DAMQĀTUM

The CEHAO Newsletter

Online Edition | www.uca.edu.ar/Damqatum

DAMQATUM
ISSN 1852-6594

N. 15| 2019

INDEX

N. 15 |2019

CENTRO DE ESTUDIOS DE HISTORIA DEL ANTIGO ORIENTE

DEPARTMENT OF HISTORY
FACULTY OF SOCIAL SCIENCES
PONTIFICAL CATHOLIC UNIVERSITY OF ARGENTINA

Damqātum is published by the Centro de Estudios de Historia del Antiguo Oriente (CEHAO). The CEHAO was founded in 2002 and is a non-profit, academic, scientific organization. Address: Av. Alicia Moreau de Justo 1500 P.B. C1107AFD. Buenos Aires, Argentina. Damqātum was founded by Juan Manuel Tebes.

Editor and Designer: Jorge Cano-Moreno

Portada y página 2. Los alrededores del sitio arqueológico de Timna, Israel (foto de Romina Della Casa).

El patrimonio histórico de Arabia ante desafíos y oportunidades crecientes

Juan Manuel Tebes | UCA – CONICET. Director del Centro de Estudios de Historia del Antiguo Oriente
Juan_Tebes@uca.edu.ar

Nunca como en los últimos años la arqueología del Medio Oriente ha estado en el epicentro de las noticias. Los sangrientos conflictos sectarios en Siria e Irak han sido el caldo de cultivo para la destrucción y el saqueo de sus antiquísimos patrimonios históricos. Sin embargo, el bombardeo diario de noticias ha invisibilizado el formidable patrimonio arqueológico de los países de la Península arábiga.

Desde 2015 Yemen, país conocido en la antigüedad clásica como "Arabia Feliz" debido a las grandes riquezas derivadas del incienso y la mirra, ha estado envuelto en una cruenta guerra civil entre rebeldes hutíes y el gobierno reconocido por la comunidad internacional. Los bombardeos de la coalición gubernamental dirigida por Arabia Saudita han dañado severamente el patrimonio histórico yemení: según un informe de 2017[1], la lista de lugares dañados o destruidos comprende 78 sitios, incluyendo seis del Patrimonio Mundial de la UNESCO. Entre ellos, yacimientos de importancia extraordinaria como Marib y Sirwah, capitales del antiguo reino de Saba; la famosa represa de Marib y Baraqis, capital del reino de Main.

Tumba nabatea esculpida en la roca, Madain Saleh, Arabia Saudita.
Foto de SammySix, tomada de Wikimedia Commons:
https://upload.wikimedia.org/wikipedia/commons/0/02/Madain_Saleh_%286811791359%29.jpg

Aunque algunos atribuyen los bombardeos saudíes a la doctrina oficial wahabita que aborrece los sitios arqueológicos anteriores al islam, lo cierto es que éstos no han discriminado entre sitios islámicos y pre-islámicos. Los ataques de las fuerzas hutíes y del grupo terrorista Al-Qaeda no se han quedado atrás y han dañado innumerables mezquitas, tumbas y cementerios.

La arqueología de Arabia Saudita presenta, en cambio, dos realidades absolutamente diferentes.

Por un lado, las investigaciones arqueológicas en las ciudades sagradas de La Meca y Medina no solo están de facto vedadas, sino que numerosos sitios históricos y tumbas de comienzos del período islámico han sido destruidos desde el siglo XIX como parte de la política wahabita para desalentar la visita a santuarios y tumbas, consideradas prácticas supersticiosas. Sólo se conocen ruinas de sitios de enorme importancia histórica relacionados con la vida de Mahoma, como los cementerios de Jannat al-Mualla en La Meca y Jannat al-Baqi en Medina.

Sumado a esto, la febril actividad constructora, producto de los billonarios desarrollos inmobiliarios destinados a proveer de alojamiento a la enorme marea humana que realiza la peregrinación anual del Hajj, amenaza el ya muy disminuido patrimonio histórico de ambas ciudades. El ejemplo más notorio es el complejo de edificios de La Meca conocido como Abraj Al-Bait, actualmente el tercer rascacielos más alto del mundo y ubicado justo al lado de la mezquita Masjid al-Haram, el primer lugar santo del islam. El complejo se alza como una enorme edificación estilo Las Vegas empequeñeciendo la mezquita, en un lugar donde anteriormente existía una fortaleza otomana que fue necesario demoler.

Pocos académicos occidentales comentan públicamente esta situación. La mayoría, consciente del largo historial de interferencia occidental en Arabia y evitando inconvenientes para sus investigaciones, vacila entre lamentar en voz baja esta destrucción del patrimonio histórico o apelar al "relativismo cultural" como triste justificación.

La otra cara de la moneda es la apertura que ha realizado Arabia Saudita a las excavaciones arqueológicas occidentales, como parte de la política reformista llevada a cabo por el príncipe Mohamed bin Salmán para desarrollar el turismo receptivo y reducir la dependencia económica que tiene el reino respecto de los ingresos petroleros. La región que más se ha visto beneficiada es el noroeste del país, donde la misión arqueológica francesa en el sitio patrimonio de la UNESCO de Madain Saleh (la "Petra" de Arabia) y la alemana en la antigua ciudad-oasis de Teima han tomado la delantera.

En esta suerte de "carrera arqueológica" ha quedado rezagado, curiosamente, Estados Unidos. Esto tiene que ver con la muy arraigada tradición norteamericana de excavaciones arqueológicas llevadas a cabo por universidades privadas, práctica menos proclive a la "diplomacia cultural" a través de entidades de investigación gubernamentales como el CNRS francés o el DAI alemán.

El potencial turístico arqueológico del noroeste de Arabia es enorme, pero tiene barreras formidables a derribar. La principal es política. Arabia Saudita no tiene relaciones diplomáticas oficiales con Israel, lo que impide que la región se incorpore al circuito turístico tradicional de "Tierra Santa". A las obvias consideraciones de seguridad en esta zona fronteriza, se suman los resquemores saudíes a la conexión que tiene la región de Madián, sobre el Golfo de Áqaba, con la tradición judeo-cristiana (y también coránica) de Moisés y el Monte Sinaí.

Los países del Golfo Pérsico y el Mar Arábigo tienen una larga tradición arqueológica que se remonta a finales del siglo XIX, un hecho por demás sorprendente dada la influencia que tuvo en el Golfo el conservadurismo wahabita. En gran medida apalancada por excavaciones occidentales, el Golfo Pérsico es una de las zonas mejor estudiadas del Medio Oriente, especialmente los Emiratos Árabes

Unidos. Aunque muchos menos famosos que el patrimonio histórico de Siria e Irak, esta región posee sitios arqueológicos importantísimos como las tumbas de la antigua Dilmun en Bahréin, recientemente incorporadas a la lista del Patrimonio de la UNESCO.

En suma, la arqueología de Arabia, por mucho tiempo opacada por el patrimonio histórico de sus vecinos más antiguos del norte, presenta desafíos y oportunidades nunca antes vistos.

Notas:

1. KHALIDI, L. 2017. "The Destruction of Yemen and Its Cultural Heritage". En: *International Journal of Middle East Studies* 49/4, pp. 735–738.

The Political Economy of the Arid Zone: Camel Caravans as a Mode of Production

Richard W. Bulliet | Columbia University.
rwb3@columbia.edu

Dear Readers: Those of you affected by the heritage of Orientalism may be embarrassed by a discussion of camels, or else inclined to a scoffing and/or bemused response to it, because it has long been suggested that associating people from the Middle East with camels is a not-so-subtle form of racism. Some others may have family or cultural roots in the region and may indeed feel annoyed or demeaned by any mention of camels. I ask all of you to set aside these prejudgments for a few minutes as you peruse the pages that follow

The trip overland from Baghdad to Nishapur, the two largest Muslim cities in the year 900, covers about 1000 miles. Considering the need to cross the Zagros mountains, a camel or donkey caravan, like a man with a full backpack, can do about 20 miles per day. This makes it a 50-day trip. Wheeled transport didn't exist in the region after about the fifth century C.E., nor is water transport a possibility for any part of the journey. Let us compare the situations of a human porter carrying a pack that weighs 60 pounds, a donkey bearing a burden of 120 pounds, and a camel with a load of 350 pounds. (Mules existed but were not as widely used as camels and donkeys. See below.) What is the cost per journey of each of these three modes of conveyance if you are a merchant seeking to transport a ton (2000 lbs.) of commercial cargo from one city to the other?

If the 60-pound backpack is entirely filled with cargo, you will need 33 men. Since these men need to eat and drink, however, some part of their load must consist of provisions. Estimating food needs of a laborer at two-and-a-half pounds of bread (or equivalent) per day, a figure sometimes used by historians of medieval Europe, and throwing in a water skin, an additional two backpacks of provisions would be required for each man over a 50 day period. Since that would mean an additional two provision porters for each porter carrying commercial cargo, which in turn would multiply the total provision burden, as the merchant organizing the trek you would have to buy provisions on the road or carry some goods for trading en route. The latter option, however, would diminish the space for commercial cargo and thereby necessitate more porters to reach the one-ton total payload.

Let us say you have enough money to buy provisions as you go, and the cost per man per day is one dollar. This makes the cost of your trip 33 men X 50 days X 1 dollar or $1,667 dollars. Unless your bearers are slaves, or soldiers, or are otherwise compelled to work for minimal or zero pay, you also need to compensate them for almost two months of toil. If that compensation equals, say, a quarter of a day's sustenance, then your total investment in transport is $2,084. Given these assumptions, the commodity you wish to transport must be worth at least that much per ton at its final point of sale. And to that you have to add the cargo's cost at its point of origin before you can even begin to think about profit.

The question is: What kind of goods are likely to be worth, per ton, as much as the maintenance of 33 porters for 50 days, in addition to the purchase price at the point of origin, and still yield enough net profit to make the trek seem worthwhile? Foodstuffs can probably be ruled out, unless they are rare and very light in weight, like saffron. Heavy objects like metallic ores can likewise be ruled out since the percentage of salable metal left after smelting would be a very small percentage of that weight. Gemstones and pearls, on the other hand, are light, durable, and high in value if they happen to be rare in the terminal market but comparatively plentiful at the point origin. But one-ton shipments of goods like these that could only be sold to very wealthy consumers would crash the retail market at the end of the road.

Consequently, so long as human porters are visualized as participants in long-distance trade, a handful of trekkers carrying a few pounds or less of precious goods in backpacks filled mostly with provisions for the road makes more sense than large shipments. Such trekkers would be vulnerable to robbery, of course, but they could gather together to travel in groups, or front the cost of hiring armed escorts and/or paying off potential bandits.

The upshot of these considerations is that prior to the appearance of domestic beasts of burden, or in world regions that never acquired them, like most of the pre-Columbian Americas and equatorial Africa, long-distance overland trade unsubsidized by governmental or military provisioning networks must always have been fairly uncommon and devoted to small quantities of precious goods. Larger cargoes made up of goods of modest value traveled by water, thus turning certain sea, lake, and river ports into thriving entrepots. Nevertheless, seaborne commerce ran substantial risks of shipwreck and piracy.

The first beast of burden to become available for human exploitation was the ox. Evidence of early use of cattle for carrying loads on their backs (*boeufs porteurs*) comes from Saharan rock art and is usually dated to the period before the climatic change that caused the verdant Saharan grasslands of deep antiquity to begin drying up beginning around 5000 B.C.E. Bovine animals were also used to carry loads in pre-modern India, Laos, and Tibet. In India, ox-carts could carry larger loads, but terrain difficulties made pack bullocks useful in situations that allowed the animals to graze as they went along.

Camel caravan from Beersheba at 1915.
Source: https://pixabay.com/photos/caravan-camels-beersheba-1915-67758/

With respect to the Middle East, references to or images of bovines carrying loads are rare, but archaeologists who study ancient cattle bones see evidence of an early use of pack cattle. The practice may have disappeared after 3000 B.C.E. because oxen became too valuable for plowing to be freed up for trips of more than a few miles. Whatever the case with cattle, domestic donkeys became available between 4000 and 3000 B.C.E. and quickly became the region's pack animal of choice. Evolving in desert conditions in northern Africa, donkeys were well adapted to the constrained provisioning circumstances involved in Middle Eastern overland trading.

So why is relatively little heard about donkeys being used for long-distance trade, as opposed to a few donkeys showing up as tag-alongs of camel caravans? The most important fact is that a typical donkey load is 120 pounds, only double what a human porter can carry. Moreover, for every three or four donkeys there must be a donkey driver. So, our hypothesized ton of commercial cargo would require 16 donkeys, which would need to be bought or rented, along with four drivers. With respect to provisioning, beyond the needs of the drivers, fodder for the donkeys would have to be carried or bought on the road. Donkeys have to be corralled or tied up at night so grazing cannot be relied on. This means that if, say, four additional animals were needed to carry provisions for the drivers and their beasts, you would also need one more driver. As to the gains realized by substituting donkeys for human porters, therefore, it is hard to imagine a donkey caravan being more than twice as efficient as a string of human porters; and it is doubtful that that gain in capacity would have greatly broadened the mix of goods that could be carried economically. Perhaps bags of dried fruits and nuts rather than just rare spices, and perhaps durable crafted goods rather than just pearls and gemstones, but really large loads of valuable but bulky goods, like grain, furs, leather, and textiles? Probably not.

Mules were stronger and larger than donkeys, as well as being suited to picking their way along mountainous tracks; but as sterile hybrids, mules had to be specially bred. This amounted to an opportunity cost that might have been undesirable, particularly given the major role horses played in military affairs. After all, every mule born to a mare means a horse not being born to that mare. In Egypt mules were valued as riding animals, but I am unaware of any evidence that they were widely used for caravan work outside mountainous regions in places like Afghanistan.

So now we come to camels, the world's most famous caravan animals. Carrying 350 pounds of cargo and able to do without food (not to mention water) for many days because of the reserve of fat contained in their humps, camels eliminated most of the costs of provisioning a caravan. They also can be tied in a line. nose to tail. So a string of, say, six can be managed by one camel-puller. Six is also the number needed to carry our hypothetical ton of commercial goods. Considering that renting the animals and provisioning and paying that one camel-puller are your primary overhead expenses, it is obvious that camel caravans made it possible for bulk transport of fairly heavy but not so costly merchandise, such as textiles, furs, paper, leather, non-luxury manufactured goods (*e.g.*, soap, ceramics, worked metalware), and even some foodstuffs (*e.g.*, honey, rice, dried fruit and nuts). In other words, camel caravans made for a titanic change in the way of doing business.

Here are some of the changes that should be explored further:

- Everyday consumer goods made in different cities and regions could be transported to other markets with only modest price mark-ups to cover the cost of transportation. Thus, markets could diversify.
- Thousands of animals could be gathered in a single caravan because it was not necessary to carry or buy their provender en route.
- Concentration of commerce in such caravans would make the hiring of guards (or payment of tolls) a reasonable expense and thus make travel safer for people who feared banditry but were willing (for a fee?) to accompany the caravan and make long journeys on foot.

- Overland caravan routes could compete successfully for the first time with maritime trade since it was cheaper to protect against bandits than pirates, and shipwreck was not a factor.
- Inland cities such as Nishapur and Bukhara could compete with sea, lake, and river ports in becoming entrepots.
- Individuals of limited financial means could embark on long journeys, thus making it possible for Andalusians to show up in Iran, Central Asians in Egypt, and people from every Muslim land in Mecca. Personal travel became a commonplace in medieval Islamic times, and not just for the well-to-do.
- The large quantities that could be transported encouraged the spread of new products and techniques as local artisans and farmers sought to compete with imported products. Thus camel caravans facilitated the spread of new crops that Andrew Watson has shown first appeared in Sasanid times.
- Monetization and the spread of readily exchangeable currencies found institutional support in partnership law, bills of exchange, and specialists in coinage values.
- Brokerage expanded as a means of doing business since buyers needed to consult specialists in one or another product to discover appropriate prices. (Occupational names such as *Dallal* and *Simsar*, both meaning "Broker," became fairly common, as did *Tajir*, or "Merchant.") *Hisba* jurisdiction in the marketplace regulated such transactions.
- The topic of brokerage deserves special attention. We are accustomed to thinking of transportation as secondary to primary production of crops, mines, workshops, and factories. People "own" the latter, but transportation simply facilitates their exchange by moving products to markets. In the camel caravan mode of production, transportation becomes an independent sector with its own set of "owners." A farming community produces a crop, stores or consumes a part of it, and sees the remainder enter the wider economy, one way or another. In a bartering or minimally monetized economy, the producers take their surplus to a market or other point of exchange. In a feudal economy, landholders determine the entry into the wider economy of the surplus produced by servile or semi-servile laborers. In a capitalist economy, the farm, mine, workshop, or factory is owned by an individual capitalist or group of shareholders, and labor is hired at the lowest rate to produce goods that are transported by conveyances that are owned by the same or other capitalists or shareholder groups.

In the camel caravan economy, providing bulk transportation involves coordinating of a network of factors that is socially complex and geographically extensive. Pastoral nomads produce the beasts of burden. Individuals or organizations that enjoy freedom of movement and (relative) immunity from harm in the deserts buy camels, herd them to markets, and sell or rent them to end users, including transportation organizers. In 20th century Arabia the buyer's guild was known as the Banu 'Uqail. Farmers or other producers do not have a means of transportation beyond their immediate horizon. A camel, ox, or donkey that is used to operate a mill or irrigation device cannot also be used for journeys to distant places. Thus, the person who organizes a caravan must exploit links with desert pastoralists and livestock handlers and at the same time know when and where there are bulk loads that need lifting. Villagers or other producers wait for the camels to come for their crop or goods and trust the caravan merchant to pay them a fair price. Needless to say, the merchant's assessment of a fair price depends on knowing the prices that different commodities will bring in a variety of markets along a given caravan track. The merchant and his partners also need capital to purchase the cargoes they wish to carry—this may be a huge amount if the cargo is carried by thousands of camels—and they also need access to banking and insurance instruments.

This arrangement might be conceived of as a variant of the European merchant capitalism that structured seaborne trade well into modern times, but the complexity of the caravan system was greater. A maritime merchant needed to buy goods; arrange for their passage on ships, which were usually owned by other people; and then hope that his estimate of the market was accurate enough for him or his agent to return home with a fair profit. How the goods got to the point of export and how they were distributed at the other end of the voyage were normally the responsibility of other people. In the case of camel caravans, however, long-distance transport was not necessarily separate from more localized transport nexuses. Moreover, while the open seas did not have political boundaries, caravan traders had to know about and be able to negotiate with the various jurisdictions, both governmental and tribal, through which they intended to pass.

Arabs were aware of the commercial revolution represented by camel caravans long before the settled lands were. When the Quran likens camels of ships (*fulk*) in Surat al-Mu'minin, verse 23, I believe there was a consciousness of the degree to which overland caravan trading was becoming truly competitive with ship-borne commerce. In addition, the appearance of "cutting the highway"—but not murder, kidnapping, etc.—as one of the five Quranic *hudud* violations in Islamic law shows a concern for caravan security analogous to the centuries-long obsessions of Rome and China with suppressing piracy. Topping these indicators is the abundant evidence and imagery relating to the caravan god Dusares, who was revered in Arab caravan cities like Palmyra.

Rome absorbed the caravan cities of Petra and Palmyra, and Arabs from the tribe of Tayyi' began to conduct commerce with and within Iran under the Sasanid Empire. But the Arab conquests were required to establish camel caravan commerce on an imperial scale.

The camel caravan mode of production was not simply a matter of market efficiencies and higher profit margins. It affected the structure of society. Here are some of the consequences we see taking root in early Islamic times and characterizing Middle Eastern society for a long time thereafter.

- The pilgrimage to Mecca provides regular annual revenues and rents for camel-breeding pastoralists and ensures that all pious Muslims became personally familiar with the conditions of caravan travel. Even those arriving at Jidda by sea had a major trek over the Hijaz mountains to get of the Haramain.
- Large (100,000+ population) inland cities without access to water-borne transport become possible for the first time. The cities that grew up around Iran's central desert (Nishapur, Ray, etc.) find parallels in Qairawan in Tunisia and Sijilmasa in Morocco. The negligible energy cost of using camels to bring in foodstuffs, charcoal, and building materials played a major role in this. By comparison, Florence, a comparable Italian city in Renaissance times, imported half of its food provisions by sea.
- Caravans became the normal mode of goods transport and gave rise to rural caravanserais, animal-mustering areas (*mirbad*) on a city's outskirts, and urban *khans* and *funduqs* to which caravan goods were transported for wholesale distribution. New routes became possible across terrain that was too rough, barren, or dry for ox-carts or other pack animals. (Many people note quite rightly that camels are wonderful on sand, but major caravan routes across sandy wastes were almost exclusively Saharan. Middle Eastern routes were typically stony.)
- The nomadic sector of the population was accepted as a normal and necessary part of any

polity despite its remoteness from government control and, for the most part, from Islamic law. Forcible settlement seems not to have taken place at a significant level until post-Mongol (or even modern) times.

- Hydraulic lifting devices and mills had similar designs from Morocco to Afghanistan and typically utilized a single animal in harness, though not always a camel. This form of energy was so cheap that the Middle East never experienced the cost squeeze that led Europeans after 1200 increasingly to invest in water mills and windmills. There was no technical lack in the Middle East, but animal power remained too cheap to justify the high initial investment in such mills.
- Intercommunication between different regions became commonplace, and along with it came cultural similarities across boundaries that had hitherto, even in periods of imperial expansion, been largely uncrossed (*e.g.*, Egypt and Mesopotamia; Central Asia and Iraq; north and south sides of the Sahara). Currencies became fungible across vast distances. Arabic and later New Persian became *linguae francae*.

With the exception of the pilgrimage, none of the above phenomena require either Islam or a comparable religious/cultural foundation. Christianity and Buddhism spread with similar success, but they did not engender similar degrees of intercommunication or cultural expression. What is at play, in my opinion, is the development of a distinctive mode of production, one that grew in its initial stages during Roman and Sasanid times, and then culminated in the rise of Arab dominion. An important mark of the success of this mode of production was a vast extension of territory where camel pastoralists maintained large herds of animals. Iran, Afghanistan, Pakistan, and northwest India were mostly outside the range of camel pastoralists in the pre-Islamic era. This quickly changed. In some areas, particularly along the Silk Road (Khurasan Highway), Arab military encampments introduced thousands of one-humped animals into the region. But farther south, in what became Baluchistan, southern Afghanistan, Sind, and Rajasthan the pastoralists who took to camel breeding seem to have less direct contact with Arab tribes.

North Africa has a separate history in which, I believe, Roman Tunisia and Tripolitania developed camel pastoralism when the Roman economy fell apart in the third century and local farm laborers took the camels they were using for plowing and cart pulling—highly unusual activities for camels at that time—and seized territory for themselves in the northern Sahara. When the Arab armies reached that far west in the early eighth century, they encountered these locally developed nomadic populations and eventually Arabized them. From an economic point of view, however, this was a union of two different breeding zones that melded easily into a unified caravan economy. (A third zone encountered later in the southern Sahara retained a greater degree of separation, partly because of different breeding calendars.) Egypt was less amenable to changing from sea and river transport to caravans and, unlike Sudan, never did not become a major camel-breeding region. Pastoralists herding two-humped camels provided yet another component of camel caravan trading from Central Asia to northwest China.

In broad strokes, here is the historical scenario that encompasses the rise and demise of the camel caravan mode of production:

The ancient Near East was based economically and politically on river valleys and mountains. Egyptians, Hittites, Sumerians, Babylonians, Assyrians, Persians, and myriad others built their cultures on either valleys or highlands and maintained them in distinction to other cultures when their political fortunes enabled them to grow from localized principalities into empires.

This pattern gradually changed in the first half millennium C.E. A hallmark of the change was the increasing contribution of the Arabs and their way of life to the region's political economy. The rise of the Arabs to political dominance under the banner of Islam culminated this process of change and opened the conquered territories to the expansion of the developing camel caravan mode of production. By the time of the Mongol invasions of the thirteenth century, this new pattern was suffering from internal and probably climatic problems, and yet another structure was coming into being, one that reverted in some measure to pre-Arab antiquity but retained a limited involvement with the type of long-distance overland trade that had developed during the era of Arab dominance. The Ottoman, Safavid, and Mughal polities exemplify the new structure.

The hallmark of arid zone political economy in the camel era is the lowering of the cost of energy through the spread of camel use. Unlike horses and oxen (though less so donkeys), camels rarely require purpose grown fodder. They are nurtured in desert environments and eat plants that are sparsely distributed and often too woody or thorny for other animals. When worked, beginning around age four, they may sometimes be given grain, but normally they simply browse during a caravan's downtime—one front leg can be hobbled to allow the a camel to graze without being able to wander off—or they go without eating entirely and derive working energy from the fat in their humps. Consequently, camels afford a nearly cost free energy source so long as you have access to three things: wastelands and deserts, pastoralists who accept the hardships of living in those deserts, and mechanisms for collecting and marketing the animals to merchants and settled peoples who value these qualities. These conditions began to come together during imperial Roman times, but they did not become region-wide until pastoral Arab tribes moved out of Arabia on a large scale in conjunction with the creation of the Islamic state.

Yoking camels for plowing did not displace oxen, but ox-carts competing with pack camels all but disappeared, and one-humped camels became ubiquitous as goods transporters from southern Iran eastward through southern Afghanistan, Pakistan, and northern India, regions that had not had them before the Muslim era. Though the human counterparts of this rapid livestock revolution—think comparison with native American responses to Europeans bringing horses to the New World—have not been studied, comparable attempts to naturalize camels to new environments around the world clearly show that this does not take place successfully without accompanying pastoralists and a desert-to-sown marketing nexus.

We lack a history of the Banu ʻUqail, the guild of camel marketers that funneled tens of thousands of working animals every year from the Arabian Peninsula into surrounding agricultural zones in the early 20the century, but similar mechanisms must have been available earlier. Marketing of camels from Sudan into Egypt along the Darb al-Arbaʻin, and from the Sahara into Morocco by way of the town of Guelmim (Goulimine) are but two of what must have been many ways of connecting the deserts' livestock with consumers.

Prior to the Arab conquests, the growing impact of camel use was largely confined to the transport sector. Wheeled transport largely disappeared, and Arab caravan cities came into existence. When the conquests commenced, however, their trajectories traced caravan routes that merchants had become familiar with in earlier decades, notably excluding Byzantine Anatolia, which was too cold for Arab camels, and Sudan and Ethiopia across the Red Sea. Arab armies also shifted many thousands of animals to locales like Marv and Balkh, thus providing the basis for breeding industries that produced super-strong hybrid crosses between two-humped sires and one-humped dams. The hybrids were never used for breeding a second generation because their offspring were puny, but the industry provided particularly valuable caravan animals.

The demise of the camel caravan mode of production remains obscure. Elements of the story include 1) increasing political disorder and loss of a consumer base in Mesopotamia, the customary western terminus of the Silk Road, culminating in 1268 when Mongol invaders destroyed Baghdad, a metropolis that was already in an advanced state of decay; 2) a northward shift of caravan routes into Anatolia, where hybrid animals were needed to fight off the cold of winter caravan work; 3) major advances in maritime trading technology from the fifteenth century onward; and 4) the entry of European warships into the Indian Ocean which had the effect first of imposing imperialist order on the shipping of the region, *i.e.*, subduing local competition by what Europeans termed pirates, and then establishing monopolies over almost all shipping for the benefit of European shareholders and customers.

While caravans continued in most parts of the camel zone, they lost their competitive edge over seafaring and were increasingly used to service seaports like Trabzon, Kerch, and Izmir. Camel-breeding nomads slowly reverted to their pre-caravan role as semi-civilized tribes whom city folk, villagers, and pilgrims viewed with distrust and disdain. As the Orientalist profession developed during this period of demise, the image of the camel as a stereotypical sign of backwardness, and of camel pastoralists as a non-productive and obsolete contributor to the economy, became set in stone. Thus, the great era of the camel caravan as the key economic structure interconnecting most of the Eastern Hemisphere arid zone from 20 to 40 degrees north latitude between 300 and 1200 C.E. came to be relegated to the dustbin of historiography. It is time now to go back and sort through that dustbin.

Observations of the Moon, Sirius and Solar Eclipses, Dating the Middle Kingdom and New Kingdom in Egypt (Part I)

David F. Lappin | Independent Researcher, Glasgow UK.
lappindf@gmail.com

Summary

In using astronomical evidence to date the Middle and New Kingdoms in Egypt an extensive analysis of the lunar cycle was undertaken. Utilising 39 potentially (only 35 probably can be trusted) fixable lunar dates from the 12th Dynasty including 12 consecutive dates on Berlin papyrus 10056D the best match with the lunar cycle was located in the period 1694 to 1644 BC, about 130 years later than orthodox dates currently in use. Also, it was possible to locate a significant astronomical event involving the star Sirius datable to year-7 of Senuseret III or Amenemhat III on day 16 of IIII Peret (IIII prt). The dated (Egyptian dates) lunar sequence was exactly 3 lunar months earlier than the traditional Sothic dating required, but the calendar was exactly in step with the seasonal year and the heliacal rising of Sirius in July occurred in the first month of Akhet (I 3ht).

The implication of this is that the Egyptian calendar had either to have been reformed or abandoned for a significant period before being reinstated or a combination of both. The redactions of Manetho indeed allude to significant changes to the calendar during the Hyksos period. In fact, the Middle Kingdom results improved after inserting a 30-day calendar reform between Senuseret III and Amenemhat III.

It was possible to determine a number of alternative chronologies in which to place Amenhotep I, Thutmoses I, Thutmoses III and Ramesses II by using three references to the heliacal rising of Sirius from the late second intermediate period and New Kingdom, twelve New kingdom lunar dates, and a contemporary account with the late 18th Dynasty of a solar eclipse in the annals of the Hittite king Murshili II. The best solar eclipse candidates were determined on the likelihood of the ancients making a naked eye observation. The best eclipse candidates occurred in 1312 BC, 1223 BC, 1138 BC, 1068 BC and 984 BC.

The Orthodox chronology date for Thutmoses (1479 BC) and Ramesses II (1279 BC) are only possible in the context of 17th century BC 12th Dynasty dates if the Second Intermediate Period can be shortened by more than one century. With the available information this would appear unlikely, therefore, it would appear that the dates of the 18th and 19th Dynasties should be lowered by at least one century, but a greater reduction can be argued for, partly because of the large number of 13th and 14th Dynasty rulers.

Indeed, the strongest candidates are the 26-Oct 1068 BC total eclipse, and the 30- Apr 984 BC large partial eclipse of 0.97 magnitude near sunset, which would require a reduction of the chronology of about 240 and 320 years, respectively.

Since the record of the eclipse in the Hittite annals refers to a military campaign it might suggest that the October eclipse candidate is less likely, but it cannot be excluded on this basis alone as the Hittites appear to have carried out campaigns in Autumn.

These particular solar eclipses agree with recent estimations of the Earth's apparent acceleration rate and allow many sets of lunar dates to match. Which of these candidates is potentially correct is dependent on four parameters. These are: 1) the precise meaning of the calendar on the Ebers papyrus (the alternatives are: it is a schematic civil calendar, a schematic lunar calendar or a true lunar calendar); 2) whether the helical rising of Sirius in III Shemu (III smw) was observed near Elephantine or Thebes; 3) the reign length of Thutmoses II of between 1 and 14 years; and 4) the day of lunar disappearance in Year-23 Thutmoses III and year 52 Ramesses II on authentic lunar texts. The best match with all of the New Kingdom lunar dates places year-1 of Ramesses II in the 11th century BC with the best matches with lunar data supporting year-1 candidates in 1040 BC, 1043 BC and 1068 BC. The later dates also fit well with Sirius observations, but the 1068 BC candidate does not support the Elephantine Sothic dates and struggles with the Ebers papyrus date also. Having no more than few lunar day errors the Ramesses year-1: 1043 BC and 1040 BC candidates match a convincing Hittite eclipses. There are three versions of the 1040 BC calendar. One is a two lunar month shift and satisfies the hypothesis that the Heliacal rising of the Sirius was observed. Version two supports Sirius disappearance dates and is shifted from the traditional Egyptian calendar by two days and can be explained if two leap-years were inserted into the Egyptian calendar before the common era. The alternate or version three of the 1040 BC candidate is related to the second, but the assumption is that the dates are first crescent visibility dates and the Egyptian calendar was not altered. All three candidates support at 2 or 3 variants, respectively. Allowing alternative accession dates for the early kings of the 18th Dynasty.

Introduction

Year-1 of Senuseret III and Amenemhat III are dated conventionally to 1836 -1817 BC and 1817–1772 BC respectively. Senuseret III is usually dated about 40 years later than he was formerly dated by the 12th Dynasty Sothic date. On Berlin papyrus 10012 is a reference to an event involving Sirius:

"You should know that the going forth of Sepdet takes place on the 16th day of the 8th month…"

This is usually translated as a heliacal rising of Sirius on day 16 of the 8th civil month (IIII Peret.16). Egyptian calendar dates are abbreviated in tables, as follows: I Akhet =I 3ht; I Peret =I prt and I Shemu = I smw

As with many of the 12th Dynasty texts, the name of the king is not mentioned on the document. Current opinion is that the document should be attributed to Senuseret III, but Senuseret II is not out of the question[1].

Thutmoses III is conventionally dated to 1479-1426 BC and Ramesses II is dated to 1279- 1213 BC. The three lunar dates of the New Kingdom and Sothic dating have been used to support the chronology, but this has lost favour among some scholars for various reasons; one being difficulty in supporting the underlying structure of the chronology with astronomical data[2]. Another reason is the possible inaccuracy of naked eye observations.

The chronology is supported by cross-references in the Near East, and by the reign lengths of later kings[3]. For some the information has been lost and the length of their reign is based on conjecture. It is recognized that not all the cross references can be considered secure as more than occasionally only one correspondent is named on tablets, inscriptions and other texts. However, epigraphy and stratigraphy is sufficiently detailed to confirm certain links, but crucially not all. Unfortunately, in many cases the context has been poorly recorded, if recorded at all. In other circumstances, assumptions have been taken out of context to support other preconceptions. This current analysis may be as flawed as others in this respect.

Unconvincing attempts to support the orthodox dates of the 12th Dynasty by lunar dating have prompted an alternative approach[4]. The number of lunar dates that matched with retrocalculated Julian dates often failed to exceed 60% of the total. Of late doubt has been cast on the ability of naked eye observations to see accurately the thin crescent either side of the new moon[5]. Nevertheless, modern observers, when experienced, achieve a better rate of success than some of the retrocalculations deem acceptable. However, this does not strictly relate to ancient practice, where the ancients did not look at the thin crescents in isolation they probably followed the lunar phases in detail and with experience over years of observations would find that they could predict the date of lunar disappearance with a high degree of accuracy. First crescent prediction would be more difficult but still possible with a higher degree of success than recent naked eye observations would suggest. However, when it comes to observations of the star Sirius the major problem is that the official location where the heliacal rising of the star was observed affects any attempt to use the records profoundly. Certainly, late Egyptian record the disappearance of Sirius for 70 days and that would imply a northerly location such as Memphis. At Elephantine, the disappearance would have been about 58 days with 62 days at Thebes. The day on which the helical rising of Sirius changes and the calculation of this was recently reviewed by Tieje de Jong (2006)[6] the dates cited were used to determine the date of the heliacal rising of Sirius in this article.

There are a number of dates that involve Sirius, the so called Sothic dates, these are as follows: 12th Dynasty Sothic date IIII prt 16 Year-7 of Senuseret III or Senuseret II, the 17th Dynasty Sothic date II smw 20 (Gebel Tjauti on 11-Jul) the King is unknown (but the conventional dating fits Year-11 Seweserenre)[7], the Ebers papyrus Sothic Date, Thebes III smw 9 Year-9 King (Amenhotep I), the Thutmoses III Sothic date[8], Elephantine Stele—year unknown but most likely between Year-23 and Year-53—a 31 year period[9]. A lost Sothic date Year-33 of Thutmoses III on IIII smw day-2 cited by F Petrie. There is also the hypothetical era of Menophres Sothic date 1314 BC, which one probably could ignore, as it is calculated from Censorinus 139 AD Sothic date. Their use for Chronological purposes (Sothic dating[10]) relies on two principles. 1) The Egyptians Civil year of 365 days being marginally shorter than the sidereal year meant that the star Sirius rose heliacally one day later every four years and is usually compared with the Julian year (a close approximation of the sidereal year and the change in the heliacal rising date of Sirius required several centuries to pass before the star rose one day later. 2) The Egyptians refused to change their civil calendar despite the fact that it failed to conform to the seasons it was originally tied.

There are two lunar dates for Thutmoses III[11]. The first given as, Year-23 I smw 21, is suspected to be a result of scribal error whereby the lunar disappearance is reduced to I smw 20. In Year-23 on IX.19 Thutmoses III and the Egyptian army arrived at Megiddo. Faulkner (1942)[12] argued that the given date of the battle and the new moon I smw 21 was recorded one day late in error, because the opposing armies were unlikely to have faced each other for more than 24 hours. Others have followed this assumption, such as Parker (1950)[13]. However, this interpretation is not necessarily correct. The Egyptian vanguard appears to have arrived on the I smw 19 after passing through the narrow pass to the rear of Megiddo, perhaps this was in sufficient strength to deter an attack by the Canaanite enemy, the vanguard then awaited arrival of the rearguard on I smw 20 before launching their own assault. Despite Thutmoses' order of I smw 19 to prepare for battle the next day the Canaanite forces may have avoided battle on I smw 20. Thus, I smw 21 might actually be correct. The second lunar date is more straightforward; it is a lunar disappearance date on Year-24 II prt 30 and relates to the measuring out of the foundations for a new temple. Krauss suggests this can be increased to 24 III prt 1.

If there really is an 'Amenhotep I' Sothic date on the Ebers papyrus (the controversy will be discussed below) the usual interpretation is that the heliacal rising of Sirius was recorded as Year-9 III smw 9, which now seems likely, then dates for Thutmoses Year-23 and Year-24 are narrowed considerably as Thutmoses Year-23 is 60 years after Amenhotep Year-9. What is uncertain is whether this record was made from Thebes (usually on the 12-Jul in the period between the 15th century BC to the 12th Century BC or at Elephantine on the 10-Jul or at Memphis on the 18-Jul. It is possible that the Ebers papyrus described an Elephantine Sothic date, less likely a Memphis date, but it is more likely that an observation was made at Thebes the early 18th Dynasty capital of Egypt.

There is also the Ramesses II, II prt 27 Year-52 lunar date, which has to be in mid December to early January to match later references to Sothic date in II 3ht day unknown and probably from reign of Merenptah or Ramesses III. Nilotic texts only fit well if during 19th Dynasty I 3ht = July and during the 20th Dynasty June (Julian calendar). It would appear that the calendar in use from the 17th to the 20th Dynasty period was contiguous.

Aims

1) To date the 12th Dynasty using the Illahun lunar texts.

2) Find matching lunar disappearance dates for Thutmoses III

3) To establish the best Hittite solar eclipse candidate and thus date Murshili II

4) Find compatible Ramesses II dates.

5) Discuss possible chronologies derived from the analysis.

Methods

The Oxford tables of Schoch[14] and the Starry Night [15] program were used to determine first crescent visibility and lunar disappearance dates. Estimations of the Earth's apparent acceleration were those described by Stephenson and Morrison (1995)[16].

There are two principles to consider which make dating easier: 1) the Metonic cycle where the same phase of the moon is often observable on the same day of a given month every 19 years, 2) the same phase is often seen on the same day of the Egyptian calendar every 25 years and it sometimes happens that it is also observable on the same calendar date in another 25 year cycle starting 14 years later.

Assumption 1: Sepdet = Sothis = Sirius.

Assumption 2: The so-called '12th Dynasty Sothic date' is derived merely from a prediction of a festival date involving Sirius.

Assumption 3: The era of Menophres Sothic date, as it is only attested for in the writings of Censorinus, is not necessarily an authentic reference to the heliacal rising of Sirius in circa 1320 BC. A lost Sothic date cited by Petrie[17] is should be treated with caution and not used to confirm a chronology.

Assumption 4: The Egyptian calendar was in use, but may have been modified at least once between the New Kingdom and Third Intermediate periods; the time is yet to be identified. What that could mean is that the first month of the civil year was not always Thoth. Also, the insertion of a leap-year or two would shift the calendar by a like number of days.

Assumption 5: Candidate dates for Year-1 Thutmoses III, for this analysis, are 15th to 12th century BC and Year-1 Ramesses III between the late 14th and 10th century BC, when Heliacal rising Sothic dates are under consideration. The possibilities are restricted to the 13th century BC and the 11th century BC for Thutmoses III and Ramesses II year-1 dates, respectively when Sirius setting Sothic dates are considered.

Assumption 6: Other than on poor weather situations, which complicate matters, in Egypt Im-r wnpt priests could have determined actual lunar disappearance or new moon dates with accuracy exceeding 90%.

About 20% of near horizon observations are predicted to be affected by cloud and other adverse weather conditions[18]. However, this need not have affected as many as 20% of observations, because the use of serial observations of the moon to anticipate lunar disappearance or the date of the last visible crescent would increase the accuracy. The ancient observers must have had a system for estimating the start and finish of lunar months during long periods of poor weather, which would be readjusted when the weather improved by observation. From calculations involving 209 Babylonian lunar dates in which they were compared with Schaefer's visibility line it has been estimated that between 86% and 94% (mean 90%) of new crescents are likely to have been observed correctly[19]. Using the method described above, similar levels of accuracy could have been achieved by prediction of lunar disappearance between two to three days in advance before actual observations of the last visible crescent or lunar disappearance had to be made.

Part 1: Dating of the 12th Dynasty

The Berlin papyrus 10056, which was found at Illahun in the mortuary temple of Senuseret II, contains a series of 12 consecutive lunar observations over an 11-month period[20], (see Table 1-1)[21]. The cycle starts on II smw 26, the dry season in the ancient Egyptian calendar. The cycle is dated to the regnal years-30 & 31, but, the name of the actual ruler is not on the papyrus, leading to speculation about his identity. The eminent chronologist, Richard Parker attributed this document, D, and three other papyri A, B & C containing lunar texts, to the 12th Dynasty period while John Read[22] favoured an 18th Dynasty certification. However, a papyrus found nearby, 'Papyrus Lahun IV, 1' resolves the issue in favour of a 12th Dynasty king and to the reign of Amenemhat III in particular. Parker points out in his reply to Read that an official named on this second document, Nehktisonb the son of Meket, is also mentioned on the Berlin Papyrus 10056 as being on duty from II smw 26 to III smw 25 in Year-30. The Lahun IV, I papyrus is definitely dated to Year-1 of the second 13th Dynasty king, Sekhemkare and mentions that a daughter was born in the regnal Year-40 to Sent, the daughter of Nehktisonb. While, one might concede that the Nehktisonb(s) named on the two documents are distinct individuals, circumstantial evidence seems to support the view that the same person is mentioned on both texts; the main reasons being that the documents were found in close proximity in a 12th Dynasty structure and that they both mentioned events during the reign of a long-lived king. None of the early 13th Dynasty kings ruled for 40 years, therefore the texts refer to the reign of an earlier king[23]. Consultation of the Turin canon tells us that Amenemhat III is the only ruler of the period to have reigned in excess of 40 years.

Early attempts to date D, such as that by Wood were doomed to failure because they used a translation of the calendar dates that has subsequently been shown to be in error. In addition to the 12 dates for which Parker provides the 'correct' translation he describes an additional five lunar dates found on papyri from Illahun. Rolf Krauss and Ulrich Luft have added to the number of lunar observations attributed to the 12th Dynasty by Parker. Attempts to answer the 'Edgerton Challenge'—that the 12th Dynasty Sothic date and the Illahun lunar observations would enable the dates of Senuseret III to be fixed with precision to the early second millennium—are disappointing because a large number of the predicted dates in these analyses miss the retro-calculated dates derived from the lunar texts. Rose demonstrated that between a third and half the dates were required to be wrong and dependent on the interpretation of the recorded cycle. However, Rose has misinterpreted some of the data; that of Krauss, which does better than Rose had determined.

One date on Berlin 10056A verso, depending on the interpretation of the text, can be considered to be in error because it infers a month of 31 days. There have been attempts to explain the 31-day month, but the solutions have remained contentious[24].

It has been proposed that Egyptians observed the moon in the morning and recorded the first date that it could no longer be seen. The evidence Parker has amassed in favour of morning sightings is immense. He shows that lunar observations from the Greco-Roman period, when calendar dates for the Roman and Egyptian civil years can be matched, only make sense if the lunar observations were made in the morning. While there is nothing in the literature from the Middle Kingdom Period or the New Kingdom period that would contradict Parker's hypothesis there is nothing to support his view either that this practice had been followed in the earlier period[25].

Early Egyptian texts alluding to lunar dates shed no light on how they made their observations of the new moon. For example, the occurrence and date of a new moon is recorded during the first Asiatic campaign of Thutmose III; inscribed on the walls at Karnak:

"… Year-23, 1st Month of the third season, day 21, the day of the feast of the true new moon. Appearance of the king at dawn."

We cannot be entirely sure what the Egyptians meant by 'the true new moon.' The Egyptians seem to date the start of a lunar month from first disappearance but they possibly also determined the date of first crescent visibility on that date they held the first crescent festival and may have been used to order the other feast days associated with the moon. This view is supported by an analysis by Rose[26], who demonstrated that the dates of lunar festivals (published by Luft 1992) appeared to be governed by the date of first crescent visibility. However, it may turn out to be quite different in reality and another pattern might emerge during the analysis[27].

Parker suggested two different interpretations of the text that lay between consecutive entries on each line of text on Berlin 10056 (D), the words 'down to' could be interpreted as 'down to and including' or 'down to and not including'. That means that the first dates on each line should be interpreted as the first day of the lunar month, while the second date could refer to either the last day of the same month (Possibility I) or the start of the next month (Possibility II). Parker argues that both are viable alternatives; initially, he preferred the interpretation 'down to and including' but found that Possibility II fitted better after carrying out his analysis.

Extensive investigations with the Berlin 10056A verso (D) failed to give a match either with lunar disappearance or first crescent visibility dates and the 12th Dynasty Sothic date in the early to mid-second millennium regardless of the location of the heliacal rising of Sirius. Recent chronological considerations have tended to ignore the 12th and very occasionally the 18th Dynasty Sothic dates. It was accepted at an early point in the study that the 12th Dynasty date Sothic date should be disregarded when trying to determine Middle Kingdom chronology. That does not mean one had to abandon the concept of Sothic dating - just that the prediction on Berlin papyrus 10012 probably did not contain a true Sothic date. When the analysis was carried, using the Sothic calendar, It was found that a number of lunar cycles between 1900, 1400 BC match the data set of Parker almost as well as the 1813 BC[28] date he determined, but most miss on at least 33% of the lunar dates. Weggelaar and Kort, in their 1989 publication[29], found that if they used a 364-day calendar they matched 14 out of 15 lunar dates, known to Parker, and the 12th Dynasty Sothic date. They placed D in 1557-1556 BC and the Sothic date to 17-Jul 1601 BC. Unfortunately, the other 24 x 12th Dynasty lunar dates will not allow this match or support a 364-day calendar.

Abandoning Sothic Based Chronology

Traditional Sothic dating was abandoned to carry out the rest of the analysis. It is important to stress that even when there is no match with Sothic-based chronology in the second millennium BC, we can still consider matching the lunar cycle to actual lunar month lengths, although there are many difficulties with this approach. However, there is probably sufficient information that the Egyptians used a 365-day calendar for sufficiently long periods to allow several references to archaeological phenomena or seasonal events to be used to form a chronological framework. So, it might be possible to link a series of astronomical observations to a series of dates in a particular epoch, because the sequence in question would be uncommon and over a time-span of several centuries, unique. Assuming the Egyptian calendar of 365 days was reset periodically, it would not have to be done particularly frequently because it would take 120 years before a discrepancy of 30 days would accrue. They could have made readjustments to no particular pattern; such readjustment might have been subject to a whim of a particular ruler or priest-elite. Unless a pattern can be defined, it would appear that problems could be insurmountable. However, such an analysis of a short sequence of month lengths without any imposed restriction does result in a large number of acceptable matches when allowances are made for poor weather and missed sightings. Regarding the 50 years of lunar observations from Illahun, the vast majority of the matches are with Parker's possibility II. Assuming a late sighting on II 3ht 20 allows a 100% match because we can assume that a sighting on D was missed on II 3ht 19 (Table 1-1). There is always the possibility that poor seeing has affected some of the other dates on D. If one allows for such an occurrence of bad sighting on at least one or two other occasions, one finds an increase in the number of possible matches for D. The 12-date sequence on D repeats on 30 occasions using lunar disappearance and on 50 occasions using first crescent visibility in the 500-year period, *i.e.*, late 20th to 15th century BC.

Analysis of the Other Lunar Dates on the Berlin Papyri

After identifying a large number of acceptable cycles that match the lunar sequence of D (Berlin 10056A verso), a process of elimination was required to weed out those that did not give acceptable results when the additional Illahun documents were analyzed. The elimination process was carried out matching the lunar dates against the predicted lunar sequence determined initially by Schoch's tables, but a more detailed analysis has now been carried out with Starry Night. As well as Berlin 10056A verso (D) three other documents (A-C) were described by both Borchardt[30] and Parker[31]: A. 10090: Year-3 III smw 16 or 17; B. 10062: Year-29, I smw 7 or 8; C. 10006: Year-32 III 3ht 6 (or 7).

B is a reduction from the day 9 date reconstructed by Borchardt. Part of the entry is now missing off the edge of the papyrus, one assumes that it was still visible to Borchardt, and that deterioration of the document resulted in the loss. However, the letter appears to be written on Year-29, I smw 15 and the assumption is that this or I smw 16 was day 9. The letter states that a lunar day 9 had occurred without a bull having been produced for sacrifice. The usual assumption is that the letter had been written on day 9; it is just as likely that it was penned the next day. Therefore, it is just as likely that day 9 was I smw 14, 15 or 16 allowing for a reduced date on I smw 6, 7 or 8. A hit with any of these dates would be acceptable, but certainly not conclusive.

None of these documents names the king, thus they could date to the reign of any of the late 12th Dynasty kings, *i.e.*, Senuseret II, Senuseret III, Amenemhat III or Amenemhat IV. Incidentally, Parker assigns both the Year-3 and Year-32 sighting to Senuseret III since they do not match his chronology of Amenemhat. However, most Egyptologists assign no more than 19 years to Senuseret and one should assume that the Year-32 dates at least must belong to Amenemhat's reign. The predicted Julian date for A is Year-3, III smw 16. Further scrutiny of the date on C has resulted in the identification of another lunar date and Krauss[32] informs us that the two day 1 dates must be (C1) II 3ht day 9 and (C2) III 3ht day 8 in Year-32. Luft reduces the dates to II 3ht 8 and III 3ht 7.

Krauss also gave reductions on four other documents: E, F, G and H. The dates of E (Year-9 III prt 10) and F (Year-14 II 3ht 18) seem to belong to Senuseret III. The date on E III prt 24 is the date of the full moon feast which most often occurs on lunar day 16 the reduction to lunar disappearance should in most cases be III prt 9; the date Luft cites. The dates on G and H are of the 'Wag' feast. These dates require reduction to find the date of first crescent visibility, lunar disappearance or some other anchor point. Parker, Krauss and Luft[33] all disagree on the extent of reduction required. It just happens that two movable 'Wag' feast dates were known to Borchardt and Parker and were analyzed by the latter. Cairo 58065 (H) from Year-9 of an unknown king records a 'Wag' feast, which according to Parker always occurred on the 13th day of the lunar month and is dated to II smw 29. Krauss argued that these feasts always happened on day 17 of the month and Luft pronounced day 18. Krauss still maintains that Document D matches 1788–1787 BC better than 37 alternatives during the 19th and 18th centuries BC[34]. This places Year-1 Amenemhat III in 1818–1817 BC. Of 19 out of 21 dates Krauss used in his most recent analysis appeared to match the retrocalculated date of lunar disappearance -1 day. Rose had previously reported that 11 were misses (eight on Document D using Parker's possibility II). Unfortunately, Rose has erred, since Krauss dates the helical rising of Sirius at Elephantine in Year-7 of Senuseret II to IIII prt 18 not IIII prt 17 as Rose suspects and appears to use Parker's possibility I not possibility II. This is a critical misunderstanding of Krauss' method and makes a great difference to the viability of Krauss' Middle Kingdom dating. Reassessment of Krauss' 21 dates using shows that Krauss' equivalent Egyptian dates have no more than seven misses according to Schoch's tables. Krauss' match does better with Starry night, the date of last crescent visibility (*i.e.*, lunar disappearance -1 day) was definitely wrong on six or seven occasions, only two on Document D (D6 and D12[35] where Krauss has miscalculated the dates) one each on H, 10056, F (Krauss accepts this), and C2. There is also one near miss D9 (a miss according to Krauss, which appears to be a miscalculation); possibly another if D4 is included. A would also miss according to Schoch's tables, but is a possible match according to Starry night, counted as a possible hit.

So, 30–33% of the dates are in error and while this is higher than Krauss[36] admits to, it is much better than Rose had attributed him (52% in error). When a further 18 lunar dates (for which Luft U (1992) provides the information that have not used by Krauss) were analyzed with Krauss' lunar sequence and according to his criteria, it was found that eight of these would fit in the sequence. Seven of the 14 dates attributed to Senuseret II would miss (includes F). A few of these cannot be corrected by an alternative reduction, as they are part of a short sequence, *i.e.* those on Berlin 10082, & 10103. At least one of three dates and one of two dates would miss, respectively. Alternatively, there would be two misses in the first set and one in the second. Details of this analysis and a comparison of the dating efforts of Krauss, Luft, Read and Rose (Table 1–2).

In his most recent dissertation on the Illahun lunar dates Krauss addressed several important issues. In particular he compared the visibility of the lunar crescent on lunar disappearance -1 with Schafer' visibility line. To compare the results of this analysis the same set of lunar dates on documents A-H etc, were analyzed in an identical manner to that used by Krauss. Despite the errors in the reductions to lunar disappearance -1 the azimuth and visibility of the waning crescent was accurately determined[37].

As stated, in his 1992 analysis Luft listed a further 18 lunar dates, 11 of which he attributed to the reign of Senuseret III and 7 to Amenemhat III. Many of these additional dates are of feasts, which happen on a particular day in the lunar month; a few of these are new moons (Psdntyw), Wag feasts as mentioned above, the others are the feasts of Full Moon (mDDjnt), of Proceeding (Xnt), of Proceeding of the Land (Xnt nt tA), of Jubilation (jhhj), and of Cord of the Nile-mile (sspt jtrw). These dates can then be reduced these dates to determine the equivalent Egyptian date for lunar day 1 'psdntyw'. While Luft and Krauss are convinced that lunar day 1 would start at dawn following lunar disappearance, Krauss proposed that many of Luft's deductions are incorrect. Part of the problem lies in the fact that the Egyptian day started at dawn and that it is equivalent to two Julian calendar days. The difference between the two is that Krauss believes the reduction should be to the dawn after the last visible crescent moon and that Luft believes that the reduction should be to lunar disappearance[39]. Both would end up with their interpretations of the reduced Egyptian date overlapping on the same Julian date but 24 hours apart.

Their position regarding 'Wag' feasts is mentioned above. While Krauss reduced to the date of the last visible crescent moon. Luft defends his view, citing as evidence the date of the fixed annual 'Wag' feast that occurred on I 3ht 18. Rose has recently carried out an analysis that seemed to indicate that first crescent visibility was used to set the dates of many lunar feasts. Then Rose reduced the dates to lunar disappearances in his analysis. Luft advocated that the date of lunar disappearance determined the date of lunar festivals, he deducted one day from the Year-30-31 dates in his analysis for he assumed that the each initial date on D refers to lunar day 2. In fact, the dates on D and C could equally be lunar day 1 (lunar disappearance), day 2 or day 3 or first crescent visibilities for all we know. Therefore, reductions should be made accordingly. Certainly, after a detailed analysis, the sequence of dates on D does appear to fit a sequence of first crescent visibilities better than a fixed lunar day, but it does not mean that the other reductions are wrong. In fact, if Document D and C are actually alternately lunar day 3 and lunar day 2 dates (these would of course be lunar day 2 and day 1 dates according to Krauss) there is a good accord with the data also. In the best match located there are two misses out of 14, but one of these could be counted a near miss.

In general, for this analysis, Luft's reductions of the additional feast dates have been followed, those following named feasts, for example the full moon feast E (Year-9 III prt 24) on lunar day 16. Rose suggests this day is wrong as it does not appear to match with his data set and because there is a feast of Land Excursion on the same document dated to day 17 of the civil month, *i.e.* III prt 17. Luft dates this feast to lunar day 9; but for this analysis Luft's calculations appear to be correct.

In an earlier analysis of the Illahun lunar dates Krauss reductions had been preferred (Lappin 2002)[40], but it was conceded at the time that Luft's reductions would also have resulted in the same conclusion regarding the dates of Amenemhat III and Senuseret III, only that the Julian calendar dates would have been one day earlier[41]. This is possible in this analysis since one does not have to consider the so-called Sothic date. For practical purposes when the so-called 12th Dynasty Sothic date is rejected either Luft or Krauss' reductions can be utilized.

Results:

Text	Year	Date	Julian date	First crescent (dates BC)		
10056 (D1)	30	*II smw* 26	3-May	=	3-May	1649
10056 (D2)	30	*III smw* 25	1-Jun	=	1-Jun	1649
10056 (D3)	30	*IIII smw* 25	1-Jul	=	1-Jul	1649
10056 (D4)	31	*I 3ht* 19	30-Jul	=	30-Jul	1649
10056 (D5)	31	*II 3ht* 19/20	29-Aug	=	29-Aug	1649
10056 (D6)	31	*III 3ht* 19	28-Sep	=	28-Sep	1649
10056 (D7)	31	*IIII 3ht* 19	28-Oct	=	28-Oct	1649
10056 (D8)	31	*I prt* 18	26-Nov	=	26-Nov	1649
10056 (D9)	31	*II prt* 18	26-Dec	=	26-Dec	1648
10056 (D10)	31	*III prt* 17	24-Jan	=	24-Jan	1648
10056 (D11)	31	*IIII prt* 17	23-Feb	=	23-Feb	1648
10056 (D12)	**31**	*I smw* 16	24-Mar	=	24-Mar	1648
10006 (C1)	32	*II 3ht* 9	19-Aug	=	19-Aug	1648
10006 (C2)	32	*III 3ht* 8	17-Sep	=	17-Sep	1648

Table 1-1: Dates on Berlin 10056A= D and 10006=C.
* D5 was given as II 3ht 20 on the original document
** D7 Damaged, Luft's photograph (Luft, 1992) shows it is IIII 3ht 19

Allowing for errors of ±1 day, early seeing or late seeing will often allow a crescent moon to be visualized on the same Egyptian civil calendar date 14 years earlier & 11 years later or 11 years earlier &14 years later, respectively. Since early disappearance is more likely the first alternative probably should be selected.

As the length of the reign of Senuseret III was an uncertain factor, the analysis was performed with the 12 lunar dates on document D that should be attributed to Amenemhat III. Berlin 10056A verso (D) appears to be a duty rota of the Priests at lllahun Year-30 to Year-31 and document 10006, which is of similar construction, but from Year-32. The Year-30-31 data were used to determine the Julian calendar dates of the additional lunar dates for Amenemhat III. In carrying out this analysis several candidates achieved higher scores than all the others. Attempts to match lunar disappearance dates indicated that the dates on D did not match the lunar sequence particularly well. Using first crescent visibility to match the dates on D, the best candidate for the predicted lunar sequence was when Year-30 II smw 26 of D is dated to 3-May 1649 BC (Table 1-1).

In the analysis the vast majority of the potential candidates for D fell by the wayside. This is in part because they missed on more two dates on D and often more than a few of the other lunar dates cited by Parker, Krauss and Luft. While most of misses were by a single day, some missed by as much as two days; some required late observations while others within the same sequence needed early observations to fit.

The original entry for D5 Year-31 II 3ht 20 is easily explained as follows: the waxing crescent moon on 29-Aug (Julian) II 3ht 19 1649 BC should have been visible, but it could easily have been missed as it was about 120 above the horizon at sunset and 60 the end of civil twilight; setting about 1 hour after the Sun. Haze or cloud on the horizon could have prevented seeing of the crescent moon that evening.

What this data show is that Rose could be correct in correlating lunar feast dates to first crescent visibility and a very good match can be achieved with the other Illahun lunar dates.

Although the lunar sequences on D match first crescent visibilities very well, they could also be lunar alternate lunar day 3 and lunar day 2 dates, but in this case using Parker's possibility I there has to be at least two misses on D. These can be explained by early lunar disappearances; *i.e.*, on D5 and D6, they have to be reduced from lunar day 4 and lunar day 3 to match, respectively. The sequence is lunar day 3, 2, 3, 2, 4, 3, 3, 2, 3, 2, 3, 2.

The D5 date as recorded matches a late first crescent. These are excusable as poor weather observations. If the dates are reduced according to Krauss' criteria the dates on D and C may well be lunar day 2 and lunar day 1 dates. The sequence is Day 2, 1, 2, 1, 3, 2, 2, 1, 2, 1, 2, 1; this appears to be what Luft originally intended in his analysis.

The dates attributable to Senuseret III were then aligned with those of Amenemhat III to determine whether the lunar dates fitted with a long reign of more than 33 years or as little as 19 years. In the analysis by Parker a long reign for Senuseret III was required. Recent evidence suggests that there was a long co-regency between Senuseret and his son[42].

First, an analysis of the dates known to Borchardt, Parker and Krauss were used in the analysis to weed out possible alternative sequences.

Schoch's tables had been used to investigate the visibility of 6000 old crescents and 6000 new crescents over a 500-year period. Schoch's tables are not sufficiently accurate to determine the visibility of all thin crescents because Schoch's visibility parameters do not allow for seasonal variation and other atmospheric conditions, etc. To overcome this drawback visibility of those crescents within four hours of invisibility according to Schoch's tables were scrutinized more closely using the computer program Starry night. The choice of four hours was because this is the near maximum amount of time for the moon to change its apparent altitude in comparison with the sun by one degree. The sequence of dates was then assessed for the overall pattern to define the best lunar sequence for the Illahun dates on Document D supported by the other Texts A-C, E-H and Berlin 10056A recto.

The altitude of the moon at sunrise and difference in azimuth of the moon and sun at that time were compared with Schaefer's visibility criteria[43]. The method employed was similar to that outlined by Krauss[44] (2006); in addition, Krauss lists Schaefer's criteria.

Essentially from the retrocalculated dates a determination was made of the true positions of the old crescent and the moon on the next morning; the day in the Julian calendar of lunar disappearance. Using a set of sine curves calculated from Schaefer's criteria, the difference in altitude of the moon from their individual visibility lines was then calculated and this result was plotted against the azimuth at two limiting time points based on the ephemeris time and a -2 hour clock time error, derived from Stephenson & Morrison (1995) estimate of the earth's apparent acceleration[45]. In essence, the data were normalized to a single visibility line. The positions of the moon on the predicted lunar disappearance date are shown in Figure 1.

It can be seen in Figure 1 that H, D9 and D12 might have been potentially visible based on their elevation. *i.e.*, the criteria described above for predicting lunar disappearance dates. While with H and D9 is moot that they would be observable, with D12 it could be what Krauss would call "a negatively incorrect observation".

However, D12 falls below the upper error limit and could be accepted to be a hit, *i.e*., not seen.

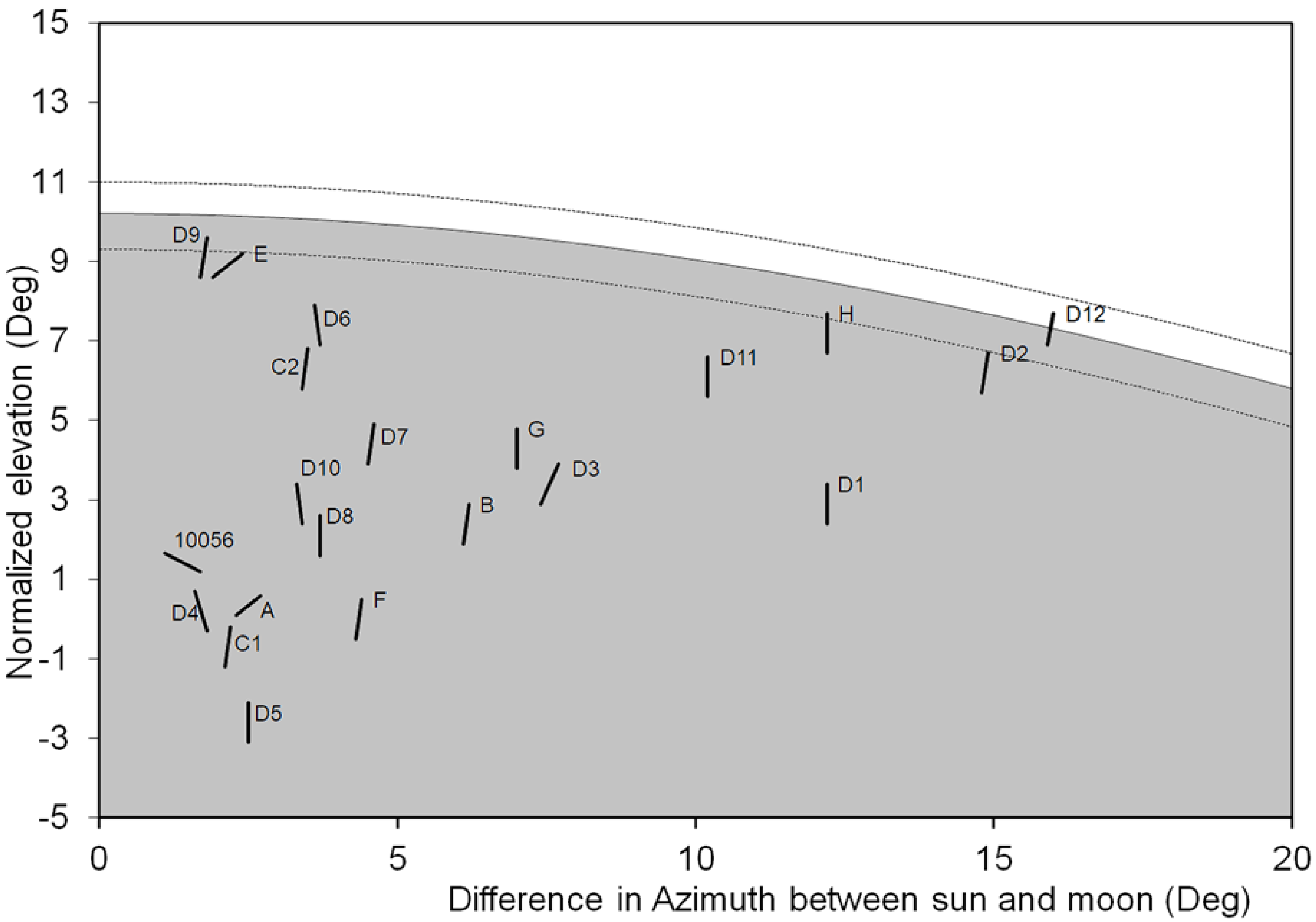


Fig. 1. The position of the moon on the predicted lunar disappearance day

The additional lunar festival dates described by Luft were reduced to first crescent and lunar disappearance dates and attributed to Senuseret III or Amenemhat III based on the lunar cycle. First the match with the Senuseret lunar dates was compared.

10009 and two dates are near hits/misses Berlin 10282 & 10130.

A comparison of model chronologies derived from the Illahun lunar dates are shown in Table 1-2. The comparisons have been made with the 21 dates utilized by Krauss, plus the additional 18 dates published by Luft.

Authority	**Luft**		**Krauss**		**Lappin**		**Read**		**Rose**	
Date range (BC)	**1868 -1818**		**1832 - 1782**		**1694 - 1644**		**1593 - 1543**		**397 - 347**	
No. of Dates	21	39	21	39	21	39	21	39	21	39
Correct	7	20	15	23	20	37	18	24	17	33
Negatively incorrect	0	2	3	12	1	2	1	3	2	4
Positively incorrect	14	17	3	4	0	0	2	12	2	2
% correct	33%	51%	70%	59%	95%+	94%	86%	62%	81%	85%

Table 1-2 Comparison of different model chronologies - Illahun Lunar dates
A truncated and amended version of the table shown in Volk Ohne Arnen

The data match well with first crescent visibility dates but two of the dates definitely miss with the reduced dates of Senuseret III Berlin 10092 and

As for Read, who assigned D to a series of first crescent visibilities, as in this present analysis, a series of reductions were made to lunar disappearance based on Luft's reductions for the 27 additional texts (not used by Read) as this gave a better fit than to first crescent visibilities. The reductions used by Rose remained as recorded, but an emendation of Document B was allowed and a miscalculated date on Document H included, meaning that six dates in total missed. In the case of Read's 1549 BC date for Year-30 Amenemhat III, it is possible that reference to an astronomical event involving Sirius in Year-7 of Senuseret II could relate to the heliacal setting of Sirius on the 10-May not far south of Memphis. With the 21 lettered dates it appears to be a good match, but with the 18 other lunar festival dates the match is poor only six of the 18 appear to agree with the retrocalculated dates.

Rose's analysis of the Illahun dates achieves a match with 81% of the lettered dates and 85% of the total. The placement in the 4th century BC is unlikely, however. The result with the highest probability places the 39 lunar dates between 1694 BC and 1644 BC. These are analysed in more detail in Table 1-3and Table 1–4. The lettered dates match 20 or 21 of the 21 dates and a total of 37 out of the total of 39 lunar dates

Table 1–3 shows this analysis in more detail and contains a sequence of lunar disappearance dates for the texts attributed to the reign of the 12th Dynasty King Senuseret III. This match hit providing the sequence on D followed Parker's possibility I and that Documents D and Document C are alternate lunar day 3 and lunar day 2 dates.

Thirteen of the 14 dates of Senuseret III are reduced from the original feast date to the date of lunar disappearance. One date when reduced appears to be one day late. This affects the following text Berlin 10282. The error in reporting lunar disappearance 10282 is a positively incorrect error due presumably to poor weather.

The reduced date Year-14 II 3ht 18 appears to be a lunar disappearance date according to Schoch's Oxford tables, but the moon was unlikely to be visible according to the retrocalculations performed on Starry night. The computer analysis is more likely to be correct and it has been counted as a hit. Furthermore, a little haze near the horizon would consign it to lunar disappearance on the earlier date. If a negative clock time error is applied to lunar disappearance dates reduced from 10248, the crescent will not be seen on the earlier date and the hit confirmed. In particular, if the more recent calculations of Huber (2006) were used to correct for the Earth's apparent acceleration lunar disappearance would be confirmed. The analysis has been repeated for clock time errors of ±2 hours and the data appear be very robust (Figure 1). Whereas the negative clock time error yields results that would be consistent with Huber's recent estimate of the Earths rate of deceleration, it also mimics the effect of a 0.5 to 1 degree increase in the minimum elevation for observing late crescents. The reverse is true when looking at first crescents positive clock time errors mimic increases in the minimum elevation. With the calculated equivalent Julian dates, given above in Table 1–3 & Table 1–4, this seldom casts in doubt on whether lunar disappearance would have occurred on a given day. The movable Wag feast dates Berlin 10165, 10016 G & Cairo 58065 H (all appear to be fixed by a significant lunar event, perhaps the full moon + 2 days or the second day in the lunar month that the moon set after sunrise in II smw, which turn out to be lunar day 18 as far as G and H are concerned. However, it appears that for 10165 at the start of lunar day 17 the moon was on the horizon, as the sun rose. The moon did not set well after the sun until lunar day 18, thus the feast day may actually have been lunar day 19 or full moon +2 days, thus the reduction from day 18 is not sufficient as it will result in a positively incorrect error. It is counted as a miss.

Reign of Senuseret III (1698-1679 BC) (Co-regent 1679 –1665 BC)								
Text	Year	Date Luft (1992)	Period days	Date	Julian date	Lunar disappearance Dates BC		
10092	5	*II 3ht* 24	118	*II 3ht* 24	15-Sep	=	14-Sep[€] 15-Sep	1694
10009	5	*II prt* 22	207	*II prt* 22	11-Jan	=	11-Jan	1693
10282 (1)	6	*I 3ht* 14	29	*I 3ht* 14	5-Aug	≠	4-Aug	1693
10282 (2)	6	*II 3ht* 13	30	*II 3ht* 13	3-Sep	=	3-Sep	1693
10282 (3)	6	*III 3ht* 13	708	*III 3ht* 13	3-Oct	≈	2-Oct[€] 3-Oct	1693
10130 (1)	8	*II 3ht* 21	30	*II 3ht* 21	11-Sep	=	11-Sep	1691
10130 (2)	8	*III 3ht* 21	473	*III 3ht* 21	11-Oct	≈	10-Oct[€] 11-Oc	1691
10003 (E)	9	*III prt* 9	295	*III prt* 9	26-Jan	=	26-Jan	1690
10112	10	*IIII 3ht* 29	266	*IIII 3ht* 29	17-Nov	=	17-Nov	1689
10412	11	*I 3ht* 20	619	*I 3ht* 20	10-Aug	=	10-Aug	1688
10165	12	*II smw* 5[w]	503	*II smw* 4	21-Apr	=	21-Apr	1686
10248 (F)	14	*II 3ht* 17	856	*II 3ht* 17[¥]	5-Sep	=	5-Sep	1685
10011	16	*II prt* 23	827	*II prt* 23	9-Jan	=	9-Jan	1682
10016 (G)	18	*I smw* 30[w]	1506	*I smw* 30	15-Apr	=	15-Apr	1680

Table 1-3: Illahun Lunar Texts attributed to Senuseret III**.**

€ According to Starry night a thin crescent might have been seen in the morning, but this date is lunar disappearance according to Schoch's Oxford tables.

¥ Schoch's tables predict the following day to be the date of lunar disappearance; while Starry night suggests the chance of seeing a thin crescent on the given date was unlikely.

W Reduced from the full moon day +2.

The results of the computer assisted retro-calculations for Amenemhat III Year-30 = 1650-1649 BC are shown in Table 1-4. The table shows a sequence of dates that follow on directly from the dates given in Table 1-3 above and indicate that 19 years separate Year-1 of Senuseret III and Year-1 of Amenemhat III. Other reconstructions have been investigated but will not fit. That is why Parker's hypothetical dates for Senuseret III and Amenemhat III have not been included in the comparison of alternative solutions.

There is one clear miss with the reduced dates of Amenemhat III Berlin 10052; plus one if we count the D5 date (which has been corrected), possibly two if D6 is also counted as a day 2 date resulting in between 33 – 37 matching lunar dates out of 39. D12 counts as a near hit or miss according to Starry night it is a hit according to Schoch's tables. The date on D9 might also be a near miss according to Figure 2 but in the case of this lunar crescent it is below the mean visibility line and just above the lower limit for a possible sighting.

The lunar disappearance date from Berlin 10052 occurs one day earlier than the astronomical date and might be due to poor seeing on II 3ht 5, when a crescent moon should still have been seen.

The miss on D5 is more of a problem it requires a late first crescent on II 3ht 20. Under the conditions of Parkers possibility I the sequence can be interpreted as alternate lunar day 3 and lunar day 2 dates with the exception of D5 and D6 which have to be lunar day 4 and day 3 dates, presumably for two consecutive months the wrong lunar date was recorded. If this interpretation is followed the number of matching dates is 34.

Furthermore, if the data indicate that Year-30 to 31 of Amenemhat was in 1649 to 1648 BC, dating Amenemhat III from 1679 to 1633 BC, which means that the independent reign of Senuseret III was from 1698 to 1679 BC.

The results also show that the calendar is running 88 days earlier than predicted by the Sothic date. It just so happens that a prediction of an event involving Sirius on Year-7 IIII prt 16, 17 or 18 of Senuseret III could describe something other than the heliacal rising of the star. Sirius actually reaches the highest point in the sky coincident with sunset on the 4-Mar, 5-Mar or 6-Mar 1692 BC. When it becomes visible is will be observed it no longer reaches the maximum elevation at due south in the evening and is seen progressively to the west of south on the following evenings. That means it is on the way to a period of invisibility.

Thus, in this analysis, where the Sothic dating anchor for the 12th Dynasty was dispensed with, the Illahun texts date to the early 18th century BC about 135 years later than previously accepted. This suggests that the Egyptian chronology is over extended. This can be been supported by the dating of the end of Amorite first Dynasty of Babylon to 1425 BC, between 70 and 150 years later than recent estimates and 99 years later than the currently accepted low chronology. Year-1 of the penultimate king Ammizaduga dates to 1483 BC on a match of at least 18 and as many as 21 x 30-day months out of 25 attested 30-day months and a Venus solution for the years 1483-1462 BC. Ur III, Agade eclipse candidates also support this dating[47].

What is also clear is that the Seasons are falling exactly where they should throughout the late part of the 12th Dynasty. Davidson (The Great Pyramid 8th ed., New York, 1940) reported that various references to sowing, harvesting, and quarrying through the era of the first 12 dynasties, which mention the month of the year, suggested that these events seemed to occur at the same time in the calendar implying that the Egyptian months did not appear to continually migrate. It might appear then that they were in the habit of modifying the civil calendar during the Middle kingdom period. There may be evidence that this continued into the 13th Dynasty period The Inundation Stele dated to Year-4 of Sobekhotep VIII (a non-canonical king of the late 13th Dynasty) was found at Karnak in 1956[48]. The Stele mentions that the king was at Karnak to witness the river in flood during the inundation and that this coincided with the epagomenal days. New Year-dates in August or September are compatible with this record, however earlier floods in June and July are not unknown. The potential lunar date for a Mentu feast recorded on Papyrus Boulaq possibly dated to Year-3 Sobekhotep II on III 3ht 17 or III 3ht 18 appears to suggest that the calendar remained unaltered during the early part of the 13th Dynasty[49]. If Year-30 Amenemhat III = 1650-1649 BC, the earliest date for Year-3 Sobekhotep II would be circa 1595 BC. Potential Year-3 candidates for lunar day 2 on III 3ht 17 = 12-Sep 1596 BC and on III 3ht 18 = 10-Sep 1585 BC.

Middle Kingdom calendar reform

The best match with the 12th Dynasty lunar cycle suggests that 12th Dynasty dates are running 88-days earlier in the year than one would predict from Sothic dating. It appears likely that some sort of calendar disruption or reform must have occurred during the second intermediate period or at earliest during the late Middle Kingdom period.

Reign of Amenemhat III (1679-1633 BC)								
Text	*Year*	*Date Luft (1992)*	*Period days*	*Date*	*Julian date*	*Lunar disappearance (dates BC)*		
10090 (A)	3	*III smw* 16	1624	*III smw* 16	30-May	=	30-May	1676
10056	8	*IIII 3ht* 26	296	*IIII 3ht* 25	9-Nov	=	9-Nov	1672
10166	9	*II 3ht* 16	235	*II 3ht* 16	1-Sep	=	1-Sep	1671
c58065(H)	9	*II smw* 12[w]	119	*II smw* 12	24-Apr	=	24-Apr	1670
10018	10	*II 3ht* 5	30	*II 3ht* 5	21-Aug	=	21-Aug	1670
10079	10	*III 3ht* 5	384	*III 3ht* 5	20-Sep	=	19-Sep[$$] 20-Sep	1670
10344	11	*III 3ht* 24	4666	*III 3ht* 24	8-Oct	=	8-Oct	1669
10052	24	*I 3ht* 5	177	*I 3ht* 5	18-Jul	≠	17-Jul	1656
10104	24	*III prt* 2	1889	*III prt* 2	11-Jan	=	11-Jan	1655
10062 (B)	29	*III smw* 7	413	*III smw* 6	15-Mar	=	15-Mar	1650
10056 (D1) **	30	*II smw* 25	29	*II smw* 24	1-May	=	1-May	1649
10056 (D2)	30	*III smw* 25	30	*III smw* 24	30-May	=	30-May	1649
10056 (D3)	30	*IIII smw* 24	30	*IIII smw* 23	29-Jun	=	29-Jun	1649
10056 (D4)	31	*I 3ht* 19	29	*I 3ht* 18	29-Jul	=	29-Jul	1649
10056 (D5)	31	*II 3ht* 19	30	*II 3ht* 17	27 -Aug	=	27-Aug	1649
10056 (D6)	31	*III 3ht* 18	30	*III 3ht* 17	26-Sep	=	26-Sep	1649
10056 (D7)	31	*IIII 3ht* 18	30	*IIII 3ht* 18	26-Oct	=	26-Oct	1649
10056 (D8)	31	*I prt* 17	29	*I prt* 17	25-Nov	=	25-Nov	1649
10056 (D9)	31	*II prt* 17	30	*II prt* 17	24-Dec	=	23-Dec 24-Dec	1649
10056 (D10)	31	*III prt* 16	29	*III prt* 16	23-Jan	=	23-Jan	1648
10056 (D11)	31	*IIII prt* 16	30	*IIII prt* 15	21-Feb	=	21-Feb	1648
10056 (D12)	31	*I smw* 15	147	*I smw* 15	23-Mar	≈	22-Mar 23-Mar[$$]	1648
10006 (C1) **	32	*II 3ht* 8	29	*II 3ht* 7	17-Aug	=	17-Aug	1648
10006 (C2)	32	*III 3ht* 7	1448	*III 3ht* 6	15-Sep	=	15-Sep	1648
10206	36	*II 3ht* 24		*II 3ht* 24	2-Sep	=	2-Sep	1644

Table 1-4: Illahun Lunar Texts dated to the reign of Amenemhat III

**The dates on D and C are reduced from their first crescent dates or alternate lunar day 3 and lunar day 2 dates, *e.g.*, D2 is lunar day 2.

$$ These lunar disappearance dates are likely hits according to Schoch's Oxford tables.

W Reduced from the full moon day +2.

Further evidence for periodic change is the 'Inundation Stele' of Sobekhotep VIII, which mentions that the king was at Karnak[50] to witness the river during the inundation and that this coincided with the end of the civil year. This is likely to have been when the Nile flooded its banks in mid-August[51] although late July is not out of the question, it could also date to the high point of the inundation in early September and even dates as late as October might be possible as some floods persisted for months. Since the best match with the lunar dates of Amenemhat III indicate that during the 17th century the civil year started in Mid-July, and that Sobekhotep VIII was about 150 – 200 years after Amenemhat III, one would otherwise conclude that a year start should have been in May or early June, if there had been no calendar reform in the intervening period. Davidson's observation that the Early dynastic and Middle Kingdom appeared to be carrying out tasks associated with the agricultural year in the correct context with the Civil year that appeared to be almost static suggests that the drift of the Civil calendar through the seasons was not allowed to proceed for extensive periods of time. Davidson's comment on the fact that the seasons appeared to be in order during the Early Dynastic and Middle Kingdom add credence to the idea that the calendar was being continually reformed. The excellent match with the 12th Dynasty lunar dates at exactly the correct time of the year further supports this view. The fact that a significant astronomical phenomenon involving Sirius matches the so-called Sothic date is important; the star was no longer seen due south after sunset. This phenomenon could be predicted days in advance. Furthermore, the 50-year period covered by the Illahun texts seem to show that at least over a short period of time the 365-day year was in operation and that there was a drift of 1 day every 4 years. It might seem unlikely that a 30-day intercalation was introduced during year-1 of Amenemhat III. However, it is possible as it appears that some 70 years later that the Mentu feast held previously in II 3ht during the 12th Dynasty period was being celebrated on III 3ht 17/18, see above.

Reign of Senuseret III (1698-1679 BC)					
Text	Year	Date Luft (1992)		Lunar disappearance Dates BC	
10092	5	*II 3ht* 24	=	16-Aug	1694
10009	5	*II prt* 22	≠	12-Dec	1693
10282 (1)	6	*I 3ht* 14	=	6-Jul	1693
10282 (2)	6	*II 3ht* 13	=	4-Aug	1693
10282 (3)	6	*III 3ht* 13	=	3-Sep	1693
10130 (1)	8	*II 3ht* 21	=	12-Aug	1691
10130 (2)	8	*III 3ht* 21	=	11-Sep	1691
10003 (E)	9	*III prt* 9	=	27-Dec	1690
10112	10	*IIII 3ht* 29	=	18-Oct	1689
10412	11	*I 3ht* 20	=	11-Jul	1688
10165	12	*II smw* 4	=	22-Mar	1686
10248 (F)	14	*II 3ht* 17	=	6-Aug	1685
10011	16	*II prt* 23	=	10-Dec	1683
10016 (G)	18	*I smw* 30	=	16-Mar	1680

Table 1-5 Effect of a 30-day shift in the lunar dates of Senuseret III

The significant event involving Sirius, mentioned above, predicted on Berlin 10012, *i.e.*, day 16 of the 8th civil month appears to argue against an intercalation between Amenemhat III and Senuseret III. However, it is entirely possible that the so-called Sothic date refers to a related event involving Sirius during year -7 of Amenemhat III, in which case the star reaches its zenith at the end of twilight on IIII prt 16 = 28-Feb 1672 BC.

Furthermore, the lunar dates of Senuseret III will match after a 30-day shift. This match is marginally better than the former result. Only one error occurs and that is a negatively incorrect date for Berlin 10009 where lunar disappearance would be on Year-5 Senuseret III, II prt 23 rather than on II prt 22 (Table 1-5). With 37 possible hits out of 39 and two incorrect dates. While, this is not proof that a reform took place, it shows that it is possible. It could also be a reason for why after Year 19 Senuseret III, the years were then recorded for the reign of Amenemhat III.

The existence of earlier lunar dates than those from Illahun allows one to test the hypothesis that the calendar was reset at regular intervals. The Khozam lunar date (Cairo JE 43290) is dated to lunar day 15 in Year-1, IIII 3ht believed to date to the reign of an early 11th Dynasty King[52]. Calculating back from dates on the Turin canon and Amenemhat III Year-30 in 1649 BC, the 11th Dynasty would have been founded in 1932 BC. Tracing back on the lunar cycle from the proposed dates for Amenemhat III and Senuseret III, without an intervening calendar reform between the early 11th and late 12th Dynasty the only possibility for the Khozam lunar date would have been a lunar day 16 in Year-1 Inyotef I. He was the second king of the Dynasty with the calculated lunar disappearance on 27-Dec 1926 BC. This is a positively incorrect observation as the expected lunar disappearance date would have been one day later (28-Dec). However, following one calendar reform or two calendar reforms of precisely 30 days made at 120 year intervals would have allowed the lunar day 15 candidates to fall on the correct dates and the equivalent lunar day 1 dates (IIII 3ht 11) to correspond with the predicted lunar disappearance dates on 28-Nov 1928 BC and 29-Oct 1926 BC, respectively.

The hypothesis can be tested further by investigating two lunar dates purported to belong to the 5th Dynasty. Since the precise period between the Old Kingdom and Middle kingdom is still subject to interpretation this evidence is not proof that calendar change occurred, but suggestive that such a proposition is possible.

The two dates, belong to the Neferikare archive, are (papyrus Louvre E25279 recto) lunar day 1 & 2 dated to IIII smw 17 & IIII smw 18 Year-7 and (papyrus Berlin 10735 recto) lunar day 2 dated to II smw 18 Year-21 or Year-22, which should date about 250 years earlier than the Cairo JE 43290 lunar date. In the context of calendar reform, this would require that at least two additional 30-day intercalations would have taken place in the intervening period. That would be four such reforms between the 5th and the late 12th Dynasty. In such circumstances if four such reforms had taken place and two of these were between the 5th and 11th Dynasties, an astronomically possible Year-7-day 1 date on IIII smw 17 could be the lunar disappearance of 15-May 2182 BC. The Year-21 lunar day 2 date on II smw 18 could the 13-Mar 2168 BC. Lunar disappearance on the 12-Mar 2168 BC would have fallen on II smw 17.

It is proposed that one or other of four different types of calendar reforms could have taken place between the 12th Dynasty and 17th Dynasty. 1) Regular 30-day intercalations at 120-year intervals during the Early Dynastic period and until the end of the 13th Dynasty. Thus, there would have been at least one intercalation between Amenemhat III and Sobekhotep VIII, but two would make more sense. The latter would witness the flooded temple at Karnak in August. This scheme fell apart during the Hyksos period. 2) Effectively the 88 days or 3 lunar months were added to the calendar late in or after the 13th Dynasty period, which results in a return to

Sothic dates; however it shortens the second intermediate period, which appears already to be shorter than one might expect given the number of kings it has to accommodate. 3) In total the change amounted to an addition of 120 and 150 days, which meant the calendar was now running approximately 30 to 60 days slower than the Sothic calendar, which would suggest the 18th and 19th Dynasty should be dated 120 to 240 years later than Sothic dating would predict. A 90-day shift in the calendar is equivalent to a 360-year deletion from the Sothic cycle. Therefore, with two modifications of about 90-days to the calendar results in lunar disappearance dates for Thutmoses III and Ramesses II that would be in close agreement with David Rohl's 'New Chronology'.

Notes:

*A large part of this article particularly on the dating of the 12th Dynasty has been published in German in LAPPIN, D.F. 2013. "Die Die Monddaten aus Illahun und die astronomishe Datierung der 12. Dynastie, Anhang B." In: P. VAN DER VEENN and U. ZERBST (eds.), *Volk Ohne Ahnen?* Holzerlingenm SCM Hanssler im SCM Verlag GmBH & Co, pp. 259–278. I should like to acknowledge the advice and encouragement from the following individuals: Peter Van der Veen, Uwe Zerbst, Ad Thijs, Peter James, Robert Porter, Bernard Newgrosh.

[1] Parker 1977.

[2] Rose 1999.

[3] Kitchen 1987.

[4] Rose 1994: 238–240.

[5] Wells 2003.

[6] De Jong 2006.

[8] Mahler 1889: 28.

[9] It seems most likely that this date fell after the building of the temple of Knum at Elephantine by Thutmoses. According to the 1479 BC accession date the Sothic date would have fallen between 1437 and 1434 BC

[10] Meyer 1904: 29–30.

[11] Edgerton 1936–1937: 195.

[12] Faulkner 1942.

[13] Parker 1950: 9–23.

[14] Langdon, Fotheringham and Schoch 1928.

[15] Starry night (Space.com, Canada).

[16] Stephenson and Morrison 1995.

[17] Torr 1896: LV citing F. Petrie.

[18] Krauss 2007: 401–402.

[19] Fatooi, Stephensen and Al-Dargazelli 1999.

[20] Borchardt 1899.

[21] Wood 1945.

[22] Read 1970.

[23] Parker 1970.

[24] Read 1970; Parker 1970.

[25] Parker 1950.

[26] Rose 1994.

[27] In an earlier analysis of the El Lahun dates, Rose was considered to be correct regarding the relationship to the first crescent and the other lunar feasts, but during the latest revision of the present article the author has become more circumspect and considers other possibilities. Since there is little to distinguish between the match obtained with either, last crescent visibility, lunar disappearance or first crescent visibility. it seemed reasonable to assume that the weight of evidence was in favour of lunar disappearance rather than first crescents.

[28] Parker 1977.

[29] Weggelaar and Kort 1989.

[30] Borchardt 1899.

[31] Parker 1970.

[32] Krauss 1985.

[33] Luft 1992.

[34] Krauss 2006: 405–406.

[35] A list of Krauss reductions of Document D (Berlin papyrus 10056A verso) was compared with the computed Illahun lunar last visible crescent (LVC) and lunar disappearance (LD) dates. Although, Rose has recently reassessed the lunar sequence favoured by Krauss for the dating of the Middle Kingdom, he used Schoch's tables to calculate lunar disappearance. Starry night was used in the reanalysis of the data. The reduced date of the dates on Document D tabulated with the equivalent lunar disappearance date and the actual date of lunar disappearance according to Starry night. With a sequence of first crescents there are either five misses on D (D5, 6, 8, 10 & 12) with Possibility I or two misses with Possibility II (D6, 12 & 5) which can be reduced to two, since D5 in possibility II has to be wrong. Possibility I would appear to be a good match for D except that it is not compatible with the

dates on C, both of which miss.

[36] Krauss 2006.

[37] Krauss 2006.

[38] Krauss 1985, Krauss 2006.

[39] Luft 1992.

[40] Lappin 2002.

[41] Furthermore, the information in the earlier study published in JACF 9, 71–84, was not presented correctly, there was some confusion by the Editor, partly because the author had found some mistakes in his calculations and changed his stance on how the disappearance dates should be reduced from the published festival dates. A final galley was not sent to the author before publication, so a major flaw remained in the analysis of the dates of Senuseret III, which showed first crescent dates instead of lunar disappearance dates. This also was not corrected in the 'Erratum', penned by the Editor, and published in JACF 10, in which the original mistake was repeated; unfortunately, the author also did not see the 'Erratum' before it was published.

[42] Wegner 1996.

[43] Doggett and Schaefer 1994; Liller 1990; Schaefer 1989; Pepin 1996.

[44] Krauss 2006: 396–405.

[45] Stephenson and Morrison 1995

[46] Luft 1992.

[47] Lappin 2013.

[48] Baines 1974.

[49] Krauss 2006: 422–423; Quirke 1990.

[50] Baines 1974.

[51] Janssen 1987.

[52] Goedicke 1994: 72; Fischer 1996: 267–270.

Bibliography:

BAINES, J. 1974. "The Inundation Stele of Sobekhotep VIII." In: *Acta Orientalia* 36, pp. 39–54.

BORCHARDT, L. 1899. "Der zweite Papyrusfund von Kahun und die zeitliche Festlegung des mittleren Reiches der agyptischen Geschichte." In: *Zeitschrift für Ägyptische Sprache und Altertumskunde* 37, pp. 99–101.

DE JONG, T. 2006. "The heliacal rising of Sirius. III.9." In: ERIK HORNUNG, ROLF KRAUSS & DAVID A. WARBURTON (eds.), *Ancient Egyptian Chronology*. Leiden & Boston, Brill, pp. 433–437.

DOGGETT, E. and B.E. SCHAEFER. 1994. "Lunar Crescent Visibility." In: *Icarus* 107, pp. 388–403.

EDGERTON, W. 1936-1937. "On the Chronology of the Early Eighteenth Dynasty." In: *American Journal of Semitic Languages and Literatures* LIII.

GOEDICKE, H. 1994. "A Cult Inventory of the Eight Dinasty From Coptos." In: *Mitteilungen des Deutschen Archäologischen Instituts Abteilung Kairo 50*, pp. 71–84.

FATOOI, I., F.R. STEPHENSEN and S. AL-DARGAZELLI. 1999. "The Babylonian First Visibility of the Lunar Crescent Data and Criterion." In: *Journal of History and Archaeology* 30, pp. 51–72.

FAULKNER, R.O. 1942. "The battle of Megiddo." In: *The Journal of Egyptian Archaeology* 28, pp. 2-15.

FISCHER, H.G. 1996. "Notes of Some Texts of the Old Kingdom and Later." In: P. DER MANUELIAN, (ed.), *Studies in Honor of William Kelly Simpson*. Boston, Museum of Fine Arts, pp. 267–274.

JANSSEN J. 1987. "The Day the Inundation Began." In: *Journal of Near Eastern Studies* 46, pp. 129–136

KITCHEN, K. 1987. "The Basics of Egyptian Chronology in Relation to Bronze Age." In: *High Medium or Low* 1, pp. 35–55.

KRAUSS, R. 1985. Sothis und Monddaten: Studien zur astronomischen und technischen Chronologie Altägyptens. Hildesheim, Gerstenberg Verlag.

KRAUSS, R. 2006. "Lunar Dates." In: E. HORNUNG, R. KRAUSS AND D.A. WARBURTON (eds.), *Ancient Egyptian Chronology*. Leiden & Boston, Brill, pp. 395–431.

LANGDON S., M.A. FOTHERINGHAM and C. SCHOCH. 1928. *The Venus tablets of Ammizaduga*. Oxford, Oxford University Press.

LAPPIN, D.F. 2002. "Decline and fall of Sothic Dating: Astronomical evidence in support of New Chronology, El-Lahun lunar texts and the astronomical dating of the 12th Dynasty." In: *Journal of the Ancient Chronology Forum* 9, pp. 71–84.

LAPPIN, D.F. 2013. "Neue Untersuchengen zur chronologie der Ersten dynastie von Babylon auf der Grundlage der Venus-Tafeln des Ammizaduga und uberlieferter 30-Tage-Mondmonats-Reihen Anhang C." In: P. VAN DER VEENN and U. ZERBST (eds.), *Volk Ohne Ahnen?* Holzerlingenm SCM Hanssler im SCM Verlag GmBH & Co, pp. 279–325.

LILLER, W. 1990. "Refraction Near the Horizon." In: *Publications of the Astronomical Society of the Pacific* 102, pp. 796–805.

LUFT, U. 1992. *Die Chronologishe fixierung des aegyptischen Mittleren Reiches nach dem Tempelarchiv von Illahun*. Vienna, Verlag der Österreichischen Akademie der Wissenschaften

MAHLER, E. 1889. "Koenig Thutmosis III." In: *Zeitschrift fuer Aegyptische Sprache* 27.

MEYER, E. 1904. *Aegyptische Chronologie, Abhandlungen der Koeniglich Preussischen Akademie der Wissenschaften*. Berlin.

STEPHENSON F.R. and L.V MORRISON. 1995. "Long-term fluctuations in the Earth's rotation: 700BC to AD 1990." In: *Philosophical Transactions of the Royal Society London A* 351, pp. 165–202.

PARKER, R.A. 1950. *The Calendars of Ancient Egypt*. Chicago, The University of Chicago Press.

PARKER, R.A. 1970. "The Beginning of the Lunar month in Ancient Egypt." In: *Journal of Near Eastern Studies* 29, pp. 217–220.

PARKER, R.A. 1977. "The Sothic dating of the Twelfth and Eighteenth Dynasties." In: J.H. JOHNSON and E.F. WENTE (eds.), *Studies in Honor of George R. Hughes.* Studies in Ancient Oriental Civilization 39. Chicago, The Oriental Institute, pp. 177–189.

PEPIN, M.B. 1996. "In Quest of the Youngest Moon." In: *Sky and Telescope* 92, pp. 104–106.

QUIRKE, S. 1990. *The administration of Egypt in the late Middle Kingdom*. New Malden, SIA Publishing.

READ, J.G. 1970. "Early Eighteenth Dynasty Chronology." In: *Journal of Near Eastern Studies* 29, pp. 1–11.

ROSE, L.E. 1994. "The Astronomical Evidence for Dating the End of the Middle Kingdom of Ancient Egypt to the Early Second Millennium: A Reassessment." In: *Journal of Near Eastern Studies* 53, pp. 237–261.

ROSE, L.E. 1999. *Sun, Moon, and Sothis, A Study of Calendars and Calendar Reforms in Ancient Egypt*. Richmond, Kronos Press.

SCHAEFER, B.E. 1989. "Refraction by Earth's Atmosphere." In: *Sky and Telescope* 77, pp. 311–313.

TORR, C. 1896. *Memphis and Mycenae; An Examination of Egyptian Chronology and Its Application to the Early History of Greece.* London, Cambridge University Press.

WEGNER, J.W. 1996. "The Nature and Chronology of the Senwosret III Amenemhat III Regnal Succession: Some Considerations Based on New Evidence from the Mortuary Temple of Senwosret III at Abydos." In: *Journal of Near Eastern Studies* 55, pp. 249–279.

WELLS, R.A. 2003. *The Role of Astronomical Techniques in Ancient Egyptian Chronology: The Use of Lunar Month Lengths in Absolute Dating. In Under One Sky Astronomy and Mathematics in the Ancient Near East*. In: J.M. STEELE and A. JONHAUSEN (eds.), *Under the Sky: Astronomy and Mathematics in the Ancient Near East.* Münster, Ugarit-Verlag, pp. 459–472.

WEGGELAAR, N. and C. KORT. 1989. "The Calendar Reforms in Ancient Egypt." In: *Discussions in Egyptology* 13, pp. 79–89.

WOOD L.H. 1945. "The Kahun Papyrus and the Date of the 12th Dynasty." In: *Bulletin of the American Schools of Oriental Research* 99, pp. 1–12.

Miembros del CEHAO en el exterior

En Noviembre-Diciembre 2019 el Dr. Juan Manuel Tebes realizó una estadía de investigación en el Munich Centre for Global History, Ludwig-Maximilians-Universität München (Alemania), con una Beca de Investigación provista por dicha universidad. Allí continuó con uno de sus proyectos llevados a cabo en el IICS, "The Interconnections between the Southern Levant and the Arabian Peninsula in the 1st Millennium BCE through the Analysis of the Decorated Pottery".

Entre octubre de 2019 y enero de 2020 el Mg. Jorge Cano Moreno realizó una estancia de investigación doctoral en el Institut für Klassische Archäologie de la Ruprecht-Karls-Universität Heidelberg gracias a una beca de la DAAD (Deutscher Akademischer Austauschdienst) para estudiar los sellos y sellados de la Edad de Bronce de Creta que se encuentran catalogados en el Corpus of Minoan and Mycenaean Seals (CMS).

Durante el año académico 2019-2020 la Dra. Romina Della Casa se encuentra realizando una estancia postdoctoral en The Sonia and Marco Nadler Institute of Archaeology (Tel Aviv University, Israel). Allí, investiga las interacciones entre los animales humanos y no-humanos, otros seres vivos y diversos componentes inanimados de la Anatolia hitita a partir del corpus documental que proviene de la antigua Ḫattuša (actual Boğazköy, Turquía).

CEHAO SCHOLARLY PARTICIPATION

PABLO R. ANDIÑACH

LIBRO

El libro de las Gratitudes 2

Buenos Aires, Lumen, 2019.

ARTÍCULO EN LIBRO

"El Cantar de los Cantares. Exploración de los espacios y los cuerpos" en M. L. Puppo y M. Cámpora, M. (coords.) *Dinámicas del espacio: reflexiones desde América Latina.*

Buenos Aires, Fundación Universidad Católica Argentina, 2019: https://repositorio.uca.edu.ar/handle/123456789/9060.

ANTIGUO ORIENTE

Recensión: Justel, Josué J. y Agnès Garcia-Ventura (eds.), *Las mujeres en el Oriente cuneiforme*, Alcalá de Henares, Universidad de Alcalá, 2018, 435 págs.

Oriente Antiguo 17, pp. 293–296.

PARTICIPACIÓN EN JURADO DOCTORAL

Laura Bizzarro. "El Sentido de la Historia en la Apocalíptica Judía Palestina. Estudio sobre los Círculos Apocalípticos Henóquico, Daniélico y Qumránico".

Pontificia Universidad Católica Argentina, Facultad de Ciencias Sociales, abril de 2019.

CONSULTA SOBRE ECLESIOLOGÍA LATINOAMERICANA

Faith and Order Commission

Vitoria, Brasil, 18–22 de marzo de 2019.

ENCUENTRO SOBRE EL DESARROLLO DE LA TEOLOGÍA EN LA DIVERSIDAD DE CONTEXTOS

Faith and Order Commission

Nanjing, China, 11–21 de junio de 2019.

ENCUENTRO DE TEOLOGÍA DE LA IGLESIA METODISTA DE BOLIVIA

"¿Qué es ser Pueblo de Dios en América Latina?"

"El contenido de nuestra teología Metodista".

Cochabamba, del 29-31 de julio de 2019.

CONGRESO INTERNACIONAL DE BIBLIA

Seminario de Devoto

Buenos Aires, 16-19 julio de 2019.

CONFERENCIA

"Hacer teología en al ámbito universitario".

Universidad Nacional de Salta, 25 agosto de 2019.

AMIR GORZALCZANY

CONGRESS "BAMERKAZ II, MEMORY".

Joint Congress of the IAA Central District and the Institute of Archaeology of the Tel Aviv University (Miembro del comité organizador).

Universidad de Tel Aviv, Tel Aviv, Israel. 29 de mayo 2019.

THE FORTY-FIFTH ARCHAEOLOGICAL CONGRESS IN ISRAEL

"Between the Quakes: Islamic Tombstones Reused during the Early Islamic Period from Ramla, Capital of Jund Filastīn".

University of Haifa, Haifa, Israel, 11 April. 2019.

JOURNAL OF MOSAIC RESEARCH (JMR-AIEMA) 12: 45–62

"The Marine Scene in the Lod Mosaics" (junto con Baruch Rosen).

https://dergipark.org.tr/tr/pub/jmr/issue/50277/614853?fbclid=IwAR2HYTx8tNNcBZ8t0IN3ag4dbfpbYMo5qmSEkTfLocFD56SeBnygJ5RMknU

JESHO (JOURNAL OF THE ECONOMIC AND SOCIAL HISTORY OF ORIENT)

"Royal Purple Industry in Lod during the Late Roman Period as Reflected in the Lod Mosaic" (Junto con Baruch Rosen y Na'ama Sukenik).

(Aceptado para publicación, en prensa).

ANTIGUO ORIENTE

"Nuevos y viejos mosaicos del *domus* romano de Lod, Israel. El estado de la investigación 23 años después de su descubrimiento".

Oriente Antiguo 17, pp. 219–256.

THE ANCIENT NEAR EAST TODAY

"Pictures of Restraint: Hunting Carnivores on Mosaics from the Roman and Byzantine Periods". (Con Baruch Rosen y Naama Sukenik).

En prensa.

CORNERSTONE (REVISTA DE DIVULGACIÓN DE LA IAA EN ÁRABE)

"Un posible laboratorio de alquimia en Ramla" (en árabe, traducido por Hammoudi Khalaile).

En prensa.

CORNERSTONE (REVISTA DE DIVULGACIÓN DE LA IAA EN ÁRABE)

"Los mosaicos del período romano en Lod" (en árabe, traducido por Hammoudi Khalaile).

En prensa.

DAMQATUN

"Un nuevo mosaico revelado en la villa romana de Lod, Israel. El estado de la investigación 23 años después del descubrimiento".

REDCAI (RED DE CIENTÍFICOS ARGENTINOS EN ISRAEL)

Miembro.

2019.

ISRAEL ANTIQUITIES AUTHORITY

Director del Scientific Assessment Branch and Publications Department.

2019.

OLGA AGUEDA GIENINI

XXXVII SEMANA ARGENTINA DE TEOLOGÍA

"El Cántico de Moisés (Dt 32). Un testimonio de Alianza a la luz de los tratados de Antiguo Oriente Medio".

Universidad Católica de Córdoba, Córdoba, Septiembre 2019.

DIÁLOGO INTERRELIGIOSO

"Estudio Conjunto de la Biblia en el marco del diálogo interreligioso".

Seminario Catequístico Santa Teresita – Obispado de San Isidro. Octubre 2019.

CONGRESO INTERNACIONAL DE ESTUDIOS BÍBLICOS

Universidad Católica Argentina.

Buenos Aires, julio 2019.

DOCENTE TITULAR

"La figura del Paráclito".

Seminario Catequístico Santa Teresita – Obispado de San Isidro.

Octubre 2019.

DOCENTE TITULAR

"El Evangelio de Juan".

Seminario Catequístico Santa Teresita – Obispado de San Isidro.

Nordelta, octubre 2019.

PANEL DE PRESENTACIÓN

Jesús, Maestro y Redentor. 12 lecturas del Evangelio desde el Cristianismo Oriental. Daniel Ayuch (Coordinadora).

Editorial PPC, agosto 2019.

ASOCIACIÓN BÍBLICA ARGENTINA

Tesorera.

Julio 2019.

JUAN MANUEL TEBES

COLOQUIO DESIGUALDADES ANTIGUAS. ECONOMÍA, CULTURA Y SOCIEDAD EN EL ORIENTE MEDIO Y MEDITERRÁNEO

"Social Hierarchies and Economy in the Highlands of Edom and the Oases of Northern Arabia in the First Millennium BCE".

Programa de Estudios sobre las Formas de Sociedad y las Configuraciones Estatales de la Antigüedad, Facultad de Filosofía y Letras, Universidad de Buenos Aires.

Buenos Aires, March 27–29.

THE DESERT ORIGINS OF GOD: YAHWEH'S EMERGENCE AND THE MATERIALITY OF DESERT CULT IN THE SOUTHERN LEVANT AND NORTHERN ARABIA

"Beyond Yahweh: The Materiality of Cult of the Iron Age Negev and Edom in the *Longue Durée*".

Käte Hamburger Kolleg, Center for Religious Studies, Ruhr-Universität Bochum. Bochum, July 15–17.

NATIONS AND NATIONALISM 25/1 (2019), 124-145.

"Memories of Humiliation, Cultures of Resentment towards Edom and the Formation of ancient Jewish National Identity".

https://onlinelibrary.wiley.com/doi/abs/10.1111/nana.12367

ANTIGUO ORIENTE

Review of Lemardelé, C. 2019. *Archéologie de la Bible hébraïque. Culture scribale et Yahwismes*. Oxford.

Antiguo Oriente 17, pp. 301–305.

BIBLE ODYSSEY

"Midian"

https://www.bibleodyssey.org/en/places/related-articles/midian#contrib_tebes-juan-manuel

SEMINARIO: LAS FORTALEZAS DE EDOM Y LA ARQUEOLOGÍA DE AL-SILA, BÍBLICA SELA

Con Rocío Da Riva

Facultad de Teología, Universidad Católica Argentina, Buenos Aires, octubre 19.

SEMINAR GLOBALGESCHICHTE – EINZELANSICHT

"Blame the Foreigner: The Construction of the Ancient Jewish Tradition of Edom's Guilt (or How Fake News is Nothing New)."

Historisches Seminar, Fakultät für Geschichts- und Kunstwissenschaften, Ludwig-Maximilians-Universität München, Munich, December 12.

BUNDESMINISTERIUM FÜR BILDUNG UND FORSCHUNG (GERMANY)

"Conference funding"

Käte Hamburger Kolleg, Center for Religious Studies, Ruhr-Universität Bochum. Bochum, July 15-17.

RESEARCH FELLOW IN GLOBAL HISTORY

"Research Fellowship".

Munich Centre for Global History, Ludwig-Maximilians-Universität München. Munich, November-December.

BARQA LANDSCAPE PROJECT

Faynan (Jordan), June-July.

University of Waterloo.

ROXANA FLAMMINI

I CONGRESO INTERNACIONAL DE ESTUDIOS BÍBLICOS

Coordinación de panel (junto a Pablo Jaruf).

Buenos Aires.

Universidad Católica Argentina – Asociación de Estudios Bíblicos.

I CONGRESO INTERNACIONAL DE ESTUDIOS BÍBLICOS

"Los Hicsos y el éxodo bíblico: más allá de la búsqueda de un paralelismo histórico".

Buenos Aires.

Universidad Católica Argentina – Asociación de Estudios Bíblicos.

I JORNADAS DE INVESTIGACIÓN DEL INSTITUTO DE HISTORIA ANTIGUA ORIENTAL

"Yesterday-Tomorrow. Una aproximación desde el realismo aspectivo a las representaciones del Antiguo Egipto".

Buenos Aires.

Instituto de Historia Antigua Oriental – Universidad de Buenos Aires.

II ENCUENTRO DE ESPECIALISTAS DEL ANTIGUO PRÓXIMO ORIENTE

"Una aproximación contextual a la segunda Estela de Kamose".

Concepción, Chile.

Universidad de Concepción.

I WORKSHOP INTERNACIONAL MITO Y SOCIEDAD. TRADICIONES ANTIGUAS Y MUNDO MODERNO

"Símbolos, poder ritual y performatividad: una aproximación a las particularidades de la Segunda Estela de Kamose".
Córdoba.
Universidad Nacional de Córdoba.

JORGE CANO-MORENO

ESTANCIA DE INVESTIGACIÓN

Beca DAAD. Institut für Klassische Archäologie, Ruprecht-Karls-Universität Heidelberg.
Heidelberg, Alemania.

ANTIGUO ORIENTE

Review of *Artemis Karnava, Seals, Sealings and Seal Impressions from Akrotiri in Thera. Corpus der Minoischen und Mykenischen Siegel*, 2018.
Antiguo Oriente 17, pp. 296–301.

ROMINA DELLA CASA

ACTS OF THE IXTH INTERNATIONAL CONGRESS OF HITITOLOGY

"Hittite Symbolic Landscapes: An Analysis from the Standing Point of Myths". In: A. SÜEL (ed). *The congress was held in Çorum*,
Turkey. September, 2014.

BECA POSTDOCTORAL

Post-doctoral Fellowship of The Sonia and Marco Nadler Institute of Archaeology.
Tel Aviv, 2019-2020.
Tel Aviv University.

DANIEL JUSTEL VICENTE

JORNADAS: JUDÍOS EN BABILONIA

Coorganizador (junto con Patricio de Navascués).
Universidad San Dámaso. Madrid, 18-19 noviembre de 2019.

CURSO

"Relatos del Antiguo Testamente a la luz de la documentación cuneiforme".
Facultad de Teología *Redemptoris Mater*. Callao (Perú), 21, 22 y 23 de octubre de 2019.

SEMINARIO DOCTORAL

"Textos y prácticas socio-políticas en el Cercano Oriente antiguo durante el II milenio a. C.: estrategias (inter)estatales y derecho familiar" (seminario co-impartido con Andrea Seri)
Pontificia Universidad Católica Argentina, Buenos Aires. Buenos Aires, 28, 29 y 30 octubre de 2019.

JORNADAS: JUDÍOS EN BABILONIA

"Presentación de un documento de época de Nabucodonosor II".
Universidad San Dámaso. Madrid, 18 de noviembre de 2019.

VIII CONGRESO NACIONAL DEL CENTRO DE ESTUDIOS DEL ORIENTE PRÓXIMO. *EX ORIENTE AD LIMINA*

"El mecanismo jurídico de la adopción a partir de la documentación casita".
Universidad de La Coruña. Ferrol (España), 10 de diciembre de 2019.

JOURNAL OF ANCIENT CIVILIZATIONS

"A Survey on Ancient Near Eastern Law".
Journal of Ancient Civilizations 34/1, pp. 69–81.

ESTANCIA DE INVESTIGACIÓN

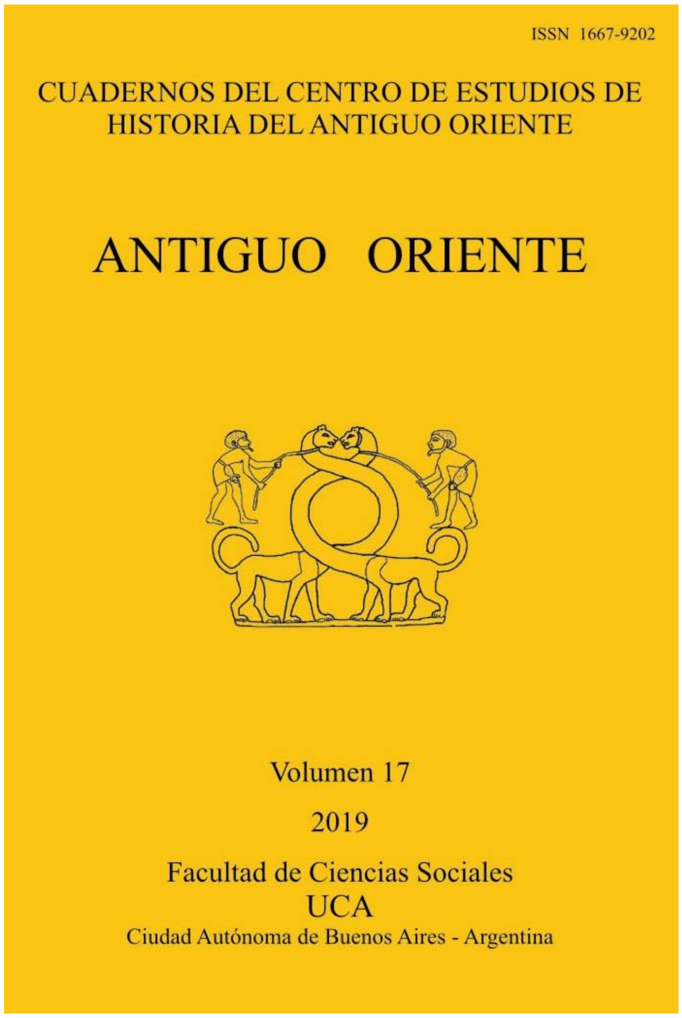
Facultad de Teología *Redemptoris Mater* (Callao, Perú).
Ayuda de la *Oficina de Investigación y Relaciones Internacionales* (OIRI) (Universidad San Dámaso)
Callao (Perú), 20-24 de octubre de 2019

ESTANCIA DE INVESTIGACIÓN

Estancia de investigación en la Pontificia Universidad Católica Argentina (Buenos Aires, Argentina)
Ayuda de la *Oficina de Investigación y Relaciones Internacionales* (OIRI) (Universidad San Dámaso)
Buenos Aires (Argentina), 25 de octubre-1 de noviembre de 2019.

ANTIGUO ORIENTE VOL. 17

ÍNDICE



CENTRO DE ESTUDIOS DE HISTORIA DEL ANTIGUO ORIENTE

LIBRARIES AND ACADEMIC INSTITUTIONS
IN THE FIELD OF ANCIENT NEAR EASTERN STUDIES

BUENOS AIRES

IMHICIHU (Instituto Multidisciplinario de Historia y Ciencias Humanas / Unidad de Investigaciones sobre el Cercano Oriente Antiguo - Consejo Nacional de Investigaciones Científicas y Técnicas)

http://www.imhicihu-conicet.gov.ar/

E-mail: imhicihu@conicet.gov.ar Address: Saavedra 15, Buenos Aires Tel.: (54-11) 4953-8548 / 2042

CEHAO (Centro de Estudios de Historia del Antiguo Oriente)

http://www.uca.edu.ar/cehao/

E-mail: cehao@uca.edu.ar
Address: Av. Alicia Moreau de Justo 1500, Buenos Aires
Tel: (54-11) 4349-0200 (int. 1189)

UCA Library

Online Library Catalog: http://anima.uca.edu.ar/
Digital Library:
http://bibliotecadigital.uca.edu.ar/greenstone/cgi-bin/library.cgi

E-mail: bibliot@uca.edu.ar
Address: Av. Alicia Moreau de Justo 1300, Buenos Aires
Tel.: (54-11) 4349-0421
Fax: (54-11) 4338-0695
Opening hours: Monday to Friday, 08:00 to 17:00

IHAO (Instituto de Historia Antigua Oriental "Dr. Abraham Rosenvasser," University of Buenos Aires)

http://www.filo.uba.ar/contenidos/investigacion/institutos/antoriental/index.htm

E-mail: ihao@filo.uba.ar
Address: 25 de Mayo 217, Buenos Aires
Tel.: (54-11) 4334-7512 / 4342-5922 / 4343-1196 (int. 107)
Fax: (54-11) 4343-2733
Opening hours: Monday to Friday, 15:00 to 19:00.

Academia Argentina de Letras, Donación Dr. Abraham Rosenvasser - Library

Online Library Catalog:
http://letras.edu.ar/wwwisis/inicio/form.htm

E-mail: biblioteca@aal.edu.ar
Address: Sánchez de Bustamante 2663, Buenos Aires Tel.: (54-11) 4802-3814 / 2408 / 7509 (int. 216 / 218)
Opening hours: Monday to Friday, 13.15 to 18.30

National University of La Plata Library (Biblioteca de Humanidades)
http://www.bibhuma.fahce.unlp.edu.ar/
Online Library Catalog:
http://www.bibhuma.fahce.unlp.edu.ar/catalogos/cat_basica.php

E-mail: bibhuma@fahce.unlp.edu.ar
Address: Calle 48 entre 6 y 7, 1º subsuelo, La Plata Tel.: 423-5745
Fax: 423-5745
Opening hours: Monday to Friday, 08:00 to 19:00

Seminario Rabínico "Marshal T. Meyer" - Library

http://www.seminariorabinico.org/

E-mail: biblioteca@seminariorabinico.org.ar Address: José Hernandez 1750, Buenos Aires Tel.: (54-11) 4783-2009 / 4783-6175
Fax: (54-11) 4781-4056
Opening hours: Monday to Thursday, 14:00 to 21:00