and scientists abroad.

The book was a hit. In a letter to Pococke, the secretary to the British Embassy in Paris regretted he did not have more copies to distribute. Scholars visiting Oxford begged Pococke for copies on behalf of colleagues and luminaries abroad who heard of it. A Swiss scholar studying under Pococke asked for a copy for a French bishop who upon "hearing of the book … impatiently expected it," according to Pococke's biographer, Leonard Twells.

Not surprisingly, more translations and editions followed, beginning with a Dutch translation published in Amsterdam in 1672, followed by a second Dutch edition in 1701. Many have speculated that the rationalist philosopher Baruch Spinoza was the translator. Two years later, Scotsman George Keith used Pococke's Arabic-Latin edition to produce the first English translation—which had its faults. In one sig-

> nificant blunder, Keith mistranslated the Arabic *zabya* (doe) as "she-goat," an error further amplified by illustrations depicting young Hayy suckled by a goat. Attar and

Baroud suggest that Defoe may have consulted one of these editions because Crusoe is sustained by, among other creatures, a herd of goats.

Nonetheless, Keith, a prominent Quaker, found in Hayy's tale many "profitable things agreeable to Christian principles," as he wrote in his introduction. Not least of these was the way Ibn Tufayl "showeth excellently how far the knowledge of man whose eyes are spiritually opened, differeth from that knowledge that men acquire simply by hear-say, or reading." This line of thinking—a line that extended directly back through Pico to Narboni, Ibn Tufayl and his own intellectual predecessors—aligned with the Quaker belief in the doctrine of Inner (or Inward) Light, that is, "saving Light and grace," which shines within every human being, as Keith's colleague, Rob-

Beyond the many plot similarities, Crusoe's reflections deeply echo Hayy's. ert Barclay, put it. In his *Apology For The True Christian Divinity*, an early Quaker manifesto, Barclay singled out and praised the story "translated out of the Arabick ... of one Hai Ebn Yokdan who, without converse of man, living in an Island alone, attained to such a profound knowledge of God, as to have immediate converse with him, and to affirm, that the best and most certain knowledge of God is not that, which is attained by premises premised, and conclusions deduced, but that, which is enjoyed by conjunction of the mind of man, with the supreme Intellect."

Though not himself a professed Quaker, Defoe was educated in a Quaker school at Newington Green, just down the road from the house in Stoke Newington, and he counted Quakers among his friends and neighbors. If he did not read Keith's translation of *Hayy*, he might well have been familiar with a later English translation by Catholic vicar George Ashwell, or Ockley's, published in 1708, 11 years prior

to the publication of *Robinson Crusoe*. Liberally lifting from the younger Pococke's original, substantial subtitle, Ockley's own read: "The improvement of human reason ... in which is demonstrated by what methods one may, by the mere light of nature, attain the knowledge of things natural and supernatural; more particularly the knowledge of God."

This was not only a Quaker credo, but also a fundamental principle of the Enlightenment that spoke to the key issues of the day: the rational inquiry into the nature of existence and the role of religion in society. Numerous scholars have pointed out that it is no coincidence that John Locke, who was tutor to the junior Pococke and one of era's most influential philosophers, began working on his "Essay Concerning Human Understanding" the same year *Philosophus autodidacticus* was published. A seminal document in the history of modern empiricism, Locke's "Essay" views the human mind—like Hayy himself—as a blank slate at birth, which



develops gradually through the accumulation of experience. Later Enlightenment thinkers, such as David Hume and George Berkeley, drew upon the essay when forming their own philosophies.

As for Defoe's own exposure to these ideas via the *Philosophus autodidacticus*, there is in fact no hard evidence that he owned a personal copy. Still, as Nawal Muhammad Hassan, author of *Hayy Bin Yaqzan* and Robinson Crusoe: A Study of an Early Arabic Impact on English Literature, pointed out, both Rycaut's Criticon and another Ockley title, A History of the Saracens, were on Defoe's library shelf. Considering the



Defoe attributed authorship of the book, published in 1719, to Crusoe himself. Subsequently, Defoe added two more volumes for a trilogy, below.

desire of the butcher's son to be accepted in society and stand shoulder-to-shoulder with literati, it stands to reason that he would have been conversant with *Hayy ibn Yaqzan*, a book that by all accounts was the Enlightenment-era equivalent of an Oprah selection.

To be sure, Defoe was also inspired by popular, contemporaneous, first-hand survival narratives. In addition to Selkirk's tale, there was Robert Knox, a trader taken captive in Ceylon (Sri Lanka) in 1660, and Henry Pitman, a 17th-century English doctor stranded on a Caribbean island, both of whom have been proposed as models for Crusoe. These made for juicy reading, and Defoe the pragmatist would have been keenly aware of their commercial appeal.

But for *Robinson Crusoe* to endure as it has—to have earned the respect of Samuel Taylor Coleridge, who regarded Crusoe as "representative of humanity in general," and Rousseau, whose self-taught Emile is weaned exclusively on the novel as a child, and Virginia Woolf, who declared that Cru-

soe "persuades us to see remote islands and the solitudes of the human soul"—there must have been something deeper going on in Defoe's mind. The steady stream of subsequent scholarship on the question of Defoe's major sources, while not conclusive, points unrelentingly in the direction of Ibn Tufayl.

Beyond the many mechanical plot similarities between *Hayy* and *Robinson Crusoe*—the cave-shelter, the animalskin clothing, the Absal/Friday secondary character—Crusoe's philosophical reflections deeply echo those of Hayy. Sitting on his isolated beach, gazing at the sea, Crusoe asked the same questions Hayy and all philosophers before and after have posed:

What is this earth and sea, of which I have seen so much? Whence is it produced? And what am I, and all the other creatures, wild and tame, human and brutal? Whence are we?

Sure we are all made by some secret power, who formed the earth and sea, the air and sky—And who is that? Then it followed most naturally,—It is God that has made it all.



Tom Verde is a regular contributor to *Saudi Aramco World*. His January/February 2013 history of pasta won a best-incategory award from *Folio:* magazine. For this article, he extends special thanks to the Italian Government Tourist Board, the Tourist Office of Spain, the Seville Tourism Board, the University of Genoa and the Bodleian Library.

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www.ibntufayl.org www.defoesociety.org

Reading Hayy Ibn-Yaqzan: A Cross-Cultural History of Autodidacticism. Avner Ben Zaken. 2010, Johns Hopkins University Press, 978-0801897399.

LAST LAKES of the GREEN

SAHARA

WRITTEN and PHOTOGRAPHED by SHELDON CHAD

IT'S A FEW MINUTES AFTER SUNUP AND THE OLD CHARTER PLANE IS COMPLETING ITS DESCENT INTO FAYA LARGEAU, THE LARGEST OF THE SPARSE OASES OF NORTHERN CHAD. THE SOUTHERN SAHARA BELOW SHIFTS FROM A DARK MOONSCAPE TO REVEAL THE FIRST IMPRESSION OF DUNES, JUST PERCEPTIBLY ORANGE; THEN SINGLES, THEN CLUSTERS, THEN FORESTS OF DATE PALMS APPEAR AS THE PLANE COMES IN TO LAND.

> ahamat Souleymane, the head of airport security, takes a look at the surname in my passport and smiles broadly. He emphasizes the double meaning when he says, "Welcome to Chad," and repeats it.

I'm in this Central African country to explore Saharan climate history through the lens of one of the Earth's great geological anomalies—the Lakes of Ounianga (oo-nee-**ahn**-ga). In 2012, the United Nations Educational, Scientific and Cultural Organization (UNESCO) added these 18 interconnected, freshwater, saline and hyper-saline lakes to its list of World Heritage sites. "Every lake tells its own story," says Columbia University marine geologist Peter deMenocal, whose research underpins much current thinking about the climate history of the Sahara. So what stories can be found on nearly a score of lakes that are apparently environmentally far out of place: in the deepest desert, more than 800 kilometers (500 mi) from the nearest other lake, Lake Chad? There are two men on this expedition who have spent much time searching and probing for these stories, and one of them is waiting with three 4x4 vehicles to make the daylong trek to the lakes. He is Baba Mallah, president of the scientific committee in charge of Chad's UNESCO bids and the nation's leading scientist.

Sunset rakes dunes and massifs around palm-ringed Lake Boukou, one of Ounianga's 18 lakes, geological relics of a once-verdant savannah and remnants of the region's once-vast "paleolakes."



Bounding up to Baba (in Chad, first names are customary) is the other man, Stefan Kröpelin, a veteran geoarcheologist from the University of Köln, Germany, who has plied the eastern Sahara for four decades and carried out research in Ounianga since 1999.

Baba's ordre de mission is to work with Kröpelin to update UNESCO with a scientific review of the lakes, and perhaps delight it with some new discoveries. Baba is eager to show me "the unheard-of geology of the desert. We have everything there—natural beauty and mystery—but it also is our wealth. Chadians love our deserts like others love their forests."

After repairing a roof-rack to carry our luggage along with a sheep for dinner, we climb into a Land Cruiser and take off on a dirt track, used barely once a month, that extends all the way to our destination: Ounianga Kebir ("Big Ounianga"). Kröpelin jokingly refers to it as "Highway One." Our driver, Abdulrahim, senses whenever the ground gives way to soft sand, and he downshifts, outside the old tire tracks. Constantly.

The desert colors change every time I turn my head. Here, a lone tree miraculously survives. There, a "trapping stone" used by our distant ancestors to funnel animals toward their deaths and

give our species life. We're close to where the Iron Age started. We're also close to where *we* started: In a desert not too far away in 2001 and 2002, fossils, including a partial skull, were found that were named Toumai, which means "hope of life" in the Goran language of this region. Dating back seven million years, Toumai is to date the oldest known hominid, the closest we have come to the point of divergence that led to chimpanzees and humans. It was Baba who gave Toumai his scientific name: *Sahelanthropus tchadensis*.

An hour before sunset, we stop for the night close to the slip-face of a massive, arch-shaped barchan dune, which will protect us from the wind in the night. Bright orange sand reaches up 100 meters (320'), and a single dune could contain some 200,000 tons of pure quartzite. Like hundreds of thousands of similar dunes throughout the Sahara, it was formed from the sands of the Mediterranean Sea, and, as if they were a flock of birds, they have been migrating south with the *harmattan* trade winds some eight meters (25½') a year for the past few thousands of years. So far, this dune has advanced some 2400 kilometers (1500 miles).

That night, sitting on a carpet under the starry sky, we eat mutton. The multilingual conversation includes Chadian Arabic—almost universally spoken throughout the country—Goran, the language of the north, French, English and German.

Baba, a physicist by training, is a polymath scientist, having headed the National Center for the Support of Science, which oversees all of Chad's research, for 17 years. In 2012 he became the director-general of the Petroleum Institute. By descent, he is from the royal line of the Kanem-Burnu, who in the 11th century brought Islam to Central Africa.

Baba has been coming to the Lakes of Ounianga since he was a child. His village was in Kanem, the closest region south of them. Those who went north were called *Toubou*, "the brothers from the south," and those who stayed were *Kanembu*, "the brothers of the people of the mountains," he says.

As the evening deepens, Mahmoud Younous, director-general of the Chad Office of Tourism, toys with the star-rating system of hotels by calling our duneside bivouac "*le hotel de milles étoiles*"—"the hotel of a thousand stars." He is, in fact, understating by millions. Night in the Sahara is an elemental experience.

On the road early the next morning, we pass sandstone table rocks or *massifs*. Other formations are needle-, pyramid- or Sphinx-shaped *yardangs*, aerodynamically sculpted by the harmattan over millions of years.

Then we come across camels, grazing on grasses and herbs in

a desert that should be devoid of vegetation. The car tops a rise, and even though I knew it was coming, the vista steals my breath. In the depression below the escarpments at the edges of Ounianga Kebir is a mirage come to life: Lush green foliage and cerulean lakes. Squinting through the

Geoarcheologist and veteran of four decades of eastern Sahara research, Stefan Kröpelin is studying year-by-year lake-bottom sediment from Ounianga to model exactly how and when the savannah dried into today's Sahara.



dust carried by the wind only makes the sight more surreal. All through our stay here, I hear the wind—touch it, feel it and even smell it.

For the Chadians, another wonder has seized their attention: Cellphone coverage. There is a tower nearby, and now everybody in the expedition is calling and texting back home to N'Djamena, the capital.

The sun is setting as we tour our first lake, Uma, in Ounianga Kebir, which is comprised of four lakes. A man is leisurely dousing himself just off the sandbar that splits this salt lake. The water color is red, an effect of the algae *Spirulina pla*-



"There are salt lakes in deserts worldwide, but freshwater lakes you just don't have," says Baba Mallah, physicist and director of Chad's national scientific research center. Standing on the shore of the reed-covered portion of Lake Boukou, he explains that the reeds retard evaporation, and together with replenishing seepage from the aquifer below, the lake water stays fresh.

tensis, which covers the lake in a layer as thick as 15 centimeters (4") in places. It stinks. This, Kröpelin explains, means there has been little wind for a few weeks prior to our arrival. "If there is wind, they don't smell," he says. But neither the smell, nor



the sight of a man swimming in the Sahara, astounds nearly as much as the croaking of a frog.

It's a living reminder of the era of the Green Sahara, known as the African Humid Period, which lasted roughly from 11,000 to 5000 years ago, but here at Ounianga, it is still, in effect, going on. This frog is a survivor, a biological relic of the once-vibrant life of the North African savannah—now the scorching Sahara—where elephants, giraffe, hippos, antelopes and a wild ancestor of domestic cattle called aurochs once made their homes.



e make our campsite on the hillside above Lake Boukou, in the second cluster of lakes, called Ounianga Serir ("Little Ounianga"), about 50 kilometers (30 mi) east of the Ounianga Kebir lakes. Boukou

is a freshwater lake, surrounded by palms and colored deep blue, half-covered by green reeds that somehow complement the Martian landscape of massifs and drifting dunes.

We camp in the open, and at three a.m. I'm startled by five jackals surrounding my head, a meter away. It's as if they are debating which part of me each one might grab first. I scare them off, go back to sleep and later wake to a glorious sunrise. All is silence. The orange sands, the massifs, the lake: All shimmer in the morning sun.

On the walk down to the shore, I'm distracted from that



Away from the reeds, the fresh water of Lake Boukou is both pleasing to the eye and habitable to aquatic life, right.

beauty by what's underfoot. Stone hammers, scrapers and other tools are strewn about here, some dating from half a million years ago to "new ones" from the Neolithic era "only" 5000 to 10,000 years ago. I meet Baba, his shortwave radio pressed to his ear, listening to the news, beside what looks like a field of wild grasses, but it's actually the reed bed on top of part of the lake.

"There are salt lakes in deserts worldwide, but freshwater lakes you just don't have," says Baba.

The Sahara is the largest of the world's hot deserts. (The polar regions are deserts, too, and larger.) The sun here is so intense that the record measured evaporation rate at nearby Lake Yoan was enough to lower the water level by six meters (19') a year. Yet now, and presumably during the last 3000 years of hyper-aridity, rainfall has been measured only in millimeters a year. Properly, any lake here "should become like the sea with the highest density of salt," says Baba, or it should have long ago disappeared completely.

"But in Ounianga we have this very big freshwater lake," says Baba, beaming so warmly at the paradox that his smile could accelerate the evaporation process.

Baba points to the *Phragmites* and *Typha*, the reed genera growing up to six meters, floating on their own debris in the 20-meter-deep ($65\frac{1}{2}$) lake. "Here, the sun doesn't hit directly the water," he explains. "The evaporation rate is very low, so the water is just about perfectly fresh." Plentiful fish and crustaceans testify to his point.

What we see here, he explains, is the result of a hydrologi-

cal system, unique in the world, that keeps all but one of the 11 lakes of Ounianga Serir fresh. To understand more, we go on a tour to the central Lake Tili. And, yet again, we have to step back in time.





uring the wet millennia of the Humid Period, water accumulated in what is now the Nubian Sandstone Aquifer System, which underlies much of the eastern Sahara. This is the world's largest fossil-water aquifer, and it

spreads roughly two million square kilometers (772,000 sq mi) beneath Chad, Sudan, Egypt and Libya to a maximum depth of 4000 meters (12,800'). The Lakes of Ounianga are supplied



Leaders of two of northern Chad's most remote communities, Aahmat Moussa Thozi, left, of Ounianga Kebir, and Nebi Guett, right, of Ounianga Serir, link their legendary tribal histories to today's science. "There was a very ancient population that lived next to this lake. We believe that our grandfather came out of the lake," says Thozi. Not far from here, the 2001 and 2002 Toumai skull discoveries show that hominid and human habitation in this region may date back seven million years. Right and opposite, top: The Office Tchadien du Tourisme, led by Director-General Younous Mahmoud, promotes adventure travel to the lakes that Guett says have "become a source of pride, and we plan for a bright future."

from below by this aquifer, which has allowed them to survive the climatic changes so far.

Remember, however, our barchan dunes. Slow but relentless, they have coalesced into "megabarchans," corridors of dunes that extend for hundreds of kilometers. Long ago, they moved into the two big original lakes in Ounianga Kebir and Ounianga Serir, splitting them into the clusters of smaller lakes we see today.

As we pass in the Land Cruiser, it is easy to see how the elongated dunes separate the lakes in the basin, an action that continues, and that may, in time, obliterate them.

From the settlement at Ounianga Serir, one of the world's most remote, we take in the view of Lake Tili. It doesn't have the mats of reeds that cover the surface of the fresh lakes. Also in contrast to them, Tili's rapid evaporation rate makes it hyper-saline and keeps its depth to only two to three meters (6 to $9\frac{1}{2}$); its surface elevation is the lowest of all the lakes.

The difference in elevation drains a slow flow of water into Lake Tili from adjacent lakes through the semipermeable dunes. This "evaporation pump" causes the other lakes to draw continually from the aquifer below to replace their own losses. Together with depth and the partial reed covers, this replenishment works to keep the water in the other lakes fresh.

Yet what we see today is but a remnant of the two vast lakes that once fed south into the largest inland lake ever known to have existed on Earth: the



Mega-Chad, once larger than today's Caspian Sea.



ur mission," says Baba, "is to sample diatomite to see how the lake levels have changed during the different periods." Diatomite is a light soil made up of the

microscopic skeletal remains of diatoms, single-celled plants that have sunk to the bottom of lakes and oceans. When the water of a lake recedes, diatomaceous earth



can often be found on the walls of the sandstone escarpments that surround the lake basin. It can be sampled, the elevation of deposits noted, and then it can be carbon-dated. By adding the approximate depth of the lake, and using a "virtual flooding" computer model, you can, in theory, project the extent of the "paleolakes" during each time period.

Kröpelin makes his way around a palm grove near Lake Edem in Ounianga Serir and up a steep gully of the sandstone escarpment that in the Humid Period must have had a rivulet. He reaches a jutting ledge that offers a view of Edem, which is completely covered by reeds.

Kröpelin takes notes, and then takes out his geologist's hammer to chip out diatomite specimens. "I'm the first geologist since the origin of Earth to take a sample at this site," says Kröpelin. He scrapes away the crust. The sediment does not resist. He digs his hand into the hole he has dug and pulls out the diatomaceous earth in white chunks. They're fragile. They crunch easily in his hand.

Without carbon dating, it's hard to be sure of their age, but he guesses they will prove to be "younger than 6000 to 7000 years old." Other samples have dated to between 8500 and 9500 years ago. His altimeter reads 405 meters (1300') above sea level, plus or minus 10 meters.

Less scientifically, but with no less enthusiasm, Fati Dadi, from the tourism office, brings Kröpelin a handful of sunbleached mollusk shells she has chipped from another part of the ancient lake sediment. "I am making necklaces," she explains. "I take a needle and I pierce some holes. *C'est originale?*" Kröpelin smiles. "Ten thousand years old," he says. "You can't buy that."

Back near Lake Boukou, we pass a train of camels, and shortly afterward, our smaller caravan of three Land Cruisers stops at the water's edge. We get out and, though the heat of the day is finally breaking, the lure of a freshwater swim has one, then another and another of the crew plunging into the lake. Kröpelin's last dip here left him with schistosomiasis, the waterborne, parasitic disease that frequently infects tropical waters. Yet in true desert-adventurer style, he declares "No risk, no fun!" and dives in, too. (Four months later, he reports he has to repeat the treatments.)

A

t Yoan, the largest lake in Ounianga Kebir, huge drifts of sand blow down to the edge of the deepgreen water. A group of Toubous, men of the local ethnic group, take shade beneath palm trees that look as if they had been placed by a landscape

designer. I realize one of the men is Baba. I join him and ask him where he is more at home, in the desert or in the laboratory?

"Sincerely, I'd rather be in the laboratory. It's where my joy is," says soft-spoken Baba. But then he catches himself. "I think they are complementary. I love the desert, but I would love the possibility to submit the results from the desert in the appropriate laboratory where I can participate. But that's the problem," he continues. "Today, in Chad, institutes and universities have been created, and we have formed a knowledge-based elite, a core group of researchers, but we have not the laboratories."



"With Stefan Kröpelin [right], we're in debt," says Baba, left. "We are able to understand precisely how these lakes function," he says. "Naturally, if we had the means, we'd do [the coring and analysis] here, and it would be uniquely a Chadian discovery." In Baba, says Kröplen, "I have a decade-long friend and trust."

As we speak, a few Chadian members of the expedition's support staff fill plastic bottles with the natural salt foam that gathers on the shore of the hyper-saline lake. Kröpelin later explains that it's natural salt foam. "You can eat it," he says, adding that Chadians regard it as a health tonic.



With reed-carpeted Lake Edem in Ounianga Serir in the background, sun-bleached and brown sandstone that once lay submerged offers samples of fossil microorganisms that, when carbon-dated, yield evidence of the lake's extent at different times. Opposite: Holding shells, souvenirs of the African Humid Period from 11,000 to 5000 years ago, Fati Dadi of the office of tourism says she will string them into a necklace.

What lies under the waters of Lake Yoan, however, is what may offer the Ouniangas' greatest potential contribution to science: "The long core." Kröpelin speaks the term in a tone normally reserved for legends and elusive treasures.

For decades, Kröpelin had been looking at thousands of now-dry paleolakes throughout Sudan, Egypt and Libya in his search to reconstruct the environmental and climatological history of the eastern Sahara. His results were limited because all the lakes dried up so long ago. "We had nothing for the past 4000 years," he says.

His hope was to find an ongoing accumulation of deposits, something that is only possible in a present-day body of water.

In 1999, Kröpelin got to Lake Yoan, and he used a gravity corer to excavate half a meter $(1\frac{1}{2})$ of lake-bottom sediment. It was a test—and the find of a lifetime.

"There could have been nothing. It could have been sand. It could have been homogenous mud where you couldn't do anything," Kröpelin remembers. But it wasn't. Clearly layered with sub-annual laminations, the core showed it was possible to analyze its layers of deposits not just yearly, but even seasonally.

"So it was clear this was worth a big coring campaign."

He returned in 2004 to extract a 6.5-meter (21') core that showed a continuous paleo-environmental record of the past 6000 years. Analysis of that long, thin column convinced Kröpelin that the prevailing scientific understanding of the most consequential African Holocene climate event—the demise of the Green Sahara—"was wrong from the beginning."

Citing analysis of pollen in the sediments of the core, in a 2008 research paper Kröpelin challenged the hypothesis, advanced by deMenocal, that North Africa dried from savannah to desert over the course of only a few centuries. The new data, Kröpelin asserted, was evidence that it may have been a far longer, much more gradual process, one taking not centuries but millennia.

This is more than an academic question. Accuracy in Saharan climate history research is important to today's climate modelers who believe that the better they "tune their models" to history, the better they can project present-day climate changes into the future.

Kröpelin's analysis, comments deMenocal, is "extremely important," but geographically, he observes, it remains but a single "data point." In contrast, he says, "there are about 20 other different data points from West and East Africa, and most recently in the Horn of Africa, that all look the same: They all get abruptly drier after about 5000 years ago. So which one was it? Or maybe it was both?" he adds. "To be honest, I would say we don't know yet."



n the town hall of Ounianga Kebir, I meet Aahmat Moussa Thozi, the *chef de canton.* The scientists are not the only ones interested in history. Through a translator, Aahmat tells me the legend of his tribe's origins.

"There was a very ancient population that lived next to this lake. We believe that our grandfather came out of the lake. The people who came out of the lake are linked to that lake. These localities were very beautiful, with palms, dates and a glorious lake. There are 15 clans in Ounianga. That is how it started."

Are there cultural clues here to geological history? It would take a geo-mythological examination to know for sure. What exactly does "ancient" mean in a land where, over the seven million years



THE BORING PART

In a cooling chamber in the basement of the University of Köln's Institute of Geology and Mineralogy, paleoclimatologist Jens Karls searches for a couple of one-meter sections from the 16-meter (521/2') 2010 Lake Yoan "long core."

As he searches, I spot other labels: Lake Tivuti, Indonesia; Lake El'gygytgyn, Siberia; Balkans; Spain; Greenland and Antarctica. It is a geological tour of world history, all encased in white plastic tubes.

Karls pulls a Lake Yoan core from its wrapping. I see immediately that this geo-snapshot of African subsoil is no less beautiful than the Chadian Sahara and the Lakes of Ounianga themselves. With the naked eye, I can easily see and count layers of sediment.

How old is this one? I ask.

"8500 to 10,000 years," says Karls. The sample we're looking at is actually only half the cylindrical core, which was sliced lengthwise. This, he explains, is the "archive half," used only for nondestructive measurements that determine elemental compositions, magnetism, density, color spectra and more. It's tedious work: Some measurements may require 32 hours for each of the core's one-meter sections.

"Boring," says Karls, obviously relishing all of it and seeming unaware of his pun in English.

The other half of the core is called the "working half." There, says Karls, "we take the samples for geochemistry, grain-size pollen analysis and so on."

Thin sections of the working core

half are cut out with a wire saw, hardened in epoxy resin and then polished down to a thickness of 30 micrometers (0.0012"). Under a microscope, "a most robust age model" is determined that pinpoints not only year-to-year changes but "even differences between the seasons," he says.

So precise are the analytical tools, he says, that Karls can look at a single grain of sand in the lake sediment and, from its surface alone, determine if it is "from the surrounding sandstone hills or if it was transported to the lake by wind, rivers or mixed transport from somewhere else."

"We have found the book," says Karls about the Ounianga "long core." "We just have to translate everything into human language."





Men relax in morning shade at Lake Yoan, the largest of the Ounianga Kebir group. With its minimal reed cover and record-high evaporation rate, the lake is saline. It is from this lake-bottom that in 2010 Kröpelin, Melles and Karls extracted the core sample, dating from the present back to 10,940 years ago, that is still under study.

since Toumai lived here, the African Humid Period was only the most recent of what may have been *hundreds* of wet phases. The recent one is of interest today only because it affected anatomically modern humans, and it is the one that may offer clues about our own future.

Aahmat continues, "My family came out of the lake. I am the offspring of that."

His meaning: The lake gave his tribe life. But exactly when that was is another question, perhaps one for science.

 n 2010, Kröpelin teamed up with the Quaternary and Paleoclimatology Group at the University of Köln, directed by Martin Melles, whose work in lake sedimentation analysis had nearly always taken him to polar regions.

"You have virtually no opportunity in hot desert areas," says Melles. "The Sahara is as extreme and remote as Antarctica."

Jens Karls, a doctoral student in paleoclimatology working under Melles, undertook much of the operation of the corer, which they set out in Lake Yoan. "You have a 30-kilogram [66lb] weight and a system with ropes. Then you have to pull it up and let it drop again, and again. The upper sediments are very easy to penetrate, but when you reach sediments that are a little bit compact, then you have a coring speed of less than one millimeter per hit," he says.

One millimeter is less than a year's sediment. The team went down 16 meters (52¹/₂') in pursuit of layers from the dawn of the Holocene Era. Through stroke after stroke of the corer's weight, in heat that, in sunshine on open water, often approached 50 degrees Centigrade (122° F), the team pressed on. In the end, they reached their goal: a continuous, 10,940-year "continental record of climate and environmental change."

To understand "how our climate system worked in the past and will operate in the future," says Melles, "you need these geological archives widely distributed over the globe." Having one "representative core for the east Sahara is already a huge step."

While analysis of the "long core" is still under way, says Kröpelin, "we have indications of really global climate events,"



Fingers of wind-driven sand continue to both shape and encroach upon the Lakes of Ounianga, and in this aerial view looking southwest over Lake Yoan, the sculpting power of the prevailing northeast *harmattan* wind is dramatically apparent.

including, he says, "the relatively late introduction of the date palms, [and] we can explain or at least better understand the history of Pharaonic Egypt." It is, he asserts, "the highest-resolution look we've ever had at climate history on the African continent."

Baba agrees. "With Stefan Kröpelin, we're in debt, having published in important international scientific journals. We are able to understand precisely how these lakes function," he says. "Naturally, if we had the means, we'd do [the coring and analysis] here, and it would be uniquely a Chadian discovery."

> e've been traveling back and forth for an hour on a track in Eguibechi, some distance from Lake Yoan in Ounianga Kebir. Kröpelin is looking for an outcropping of diatomaceous earth that he spied on the

way into town. He had noted its GPS position, but he is having no luck. We retrace the route one last time. It is not what Kröpelin has been searching for, but I spot a swath of white over a rise.

When we get to it, Kröpelin is ecstatic, and he immediately starts to work. Baba crouches over him. "You are witnessing really a new discovery," Kröpelin says. "It's a site I wanted to go to for many years. We urgently need it for the interpretation of the core we took down there in the lake so we can make a valid interpretation of the depth of the lake at the time of deposition."

What we see, Kröpelin explains, is the shoreline of the original paleolake. "There is still this rhizome, the ancient roots of reeds, and some places even trees which were growing when the lake was still shallow." He estimates that here, they will prove to be about 8000 years old.

"On this side you find the highest exposed sediments from the ancient lake floor," which he claims is evidence that the ancient lake was "50 or 100 times—an order of magnitude—more extensive than the present-day lake." In other words, during the Green Sahara era, "as far as your eyes see, it was covered by water."

Kröpelin packs the sediment into plastic bags labeled W76, the new discovery.

The wind whips up, and it starts drowning out Kröpelin's voice. In the distance you can just make out the remnant sliver of oasis, its green palms and its sky-blue lake.

Baba comes over, puts his arm around me and spins me around to face the sand. "At Ounianga, you see the beauty of the desert," he says. "But scientific research doesn't stop, and we will uncover more secrets hidden in these lakes."



Thanks to Chadian hosts with a sense of humor, awardwinning Canadian writer and photographer **Sheldon Chad** (shelchad@gmail.com) was, for the duration of this expedition, affectionately nicknamed "Wardougou" Chad, which means "Man-who-loves-his-country" Chad. It fit fine from the start, he says, noting that "the unforgettable beauty of

the Saharan landscape may be exceeded only by the elegance and generosity of the people who live there." He currently lives in Brussels.

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Written by HABIB BATTAH

Portraits and video by DAVID DEGNER

#techboom #arabnets

With no streetlights and its row of abandoned late-Ottomanera buildings, the Beirut neighborhood of Khandaq al-Ghamiq seems to live up to its Arabic name, "the dark ditch." It is home to some of the city's poorest residents, many displaced by war, squatting for decades in crumbling, shell-pierced dwellings.

But on a recent evening in March, the Khandaq was lit up with a bright white party tent. Valets lined up outside and Arabic beats pulsated from within. Inside, amid a cacophony of excited conversations, a hip young Lebanese band remixed traditional melodies while Beirut's finest restaurants served up steaks imported from Australia, gourmet Black Angus burgers and artisan cold-press juices. The attendees were smartly dressed in "dotcom casual" suits open to ironic T-shirts, Converse sneakers and jeans—many still wearing bright yellow lanyards branded "ArabNet."

The three-day conference, now in its fifth year, is one of the largest gatherings of the Middle East's budding startup industry, and tonight's dinner was one of the many afterparties where the region's future business leaders get to network and capitalize on a regional e-commerce market that will be worth \$15 billion by 2015, according to estimates by PayPal.

If all goes according to plan, much of the shrapnel-scarred Khandaq area will be transformed too, into the Beirut Digital District, a 10-year initiative to build some 10 high-rises that planners hope will house the new industry just a few blocks from the luxury glass-and-steel residential towers now going up in downtown Beirut. Subsidized Wi-Fi and fiber optic cables are expected to flow freely throughout the area, which aims to rival similar new regional facilities like Oasis500 in Jordan or Flat6Labs in Egypt, which have been hosting, training and investing in hundreds of tech-based startups, buoyed by millions of dollars in new venture capital funds that are cropping up across the region.

Hours before the party, a scale model of the Digital District was on display at ArabNet, held in a sprawling banquet hall in Beirut's newest Hilton hotel. With the backdrop of a 14-meter (45') electronic display, dozens of young, aspiring entrepreneurs from across the Arab world took to the stage to deliver twominute "Ideathon" pitches with infomercial-like zeal to the

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crowd of some 600 IT professionals. More-established CEOS were also on hand, speaking at panels covering everything from social-media marketing to venture-capital opportunities to forging links with Silicon Valley. There was a brief discussion of Bitcoin, as well as corporate social responsibility, better known by its industry buzzword, CSR.

"Why do CSR?" asked twenty-something digital-media strategist Ralf Aoun as he paced the stage with a headset microphone. "It's good for business, good for PR and good for karma!"

But what about regional turmoil, asked moderator and industry veteran Mike Butcher, who was making his third visit to ArabNet as editor of *TechCrunch*, one of the world's most popular technology news sites. He put the question also to co-panelist Stephanie Holden, formerly of Priceline and Walt Disney and now the head of Saudi-owned television giant MBC's investment arm, MBC Ventures. Touting her firm's investments in nine Arab startups, she said regional entrepreneurs faced more of a threat from government bureaucracy than armed violence. Butcher himself had come to a similar—if blunter—conclusion the previous evening at another off-ArabNet event.

"Amid everything going on, you guys are still kicking ass," he said to cheers from an audience that had gathered at Coworking 961, yet another technology incubator space in Beirut. Butcher had been one of the judges at a pitching contest at the space, which occupies the guesthouse of a 19th-century palace. Under its castle-like turrets, the representatives of young Lebanese firms had presented their ideas on a projection screen in the garden, a rare patch of lush greenery in the exhaust-choked city.

The winners that evening were the developers behind Roadie Tuner, a handheld piece of hardware that tunes guitars and other stringed instruments. It was born out of the frustration faced by 27-year-old engineer Bassam Jalgha while tuning his '*ud*, or Arab lute. In 2009, Jalgha had entered and won the MBC reality-TV show for innovators, "Stars of Science," walking away with a check for \$300,000 from the Qatar Foundation. He would later team up with friend, fellow engineer and flute player Hassane Slaibi and launch a Kickstarter crowdfunding campaign that netAramex founder and CEO Fadi Ghandour has emerged as a key investor in the region's growing technology sector, having helped launch several major startups and venture-capital funds. He serves as chairman of leading regional tech news site wamda.com, and he is now partnering with the United Nations to fund 200 "microbusinesses" in his native Jordan.

ted nearly \$180,000—three times their stated target. Jalgha has since traveled to China to oversee the first batch of production, and he expects Roadie Tuner to hit stores sometime this summer.

"I don't think you guys need any help from us," said Butcher after awarding the duo tickets and a table at the 2014 Tech-Crunch Disrupt event in New York City. "Awesome job."

Taking second prize at the challenge was Ki, a plug-in USB security device that reads a user's fingerprint with both security algorithms and biometrics developed in Beirut. "That seems like overkill," said one of the judges. "Why not buy the technology from the US?" "What guarantees that the NSA hasn't tampered with it?" rejoined the twenty-something developer, to laughs from the crowd. The judges also rewarded Jihad Kawas, who was pitching an app that connects buyers and sellers of used items within close proximity. This wasn't Kawas's first app, and he is 17.

Of course, many of Lebanon's most successful developers no longer need to pitch at such events.

Twenty-six-year-old Hind Hobeika has already raised over \$1 million in investment capital for her hardware innovation, Instabeat, which had just won a 2014 design and engineering award at the Consumer Electronics Show in Las Vegas. The product is the first waterproof, goggles-mounted heart-rate monitor, which allows swimmers to hone their workouts and also track their performance after a swim. Hobeika, a former varsity swimmer





and engineering student at the American University of Beirut, saw the need for such a device when she couldn't find it in stores. After more than two years of development and nine prototypes, production is scheduled to begin this summer, and Hobeika is negotiating distribution deals in the US and Australia.

Still other products have already gone to market, many in the form of mobile apps. Perhaps the most successful of these has been Poo, a virtual pet users can feed, stroke, buy gifts for and watch grow. Created by 24-year-old Paul Salameh, the application has proven viral. In press interviews, Salameh has claimed up to 300,000 downloads per day, with Poo having reached the number-one spot in the kids' games category at app stores in more than 65 countries. Revenues will likely soar with in-app purchases to feed and dress your Poo, available from \$1 to \$11. YouTube videos celebrating the game in various languages have seen millions of views while Poo's Facebook page has garnered more than five million likes.

But runaway success stories like this are still somewhat rare in the region, where the tech industry is still understandably finding its feet after barely a decade of existence. And developments in Lebanon, as one of the Arab world's smallest countries, amount to just a fraction of the region's newest industry.

Known for sealing the biggest Middle East tech deal to date, Samih Toukan cofounded the first major Arabic-language Internet provider, Maktoob.com, which sold in 2009 for some \$175 million. More recently, his investment firm has acquired Souq.com, the region's largest online retailer.



Ahmed Alfi returned to Cairo in 2006 and in 2011 launched one of the region's best-known incubator spaces, Flat6Labs. He is now remodeling part of the former campus of the American University of Cairo to become Egypt's largest technology park. "Everyone knows my main goal is collaboration," he says.

There have been few opportunities in the Arab tech industry like that which was seized by Jordanian Samih Toukan. After completing his MBA in London, Toukan went on to work as an IT consultant for Andersen Consulting in Amman, but sensing demand, he left the job in the mid-1990's to start his own business. Toukan had made a proposal to one of his former Andersen clients, fellow Jordanian Fadi Ghandour, CEO of Aramex, the region's largest courier service. Internet penetration was still nascent in the region, and very little of it was in Arabic. The solution seems obvious today: Create Arabic content and an email server for its readers. And by the late 1990's Toukan did just that by launching Maktoob.com.

As a first market entrant, the site exploded from 100,000 users in 2000 to 10 million by 2005. Yahoo bought the company in 2008 for \$175 million. It was the kind of "exit" or sell-off that gave impetus to the regional industry.

"Before that exit, the industry was nonexistent. Maktoob was a turning point," says Toukan from his new offices in Dubai. "It was the beginning of the industry. After that exit we saw an acceleration of ideas and investment."

Toukan, Ghandour and a handful of others have grown into major drivers of that trend. The proceeds from the Maktoob deal helped Toukan launch Jabbar Internet Group, which has invested in products like Hobeika's Instabeat as well as Souq.com, an online retailer akin to amazon.com in the Us. With a thousand employees, Toukan says Souq.com already

Flat6Labs CEO Ramez Mohamed has overseen the company's incubation of 36 startups with loans from \$10,000 to \$15,000, in exchange for which Flat6Labs received 10-15 percent ownership. generates hundreds of millions of dollars in revenues, but he will not disclose exactly how much. In March, South African media giant Naspers invested \$75 million for a 36 percent stake in the firm, after having put \$40 million into Souq.com in 2012.

"Give us three years and you will see a company bigger than Maktoob," Toukan says. "This could be a much bigger exit. I think the industry is beginning to materialize," he says.

Meanwhile, the Jordanian monarchy is placing bets on similar success stories beginning with the launch, shortly after Toukan's watershed sell-off, of Oasis500. Established in 2010 with the backing of King Abdullah, Oasis was given a mandate to mentor, invest and help launch 500 regional startups over six years.





Swimmer and engineer Hind Hobeika, 26, invented high-tech swim goggles, called Instabeat, that allow swimmers to track their heart rates throughout each workout.

Kickstarter campaign that surpassed its goal of \$10,000 within hours, raising a total

With its colorful wall murals, futuristic furniture and even an adult slide that spirals through a large atrium, the Oasis building in Amman is every bit the dotcom space one would expect. In addition to providing coaching and co-working office space for young firms, Oasis has a \$6 million fund from which it invests up to \$30,000 in startups in exchange for a 10 to 20 percent ownership stake.

So far, Oasis has invested in 70 startups and trained an additional 1500 entrepreneurs through its monthly "bootcamp" workshops, according to the investment manager Salwa Katkhuda. One of its first successful exits has been the online sports retailer Run2sport, which sold a majority of its stock for \$2.5 million to Toukan's Souq.com. Another Jordanian startup, online-payment gateway Madfoo3atCom, raised more than \$500,000 from private investors. Both deals took place in 2012 and Katkhuda says Oasis is now expanding into the United Arab Emirates (UAE) and Saudi Arabia.

"We are at the very beginning of an entrepreneurial era in the region, but it will take a long time for the market to mature," she says. "The early players have a huge advantage and opportunity by being the first risk-takers."

Prominent among those early risk-takers is Ahmed Alfi, who after nearly two decades as a media and technology investor in Los Angeles returned in 2006 to his native Egypt to launch one of the region's first venture capital funds. In 2011, he opened Flat6Labs, which offers services for startups similar to those offered by Oasis500. So far it has graduated 36 companies, and it offers facilities and loans from \$10,000 to \$15,000 in exchange for 10 to 15 percent ownership.

"There's quite a few breakthroughs that will happen this year," Alfi says from Cairo, where he is busy giving a tour of the facility. "A lot of companies are on the cusp."

Among the Flat6Labs success stories is Instabug, an application that helps developers find and report programming bugs through physically shaking a mobile device. Developed by a pair of Egyptian 22-year-olds, the app was partially funded by a of \$85,000 and now celebrating its millionth download. Then there is 1Sheeld, a device that can help automate objects and appliances, which won the audience-choice award at last year's TechCrunch Europe Disrupt event, and Kngine, which Alfi says is similar to Apple's automated voice assistant, Siri.

"We are finally getting outside firms interested," he says, naming Samsung Ventures and Vodafone Ventures as parties negotiating potential deals.

Following on the success of Flat6Labs, Alfi is now expanding. He is building Egypt's largest technology park by converting nearly an entire city block of buildings that were formerly used by the American University of Cairo. Known as "Greek Campus"—which comes from its original use as schools for Greek expatriates—Flat6Labs has already attracted 20 companies that have moved into one building, while four more buildings are planned to open this summer with the goal of attracting hundreds of companies and creating some 3000 jobs. Alfi says the word is getting around quickly.

"People were coming up to us when we were moving in, as we were doing construction. Eighty percent of the companies I had never heard of before. These are not even people who knew me," he says excitedly. "These are people who wanted to be part of the community."

The idea is to create a campus environment, where innovation and talent can spread quickly, which has been a major challenge for the Arab tech industry. "Everybody knows my main goal is collaboration, and collaboration will accelerate the development of the tech sector," Alfi says. "Networking is one of the major missing components. If you are building something and you meet somebody who has already made subcomponents, you can collaborate. Networking is an educational tool to learn what other people are doing. Networking helps create teams faster to attack problems faster."

But once teams are built, regional entrepreneurs, particularly in a place like Cairo, face the additional challenge of turning profits in a region with generally high unemployment, low per-capita incomes and low levels of disposable income. In Egypt, the Arab world's most populous country, fewer than 10 percent of the population have bank accounts, and among the entire Arab world population of 350 million, fewer than 10 percent own credit cards.

Not surprisingly, many tech firms are looking to the Arabian Peninsula, where salaries are higher and growing consumer markets are more lucrative.

Plans by Jordan's Oasis500 to expand into both the UAE and Saudi Arabia this year will enable it to "serve a much larger market," according to investment manager Katkhuda. ArabNet has also begun targeting the Gulf with new annual conferences in both Dubai and Riyadh.

Meanwhile, Flat6Labs has already graduated six firms from its recently established accelerator program in Jiddah, Saudi Arabia, and it has five firms enrolled in a new cycle. Flat6Labs Director Ramez Mohamed is bullish on the Gulf region. "Our main focus will be in the Gulf over the next year," he says, disclosing plans to open yet another accelerator program in the UAE as well as a branch in North Africa.

"Our perceptions about the Saudi market were wrong," he admits. "We thought they wouldn't be able to start successful companies or lack passion or qualifications, but these were all proven false. When we went there, we found entrepreneurs very eager to succeed and they had something really presentable on demonstration day."

Alfi concurs. "Saudi youth are coming up with good ideas, more importantly, a desire to succeed," the Flat6Labs chief says.

Indeed, Saudi talent has gone internationally viral with the suc-

cess of media startups like Telfaz11, which produced a satirical spoof of Bob Marley's "No Woman, No Cry" late last year that earned 11 million YouTube views. It has also produced dozens more high-production-value videos, animations and short films, with many on the site garnering up to three million views and hundreds of thousands of subscribers for its webisodes.

Prominent Saudi investor Rachid Al Balla says he is proud of young Saudi creatives and the "geek societies" that have emerged, such as Riyadh Geeks, Jiddah Geeks and Banat [Girl] Geeks. The challenge, he says, is to harness and mature their skills to help build an entrepreneurial ecosystem. Some of the groups have up to 2000 members, he explains, but they often lack the grassroots organizing or funding to meet and create networking opportunities to form a more solid community. "There is no venue large enough for them to meet," he explains. "They are free organizations."

While governments in the region are spending billions on transportation infrastructure such as railways and financial cities, Al Balla argues that many of these projects target established business that can afford high rents, and thus they are not often suited for young entrepreneurs. He suggests a need for more community spaces, perhaps subsidized by sponsorships.

Al Balla says too often there is skittishness about spending and waste and a fear that government programs will overlap.

"When you invest billions, there will be waste and repetition, but that's okay," he notes. "In Korea, for example, you'll find hundreds of programs competing with each other for the same objective. Over-irrigating is less risky than under-irrigating."

Another challenge is the high salaries paid in Saudi Arabia

30-year-old Yale graduate Omar Christidis is the founder and director of five-year-old, Beirut-based ArabNet, which has brought together hundreds of IT professionals, venture-capital investors and young entrepreneurs in conferences and events across the region.





For Ahmed Zahran, the future of economic growth is "off the grid" in the swaths of the Middle East not served by national electricity networks. In 2011 he cofounded KarmSolar, which is building one of the world's largest solar-powered water pumps and aims to bring renewable energy to desert farming and tourism across the Sinai Peninsula.

and other Gulf states, which he says may create a disincentive for young professionals to take risks: "If you are making \$10,000 per month, why would you work for a startup and leave at 10 o'clock at night, when you can leave in the early afternoon?"

"I don't think there is lack of liquidity," he says. "There are trillions of dollars. There's a lack of maturity among investors, entrepreneurs, regulators. What needs to be done is to create an ecosystem."

It's high time, he asserts, for regional telecom companies that are already making billions to invest in the sector. "If an ecosystem does not mature fast enough, it's going to be given to international companies who will set up shop here."

From his offices in the heart of Dubai's new financial district, Toukan looks down at the rows of towers that line the city's main thoroughfare, Shaikh Zayed Road. Though there are no exact figures, he estimates the current value of the Arab tech industry to be worth the equivalent of a couple of the \$100-\$200 million skyscrapers below.

"If only one percent of what is spent on real estate would go into technology investments," he laments. "Investors are used to traditional investments. Tech is new to them. We need to prove it. Over the last 10 to 15 years, I have done a lot of convincing. I can see things changing. In the beginning people didn't believe at all in what we were doing, but when they start hearing about things like WhatsApp being sold for \$19 billion, I mean this all helps," he exclaims with a laugh.

Though there are new funds coming online, such as Saudi

telecom-giant sTC's launch of a \$50-million fund to invest in small- and medium-sized businesses, Toukan says this is not enough. "We should be talking about billions not millions."

Alfi says the pool of major investors, known in industryspeak as "angel investors," needs to broaden: "The people of my generation—myself, Fadi Ghandour, Samih Toukan—these people are not that many. If there were a few hundred of us, the sector would move a lot faster. So now Fadi funds 50 companies, I fund 50 companies, but if there were hundreds of us it would be fantastic. Hopefully in the next 10 to 15 years, the new generation of entrepreneurs will be playing our role but for a much broader sector."

Another challenge cited by Toukan, Al Balla and other investors is the difficulty of mobilizing talent in the region with the complications of visas procedures, particularly in Saudi Arabia.

On the other end of the spectrum, while poorer countries like Lebanon may be more desirable and accessible destinations, they are beset by massive infrastructure challenges.

Despite the buzz over Beirut's new Digital District, Internet connections in the country remain among the world's slowest. The government has promised to deliver discounted fiber optics to such facilities as Berytech, an incubator and one of the first tenants in the district. Berytech has a \$6 million fund to invest in startups, and it accelerates three firms per year. But so far the facility has obtained just 12 megabits per second of bandwidth that it must share among dozens of tenants, resulting in individual speeds that hark back to late 1990's dial-up era. And yet the costs of even this minimal service are staggering. "We pay \$12,000 per month for 12 megabits," exclaims Berytech Director Nicolas Rouhana. "How am I supposed to help entrepreneurs if I pay that much?"

Meanwhile, the poverty of crumbling neighborhoods like Khandaq al-Ghamiq—visible from the windows of Berytech and the Digital District—is an aching reminder of the deeper challenges of job creation, both in Lebanon and across the region, where the

World Bank estimates 100 million jobs will be needed in the coming decade to absorb new workers.

As suggested by the title of his 2013 book, *Startup Rising*, writer and investor Christopher Schroeder argues that the new generation of Mideast entrepreneurs is poised to have a sweeping impact on the region and its economic future.

"Technology offers an irreversible level of transparency, connectivity and inexpensive access to capital markets unprecedented only five years ago," he writes.

The product of a year of traveling throughout the region, Schroeder's book is a catalog of the dozens of startup successes across the Arab world. He makes frequent reference to the potential of the region's youth population of 100 million under the age of 15, and Internet and smartphone penetration growing at double-digit rates in many countries. Convinced of the industry's future, Schroeder now sits on the boards of both Oasis500 and Wamda, a Beirut-based tech-news agency and organizer of

English, despite the fact that 80 percent of the Arab population speaks only Arabic, according to the United Nations 2005 Human Development Report.

And entrance into the industry is not cheap. A single desk at facilities like Oasis500 or Berytech rents for a starting price of \$300 to \$350 per month, which is about the same as a discounted youth entrance fee to a three-day ArabNet conference. This may not seem expensive in the West, but these numbers are



Early tenant in Beirut's newly established Digital District, Nicolas Rouhana is director of Berytech, which has a \$6 million fund to invest in startups.

entrepreneurial workshops from Casablanca to Doha.

"The youth, well-educated and unleashed, are really an asset. Entrepreneurship generally, and tech availability specifically, offer us tools and capabilities not even on the table to discuss five years ago," he wrote in an email.

Yet at the same time, it's hard to deny that a great number of the industry's young stars come from privileged backgrounds or have attended prestigious universities, often in the West, and that they are generally comfortable in English. In fact nearly every session and speaker at ArabNet in Beirut spoke entirely in characterize most world tech markets. "Is entrepreneurship in Silicon Valley catered to those with little means?"

Industry veteran and Aramex CEO Fadi Ghandour says he too is aware of the divide, and he touts a new partnership with the United Nations Development Program to help fund 200 microbusinesses in Jordan. The initiative, which Ghandour says will also be extended to Lebanon, is offered through Ruwwad, a youth empowerment and volunteering organization that he also chairs.

"The Internet abolishes divides, and it is an equalizer and has brought down the cost of innovation and doing business

roughly equivalent to or greater than the average monthly salaries in much of the Middle East.

In response, organizations like ArabNet and Oasis500 say they offer scholarships and massive discounts to financially challenged individuals with compelling applications.

"There are a lot of ways to get in if you can't afford the fees," says Omar Christidis, ArabNet founder and director. The 30-year-old Yale graduate notes that all who participate in the Ideathon pitching session receive free event access.

"In theory, most of the opportunities are open to anyone regardless of class," he explains over a choppy Beirut Skype connection. "Now does education play a role in filling out the application form? Yes."

And Christidis acknowledges that many of the region's youth may not have the luxury of experimenting with entrepreneurial ideas due to commitments to earn a living. "If you are a breadwinner for your parents, you may be less likely to take the risk," he adds, while cautioning that these same digital divides Saudi national Joumana Al Jabri cofounded Beirut-based Visualizing Impact, which produces data and graphicbased storytelling to map out Middle East social and political challenges not covered in depth by news media. "There's a lot of talent in the region and it's not being utilized in areas that need it most," she says. "Our ambition is to create a precedent that can both address pressing issues and engage highly creative people in data-science technology and design."

substantially," he says. "So the divide exists, but that does not worry me as much as red tape, access to capital and building the infrastructure for enabling people and businesses to transact online."



Indeed, those worries may also endanger the Arab world's ability to retain the precious talent it has built. For example, young hardware developers like Hobeika of Instabeat are weighing options for future locations.

"I think we will have a lot of trouble scaling in the future when we want to create more than one product," she says. "We've been looking into relocating, places in Europe, in the US. We are definitely exploring. You want to hire senior people and high-level expertise."

Sitting in a Beirut café, Bassam Jalgha, the creator of Roadie Tuner, is also torn, facing his next trip to China to oversee the first production cycle. "I want to give hope to people, to tell them it is possible, that we are doing it, even if the situation is bad, that you can still do it." But as car bombs continue to go off in Beirut, he has been considering spending more time in China, and he

Startups for Refugee Relief

By the end of 2014, the number of Syrian refugees in Lebanon is predicted to reach two million, equivalent to a nearly 50 percent increase in Lebanon's population. With many refugees living in tents across the country, technology has empowered several grassroots aid efforts. Inspired by the Syrian families peddling goods on the streets near her university in Beirut, college student Tanya Khalil cofounded the "I am not a Tourist" initiative. Using a highly publicized Facebook page and partnering with relief groups, she organized a clothing drive that in a single day filled more than 25 trucks with winter clothing and bedding.

Rainboots for Syrian Children, spearheaded by furniture designer Hala Habib, mobilized dozens of young volunteers to provide waterproof footwear for refugee children living in muddy campsites. With an online gateway that allows donors to purchase a pair of boots for \$5, to date the initiative has delivered more than 10,000 boots to refugee children across Lebanon. is learning Chinese. "I like it," he says wistfully. "The sad part about being here is nothing is getting better. I came back after six months in China and now it's worse."

And time is of the essence. Governments and institutions that constrain investment or opportunities now are making "terrible choices" that may affect generations, author Schroeder argues. "Technology moves so fast," he says. "If a country falls behind, it is hard to catch up. They will lose their best talent."

But Ghandour remains confident for the longer term: "I understand the risk very well, and I know the rewards. Profits are important, but this industry needs to be built and nurtured, and investors and entrepreneurs have to be very patient before pushing to see profits. Like all business or startups, everything takes time to build."

Ghandour's team at Wamda is now raising a \$75 million fund to support entrepreneurs, a more than tenfold increase on Wamda's previous \$7 million fund launched just three years ago.

"The trends in all areas look good. Green shoots everywhere. We just have to keep pushing and pushing and continue believing and investing," says Ghandour. "Pathfinders are people that are going to take the biggest risks. They are the most courageous and most committed. Their work will be rewarded. History tells us that all the time." (#



Habib Battah (habib.battah@gmail.com and @habib_b) is a Beirut-based investigative journalist, filmmaker and author of the blog www.beirutreport.com. He is also a regular contributor to Al Jazeera, BBC World and *The Daily Star* newspaper. He is a two-time recipient of the Samir Kassir Press

Freedom Award. Cairo-based freelance photojournalist **David Degner** (degner@gmail.com) is represented by Getty Reportage. He studied philosophy and photojournalism at Western Kentucky University.



www.wamda.com

Startup Rising. Christopher M. Schroeder. 2013, Palgrave Macmillan, 978-0230342224.



Scan to link to the video interviews with Arab entrepreneurs.



Vigorous and cheerful, Dżenneta Bogdanowicz gestures for visitors to come inside the small restaurant she runs out of her home in Kruszyniany, a village so remote it feels like it sits at the edge of the world. Bogdanowicz turns 'round and 'round the room. She can be seen and heard everywhere. She joins the guests at their tables, talks to them and smiles widely. Without hesitation, she gives away the recipes of her dishes, such as pierekaczewnik (meat dumplings) and syte (water with honey and lemon juice). She is just as open telling the story of her family, which comes from the land of today's Belarus, and she shares details about its customs, traditions and religion, all of which have been pushed to the brink of extinction many times.

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Bogdanowicz family photographs and an antique Qur'an are among the personal artifacts that help rekindle interest in heritage and cultural expressions. Previous spread: Kruszyniany's wooden mosque, built in the early 18th century and recently restored, is the oldest in Poland. Inset: Dzenneta Bogdanowicz.

A tourism professional herself, Bogdanowicz first visited Kruszyniany (kru-shen-ee-**ahn**-ee), a couple kilometers (a mile) from Poland's border with Belarus, more than 30 years ago on a tour that included small, sparsely populated villages, old farmyards, sandy roads and a powerful silence that, unexpectedly, tapped in her a compelling curiosity about her ancestors. Kruszyniany was no different from hundreds of other quiet villages in northeastern Poland, except for one thing: the celadon mosque that stands in the middle of it. To anyone unfamiliar with Kruszyniany, the mosque might simply be an unassuming place of worship. But to Bogdanowicz, Poland's oldest Muslim While most live in Russia, others are descended from those who began gradual migrations west into what are now Belarus, Poland and Lithuania as early as the fifth century.

Today, they are the survivors of centuries of wars and, most recently, communist political repression of religion, traditions and language. Yet, they fought to hang on to their historic identities—a fact underscored by the weathered, 18th-century wooden mosque wearing multiple shades of green, the centerpiece of Kruszyniany and the village's only landmark of more than local note.

On her first tour through the village, Bogdanowicz also

house of prayer was a beacon illuminating a nearly forgotten heritage.

Polish Tatars are Muslim peoples of largely Central Asian descents and Polish customs, and in Kruszyniany, population 160, they live among both Catholic and Eastern Orthodox Christians. Heirs of the Mongol empire, Tatars are descendants of Batu Khan and the Golden Horde.



came across the Tatar *mizar* (cemetery), almost overgrown by forest. The mosscovered headstones, she realized, were those of her ancestors. "I had a moment of enlightenment. Suddenly I felt the call of the blood, of the land," she

In the dining room of her Tatarska Jurta, Bogdanowicz helps visiting teenagers learn to knead dough for one of her many Tatar recipes. It was when she found Kruszyniany's Tatar *mizar* (cemetery), Bogdanowicz says, that for the first time, "I thought of myself as a Tatar of Polish origin. I had to come back."

recalls. For the first time, "I thought of myself as a Tatar of Polish origin. I had to come back."

Tatars who settled in this region in the 14th century were speaking Polish, Lithuanian or Ruthenian by the 16th century, and their surnames had usually



taken on Polish forms. Most of the dress and rituals customary of steppe nomads faded as well. But as the Kruszyniany mosque silently proclaims, their religion endured.

Dzemil Gembicki, guide and conservator of the Kruszyniany mosque, says Polish Tatars have three defining characteristics: Tatar ethnicity, Polish nationality and Islamic religion. Zofia Bohdanowicz, from Bohoniki, a nearby village similar to Kruszyniany, in which stands the other of Poland's oldest mosques, echoes his sentiments. "My family has been living here for generations, and I am Polish, but what distinguishes me and my children is the different religion. That is why we are Polish Muslims. If there is no Islam, there is no us," she been given its land in the late 17th century by Polish King John III Sobieski in recognition of their ancestors' military service. In her own tour-guide work, Bogdanowicz began to include Kruszyniany, where she took tourists to a cottage once inhabited by her husband's family, as well as to the mosque and mizar.

It didn't take long for her to realize that those drawn to this village had no place to eat and relax. Not minding tourists at their home, the couple set up a few tables and benches outdoors. The Tatarska Jurta (Tatar Yurt), as the simple restaurant was called, offered specialties of Tatar cuisine from late spring into the fall. Over time, and with the help of their three daughters, the couple renovated the house, and they began inviting guests

Bogdanowicz decorated her restaurant with family photos and Tatar traditional dresses.



says. "I am a Polish Tatar Muslim. All these three terms are important for us."

Bogdanowicz was only 20 when she made her first visit to Kruszyniany. After her visit, she returned to Bialystok for her studies. There, she met Mirek, her future husband and a native of the historic village. After marrying, they visited Kruszyniany often to see his family, which, similar to many other Tatar families, had inside to eat and sample a taste of Tatar family life. They eventually added on to the house, moved upstairs, and made the entire downstairs the restaurant, as word of the Tatarska Jurta was spreading. In 2003, she and Mirek moved there permanently.

Now, arriving guests enter through a small room in which family photographs hang on the walls. Women in these pictures have Asian eyes and raven-black hair, and swarthy men wear Polish military uniforms.

"My mom rules in the kitchen. The dishes we serve are exactly the same as the ones I was eating in my childhood during Muslim holidays," said Dżemila, one of Dżenneta and Mirek's daughters. "My mom gathered some of the recipes when she was visiting Tatar households that are scattered all over Poland. Today, their pile would make a bulky cookbook." Word of mouth and online reviews about the restaurant's atmosphere, the vivacious personalities of the restaurant's staff—especially Bogdanowicz—and the refined Tatar cuisine continue to spread. Now, connoisseurs are traveling for hours to eat pierekaczewnik and drink coffee laced with cardamom.

Patrons who talk to Bogdanowicz between scrumptious bites inevitably learn that Kruszyniany is a part of the historic Tatar Trail, largely a network of roads that connect seven main towns and villages in northeast Poland, all sparsely populated and influenced in different ways by Polish and eastern European customs. About 150 kilometers (90 mi) at its greatest length, the trail winds through the picturesque Sokółka Hills and Knyszyńska Forest to connect Sokółka, Bohoniki, Malawicze, Krynki, Kruszyniany, Supraśl and its most populous town, Białystok. Following the trail, one can not only learn about the history of Polish Tatars, but also get a taste of modern life and

Guide and conservator of Kruszyniany's mosque, Dżemil Gembicki sits with a copy of the Qur'an in front of the mosque's wooden *mihrab*, oriented toward Makkah. Polish Tatars, he says, have three defining characteristics: Tatar ethnicity, Polish nationality and Islamic religion.




Like Bogdanowicz and other Tatar families, Bronislaw Talkowski lives on the land given to his family in the late 17th century by King John III Sobieski as compensation to Tatar soldiers for their military service. Talkowski is chairman of Kruszyniany's Muslim parish, one of only two in Poland that predate World War II. Above, right: A signpost in Krusziniany points the way to the rest of the world.

culture. One of the most noteworthy places on it is Kruszyniany, as it is one of few villages that, due almost entirely to Bogdanowicz's efforts, comes back to life during Muslim holidays and cultural festivals.

Bogdanowicz noticed the need for cyclic events that would allow for the rebirth of Tatar traditions and customs. It was on her initiative that the first Festival of Polish Tatars' Culture and Tradition was organized a few years ago. There were band performances, dances, songs, handicraft demonstrations and competitions. Everyone was invited to participate in Tatar cooking workshops, bow shooting and horse riding. Interest exceeded even her boldest expectations. "Again, Kruszyniany became teeming and lively. I am happy that many Polish Tatars, just like me 30 years ago, felt the call of the blood and now want to come back," she says.

Seven years ago, she reintroduced the *Sabantuy*, which literally means "Plough Festival," a Tatar Muslim folk tradition dating back more than 1000 years that celebrates the end of the spring agricultural season. Villagers and their guests gathered for games, competitions, Mongolian-style archery and horseback riding, and the most valuable prizes were rams and handmade towels.



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Today, visitors who choose to tour the mosque in Kruszyniany may be greeted by a beaming Gembicki, whose Central Asian features reveal his unmistakably Tatar ancestry. He explains how the mosque is divided into spaces for men and women, and he shows the wood-covered walls decorated with calligraphy and pictures of Makkah and Madinah. The floor is covered with carpets. The *mihrab* in the southern wall indicates the direction of Makkah. Above it, a brightly lit crescent with a star shines. "It is the symbol of Islam," Gembicki says, as he sits on the stairs of the *minbar* (pulpit), where the *imam*, or prayer leader, preaches during the weekly Friday service. He explains that although many Polish Muslims no longer understand Arabic, the Qur'an is nevertheless recited in Arabic.

Then, Gembicki leads visitors to a small hill covered with trees. Their thick canopies guard the Muslim cemetery where Bogdanowicz found her ancestors' graves. Here, it is clear how Tatars blended with their eastern European surroundings. Through years of wear and tear, Arabic, Russian and Polish inscriptions can be seen on the headstones dating from the 18th century.

The history of Tatar settlement in northeastern Poland is connected with the King John III Sobieski, whose life was saved by Colonel Samuel Murza Krzeczkowski, commander of the Tatar regiment, during the battle of Párkány, which occurred as part of the Battle of Vienna in 1683 against the Ottoman Turks. As wages for their service, the king gave the Tatars the lands along what is today's Tatar Trail. Even today, residents of Kruszyniany can point to the place, overgrown with old linden trees, where the manor house of Krzeczkowski once stood.

The Tatars slowly blended into their newly bestowed homeland. "They gave in to it consciously, but at the same time, they were protecting their beliefs. In Poland, being Tatar also meant being Muslim," says Ali Miśkiewicz, a historian and editor of *Yearbook* of Polish Tatars and other works





In Białystok, the largest town in the region, the Tatar folk group Bunczuk helps both adults and children maintain the traditional folk repertoire of songs and dances.

on Tatar history. Their traditions survived in major centers both in Lithuania and in Poland, where they taught their religion and built their own places of worship, he adds. And as Musa Czachorowski, spokesperson for the *mufti* (chief Islamic legal official) of the Republic of Poland, says, "Muslims lived in Poland for 600 years and the Polish law never forced us to act against the rules of Islam."

In the 1920's, about 6,000 Polish-Lithuanian Tatars lived among some 19 communities and worshipped in 17 mosques. In 1925, they established the Muslim Religious Association (Muzułmański Związek Religijny) and attempted to unite all Muslims in Poland. They also established the Cultural and Educational Union of Polish Tatars, where they developed social and cultural activities.

Dżemil and Kasia Gembicki, who are, respectively, Muslim and Catholic, play at home in Kruszyniany with their children. The couple explains they are raising Selim, left, Muslim, and Lilia Catholic.

Living in a non-Muslim country, Polish Tatars naturally absorbed their surroundings and, to a certain degree, assimilated. For instance, it is typical that Polish-Lithuanian Tatar women have never covered their heads or faces. "Although I sit with women in the mosque, there are equal rights at home," Bogdanowicz says.

Architecture was influenced as well. The wooden mosques in Kruszyniany and nearby Bohoniki differ in outward appearance only a little from Catholic and Orthodox churches, except for their distinguishing crescents.

Tatar writing is another example of cultures intermingling. Their literature was written in Polish and Lithuanian, but also contained Arabic, Ottoman Turkish and Tatar elements. For the Qur'an

and other religious writings, Tatars at times used a form of Arabic developed to allow phonetic reading of the words in either Polish or Belarusian.

Some things, however, remained the same. Weddings continue to be held on large swaths of sheepskin, a symbol dating back to the Golden Horde that represented home, wealthand stabilization.

However, in what seemed like an overnight sweep, Soviet communists worked feverishly after World War II to stamp out the individual cultures and religion of Tatars throughout Poland, Russia, Lithuania, Estonia, Latvia, Ukraine and Belarus. Settlements, educational and cultural institutions, and many mosques were destroyed. Members of the Tatar intelligentsia were arrested, some repeatedly, deported or murdered. The population of 6000 Polish-Lithuanian Tatars was reduced to around 3000.

At that time, the communist authorities did not accept any national and ethnic minorities. Thus the "Tatar Trail," established in the 1960's, was promoted as a mere tourist attraction, a ploy to reduce the Polish Tatars to an ethnographic curiosity. Polish Muslims were forced to fraternize with immigrants from the Middle East and North Africa on the basis of "religious community." This contributed to the reduction of ethnicity and, in many cases, the complete loss of it. Many Tatars who were born at that time do not know today how to pray in Arabic.

Not wanting to be identified by name, a Tatar woman in Sokółka says, "I have not learned religion as it should be done. I do not know and cannot do many things. Every now and then, a Tatar would come to our house to teach us how to pray, and my grandparents taught me to read Arabic letters."

After the fall of communism in 1989, the Tatar community began to revive itself in Poland. The Muslim Religious Association of Poland now has eight communities-Białystok, Gdańsk, Warsaw, Bohoniki, Kruszyniany, Poznań, Bydgoszcz, and Gorzów Wielkopolski-that embrace the population of about 5000 Polish Tatar Muslims. The association represents



In a Białystok classroom, Maria Aleksandrowicz-Bukin, who chairs the Muslim Religious Association in that town, leads a lesson about Islam.

Polish Muslims before the state, provides religious and spiritual services, and maintains historic sites and cemeteries, such as the one in Kruszyniany. It also hosts marriages, funerals and prayer services. The association organizes the celebrations of Muslim holidays—Kurban Bayram ('Id al-Adha) and Ramadan Bayram ('Id al-Fitr)-and other ceremonial occasions.

Today, many of the Muslim community's rituals are performed not only for Muslims, but also for non-Muslims interested in inter-religious dialogue. "It is conducive to learning about each other, building respect, discovering common values in both religions and breaking stereotypes," says Agata Skowron-Nalborczyk, an associate professor at the Faculty of Oriental Studies at the University of Warsaw.

Today, about 20,000 to 30,000 Muslims live in Poland, and

they comprise a mere 0.6 percent of Poland's population. Although the community is small, it is diverse: The largest group of Muslim newcomers hails from Arab countries, but also there are Turks, Bosnians and refugees from Somalia, Afghanistan, Chechnya and Syria.

Of the 5000 Tatars in Poland, most live in Białystok and other cities. Tatar villages such as Kruszyniany and Bohoniki are mostly deserted except during Muslim holidays when Muslims travel there with their families to pray in mosques and visit cemeteries. It is then they taste the increasingly famous dishes offered by Bogdanowicz.

Polish Tatars are keenly aware that the survival of culture depends on children. For several years schools in Tatar communities have begun to offer curriculum for Tatar children, and community-based cultural and religious instruction is increasingly common. They also get to know Tatar tradition and history from the stories and values handed down by the family, especially grandparents, and from activities of Tatar organizations and associations.

For many years, Tatars often dreamed and prayed that

they once again could teach the forgotten Tatar language. They realized their dream in 2012, when the opening lesson of Tatar language was held in Białystok. "After over 400 years of 'silence,' we have the opportunity to use the language of our ancestors," announced the Central Council of the Union of Tatars of the Republic of Poland.

Because of their heritage, Tatars may well be Poland's strongest bridge between the West and the East, between Islam and Christianity, as they retain their religious roots while comfortably living among people of other heritages and faiths. "Tatars," as Miśkiewicz says, "who feel Polish, should never forget about their origin and belief, but as Tatars they should always remember that Poland has been their homeland for 600 years, and that they will always be an integral part of the society."



Katarzyna Jarecka-Stępień (jareckakat@gmail.com) holds a doctorate in humanities from Jagiellonian University in Krakow, where her research focuses on how society and culture influence the effectiveness of international aid. She also runs workshops in intercultural communications.

Photojournalist Aga Luczakowska (www.agaluczakowska. com) began her career with the Dziennik Zachodni (Western Daily) newspaper in Poland, and she currently freelances from Bucharest, Romania. Her work has appeared in the New York Times' "Lens" blog, The Washington Post and The Guardian.



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It is hard to imagine springtime in northern Europe, or much of the US, without the crocuses, tulips, narcissi, hyacinths and numerous other flowers that arrived from the Muslim world. It is almost as hard to imagine European cuisine without the fruits and vegetables of the Americas: potatoes, corn, peppers, tomatoes and squashes—to say nothing of chocolate, pineapples and vanilla.

Plants both have moved and have been moved since time immemorial, but during Greek, Roman and Islamic classical periods, interest lay primarily in those of economic or medical importance. Purely decorative flowers were felt to have been of limited few flowers for their beauty or rarity among the more than 180 listed in his *Diwan al-Filaha* (*Book on Agriculture*). This might seem surprising today, since he was head of the royal botanical gardens in Toledo, and later in Seville.

importance until the 16th century, although scented ones were considered health-giving and hence classed with herbal drugs.

Treatises, from Cato's On Agriculture, written around 160 BCE, to works on agriculture from botanists in al-Andalus and elsewhere in the Muslim world of the Middle Ages, tend to concentrate on these categories. Even Ibn Bassal, who collected plants in the late 11th century while returning to Spain from the Hajj, mentions



Control offic at Alexandra and an and a second state and a second state of a boot to control four sounds for a second state and an another offic to point branch for sound and to be a second state of the second state of the toppoint branch that states and to be the second state of the toppoint branch that the second state of the second state of the toppoint branch that the second state of the second state of the second states and second states an The first wave of plant introductions about which we have written records took place during the classical period. Alexander the Great, for example,

Probably introduced to Europe in the 13th century, saffron crocuses have long held both medical and, most importantly, economic value. *Crocus sativus* appears on this folio, far left, from a 10th-century Arabic version of Dioscorides's *De Materia Medica* and in this 15th-century illustration, left, a woman harvests crocus blossoms for saffron.

Opposite: Narcissi adorn this detail of a box from Kashmir painted in Mughal style.

is credited with bringing the lemon and the peach to Europe as a result of his Persian campaigns in the fourth century BCE. Other citrus fruits were known around the Mediterranean, especially the citron and almost certainly the bitter—or "Seville"—orange. Agriculture declined after the fall of the Roman Empire in the fifth century CE, and many plants, including



citrus, were introduced or reintroduced in the wake of the Muslim entry into Europe in the eighth century.

Another wave came during the Crusades. Once again, practical considerations seem to have been paramount. The English geographer Richard Hakluyt, writing in the 1580's on the value of plant introductions, relates how a pilgrim "purposing to do good to his country" risked his life by smuggling saffron crocus bulbs back to England in his staff—an echo of the tale of the monks who allegedly smuggled silkworm cocoons from China

> THE LAST ICE AGE GREATLY REDUCED THE FLORA OF MUCH OF NORTHERN EUROPE, AND TRAVELERS FROM THOSE LANDS WHO CAME INTO CONTACT WITH THE INFINITELY RICHER FLORA OF EURASIA WERE AMAZED AND IMPRESSED.

to Byzantium in the sixth century CE.

The crocus, which now carpets northern European gardens in spring, appears to have arrived in England in the mid-13th century. Its name comes from the Aramaic *kurkama*, and it is native to the Mediterranean and Eurasia.

The *Crocus sativus* was almost certainly domesticated in Crete, where it has been cultivated for saffron for at least 3000 years. Saffron was so valuable as a spice, medicine and dye that rules against adulteration appear in nearly every code dealing with quality control. The significance of the crocus lay not in its beauty, but in its value as a cash crop.

Another plant that seems to have reached England in the mid-13th century is the hollyhock. Long synonymous with traditional cottage gardens, it is native to Eurasia. A number of species come from Central Asia, and they appear in the background of many miniature paintings, particularly those of the Herat school of the mid-15th century. (See illustration, *left.*) The name is thought to derive from "Holy Hoc," or "holy mallow," because it came from Palestine. Like many of the family, including marsh mallow and the popular Egyptian and Tunisian vegetable *mulukhiyya*, the hollyhock was held to have me-

This miniature, dated to around 1430, by a painter of the Herat school, illustrates a royal garden abundant in hollyhocks, which were particularly common in Central Asia and reached northern Europe about the 13th century.

A stylized tulip adorns a tile in Istanbul's Rüstem Pasha mosque, completed in 1563. With many species originating in Central Asia, the tulip became one of Ottoman Turkey's most popular flowers and artistic motifs.

dicinal properties, and was probably introduced for that reason.

England had its own rose—*Rosa canina*—when the beautiful and highly scented *Rosa damascena* reached its shores in the 13th century, probably from Syria, where it had been an important cash crop for centuries. Syrian naturalist al-Dimashqi, writing around 1300, discusses it purely in economic terms as the key ingredient in making "the celebrated rose-water of Damascus."

It was horticulturalists in the Far East who had long practiced selective breeding to increase the varieties of decorative plants. Their attitude seems to have percolated west into both the Muslim world and Europe by about 1500. Babur, founder in the early 16th century of the Mughal Empire in India and a passionate lover of nature and creator of gardens, adored tulips. He wrote in 1504-5 of the Kabul region—located within the center of diversity for the tulip genus:



Tulips of many colors cover these foothills; I once counted them up; it came out at 32 or 33 different sorts. We named one the Rose-scented, because its perfume was a little like that of the red rose; it grows by itself on Shaikh's-plain, here and nowhere else. The Hundred-leaved tulip is another; this grows, also by itself, at the outlet of the Ghur-bund narrows, on the hillskirt below Parwan.

Later, Babur would try to introduce to India numerous plants from his home-

land of Uzbekistan as well as from Kashmir. Some of these appear in Mughal miniatures, and they also became decorative motifs in embroideries, textiles, carpets and furniture, as well as carving and inlay.

The passion for tulips

in their many varieties spread westward by way of Iran and the Ottoman Empire, which experienced a period of intense interest in flowers and gardens in the 16th century. Tulips, hyacinths, roses and carnations were the favorites, together with narcissus and blossoms. Tulips are represented over and over again, on countless tiles, on the famous ceramics from Iznik, in the decorative paintings in palaces, on the lacquer covers of manuscripts and in textiles—from silk velvets to embroidered muslin scarves. There are even tulips all the way up the minaret of a recently restored 18th-century mosque built at the height of the *Lâle Devri* (Tulip Period) in Durrës, Albania.

The 17th-century Ottoman traveler Evliya Çelebi describes the gardeners' guild in Turkey and makes numerous mentions of flowers and their uses. Scented ones, for example, were placed in mosques, and great trays of them accompanied the procession when the Hajj caravan to Makkah set out from Istanbul. He also describes the Edirne gardens at the palace of Suleiman the Magnificent: They "cannot be equaled by any other garden on earth, not even that in the imperial city of Vienna in the lands of the Germans." Its list of flowers includes "Chinese hyacinth."

Produced in the 1630's for Mughal prince Dara Shikoh, this folio elegantly depicts several flowers of Central Asia and Kashmir including several that were also introduced into Europe: roses, irises, delphiniums and what may be Asian marigolds.







The popularity of tulips, both as flowers and as motifs, spread west and north from Turkey. In Durrës, Albania, this 18th-century minaret is adorned with tulips. Although the greater migration of flowers west from China did not begin until the mid-18th century, a treatise entitled *Tuhfe-i Çerağan (The Excellence of Festivals*), written in the early 18th century during the reign of Sultan Ahmed III, gives an idea of how nocturnal flower-viewing festivals by lamplight came from China with returning embassies.

Above all, however, information on various flowers comes from beautifully illustrated treatises, some of the finest examples of which are preserved in the library at Topkapı in Istanbul. A *Sümbülname (Hyacinth book)*, dating from about 1736, illustrates 42 varieties. (Ironically, judging by their names, one or two had come back to the Ottoman world from Holland.) Other albums give detailed information on the provenance of the flowers, their cultivation and often notes on major plant breeders and collectors, as well as the names of famous bulbs and their owners, and even prices.

"The narcissus came from Algeria. It was first sown here by Ahmed Çelebi," writes Abdullah Efendi in *Sükûfenamesi*, a 17th-century treatise on narcissi. He goes on to describe varieties and their cultivation, illustrating dozens. This contrasts with earlier writers, who offered much sketchier information. For example, the Persian traveler Nasr-i Khusraw writes of his journey on the coast road from Hama to Damascus in 1047 that "we came to a plain that everywhere was covered with narcissus flowers in bloom, and the whole plain appeared white thereby," yet he provides no further details.

And Ibn Bassal only mentions "white narcissus," "yellow narcissus" and "jonquil" in Spain, even though it was a center of diversity for narcissi.

England has its own native wild daffodil (*Narcissus pseudonarcissus*), made famous by Wordsworth, but by the 16th century, gardeners

were on the lookout for new varieties. John Tradescant, a noted horticulturalist, writes in one of his plant lists:

Reseved in the yeare 1630 from forrin partes. From Constantinople Sr Peter Wyche [the British ambassador]:

....On narciss On ciclaman 4 renuncculuses Tulippe Caffa Tulippe perse 4 sortes of Anemones....

Two years later, he received hyacinths, tulips and

"THERE WERE THOSE WHO HAD FLOWERS IMPORTED WITH THE GREATEST DIFFICULTY FROM INDIA, FROM MAGHRIB AND ALGERIA, AND FROM DISTANT EUROPEAN COUNTRIES, AND WHO SPENT ALL THEIR TIME BREEDING AND CULTIVATING FLOWERS.... [I]N SOME ACCOUNTS IT IS RECORDED THAT THE NUMBER OF VARIETIES AND KINDS OF TULIP REACHED 481 OF WHICH 149 ALONE WERE FROM CRETE AND CYPRUS."

-Abdülaziz Bey, c. 1900, cited in Nurhan Atasoy, A Garden for the Sultan, 2002

several kinds of narcissus, including "Narcissus Constantinopolis," which was probably *Narcissus tazetta*, the variety admired by Nasir-i Khusraw.

There are books on carnations and other flowers, but roses and, of course, tulips, were by far the most popular. According to an 18th-century treatise, it was Ebüssuud Efendi, the chief judge under Suleiman the Magnificent, who was responsible for the popularization of tulips. For instance, when he was given a white tulip—probably a spontaneous mutation discovered growing wild in Turkey's Bolu region—he propagated it in his garden.

Another *Sükûfenamesi*, by Fenni Çelebi, provides extensive information about the "Cretan tulips" collected and propagated by Mehmed Aga, perhaps to while away the 21-year siege of Candia (Heraklion) in Crete—the longest siege in history. The Venetian-ruled city finally fell to Ottoman forces in 1669, whereupon he was able to take his flower collection safely home to Istanbul.

By the 16th century, the passion for new and exotic varieties of flora had taken firm root in Europe, and flowers like tulips were

An illustration from the 17th-century German *Album Amicorum (Album of Friendship)* shows a number of flowers introduced from the East including tulips, irises, anemones, a fritillary, wild gladiolus, and more.





actively sought out for their aesthetic rather than practical qualities.

There is some debate about how the tulip got its name and how it arrived in Europe. In 1546, French naturalist Pierre Belon set off on a scientific journey through Greece, Asia Minor, Egypt, Syria and Palestine, and he published his *Observations* in 1553. He comments that it was the fashion for Turks to wear tulips in their turbans, or *tülbend*, which the tulips themselves at least vaguely resembled. Since the Turkish word for tulip is *lâle*, it has been suggested that the modern English name is the result of confusing the headdress for the flower.

There is no evidence, however, that Belon sent tulip bulbs home. A plausible theory is that the Austrian diplomat Ogier Ghislain de Busbecq gave some to his friend Carolus Clusius, the Flemish botanist in charge of the imperial medical garden at Vienna. De Busbecq was ambassador at the court of Suleiman the Magnificent, and he spent part of each year from 1554 to 1562 in Istanbul. Besides tulips, he is credited with sending home a number of other bulbs and plants, among them lilac, the grape hyacinth and the plane tree, to friends in Vienna and elsewhere. Later in his career, Clusius moved to Leiden, where he This miniature shows Europeans dining in a garden with two Turks. Such an occasion might have led to a gift of flowers, seeds or bulbs or advice on where they could be purchased.

founded one of the first academic botanical gardens in Europe. From these transmissions sprang the extraordinary phenomenon of "tulipomania" in Holland in the 1630's and the multimilliondollar export industry of today.

Massive demand for bulbs was nothing new, however. In *A Garden for the Sultan* (2002), Nurhan Atasoy cites ledgers from Topkapı showing, for example, that in 1592 there was an urgent request for 50,000 white and 50,000 blue hyacinths from the summer pastures at Maraş in south-central Turkey.

Diplomats and merchants were important in the transmission of garden flowers back to Europe. They were in contact with the kinds of people who collected plants, who had gardens, and who also would have known where to obtain specimens. Clusius mentions that he saw the first scilla (*Scilla siberica*) in bloom in Vienna in 1575, grown from bulbs given to him by a member of the imperial delegation to the Ottoman Porte. Today, scilla provide a carpet of brilliant blue in northern gardens in early spring.

It is not clear whether lilies are native to western Europe, but the Madonna lily (*Lilium candidum*), which originated in the Balkans and western Asia, was certainly present as far back as classical times. As the name indicates, it came to have great symbolic importance through its association with purity and virtue.

Other varieties of lilies came along the route from Constantinople. The spectacular Crown Imperial (*Fritillaria imperialis*) is native to the area stretching from Kurdistan to the foothills of the Himalayas, where the red version was used for

dye. It is the subject of numerous legends and a common motif in miniatures and embroidery. Clusius received bulbs forwarded from the Ottoman Empire to Vienna in 1576, and soon it was the "must have" in elegant gardens, although it is relatively little grown today. The yellow variant—*lutea*—was first mentioned in 1665.

One more 16th-century introduction, probably along the same route, is the Turk's Cap Lily—*Lilium martagon*. It grows across Eurasia, but there is some debate as to whether it is also native to certain areas of Europe. The word *martagan*, meaning a small, tightly rolled turban in Turkish, suggests that, wherever it may grow, it reached Europe from the Ottoman world. It appears in English in the 16th century and is apparently mentioned as growing in Bergen, Norway, by 1597, which gives an idea of how quickly fashionable plants spread.

Lilac (*Syringa vulgaris*), another important symbol of spring across eastern Europe, is native to the Balkans, but because of religious and political divisions, it reached western Europe from the gardens of Constantinople from two directions: De Busbecq carried it to Vienna, while the Venetian ambassador introduced it to Italy. Sir Thomas Roe, the English ambassador to both the Mughal and the Ottoman courts in the early 17th century, sent home plants at the request of John Tradescant, head gardener to various members of the nobility, including George Villiers, Duke of Buckingham, and King Charles I.

This was a period marked by great competition to produce the finest gardens with the most unusual plants. Buckingham asked merchants in the Levant to send him any exotic and unusual flowers "I VERY MUCH WANT TO BRING SOMETHING BACK SOMETHING FINE, FOR IT IS THE DUTY OF EVERYONE TO ENRICH THEIR HOMELAND WHEN THEY CAN WITH BEAUTIFUL THINGS FROM ABROAD. AMONG OTHER THINGS, I THINK THAT IT WOULD BE POSSIBLE FOR ME TO FIND SOMETHING NEW IN THE WAY OF FLOWERS, BECAUSE HERE THERE ARE MANY AND THEY TAKE GREAT INTEREST IN THEM."

-Pietro della Valle in Istanbul, June 27, 1615

they could acquire. It is not surprising, therefore, that Tradescant was sent on missions to the Netherlands, from which he



introduced a number of plants that had arrived from the Middle East. He also went on an expedition to Russia, and from there he brought back new species, including the larch and a type of pink that was apparently highly scented. (Sadly, Tradescant could not vouch for this himself: He had no sense of smell.)

Pinks had symbolic importance in Europe, and they appear in many paintings and in the borders of manuscripts, but always as small, flat flowers with five petals. The richly frilled carnations beloved of the Ottomans

This illustrated album of Persian poetry dates from the early 18th century, and this folio shows a damask rose set among a spray of fruit blossom, violets and a scilla. were clearly different and almost certainly cultivated, probably as a hybrid from the Mediterranean *Dianthus caryophyllus*, since there are no wild progenitors. These pinks reached England from Constantinople in the mid-16th century and seem to have been double-flowered, scarlet and with the characteristic clove scent.

Selective carnation breeding began both in Ottoman gardens and in the West. By the early 1600's there were dozens of varieties—one English list

mentions 63, and the Turkish *Karanfil Risalesi* (*Carnation Treatise*) illustrates some that were to provide the ancestors for the modern carnation, which is today perhaps the most widely sold flower in the world.

Taking advantage of the opportunity for further travel, in 1620 Tradescant volunteered for an expedition against the corsairs of Algiers. The expedition was not a success, but he managed to go ashore near Tétouan, Morocco, writing "that he saw many acres of ground in Barbary spread over with the Corne Flagge or Gladiolus." Even into the late 20th century, fields of the bright magenta *Gladiolus byzantinus* were still a spectacular sight in North Africa.

The gladiolus family largely grows south of the Sahara, but this species, which adapted well to the north, quickly became popular, and it is the ancestor of the much larger garden gladiolus today. Surprisingly, it does not seem to have attracted attention among gardeners and artists in the Islamic world, perhaps because it was associated not with gardens but with agriculture—as a weed! Other spoils from this expedition included the "Algiers apricot," a variety superior to that known in England at the time, and the wild pomegranate (the cultivated variety was already known) "of an excellent bright crimson color, tending to a silken carnation," Tradescant writes.

During much of this time, all of these plants from the East were also moving even farther west, carried by enterprising horticulturalists across the Atlantic to North and South America, and often naturalized there. By the middle of the 18th century, flowers that had been the pride of gardens in Constantinople, Aleppo, Vienna and Leiden were becoming commonplace in Alexandria, Virginia, and nearby Georgetown.



Caroline Stone (stonelunde@hotmail.com) divides her time between Cambridge and Seville. Her latest book, *Ibn Fadlan and the Land of Darkness*, translated with Paul Lunde from the medieval Arab accounts of the lands in the Far North, was published in 2011 by Penguin Classics.

Related articles at www.saudiaramcoworld.com Crocuses and saffron: S/O 13 Ottoman garden in St. Louis: N/D 10 Orchids in Arabia: S/O 06 Roses in Taif: N/D 97



FOR STUDENTS

We hope this two-page guide will help sharpen your reading skills and deepen your understanding of this issue's articles.

FOR TEACHERS We encourage reproduction and adaptation of these ideas, freely and without further permission from *Saudi Aramco World*, by teachers at any level, whether working in a classroom or through home study.

Curriculum Alignments

To see alignments with us national standards for all articles in this issue, click "Curriculum Alignments" at www.saudiaramco world.com.

Julie Weiss is an education consultant based in Eliot, Maine. She holds a Ph.D. in American studies. Her company, Unlimited Horizons, produces textbook materials and develops social studies, media literacy and English as a Second Language curricula.

CLASS ACTIVITIES

This Classroom Guide looks at the creation of a high-tech industry in the Arab world, and it asks students to think about what kinds of people start an industry and how they do it. The Visual Analysis segment is embedded in the rest of the activities; it gives students a chance to explore what photographs can reveal about people.

Theme: Creating an Industry

This is a very exciting time in the Arab world: Technology developers and investors are creating a high-tech industry there. This may sound rather ho-hum to you if you've grown up with computers, cell phones and the Internet. But it's quite a big deal. It's not often that a brand-new industry comes into being in a particular place. It happened in the late 1700's and early 1800's in Britain and the United States, when steam power made it possible to mass-produce cloth in factories. It happened in Saudi Arabia in the 1930's when drilling for oil started to become central to the country's economy. Now it's happening again, and "#techboom #arabnets" gives you a front-row seat to the birth of an industry.

Tools: A Glossary

There's some vocabulary in "#techboom #arabnets" that you will need to learn to join a discussion about the birth of the high-tech industry in the Arab world. Some of the words you may know already, but they're used differently here—for example, *exit, network* and *incubator.* Other words and terms may be new to you—such as *entrepreneur* and *venture capital.* List the words and terms you don't know as you come across them. Find out what they mean and write down the definitions. By the time you finish the activities, you will have a glossary of words related to the world of high-tech business.

Tools: A Map

Download and print a blank map of the region to keep with you as you work. (You can also copy a map from an atlas if that's easier.) As you read about hightech developments in different countries, use the map to orient yourself. Make your map a visual guide to the content of the article. Find a way to code each country that will show a viewer what's going on there. (Remember, that viewer might be you if at some point you want to review what you've learned, which is always a good idea.) Think of the map as being like the kinds of maps you might see accompanying an article in *Saudi Aramco*



World or find in one of your textbooks. Now, with tools in hand, read "#techboom #arabnets."

Who are the people who start big things? What are they like?

One way to understand how big ventures start is to look closely at the people who start them. Two words come to mind, and both appear in "#techboom #arabnets." The first is *innovator*. What does *innovator* mean? Working alone or with a partner, look it up and write down a definition. Be sure to look at the word's Latin origin. How does knowing the word's origin enrich your thinking about innovators? The other word is *entrepreneur*. Again, look it up, write down a definition, and think about what knowing the word's origin adds to your understanding.

"#techboom #arabnets" reports that the tech industry in the Arab world is only about 10 years old. In industry years (as opposed to people years or dog years), that's still very young. What kinds of people get involved in such a new effort? Working on your own or with a partner, go back through the article to find out. Look for places that specifically say something about an innovator's personality. And read between the lines-that is, look for what these people say and do, and work backward. How would you describe someone who says and does those things? For example, Hind Hobeika invented Instabeat. Why? Because she wanted a tool that would do what Instabeat does. and there wasn't one. So she made her

own, and now she's going to sell it to others. Given that behavior, how would you describe Hind Hobeika? You might say she is creative, resourceful, determined; that she meets challenges, and so on. Record your answers in a two-column chart. In the left-hand column, list what the person described in the article said or did. In the right-hand column, list the words you would use to describe someone who said or did those things. When you're done, bring the class together, and have pairs share their descriptions. Have a scribe write the words on the board or chart paper. What conclusions can you draw about people who start big things?

What do innovators make? Who pays for innovators to do their work? Now that you know who is involved in the Arab high-tech boom, turn your attention to what they make. We've already mentioned Instabeat. What else are the creators profiled in the article creating? List the products and see if you notice any patterns. For example, do the innovations fall into categories like apps, hardware and so on? How would you summarize what kinds of creations are being developed in the Arab high-tech world? Write a onesentence summary. Discuss with your partner any of the innovations that you think are particularly interesting and explain why you think so. As a class, brainstorm about what high-tech product you might make.

Creating new products costs money. In the high-tech industry, perhaps more than in most, someone has to give the

> innovators money to live on and pay for office space, computers and so on, while they invest their own time and talent to work on their products. Some products work, and some do not. This is why giving money to innovators is risky: There might be a multimilliondollar product at the end, which the investor gets to share in, or nothing at all. Investments therefore go hand-in-hand with innovation. Much of the article focuses on the different ways that innovators get funded to

VISUAL ANALYSIS

Now that you've got a list of adjectives to describe the innovators and entrepreneurs of the Arab tech boom, see what visual analysis can add. The photographs in "#techboom #arabnets" show nine people who are involved in the high-tech startup industry. With a guick glance at the photos you'll notice that each one shows one person, and that most of those people are looking at the camera. But spend some more time looking. Working with your partner, match each photo to the parts of the article that focus on that individual. What does each photo reveal about its subject? What do the photos add to your knowledge of the birth of high-tech in the Arab world? What do they add to your knowledge of the individual's role in that birth? And what do they add to your knowledge of the individual's personality? [Note to teachers: If you don't have time to have all pairs look at all nine photos, assign each pair one photo and have them share their visual analysis with the class.]



IF YOU ONLY HAVE 15 MINUTES...

Many words in English originated in other languages. Take, for example, the word *autodidact*, from the article "Hayy Was Here, Robinson Crusoe." Look up the meaning of the word and write it down. Then notice that the word has two parts: *auto-* and *-didact*. Look up their meanings, too. Working with a partner, list at least three other words that use auto- as a prefix. What do those words mean? How will knowing the meaning of auto- help you understand words you may not know?

Sometimes when you read English, you will see words or phrases from other languages. These are used by English speakers, even though they are not English. Take the phrase *tabula rasa*, also from "Hayy Was Here, Robinson Crusoe." Look up the meaning of the phrase—it is one you may well hear again. As you go about your business in the next week, pay attention to the words you see and hear, and make a note if you hear any that have auto- or -didact in them. See if you can find a situation in which you can casually use the phrase tabula rasa. You'll find that people might be very impressed.

do their work. Where does that money come from? Here are a few questions to guide you: What is a *venture capitalist*? Why are venture capitalists important in high-tech development? What role do governments play in encouraging technological innovation? What is an *exit*? Why might investors and developers want one?

What factors make a place appealing for building a high-tech industry?

Finally, the article "#techboom #arabnets" is organized by place, with a section each for Lebanon, Jordan, Egypt, Saudi Arabia and the United Arab Emirates. What are the pros and cons of locating high-tech businesses in each place? Find a way to add this information to your map of the region. Or make a graphic organizer that shows the information. When you're done, use the data to answer these questions: If I were investing in high-tech, where would I locate my business? Why? What characteristics would make a place a good place for me to invest? Keep in mind that you might decide to locate somewhere beyond the borders of the Arab world. If so, explain where you would be instead, and why. You can share your answers either in writing or in a presentation to the class.



Nine-year-old Carlos Noreña inspects one of the 20 tombstones from a cemetery near Makkah, some of which marked the graves of pilgrims who had traveled thousands of kilometers to perform the Hajj, on display as part of "Roads of Arabia: Archaeology and History of the Kingdom of Saudi Arabia" in Pittsburgh last year. The stone was used twice and has writing—in different calligraphic styles—on each of its sides.

Roads of Arabia:

Archaeology and History of the Kingdom of Saudi Arabia. An eye-opening look at the largely unknown ancient past of the Kingdom of Saudi Arabia, this exhibition draws on recently discovered archeological material never before seen in the United States. Roads of Arabia features objects excavated from several sites throughout the Arabian Peninsula, tracing the impact of ancient trade routes and pilgrimage roads stretching from Yemen in the south to Iraq, Syria and Mediterranean cultures in the north. Elegant alabaster bowls and fragile glassware, heavy gold earrings and Hellenistic bronze statues testify to a lively mercantile and cultural interchange among distant civilizations. The study of archeological remains only really began in Saudi Arabia in the 1970's, yet brought-and is still bringing-a wealth of unsuspected treasures to light: temples, palaces adorned with frescoes, monumental sculpture, silver dishes and precious jewelry left in tombs. The exhibition, organized as a series of points along trade and pilgrimage routes, focuses on the region's rich history as a major center of commercial and cultural exchange, provides both chronological and geographical information about the discoveries made during recent excavations and emphasizes the important role played by this region as a trading center during the past 6000 years. Nelson-Atkins Museum, Kansas City, through July 6; Asian Art Museum of San Francisco, October 24 through January 18, 2015.

Current May

Court and Craft: A Masterpiece from Northern Iraq examines one of the rarest and most beautiful objects in the collection: a precious metalwork bag, made in northern Iraq around 1300. Decorated with a courtly scene showing an enthroned couple at a banquet as well as musicians, hunters and revelers, it ranks as one of the finest pieces of Islamic inlaid metalwork in existence. The exhibition explores the origins, function and imagery of this little-known masterpiece, as well as the cultural context in which it was made, probably in Mosul. The exhibition also includes rare contemporary manuscripts in which similar bags are depicted, a life-size display evoking the court banqueting scene on the lid and related metal objects. Courtauld Gallery, London, through May 18.

Nilima Sheikh: Each Night Put Kashmir in Your Dreams features nine banners painted by revered Indian-born artist Nilima Sheikh for a series focusing on the magical history and contentious present of Kashmir. Completed between 2003 and 2010, these scroll-like works, once scattered across India and Southeast Asia, have been brought together in Chicago alongside two additional works that Sheikh will create especially for this installation. The exhibition's title is derived from a line in a poem by the Kashmiri-American poet Agha Shahid Ali. Sheikh's scrolls combine Ali's poems with excerpts from myriad sources, and her visual references include miniatures, wall paintings and magical Kashmiri folktales. While the paintings focus on the cosmopolitanism of the ancient Silk Roads, their contemporary perspective encourages viewers to think afresh about this contested territory. Art Institute of **Chicago**, through May 18. Mona Hatoum: Turbulence foregrounds the diversity of the artist's work over the last 30 years. The notion of turbulence as a conceptual framework for the exhibition derives from the thematic and formal dichotomies in the artist's work, which render it familiar vet perplexing, inviting yet impenetrable, or, in other words, turbulent. Turbulence also echoes the artist's questioning of herself as distinct from grappling with issues of alienation and displacement. The exhibition presents more than 70 works. ranging from large-scale room installations to smaller works on paper, sculptural objects, kinetic installations and photographs. Mathaf: Arab Museum of Modern Art, Doha, Qatar, through May 18.

Sharjah Art Foundation Exhibitions: Ahmed Mater: 100 Found Objects, through May 22; Abdullah Al Saadi: Al-Toubay, through May 22; Eduard Puterbrot: Between My East and My West, through May 22; Rasheed Araeen: Before and After Minimalism, through June 13; Wael Shawky: Horsemen Adore Perfumes and Other *Stories,* through June 13; **Susan Hefuna:** *Another Place,* through June 13. Various venues, **Sharjah** (UAE).

Christian Marclay: The Clock is a 24-hour single-channel montage constructed from thousands of moments of cinema and television history depicting the passage of time, excerpted and edited together to create a functioning timepiece synchronized to local time wherever it is shown. The result marks the exact time in real time for the viewer for 24 consecutive hours. SALT Beyoğlu, Istanbul, through May 25.

Charles Atlas: *MC9* is a nine-channel synchronized video work with sound, featuring clips from 21 collaborative works between filmmaker Charles Atlas and choreographer Merce Cunningham. This immersive installation encompasses the entire 40-year working relationship between these two visionary artists. Together, they developed a radical new way of incorporating the camera into live performance, which they referred to as "media dances." Rather than using it as a static recording device, they allowed

the camera to play an active part in the choreography. sALT Beyoğlu, **Istanbul,** through May 25.

Hito Steyerl: *Junktime* is "an exhibition that cannot be sustained, that is falling apart before installation has even begun, that flickers on and off to Skype notification sounds, that consists of nothing but these sounds... Junktime is what happens if the rug of time is pulled out from under time-based media." Ashkal Alwan, **Beirut,** through May 31.

Current June

Burnt Generation: Contemporary Iranian Photography offers an opportunity to move beyond cliché and enter the worlds of eight original and engaged image-makers who have lived and worked in Iran. Their photographs reflect the realities of contemporary Iranian society, from coping with the consequences of conflict to conforming to class ideals to taking part in religious rituals, but they take a sideways perspective on public and personal histories. Some of the artists make documentary photography, others portraiture, others fine art or conceptual work, but their subjects are all caught in the web of history, be it personal, historical or political. Somerset House, London, through June 1.

Welcome to Iraq shows the work of 11 contemporary Iraq-based artists, including photography, painting and political caricature, to provide insights into Iraqi culture. The exhibition was originally displayed at the 55th Venice Biennale. South London Gallery, through June 1.

Don't Embarrass the Bureau is a group exhibition featuring artists who question the workings of bureaucracy, in the time of so-called "leaked democracy," by subjecting it to challenges that reveal how sensitive and even precarious it may be. The works in the exhibition query the legitimacy of the structures that govern our social, political and economic life and inspire us to rethink how we perform our roles as citizens. Lunds [Sweden] Konsthall, through June 1.

Sacred Scenes: *lcons of the Orthodox Church* presents works by renowned artist Vlasios Tsotsonis, whose artwork is found in churches around the globe, including in Jerusalem's Church of the Holy Sepulchre. In addition to showing original, large-scale pieces by the artist and studies for his first us pieces, which he is completing at St. Mary in Livonia, Michigan, the exhibition explores the establishment and growth of Arab-American Orthodox communities. Arab American, Museum, **Dearborn, Michigan,** through June 1.

Lost and Found: The Secrets of Archimedes. Archimedes-mathematician, physicist, inventor, engineer and astronomer-lived in the third century BCE. In 10th-century Constantinople, a scribe copied Archimedes' treatises onto parchment. In the 13th century, a monk erased the Archimedes text, cut the pages along the center fold, rotated the leaves 90 degrees, folded them in half and reused them to create a prayer book. This process of reuse results in a "palimpsest." In 1999, the Walters Art Museum in Baltimore and a team of researchers began a project to read the erased texts of the Archimedes Palimpsest-the oldest surviving copy

of works by the greatest mathematical genius of antiquity. Over 12 years, many techniques, novel and traditional, were employed by more than 80 scientists and scholars in the fields of conservation, imaging and classical studies. This exhibition tells the story of the resulting rediscovery of new scientific, philosophical and political texts from the ancient world. The manuscript demonstrates that Archimedes discovered the mathematics of infinity, mathematical physics and combinatorics-a branch of mathematics used in modern computing. Huntington Library, San Marino, California, through June 8.

Perspectives: *Rita Bannerjee* draws on the artist's background as a scientist and her experience as an immigrant. Her richly textured works complicate the role of objects as representations of cultures; by juxtaposing organic and plastic objects, she concocts worlds that are both enticing and subtly menacing. Sackler Gallery, **Washington, D.C.**, through June 8.

Cleopatra's Needle celebrates the Central Park Conservancy's upcoming conservation of the obelisk of Thutmose III, popularly known as "Cleopatra's Needle," explores the meaning of obelisks in ancient Egyptian divine and funerary cults and considers how these massive monuments were created and erected. An equally important part of the presentation shows the significance of this ancient architectural form in western culture. Metropolitan Museum of Art, New York, through June 8.

Living Shrines: Uyghur Manifestations of Faith brings into focus a Uyghur desert tradition of construction of desert shrines to religious teachers and pilgrimage sites, some reaching back as far as the 10th century. For 10 years, photographer and videographer Lisa Rose worked in the Taklamakan Desert in China's northwestern Xiniiana Uvahur Autonomous Region photographing these ephemeral markers of faith. The sites, called mazars, not only are devotional but also encompass personal prayers, often accompanied by such offerings as animals or dolls, the latter left by women praying for children. They express individual invocations, honor teachers or denote burials. Brunei Gallery, soas, London, through June 21.

Helen Pashgian: Light Invisible debuts a new large-scale work by the Los Angeles-based light and space artist. It comprises 12 two-part columns formed of molded acrylic; as viewers walk past, around and between these columnar forms, the sculpture creates an immersive viewing experience that invites meditations on the nature of materials and light. Los Angeles County Museum of Art, through June 29.

Current July

Etel Adnan in All Her Dimensions highlights the different aspects of the work of the Lebanese-American visual artist, poet, playwright and essayist, still active at almost 90. The exhibition includes paintings, drawings, leporellos (accordion-folded artist's books), tapestries, writings and films from the 1960's onward. Adnan addresses such concepts as identity, war and the dichotomy of work and home life; she sees her paintings as expressing *joie de vivre* and turns to her writing to meditate on the darker side of life. Besides showing the development of her work over time, the exhibition shows connections among the different fields in which she is active. "You know there is something that links the different things. It's what we call our person," she has said. "There is a link that you don't do purposely; it's there, it's your sensitivity, it's your identity, really. It's one person in different rooms." Mathaf: Arab Museum of Modern Art, **Doha, Qatar**, through July 6.

Mounira AI Solh: All Mother Tongues Are Difficult engages with the concept of language as a mechanism of transmission and traversal. The new work shown here is informed by AI Solh's readings on language and the voice; she uses language to examine a route and a place of transition between the mother tongue and the languages of immigration. She links the concept of dialects navigating across boundaries with the recent upsurge in refugees caused by the current situation in Syria. Sfeir-Semler Gallery, **Beirut**, through July 19.

Gérôme and the Lure of the Orient

features paintings by the Orientalist and academic painter Jean-Léon Gérôme (1824-1904), along with a selection of decorative objects that explore the intersection of eastern and western art production. Like many artists of his time, Gérôme was drawn to the Orient-'always my most frequent dream"a term that included the lands of the Middle East, North Africa and Asia Minor. In 1853. Gérôme first visited Istanbul, and between 1856 and 1880 he took regular trips to Turkey, Egypt and Palestine, making artistic studies of the people and places he encountered. Back in Paris, he transformed his observations into highly polished pictures that earned him great acclaim. Nelson-Atkins Museum of Art, Kansas City, Missouri, through July 20.

India: Jewels That Enchanted the World examines the legacy of 500 years of Indian jewelry, from the 17th century to the present day. More than 300 pieces of jewelry and jeweled objects are brought together for the first time to showcase the beauty of Indian craftsmanship, the magnificence of gemstone setting and the refinement of Indian taste. Assembled from more than 30 museums, institutions and private collections, the exhibition is the most comprehensive ever staged on the subject. Its first section focuses on the jewelry traditions of South India: monumental pieces crafted from gold, worked in relief and decorated with gemstone flowers and birds. The second is devoted to the jeweled splendor of the courts of the Mughals, who came as conquerors, ruled as emperors and, as connoisseurs, patronized artists, architects, enamelers and jewelers. A further section is devoted to the symbiosis between India and European jewelry houses and the cross-cultural influences that resulted in the 19th and early 20th centuries. It concludes with the work of two of India's leading present-day jewelry houses, The Gem Palace and Bhagat. Catalog in English and Russian. State Museums of Moscow Kremlin, through July 27.

The Divine Comedy: Heaven, Hell, Purgatory Revisited by Contemporary African Artists converts three floors of the museum—Hell, Purgatory and Heaven—into the stage for a new interpretation of Dante's *Divine Comedy* and for an esthetic approach to contemporary African art, exploring poetry and art as means of expressing the ineffable. Why Dante? Curator Simon Njami answers, "Because the *Divine Comedy* is first and foremost a human comedy. And I am convinced that nothing human can be alien to another human being." Museum für Moderne Kunst, **Frankfurt/Main**, through July 27.

When the Greeks Ruled Egypt

explores the confluence of two cultures through more than 75 artworks. Gilded mummy masks, luxury glass, magical amulets and portraits in stone and precious metals demonstrate the integration of foreign styles while also paying tribute to the enduring legacy of ancient Egypt's distinctive visual culture. Despite centuries of cultural contact with Greece, the art and architecture of the Egyptian kingdom retained its distinct style, uninfluenced by Greek tourists, traders, diplomats and soldiers. So when Ptolemy, one of Alexander's generals, came to rule Eqvpt, he found it wise to adapt to the older culture, whose unique art forms had persisted for more than 3000 years. He installed himself as "pharaoh," built a new capital at Alexandria, and united the two major gods of each nation to form a new universal deity, Zeus Amon. The era of Ptolemy's dynasty was an age of profound curiosity and rich experimentation, as the Greeks, and later the Romans, met an established culture far older than their own and exchanged artistic, social and religious ideas with it. Art Institute of Chicago, through July 27

Carpets of the East in Paintings

From the West. Since biblical times, an expensive textile underfoot was a sign of power and/or sanctity; only the wealthy could afford fine carpets, which were traded as luxury goods from the Islamic world to Europe and other parts of the world. As early as the 14th century, images of carpets made in the East began to appear in European paintings. This exhibition shows three mid-17thcentury Dutch paintings along with three actual, corresponding rugs of the same period. Metropolitan Museum of Art, New York, through July 29.

Current August

Design Motifs in Byzantine Art. Many of the textiles found in Egypt, the southernmost province of the Byzantine Empire, were woven in linen and wool and decorated with a great variety of motifs. Meant to be worn and to decorate domestic and religious spaces, the works on view in this exhibition feature designs that generally refer to abundance and prosperity. Metropolitan Museum of Art, New York, through August 3.

Ordinary Lives: Photography by Rania Matar captures the mundane activities of everyday life amid the political and social turmoil of post-war Lebanon. The energy and determination of Matar's subjects are dramatically conveyed in a series of 28 images, which depict the bond between mother and child, the camaraderie of friends and the resilience of ordinary people—and of their country. Arab American National Museum, **Dearborn, Michigan**, through August 31.

Current September

String of Pearls: Traditional Indian Painting presents manuscript paintings from different parts of India and surrounding regions and highlights their interrelationships, analogous to pearls on a string. The paintings were inspired by musical and literary sources, historical events and various religious traditions; viewed together, they offer a glimpse into the richness of Indian painting during the 17th, 18th and 19th centuries. The exhibition bursts with figures bedecked with precious gems, often including spectacular garlands of pearls; besides personal ornamentation, such decoration often contained symbolic meanings to communicate either specific ideas or messages from the wearer to the beholder. Harn Museum of Art, Gainsville, Florida,

Current October

through September 14.

Princely Traditions and Colonial Pursuits in India. South Asian artistic traditions were dramatically transformed by the political, social and economic changes that accompanied India's transition from local to colonial rule in the 19th century. Artists formerly patronized by Indian princes came to work for English officials and merchant elites, adjusting their practices to suit their new patrons' tastes. English artists and expatriates introduced new genres and pictorial styles to India, while foreign demand for Indian luxury items brought about esthetic transformations in textiles, silver and other goods. The exhibition explores a complex and fascinating visual history. Los Angeles County Museum of Art, through October 12.

Current November and later

Kader Attia, the renowned French-Algerian artist, unveils a new site-specific commission. The work revisits the biblical story of Jacob's Ladder with a towering floor-to-ceiling structure of rare artifacts and books. Hidden inside this library is a cabinet of curiosities filled with items ranging from old scientific measuring devices to books by such authors as Descartes and Alfred Russell Wallace. At the center of the work, a beam of light shines up to a mirrored ceiling. Attia's multimedia installations reflect on anthropology. politics and science and are rooted in history and archival research. His works explore ideas around identity in an age of globalization. Whitechapel Gallery, London, through November.

Divine Felines: Cats of Ancient Egypt presents 30 artworks selected from

SAUDI ARAMCO WORLD (ISSN 1530-5821) is published bimonthly by Aramco Services Company 9009 West Loop South, Houston, Texas 77096-1799, USA

Copyright © 2014 by Aramco Services Company. Volume 65, Number 3. Periodicals postage paid at Houston, Texas and at additional mailing offices.

POSTMASTER: Send address changes to Saudi Aramco World Box 2106 Houston, Texas 77252-2106 **Nur:** Light in Art and Science from the Islamic World explores the use and significance of light and demonstrates that *nur*—which means "light" in both the physical and metaphysical sense—is a unifying motif in Islamic civilizations worldwide. The exhibition spans more than 10 centuries and includes 150 objects whose provenance



the museum's extensive Egyptian collection: feral and tame cats, stone or bronze cats, small or large cats, domestic or divine cats. The exhibition explores the role of cats, lions and other felines in Egyptian mythology, kingship and everyday life, where they were revered for their fertility, associated with royalty and valued for their ability to protect homes and granaries from rats and mice. On public view for the first time is a gilded leonine goddess dating from between 770 and 412 BCE that entered the Brooklyn collection in 1937 Brooklyn Museum, New York, through December 31

In Remembrance of Me: Feasting with the Dead in the Ancient Middle East explores how the living and the dead interacted to commemorate ancestors in the ancient Middle East. More than 50 artifacts document how food and drink were regularly offered to nourish the dead in the afterlife and how two- or three-dimensional effigies preserved the memory of the deceased. The exhibition was motivated by the 2008 discovery of a stela in eastern Turkey that dates to about 735 BCE; it commemorates an official named Katumuwa. The lengthy text carved on it reveals that, in that region. the soul of the deceased was thought to actually dwell in the stela, and needed to be cared for by the living. Other exhibits examine commemoration of and communication with the dead and different conceptions of the soul in ancient Egypt, Iraq and Israel/Palestine. Catalog. Orien-

tal Institute Museum, **Chicago**, through January 4.

Coming May

Ancient Lives, New Discoveries introduces visitors to eight people from ancient Egypt and Sudan whose bodies have been preserved, either naturally or by deliberate embalming. Using the latest technology, the exhibition builds up a rounded picture of their lives, their health, their occupations and how they died, all in the Nile Valley over a span of 4000 years—from ancient Egypt to Christian Sudan. The individuals on display include a priest's daughter, a temple singer, a middle-aged man, a young child, a temple doorkeeper and a woman with a Christian tattoo. British Museum, **London**, May 22 through November 30.

Coming July

Empire, Faith and War: The Sikhs and World War One tells the story of the disproportionately large role played by Britain's Sikh community in "the Great War." Though Sikhs were only two percent of the population of British India at the time, they made up more than 20 percent of the British Indian Army in 1914, gaining commendations and a reputation as fearsome and fearless soldiers. Brunei Gallery, soas, London, July 9 through September 28.

Concentrations 57: Slavs and Tartars. Slavs and Tartars is an art collective whose installations, lecture performances, sculptures and publications result from an unconventional, researchbased approach. The group identifies the "area east of the former Berlin Wall and west of the Great Wall of China known as Eurasia" as the focus of its multidisciplinary practice. In this exhibition, the group presents new work from its current series, "Long Legged Linguistics," an investigation of language as a source of political, metaphysical and even sexual emancipation, using its trademark mix of high and low culture to address the thorny issues of "alphabet politics": the attempts by nations, cultures and ideologies to ascribe a specific set of letters to a given language. The exhibition includes original works in Persian, Russian, Turkish, Georgian and English presented in a series of

ranges from Spain to Central Asia. It is organized into two major sections: one includes goldilluminated manuscripts, lusterglazed ceramics, inlay metalwork in silver and gold and objects made from precious and semiprecious stones. The second shows such objects as equatorial sundials, astrolabes and anatomical instruments. The exhibition also highlights Spain's role as a bridge between Europe and the Islamic world, and notes the idea of light as a metaphor shared by Muslim, Christian and Jewish cultures. Explanatory talks on April 3, April 18 and May 8. Dallas Museum of Art, through June 29.

Blue and white bowl with radial design, 13th century, Kashan, Iran.

sculptures, installations, textiles and printed matter. **Dallas** Museum of Art, July 27 through December 14.

Coming August

Saturated: Dye-Decorated Cloths From North and West Africa celebrates the art of the dver, exhibiting 11 examples of cloths produced by traditional methods in Morocco, Tunisia, Algeria, Côte d'Ivoire, Nigeria and Cameroon and worn as garments or accessories. Before the introduction of European manufactured printed textiles in the 19th century, textile designs were made with natural dyes-among them henna and indigo-on plain-wove natural cotton or on wool, raffia or other materials. Women were most often the dyers, and dye-decorated cloth was a major form of feminine artistic expression. Dallas Museum of Art, August 16 through October 12.

Coming September

Ghosts, Spies and Grandmothers: SeMA Biennale, Mediacity Seoul 2014 invokes the word ghost to call on spirits whose presence has been erased by dominant historical narratives. It uses spy to allude to the experience of colonialism and the Cold War in Asia. Grandmothers are living witnesses who have endured the ages of ghosts and spies and who demonstrate once again that women bear the brunt of the harm caused by colonialism and war. Under that title, the biennale views Asia as a moving target, a cognitive lens and a region that is much more complex than its stereotypes, and includes work by artists from Arab and western countries as well as Korea. Seoul Museum of Art and Korean Film Archive, Seoul, Korea, September 2 through November 23.

Francesco Clemente: Inspired by India examines the Indian influences in Clemente's work and how they relate to the artistic traditions and practices of various regions of India. In contrast to leading conceptual artists' practices of the 1970's, Clemente focused on representation, narrative and the figure, and explored traditional, artisanal materials and modes of working. The exhibition includes some 20 works, including paintings from the past 30 years and four new, larger-than-life sculptures. Rubin Museum of Art, **New York**, September 5 through February 2.

Coming October

Serendipity Revealed: Contemporary Sri Lankan Art. Brunei Gallery, soas, London, October 9 through December 20.

Jerusalem Show vu ('Ala Abwab Al Janna) encompasses exhibitions, film screenings, performances, talks, walks and workshops showcasing works of Palestinian and international artists, presented in the Old City of Jerusalem in various indoor and outdoor venues. Jerusalem, October 24 to November 7.

Coming November and later

The Future Is Not What It Used to Be: The 2nd Istanbul Design Biennial considers "the manifesto" as a platform and a catalyst for critical thinking in design. It asks how 21st-century designers can use the manifesto not only in the production of texts but also through actions, services, provocations or objects with the goal of inciting inventive outcomes. Of 800 submissions from Turkish and international designers, curator Zoë Ryan selected 75 that imagine a new future and instigate change by building on and reinterpreting history. They include "LEPSIS: The Art of Growing Grasshoppers" by Mansour Ourasanah, which addresses the implications of a growing world population and imminent global food shortage, and "Alternative Bug Out Bags"-kits for short-term evacuation after a disaster-by Jessica Charlesworth and Tim Parsons. Galata Greek Primary School and other locations, Istanbul, November 1 through December 14

Unraveling Identity: Our Textiles, Our Stories will unite textiles from across the globe to explore expressions of individual, cultural, political and social identity through the ages. In all times and places, clothing, adornments and other fabrics have articulated self and status, from ethnicity and occupation to religious belief. The exhibition, the first in the museum's new venue, features more than 100 pieces that span 3000 years and five continents. Textile Museum, Washington, D.C., Fall 2014.

Egypt's Mysterious Book of the

Faiyum is an exquisitely illustrated papyrus from Greco-Roman Egypt, one of the most intriguing ancient representations of a place ever found. The papyrus depicts the Faiyum Oasis, located to the west of the Nile, as a center of prosperity and ritual. For the first time in over 150 years, major sections owned by the Walters Art Museum and the Morgan Library & Museum, separated since the manuscript was divided and sold in the 19th century, will be reunited. Egyptian jewelry, papyri, statues, reliefs and ritual objects will illuminate the religious context that gave rise to this enigmatic text, which celebrates the crocodile god Sobek and his special

relationship with the Faiyum. Roemerund Pelizaeus-Museum, **Hildesheim**, **Germany**, Fall 2014; Reiss-Engelhorn-Museen, **Mannheim**, **Germany**, Spring 2015.

The Rainbow Behind the Black: 100 Years of Saudi Arabian Dress and Accessories. Brunei Gallery, soas, London, January through March 2015.

Pearls on a String: Art and Biography in the Islamic World presents the arts of Islamic cultures from the point of view of authors and artists from historical Muslim societies, offering an alternative to impersonal presentations of Islamic art. Instead, the exhibition focuses on specific people and relationships among cultural tastemakers threaded together "as pearls on a string," a Persian metaphor for human connectedness—especially among painters, calligraphers, poets and their patrons. The exhibition highlights the exceptional art of the Islamic manuscript and underscores the book's unique ability to relate narratives about specific people. Through a series of vignettes, the visitor is introduced to the art inextricably linked to the men and women who shaped the Islamic past and contribute to its future. Asian Art Museum, San Francisco, Summer 2015; Museum of Islamic Art, Doha, Qatar, Fall 2015; Walters Art Museum, Baltimore, Maryland, Spring 2016.

Marvels and Mirages of Orientalism:

Benjamin-Constant in His Time presents an acclaimed painter of the Belle Époque in a major exhibition of Orientalist art. The artist's huge, spectacular canvases, now traveling for the first time, conjure up fantasies of a dreamlike Orient, viewed through the prism of folklore, ethnographic pretext and the erotic imagination. Benjamin-Constant's dazzling color palette was greatly influenced by his trips to Andalusia and Morocco. Perspective is provided by paintings by artists of his time, from Delacroix to Gérôme, and reactions to his work by contemporary artists. **Montreal** Museum of Fine Arts, Winter 2015.

PERMANENT / INDEFINITE

East-West/West-East is a newly unveiled sculpture by Richard Serra, placed in a desert area, that consists of four steel plates, varying from 14.7 to 16.7 meters tall, that the artist says symbolize the connections between Qatar's two regions. "It brings this peninsula together, with the sea on one side and the sea on the other," says Serra. "I went to several desert [areas] ... and liked this one the most." Sixty kilometers from **Doha, Qatar.**

Monuments From Mesopotamia is a nuanced collection of Mesopotamian casts, including the Laws of Hammurabi, the Black Obelisk of Shalmaneser II and the Stela of Esarhaddon. These monuments depict scenes of rulers and gods or symbols of the royal and divine, meant to proclaim the rulers' greatness before the gods and their subjects. Harvard Semitic Museum, Cambridge, Massachusetts.

"The Invisible Hand," a work by the Pulitzer Prize-winning playwright Ayad Akhtar, will be presented in the 2014-2015 season of the New York Theater Workshop. The play is about an American stockbroker kidnaped by Islamic militants; his perspective on his captors evolves as he negotiates for his release. Hassan Hajjaj: My Rock Stars Experimental, a three-channel video installation, includes nine separately filmed performances by an international array of musicians. The sitters/performers wear clothes that Hajjaj has designed himself, and pose in spaces covered by patterns he has selected. Clad in traditional fabrics as well as international-brand clothes and shoes, the musicians bridge the gap between now and then, us and them, high culture and low, reflecting a fusion of Moroccan craftsmanship and contemporary art. Los Angeles County Museum of Art.

Contemporary Art Museum in

Jiddah. Abdul Latif Jameel Community Initiatives plans to construct a 7000-square-meter museum, to be called Bayt Jameel, which will include spaces devoted to education, exhibitions of local artists' work and international temporary exhibitions, as well as a gallery where works that have received the Victoria and Albert Museum's Jameel Prize will be displayed. There will also be an open-air sculpture garden, lecture/training rooms, art laboratories, an events hall and a cafeteria. Bayt Jameel will offer international study scholarships to young Saudi artists. The master plan for the project is currently being designed.

Information is correct at press time, but please reconfirm dates and times before traveling. Most institutions listed have further information available at their Web sites. Readers are welcome to submit information eight weeks in advance for possible inclusion in this listing. Some listings have been kindly provided to us by *Canvas*, the art and culture magazine for the Middle East and the Arab world.

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