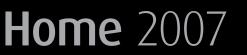
Saudi Aramco VOIC



"For them will be a home of peace in the presence of their Lord." —The Qur'an, Chapter 6, Verse 127

Gregorian and Hijri Calendars



Cover: Silla Camara decorates the adobe wall of her home in the Gandega family compound in Djajibinni, Mauritania, applying a paste of ground white limestone, dye and water known as *fo khoule*. Photo by Margaret Courtney-Clarke / CORBIS. The main reception room of the 250-year-old Emirhocazade Ahmet Beyler house in Safranbolu, Turkey has a continuous sofa around its periphery, centered on a hearth used for warmth and making coffee. Paneled wooden cabinets provide storage space; arched shelves display ceramics. Photo by Barry and Michael Gross.

Patterns of Moon, Patterns of Sun

BY PAUL LUNDE

The *hijri* calendar

In AD 638, six years after the death of the Prophet Muhammad, Islam's second caliph 'Umar recognized the necessity of a calendar to govern the affairs of the Muslims. This was first of all a practical matter. Correspondence with military and civilian officials in the newly conquered lands had to be dated. But Persia used a different calendar from Syria, where the caliphate was based; Egypt used yet another. Each of these calendars had a different starting point, or epoch. The Sasanids, the ruling dynasty of Persia, used June 16, AD 632, the date of the accession of the last Sasanid monarch, Yazdagird III. Syria, which until the Muslim conquest was part of the Byzantine Empire, used a form of the Roman "Julian" calendar, with an epoch of October 1, 312 BC. Egypt used the Coptic calendar, with an epoch of August 29, AD 284. Although all were solar, and hence geared to the seasons and containing 365 days, each also had a different system for periodically adding days to compensate for the fact that the true length of the solar year is not 365 but 365.2422 days.

In pre-Islamic Arabia, various other systems of measuring time had been used. In South Arabia, some calendars apparently were lunar, while others were lunisolar, using months based on the phases of the moon but intercalating days outside the lunar cycle to synchronize the calendar with the seasons. On the eve of Islam, the Himyarites appear to have used a calendar based on the Julian form, but with an epoch of 110 BC. In central Arabia, the course of the year was charted by the position of the stars relative to the horizon at sunset or sunrise, dividing the ecliptic into 28 equal parts corresponding to the location of the moon on each successive night of the month. The names of the months in that calendar have continued in the Islamic calendar to this day and would seem to indicate that, before Islam, some sort of lunisolar calendar was in use, though it is not known to have had an epoch other than memorable local events.

There were two other reasons 'Umar rejected existing solar calendars. The Qur'an, in Chapter 10, Verse 5, states that time should be reckoned by the moon. Not only that, calendars used by the Persians, Syrians and Egyptians were identified with other religions and cultures. He therefore decided to create a calendar specifically for the Muslim community. It would be lunar, and it would have 12 months, each with 29 or 30 days. This gives the lunar year 354 days, 11 days fewer than the solar year. 'Umar chose as the epoch for the new Muslim calendar the *hijrah*, the emigration of the Prophet Muhammad and 70 Muslims from Makkah to Madinah, where Muslims first attained religious and political autonomy. The *hijrah* thus occurred on 1 Muharram 1 according to the Islamic calendar, which was named "*hijri*" after its

epoch. (This date corresponds to July 16, AD 622 on the Gregorian calendar.) Today in the West, it is customary, when writing *hijri* dates, to use the abbreviation AH, which stands for the Latin *anno hegirae*, "year of the *hijrah*."

Because the Islamic lunar calendar is 11 days shorter than the solar, it is therefore not synchronized to the seasons. Its festivals, which fall on the same days of the same lunar months each year, make the round of the sea-

sons every 33 solar years. This 11-day difference between the lunar and the solar year accounts for the difficulty of converting dates from one system to the other.

The Gregorian calendar

The early calendar of the Roman Empire was lunisolar, containing 355 days divided into 12 months beginning on January 1. To keep it more or less in accord with the actual solar year, a month was added every two years. The system for doing so was complex, and cumulative errors gradually misaligned it with the seasons. By 46 BC, it was some three months out of alignment, and Julius Caesar oversaw its reform. Consulting Greek astronomers in Alexandria, he created a solar calendar in which one day was added to

It is he who made the sun to be a shining glory, and the moon to be a light (of beauty), and measured out stages for her, that ye might know the number of years and the count (of time). —The Qur'an, Chapter 10 ("Yunus") Verse 5

February every fourth year, effectively compensating for the solar year's length of 365.2422 days. This Julian calendar was used throughout Europe until AD 1582.

In the Middle Ages, the Christian liturgical calendar was grafted onto the Julian one, and the computation of lunar festivals like Easter, which falls on the first Sunday after the first full moon after the spring equinox, exercised some of

the best minds in Christendom. The use of the epoch AD 1 dates from the sixth century, but did not become common until the 10th. Because the zero had not yet reached the West from Islamic lands, a year was lost between 1 BC and AD 1.

The Julian year was nonetheless 11 minutes and 14 seconds too long. By the early 16th century, due to the accumulated error, the spring equinox was falling on March 11 rather than

where it should, on March 21. Copernicus, Christophorus Clavius and the physician Aloysius Lilius provided the calculations, and in 1582 Pope Gregory XIII ordered that Thursday, October 4, 1582 would be followed by Friday, October 15, 1582. Most Catholic countries accepted the new "Gregorian" calendar, but it was not adopted in England and the Americas until the 18th century. Its use is now almost universal worldwide. The Gregorian year is nonetheless 25.96 seconds ahead of the solar year, which by the year 4909 will add up to an extra day.

Historian **Paul Lunde** (paullunde@hotmail.com) specializes in Islamic history and literature. His most recent book is *Islam: Culture, Faith and History* (2001, Dorling Kindersley).

Converting Dates

The following equations convert roughly from Gregorian to *hijri* and vice versa. However, the results can be slightly misleading: They tell you only the year in which the other calendar's year *began*. For example, 2007 Gregorian spans both 1427 and 1428 *hijri*, but the equation tells you that 2007 "equals" 1428, when in fact 1428 merely began during 2008.

Gregorian year = [(32 x hijri year) ÷ 33] + 622 hijri year = [(Gregorian year – 622) x 33] ÷ 32

Alternatively, there are more precise calculators available on the Internet: Try www.rabiah.com/convert/ and www.ori.unizh.ch/hegira.html.

Though they share 12 lunar cycles—months—per solar year, the *hijri* calendar uses actual moon phases to mark them, whereas the Gregorian calendar adjusts its nearly lunar months to synchronize with the sun.



In Sana'a, some 6000 "tower houses" of mud brick are decorated with lattice windows and patterns made using a gypsum slurry called *gos*. Here and in other cities in Yemen, traditional homes can reach seven stories in height. Photo by Jerome Ladefoged / vII.

JANUARY DHU AL-HIJJAH 1427 – MUHARRAM 1428

	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					
Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
		1 11	2 12	3 13	4 14	5 15
6 16	7 17	8 18	9 19	10 20	11 21	12 22
13 23	14 24	15 25	16 26	17 27	18 28	19 29
20 1	21 2	22 3	23 4	24 5	25 6	26 7
27 8	28 9	29 10	30 11	31 12		

FEBRUARY MUHARRAM — SAFAR 1428

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
					1	2
					13	14
3	4	5	6	7	8	9
15	16	17	18	19	20	21
10		10	10	14	10	1(
10 22	11 23	12 24	13 25	14 26	15 27	16 28
	23	2 '	23	20	27	20
17	18	19	20	21	22	23
29	30	1	2	3	4	5
24	25	26	27	28		
6	7	8	9	10		



The ornamentation in this home in the old town of Ghadames, Libya, has been applied by the family to celebrate an upcoming wedding. Ghadames, a World Heritage Site, has been continuously inhabited for some 4000 years. Photo by Naftali Hilger / arabianEye. MARCH

SAFAR — RABI' AL-AWWAL 1428

APRIL RABI' AL-AWWAL — RABI' AL-THANI 1428

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday		Satu
					1 11	2 12		
3 13	4 14	5 15	6 16	7 17	8 18	9 19		7 19
10 20	11 21	12 22	13 23	14 24	15 25	16 26		14 26
17 27	18 28	19 29	20 1	21 2	22 3	23 4		21 4
24 5	25 6	26 7	27 8	28 9	29 10	30 11	-	28 11
31 12								

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday				
	1	2	3	4	5	6				
	13	14	15	16	17	18				
7	8	9	10	11	12	13				
19	20	21	22	23	24	25				
				20		20				
14	Easter	16	17	10	10	20				
14	15	16	17	18 1	19	20				
26	27	28	29	I	2	3				
21	22	23	24	25	26	27				
4	5	6	7	8	9	10				
28	29	30								
11	12	13								



Saudi Aramco WOLD 2007

Beginning in the 17th century, the gazebo began to appeared in palace architecture from Istanbul to India, and from there its popularity spread west to Europe and the Americas. This modern gazebo overlooking the Atlantic Ocean offers a quiet place for conversation. Photo by Massimo Listri / CORBIS.

MAY RABI' AL-THANI — JUMADA AL-ULA 1428

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
			1	2	3	4
			14	15	16	17
5	6	7	8	9	10	11
J 18	0 19	20	21	22	23	24
12	13	14	15	16	17	18
25	26	27	28	29	30	1
19	20	21	22	23	24	25
2	3	4	5	6	7	8
26	27	28	29	30	31	
9	10	11	12	13	14	

JUNE JUMADA AL-ULA – JUMADA AL-AKHIRA 1428

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
						1 15
2 16	3 17	4 18	5 19	6 20	7 21	8 22
9 23	10 24	11 25	12 26	13 27	14 28	15 29
16 1	17 2	18 3	19 4	20 5	21 6	22 7
23 8	24 9	25 10	26 11	27 12	28 13	29 14
30 15						



Built over a rock near the water's edge on Pangkor Island, off the coast of Perak State, Malaysia, this colorfully painted home relies on stilts to keep it out of reach of occasional floods. Photo by R. Matina / age fotostock / fotosearch.

JULY JUMADA AL-AKHIRA — RAJAB 1428

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
	1	2	3	4	5	6
	16	17	18	19	20	21
7	8	9	10	11	12	13
22	23	24	25	26	27	28
14	15	16	17	18	19	20
29	1	2	3	4	5	6
21	22	23	24	25	26	27
7	8	9	10	11	12	13
28 14	29 15	30 16	31 17			

AUGUST RAJAB — SHA'BAN 1428

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
				1 18	2 19	3 20
4	5	6	7	8	9	10
21	22	23	24	25	26	27
11	12	13	14	15	16	17
28	29	30	1	2	3	4
18	19	20	21	22	23	24
5	6	7	8	9	10	11
25	26	27	28	29	30	31
12	13	14	15	16	17	18



Pile, flatweave and felt rugs cover the floor and walls of a yurt in Almaty, Kazakhstan, a home that can be moved in a matter of hours by stripping the inside and outside coverings from its light wooden frame. Photo by David Samuel Robbins / CORBIS.

SEPTEMBER

SHA'BAN — RAMADAN 1428

		OCTOBER		
		RAMADAN	I — SHAWWAL	1428
/	Friday	Saturday	Sunday	Monda
	7		4	

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
1	2	3	4	5	6	7
19	20	21	22	23	24	25
8	9	10	11	12	13	14
26	27	28	29	30	1	2
15	16	17	18	19	20	21
3	4	5	6	7	8	9
22 10	23 11	24 12	25 13	26 14	27 15	28 16
10	11	12	15	14	15	10
29	30					
17	18					

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
		1	2	3	4	5
		19	20	21	22	23
6	7	8	9	10	11	12
24	25	26	27	28	29	30
21	23	20	21	20	27	50
12		4.5		47	10	ʻId al-Fitr
13	14	15	16	17	18	19
1	2	3	4	5	6	7
20	21	22	23	24	25	26
8	9	10	11	12	13	14
27	28	29	30	31		
15	16	17	18	19		



In Dhaka, Bangladesh, a newly married couple receives formal congratulations from family and friends in a living room designed and furnished along western lines. Photo by Andrew Biraj / Drik.

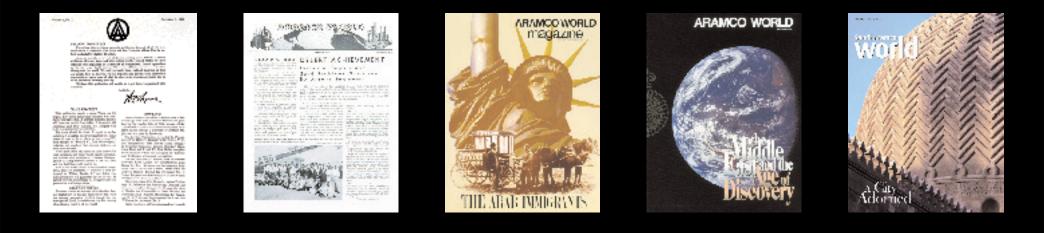
NOVEMBER

SHAWWAL — DHU AL-QA'DAH 1428

DECEMBER DHU AL-QA'DAH — DHU AL-HIJJAH 1428

Friday

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
					1 20	2 21	1 21	2 22	3 23	4 24	5 25	6 26
3 22	4 23	5 24	6 25	7 26	8 27	9 28	8 28	9 29	10 30	11 1	12 2	13 3
10 29	11 1	12 2	13 3	14 4	15 5	16 6	15 5	16 6	17 7	18 8	19 9 'id al-Adha	20 10
17 7	18 8	19 9	20 10	21 11	22 12	23 13	22 12	23 13	24 14	25 15 Christmas	26 16	27 17
24 14	25 15	26 16	27 17	28 18	29 19	30 20	29 19	30 20	31 21			



n November 1949, the Arabian American Oil Company (Aramco) launched an interoffice newsletter named *Aramco World*. Over the next two decades, as the number of Americans working with Saudi colleagues in Dhahran grew into the tens of thousands, *Aramco World* grew into a bimonthly educational magazine whose historical, geographical and cultural articles helped the American employees and their families appreciate an unfamiliar land.

The magazine is now published by Aramco Services Company in Houston, Texas on behalf of Saudi Aramco, which succeeded Aramco in 1988 as the national oil company of Saudi Arabia. In 2000, *Aramco World* changed its name to *Saudi Aramco World* to reflect this relationship.

Today, *Saudi Aramco World's* orientation is still toward education, the fostering of cooperation and the building of mutual appreciation between East and West, but for the last four decades the magazine has been aimed primarily at readers outside the company, worldwide, as well as at internal readers. Its articles have spanned the Arab and Muslim worlds, past and present, with special attention to their connections with the cultures of the West. Subscriptions to *Saudi Aramco World* are available without charge to a limited number of readers interested in the cultures of the Arab and Muslim worlds and their connections with the West. Multiple-copy subscriptions for seminars or classrooms are also available. From Saudi Arabia, please send subscription requests to Public Relations, Saudi Aramco, Box 5000, Dhahran 31311. From all other countries, send subscription requests—signed and dated, please—by postal mail to *Saudi Aramco World*, Box 2106, Houston, Texas 77252, USA; or by fax to +1-713-432-5536.

The texts of all back issues of *Aramco World* and *Saudi Aramco World* can be found on our Web site, www.saudiaramcoworld.com; articles from issues since the end of 2003 include photographs. The Web site is fully searchable, and texts can be downloaded. In addition, many of the photographs from past issues are available at photoarchive.saudiaramcoworld.com and may be used once permission has been obtained online.



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