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What can you do with a Calendar?
Extracting Facts, Stories, and Information otherwise pertinent to
your own Field from a Table of Dates

Daniel Patrick Morgan
ERC Project SAW
(CNRS – Université Paris Diderot)

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Introduction

A couple of years ago, while writing a chapter on calendars, I was hanging out with a friend, and I suggested he might look in to *rìshū* for what he was doing. My friend sighs and says, « I can't imagine anything more boring »; « What about calendars? », I ask, to which his response was « Oh, god, you're right, I forgot about those! ». Calendars are an afterthought: even when you're making a mental list of the texts that you would never want to read, calendars don't even make the list. They're not poetry, they're not philosophy, they're not treatises on law, medicine or mathematics, nor are they the sort of administrative documents that reveal things about taxation or military life... *calendars* are simply not something you sit down to read. But, they *are* manuscripts.

There are people who make it their career to study these manuscripts, and what they do is *interesting*, but it's also *very insular*, and it probably doesn't make it to your bedside table, and that's fine... I'm not here to lecture you to read all of Zhāng Péiyú; *rather*, what I want to do is talk about what *you*, a specialist of *x*, *y*, or *z* literature, can get out of a calendar. I'm going to proceed in three parts: first, I'm gonna introduce the Zhāngjiāshān « calendar », or « lunation table », as I call it; second, I'm going to summarise what scholars have done with *this* and other manuscripts like it; then, I'm gonna talk about would we *could* do, focusing on the big questions. For example: How do we date a tomb? Are tomb texts « real », or *míngqì* funerary objects? Did tomb texts belong to the occupant in *life*, or only after death? Are they *written* by the occupant, or by someone else? And, how are they *written* in the first place?

Introduction to the ZJS M247 lunation table

So, the Zhāngjiāshān « calendar » is composed of 18 slips, 23 cm in length, and bound in two places around the centre. In terms of contents, each slip lists the new moon days of a single year: « Year 12: month ten, *guǐ-wèi*; month eleven, *guǐ-chǒu* », and so on. And this runs from Gāozǔ 5 to Gāohòu 2, 202 to 186 BCE. We also have two personal notes. Under 201, month nine, we have: « Newly surrendered to the Han » and, under 195, month six, we have: « Sick, relieved [of office] ».

As to codicology, one notes that the *scripteur* writes two of these years onto the verso, rather than writing one year on two adjacent slips, so the organisational logic is clearly *tabular*. Now, that's

about all there is to say about the manuscript *itself*. It's not that interesting, *as such*, compared to something like the *Ēr-nián lù-líng*, *but*, we have ways of making it talk.

What's been done?

The first thing that we do with a calendar is check it against historical lunation tables, like Zhāng Péiyú, or the online date-conversion site provided by Academia Sinica. This is how we identify « shí-èr nián » with « Gāozǔ shí-èr nián », so we know what year we're talking about—196 BCE, in this case. Now, the thing is, the sort of historical tables you see here are not completely reliable, so scholars like Zhāng Péiyú and Lǐ Zhōnglín, for example, correct one against the other. But we're not going to go into that, because it's ... boring.

Anyway, once we've established the year—or *years*—of a « calendar », that gives us a *terminus post quem* for the burial. Why? Well, *today*, when you buy a calendar, you can only buy one for *this year* or *the next*, but nothing is stopping you from calculating one for, say, 2020. The problem is this: *We* use the Common Era, but if we were using *reign-years*, who's to say if 2020 is Hollande 9 or Le Pen 4? If you can't see the future, you can't make a calendar for it. So, a « calendar » gives us a *terminus post quem*, and that's how we date the Zhāngjiāshān tomb: to quote the editors, the lunation table puts the burial « in, or not long after, 186 BCE ». *This*, by the way, is how we date many other tombs from the period. Zhōujiātái Tomb 30, for example, has a calendar for 209 BCE, from which the editors deduce « the upper limit for the year of interment »; Kǒngjiāpō Tomb 8, likewise, has a calendar from 142 BCE...

So, how « long » is « not long after »? Well, in the case of Kǒngjiāpō, you have a « calendar » for 142, and you have a *gào-dì shū* dated to month one, day eight, of the same year, so the deceased is buried with a calendar for the upcoming year. At Mǎwángdūī, however, you have the *Wú-xīng zhān*, whose planetary tables cover 246 to 177 BCE, *but*, you also have a burial tag dating to 168, so *here*, « not long after » is *nine years*. Think about this: in the one case, you have a *li* for the future, one that the deceased could really only use in the afterlife, and in the other, you have a *li* for the past, which was either for some sort of historical reflection in the afterlife, or, one imagines, it was something that belonged to him in life. Now, the Zhāngjiāshān « lunation table », the Kǒngjiāpō « calendar », and the Mǎwángdūī « planetary tables » are all within the purview of *li*, *but*, they're not at all the same sort of text, so we can't really deduce a single pattern from such objects.

The third thing we do with « calendars » is mine them for information about the tomb occupant. Everyone does this; the assumption is that any *diary* you find in a tomb must belong to the occupant, *and not*, for example, that the son puts *somebody else's diary* into his father's tomb. This is what we learn about the occupant of Tomb 247: he was born; he surrendered to Han authorities in 201; he fell ill and left office six years later, in 196; he stopped filling out his « table » nine years later, in 186; and then he died. Now, the corpse itself has « disintegrated », according to the site report, but the presence of a dove-head staff in the inner coffin points to an age of at least 70, so it makes sense that he might be « relieved of office » due to « illness » at that age.

What can be done?

That's what *has* been done, but we can do more. First, if you have the tomb occupant's *diary*, then you have his handwriting; if you have his *handwriting*, then you can see if he wrote the other texts with which he's buried. You do *that*, and you have positive evidence on the question of whether these texts are *acquired* or if they're *personal creations*. And if it's the *tomb occupant* who wrote those texts, they can't be *míngqì*.

Second, « calendars » provide us with a special window into transmission and copying practices. Early Chinese manuscript studies is focused on classics and philosophical literature. On the technical side, we have people working on divination, medicine, law, and administration, but there aren't a lot of us, and there's a clear divide between what we're doing and what you see, for example, the recent monographs by Matthias Richter and Dirk Meyer. I think it's important that we build bridges, especially those of us in technical fields, because, when you have manuscripts like the *Èr-nián lǚ-líng*, *Yīn shū* and *Gài lú* in the same tomb, I suspect that they're not *radically* different in terms of how they came to be—that the *Gài lú* alone was produced *this way* because it's « philosophy ».

Karine and I have begun working on mathematical manuscripts with an idea of adding to the conversation. Now, the thing that's great about math texts—and *calendars*—, in this regard, is that: they are repetitive and limited in vocabulary, which makes them *perfect* for codicological analysis, and that they are comprised largely of *numbers*—and *tiān-gān dì-zhī*—and when you're dealing with *numbers*, you can say for certain what is a mistake, *and what kind of mistake it is*.

Calendars, of course, are *documents*—rather than treatises written for the sake of posterity—and that bridges us with administrative texts, in terms of how documents and literature might circulate differently. *Everything* I think we can do with calendars rests on a single assumption—that they are *personal property* and *personal creations*—and, while this is a *common assumption*, it must, *as such*, be questioned. Before we get to that, though, I want to show you why it matters.

Handwriting analysis

As of a month ago, I was unable to connect the lunation table to any of the other hands present at Zhangjiashan. The problem is that the table is kind of limited, as none of the characters I was looking for really appear there. All we have is *part* of a single *wéi*. That's not much of a sample, when the *Suàn-shù shū*, for example, that has 287, but we can say that this *wéi* only really looks like hand B of the *Suàn-shù shū* and *Zòu-yàn shū*. The lunation table has plenty of other characters, of course, but things like *yuè*, *nián*, *zhēng* and *wǔ* are a little more variable within each hand...

Anyway, last week I sat down to try again with what we have. After several bad ideas, I began to notice that the way the lunation table writes *wǔ* is both consistent & unique, which is to say that most of the Zhāngjiāshān corpus is careful to connect the lines. Only three other script-groups left the character open: hand B of the *Suàn-shù shū* and *Zòu-yàn shū*, and the *Mài shū*. Looking at *yuè*, most of the Zhāngjiāshān corpus uses slanted, curving strokes on

the outside, while the lunation table prefers a more boxy form, *with* or *without* a slight outward curl at the bottom. That also matches what we see in hand B of the *Suàn-shù shū* and *Zòu-yàn shū*.

In the corpus-wide analysis from a month ago, if you recall, I had I had independently identified hand B of the *Suàn-shù shū* and *Zòu-yàn shū*. They don't look the same: just about every one of the character forms here is different, but *that*, I suspect, is a matter of *script*. I say that because, of course, because I began by separating out the scripts, and moved from there to script-independent features like, in this case a boxy *yuè*, and an idiosyncratic *wéi*. Now, I could be wrong. I'm learning as I go, and it wouldn't surprise me if there's a better way to do this, but for now, let's say that I'm right.

If I'm right, the man who wrote the lunation table wrote part of the *Suàn-shù shū*. « Which part ? », you ask... Well, *Scripteur C*—*in purple*—is the one who wrote the headings and the sample problems, which is to say that if Karine and I are right about this manuscript, *Scripteur C* is the teacher.

In the *Zòu-yàn shū*, *Scripteur C* appears to have written the following sections. I have no idea what this means, because I have never really read the *Zòu-yàn shū*, so hopefully you can tell me. Anyway, what I find noteworthy, in my ignorance, is that here again it is *Scripteur C* who appears to be leading, as in the section starting « Huáiyáng shǒu-xíng xiàn-yuàn xīn qī-yù », it is A who finishes what C began.

OK, so: *Scripteur C* wrote the lunation table and led the *Suàn-shù shū* and *Zòu-yàn shū*. *Scripteur C* looks like a teacher. By merit of the lunation table « diary », if you will, we assume that *Scripteur C* is the tomb occupant. And if *Scripteur C* is the tomb occupant, then the *Suàn-shù shū* and *Zòu-yàn shū* did not come from a « funerary workshop », nor can they be *mingqi*. And, *if so*, we can extend this sort of analysis to other corpora and begin an *empirical* discussion of what individual tomb occupants did and didn't write. This of course brings us back to the assumption underlying the way we use calendars—that a tomb calendar recording business, travel, illness, and so on is talking about the tomb occupant, and not somebody else. This seems self-evident... to me... but I'm always surprised by the stuff that my historical subjects thought was normal, so it's worth questioning.

Does the « calendar » belong to the tomb occupant?

First of all, « calendar » is a clumsy word, because it we apply it to different things. Scholars recognise an absolute divide in the archaeological record *circa* the seventh century between self-styled *jù-zhù lì-rì* almanacs, of the sort we find at Dūnhuáng, and so-called *lì-rì* « calendars ». So we're talking about the latter. « Calendar », in this sense, is a catch-all for everything that's not a *jù-zhù lì-rì*—some sixty manuscripts and manuscript fragments from 213 BCE to 630 CE. This corpus is nowhere near as homogeneous as the *jù-zhù lì-rì*, and Alain Arrault, Yoshimura Masayuki and myself have all proposed our own calendar typologies. But for the sake of today, let's work with the following: You have day calendars and you have lunation tables; within day calendars, you have « public calendars » for display and « private calendars » for record-keeping; and within *lunation tables*, you have annual tables, and multi-annual tables.

This is a reconstruction of the « Sà-sì nián zhì-rì » from Zhōujiātái tomb 30—a private day-calendar for 213 BCE. The manuscript is divided into six registers, each register running

through the days of two successive months. The layout is designed for annotation, and here we have notes about travel, lodging, administration and construction.

In the Yuèlù shūyuàn collection we have *another* « Sà-sì nián zhì-rì ». The layout is identical. This *too* has notes, mostly about one Téng, in the third person, his travels, lodging and administrative business, but we also have entries on illness, archery and someone else's death.

We have a total of six *zhìrì* from 213 to 170 BCE, three from southern tombs and three from the Yuèlù shūyuàn collection, which probably also derives from southern tombs. The fact that all six are identical in layout, and that five bear the title *zhìrì*, means that we're probably looking at a standard document-type, and so it's safe to talk about the Zhōujiātái manuscript as a « zhì-rì ». Two of these are unpublished, so we can't say what's in them, but the other four all gravitate towards matters of travel and administration.

The fact that the Yuèlù shūyuàn collection features a « private » or « personal » *zhìrì* has led scholars like Lǐ Líng and Sū Jùnlin to debate whether these things are personal diaries or official documents. Either way, they are specific to the individual, because we either have no name associated with the actions as we would expect of a diary, *or* we have one name appearing consistently throughout. If the document was meant to keep track of *multiple* individuals, an entry like « day *dìng*hai: sick » would tell you nothing.

Here we have what I classify as a « display calendar », this one, entitled « Qī nián lì rì », comes from Yínquèshān tomb 2, but we have something like 30 of these from Northwest administrative sites. What's different? The layout, first of all: each month has its own register; each slip is labelled with an ordinal day-number; and the *gān-zhī* are written horizontally. So too are the annotations different: you have holidays, *qì*, and hemerologies, but nothing at all of an individual nature. The biggest difference... is how big they are, both in terms of physical dimensions and font. *This*, for the sake of comparison, is the Zhōujiātái *zhìrì* in the upper corner. All-in-all, « lì rì » would seem to label a document-type that is distinct from the *zhìrì*, and whose function is display.

So now we come to lunation tables. We have seven of these: one from Dūnhuáng, two from tombs, and three from administrative sites. Six of them are annual. In its simplest form, all you have is the month, the *gān-zhī* and the size; in some, like the one in the middle, you also have the sort of spare annotations you find on a public display calendar: i.e. holidays, *qì* and hemerologies. Zhāngjiāshān is the exception, here, because it combines several years into one, and because it inserts annotations of a personal nature into that list.

The Zhāngjiāshān table is personal property, and so too is that from Zhōujiātái. The owner of the Zhōujiātái lunation table has used the verso as a notepad.

 Jiaping on month twelve, *wù-xū*—four days out from the end of the month.

 Month twelve, *yǐ-mǎo*, arrived at court tax office a total of 20 mat cushions.

And then, we have a list of thirty *tiān-gān dì-zhī*. Now, it so happens that *these* are the *tiān-gān dì-zhī* of the very same month—

month twelve—so, what the owner’s done is expand the lunation table on the recto into a day table and he does this, apparently, to work out the number of days between sexagenary dates. This is important, and we’ll come back to it, but let’s first settle the question with which we began.

If a tomb has a « calendar », or a « diary », is that « calendar » *necessarily* the property of the tomb occupant while he was alive? Well, first we need to distinguish between « personal » and « public » calendars. And here there’s some ambiguity, because we find « public » display calendars in private tombs, and « private » calendars conforming to public standards. Whatever « private » means, there are calendars that record *activities*—like going and sleeping and coming back—and those activities are specific to an individual. We can’t *prove* that *that* individual is the tomb occupant, but we *can* try to falsify it.

One could look for *conflicting* diaries in the same tomb, but *that* we’ve never seen. We *might* have two people in the Yuèlù shūyuàn calendars—Téng and Shuǎng—but we don’t know here these manuscripts came from. You could also have travel records impossibly far from the tomb, but diaries from Jiānglíng describe Jiānglíng, and Yīnwān, Yīnwān. You could find a burial context that contradicts the diary, but that doesn’t happen either. At Shuihǔdì, the « biān jì nián » ends when the protagonist, Xǐ, is 46, and forensic analysis places the corpse at 40 to 45 years of age. At Zhāngjiāshān, the lunation table ends nine years after retirement, which fits with the occupant’s dove-head staff and the *scripteur*’s apparent role as teacher. At Kǒngjiāpō, the deceased is buried with a calendar for a year in which he was not alive, and that calendar is blank. At Yīnwān Tomb 6, furthermore, we have calling cards identifying the occupant with the *gōng-cáo*, and a calendar mentioning the unnamed author’s appointment to that very office. I could go on, but the point is I think we’re right to assume that « personal » tomb calendars belong to the men with which they’re buried. The question, if we want to be thorough, is whether or not they *wrote* them, but luckily we know something about how calendars were made.

Calendar-making

Let’s go back to the Zhōujiātái lunation table. What we see here is calendar-making. The owner uses the new moon of month twelve on the lunation table to make himself a day-calendar. I think that this is how it works. OK, prior to the 7th century, you have day calendars and you have lunation tables; after the 7th century, all you have is almanacs. Now, when you look at *li* procedure texts, which give you the mathematics to calculate the civil calendar, what they instruct you to compute is lunation tables—tables identical to those we see in the archaeological record.

Now, it just so happens, *in the 7th century*, that we a shift in vocabulary, (and I know this from exhaustive database searches): prior to the 7th century, people talk about « promulgating lunations » or « months ». It is *only in the Tang* that that a new expression appears: « promulgating the *li* ». The change of vocabulary coincides with a change in document-type, and the change in document-type roughly coincides with the popularisation of paper and printing. Now, whatever the cause-effect relationship, what’s important is that everything points to the reliance on lunation

tables for the computation and distribution of the early civil calendar.

The reason that distribution relied on lunation tables, I suspect, is because it relied on hand-copying, and this copying was « handled » by the individual. This, for example, is what the *Jí-xián zhù-jì* of circa 757 tells us:

Ever since its establishment in 725, the academy has been ordered to make 120 copies of the new *li* to disseminate to the kings and princesses of royal blood as well as the grand councillor, excellencies, ministers, etc. within month XI of every year. All of these are ordered to be distributed in red & black ink with annotations concerning the sequence of stars so that they may be passed around for copying.

120 copies is not a lot. Now, you would think that with printing, what would happen is that the state would centralise calendar production, taking it out of the hands of the individual. The calendar, after all, is one of the most sacred symbols of imperial dominion. *But* just look at the Tiān-shèng ordinances of 976:

Every year, the Clerk's Office is to create in advance a *liri* for the upcoming year, giving one copy each to the three capitals & various prefectures. [They] are to be dispatched sequentially, based on the measured distance of the journey required. The Privy Council disseminates [them] and are furthermore ordered to do so such that they arrive before the beginning of the civil year.

One copy per prefecture—and this is 141 years after the first ban on pirate woodblocks! So, if « *dì-xiāng chuán-xiě* » is how it worked in the age of printing, and in 725 this is probably how it worked earlier.

« Pass around for copying »

Now, there are all sorts of theories about how texts were copied in early China—dictation, memory, *visual* copying, oral transmission, and so on, and there are a lot of theories about whether or not copyists understood or could even read what they were copying, Literacy, orality, and, if I may, *numeracy*, are all interesting questions—questions that I myself have written upon—but... I would like to suggest that if we want clear answers to these questions, the best place to look is mathematics.

This is the Yuèlù shūyuàn « Sà-sì nián zhì-rì ». If we remember, the *zhì-rì* has two months per register, which works out 59 days. Now, the result of this is that we fall one day short of the sexagenary cycle, so the *tiān-gān dì-zhī* repeat moving one place left every register. Here I've circled *bǐng-wǔ*, so you can see how it repeats.

Now, the interesting thing is that *here*, the copyist makes a mistake in the fourth register, writing *bǐng-shēn* instead of *bǐng-wǔ* and that mistake repeats in the fifth and sixth registers. Why?—because he's visually copying from the preceding register.

Guess what—the exact same thing happens with the Zhōujiātái *zhì-rì* this time with *xīn-yǒu* and *xīn-chǒu*. But, there's an even bigger problem with this manuscript! The copyist forgets to leave a space at the end of a « small » month ten, as per the the *zhì-rì* format. When he gets to the second register, he then has to leave off the last day of month twelve, skipping day *bǐng-yín*. When he gets to the third register, however, he goes straight through, which

effectively moves all of month three one day forward. He then *repeats* this mistake through registers four, five and six, until he gets to his *other mistake*, then, he apparently realises what he's done, because he once again skips the last day to reset month nine to the correct new moon date. These mistakes are *clearly* products of visual copying, and it's interesting to see that the copyist, himself, is able to *identify* and *correct* them, because that's proof that he understands. We see this in the Zhōujiātái and Yuèlù « calendars », and I can tell you from experience that it's pretty common. Regardless of whether it's « public » or « private », a tomb or an administrative site—this is just something that happens with day calendars.

Now, when it comes to the annual calendar distribution, the lunation table makes sense: it's small, it's light, it's fast to copy, and it's expandable, upon delivery. But the genius of this document is that it provides fail-safes against copy-error. First, the document is formulaic and offers a minimal number of characters to copy—or *miscopy*, as the case may be. Second, you have predictable sequences of month-size and *gān-zhī*-day the size always goes « 大、小、大、小、大、小、大、大、小 », so all you have to do is find the « double 大 ». The *tiangan* always come in pairs, going backwards through the count. The *dizhi* come in opposite pairs—*zī* – *wu*, for example, and they proceed in a predictable sequence. The *tiān-gān dì-zhī* sequence, furthermore, is tied to the size-sequence. Now, all you really need is the *gān-zhī*, because the sequence of *tiān-gān dì-zhī* is determined by month-size, but let's say that you make a mistake... writing *ren* instead of *gui*, or *you* instead of *wei*.... Well, the fact that you have three parallel sequences in 60 characters makes it really easy to *spot* that mistake.

Conclusion

So, « calendars » offer us a really interesting case study in manuscript transmission: we know how they were computed; we know how they were distributed; we know how they were copied; and we know how they were used. Top to bottom, capital to frontier, public to private, you can see trace the entire process. When you do that, what you see is a diffusion of production to a local and/or individual level—a diffusion that relied upon local officials to understand, unpack, and correct *li* knowledge and a diffusion, more importantly, that expected and took proactive measures against human error, human error caused by mindless visual copying.

The new year's lunation table arrives at a district office, this is « passed around for copying », and it is... *expanded on site* into the necessary formats: display calendars, duty logs, or the sort of *weird* multi-year lunation table you find at Zhangjiashan. Some of these formats are designed for recording events. The events they record are individual in nature, and they appear in an individual's tomb, *and nowhere else*. Now, we *all* use these calendars to speak about that individual: to place his death, to date his tomb, to identify his official function, and so on, because there's no reason—and no evidence—to doubt that it belongs to him.

I think we all assume also that he *wrote* his own « diary ». We can imagine other possibilities, *I know*, and we can try to falsify this in the future, *I will*, but this is the simplest possible explanation. Well, if he *wrote* his « diary », then we have his *handwriting*, and his handwriting allows us to say what else he wrote. In the case of Zhangjiashan, it looks like the tomb occupant took the leading role

in the *Suàn-shù shū* and *Zòu-yàn shū*. If so, these cannot be *mingqi*, they cannot be products of a « funerary workshop », they cannot be this that or the other, they can only be *realia*—real things, belonging to a real man, that may reveal who he really was.