

**Shesh Kenafayim (שש
כנפים, "Six Wings"); also
known as Kanfei
Nesharim**

Wings of Eagles

(c. 1365)

by R. Immanuel ben Jacob Bonfils of Tarascon (active 14th century,
Provence)

Translation by Scott Weisman



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Translator Version 2

Upright reason dictates that the recipients of the good, of whatever type and level of beneficence it may be, must show gratitude and blessing to the beneficent person in every way possible, commensurate with the value of the beneficence. And one who has benefited all the people of the world — for example, one who invented a new instrument for the good of the world, or a good book — it is fitting for every discerning person, out of the obligation of love of fellow beings, to at least purchase it, so that the man will profit and his heart will be encouraged thereby to invent yet more good instruments in the world. And similarly, all other wise-hearted people will likewise strive and exert themselves to invent good things and instruments needed for the repair of the world and its perfection.

And therefore, whoever says: "What do I need this new instrument for?" — he does not act well towards the world. For if not for the man who invented it, where would you be? And what would your city do? And more than this, if the man did not exert himself, what would the world do?

— R. Pinchas Eliyahu Hurwitz, *Sefer HaBris HaShalem* (1797)

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A note on the work

One of the most widely copied Hebrew astronomical handbooks of the late Middle Ages, composed around 1365 in Provence. Its six sets of tables — the "wings" that give the work its name — let the user compute the positions of the sun and moon, predict eclipses, and convert between calendars, each with brief instructions for use. It employs a decimal notation for astronomical fractions long before such methods spread through European mathematics, and was later translated into Greek and Latin. This English version is drawn from an Italian manuscript copy made in 1509.

A note on the translation process

This translation was produced with the [translation-pipeline](#). See the linked repository for details on the process.

This text is the product of a highly refined automated translation process. It has undergone only cursory human review and should not be treated as an authoritative or scholarly rendering. It is offered solely as a reference and reading aid — a way to make an otherwise inaccessible work approachable — and any passage of real consequence should be checked against the original source.

Acknowledgements

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Shesh Kenafayim (Six Wings) — Immanuel ben Yaakov Bonfils

[The folio opens with a rhymed preface set in two columns of couplets, all sharing the rhyme-syllable *-im*. Hebrew reads right-to-left, so each couplet's first hemistich stands in the right column and its rhyming close in the left column. Rendered here couplet by couplet.]

When I came to set the planets in order, I found myself longing for companions
[or: for friends' company]; [?]

I weighed [their] motion and the reckoning of the shortest [course], without much
labor and without lengthy words. [?]

[I joined?] companions and topics, and arranged the luminaries, fitting them
together; [?]

so that those who seek them may find them, and the great reckoning be made
simple [for] the abridgers. [?]

And I made these tables radiant in their working [or: in their motion], wing upon
wing [arranged]; [?]

and these are six wings by number, like the seraphim who are engraved [in the
verse], "with two he covered [his face]." [?]

to shelter beneath the wing — [each] moment its reckonings recounted; [?]

[that] they may know it and not grow weary over it, and not be wearied — the toil
of the toilers; [?]

and this is a path for those who walk in righteousness; it heals with its wings
those who pass through; [?]

and as a fit thing they go up to it [?] — for this reason I called its name "Six
Wings" [שש כנפיים / shesh kenafayim]. [?]

[Red ink initial-word: אמר — *Amar*, "Said"] Immanuel ben Yaakov [Bonfils], the
author of [these] wings, may God [?] love him [?]: When I sought to set in order —
and I am [but] a youth among the people of Israel — at the start, for the benefit of
my contemporaries and companions, and I drew it up; and the best of [the
methods of finding] the *moladot* [conjunctions] and the topics of the keepers and
the laborers [or: the workers and the toilers] — by every short and brief path.

And R. [?] verified [it] for me afterwards, in [the] portion [ḥeleq] of its workings [?], from the reckoning. And I kept and made [these tables?] truthful and right, "and this is the matter of its statutes." [?]

[Red ink initial-word: וְאִלּוּם — *Ve-ulam*, "However / But indeed"] Easy is the matter for one who knows, but its time is not given [?], and there is in this a reckoning [?] for [the purpose of] making good the great lights, that I [?] may not transmit [?] — neither warfare nor toil, nor sickness, nor disease in the body; and it [?] ran swiftly, the whole [thing] being corrected. [Several words in this line are abraded/uncertain — flagged.] R. [?] verified, and [?] their reckonings. [?]

[Red ink initial-word: הָאֶחָד — *Ha-ehad*, "The First [Wing]"]... [the description of the first wing begins here and runs over the foot of the folio]... [?]

Folio 1v — opening of the canon

A poem [shir] of the reckonings [is given] for diminishing the value [erekh] of the difference [ḥilluf] from the time of the *molad* — whether the lesser [?] [value]; thus I have presumed [?] in completing [?] the reckoning. And in this there is great profit [?], for in truth it is fitting to add [?], as I have explained in the foregoing treatise. The "value of the difference" is itself the statement [ma'amar] of the difference [?]. And the value of the difference [ḥilluf] of the *molad* [is] something that happens [?], such that the difference will rise [?] to — and this is the reason for it — about [a value of] 200 [ר'] [?] in the reckoning. And in this the reckoning is [as] the corrected one [ha-meduyaq], like an hour and [?] minutes [daqim], such that the total value [erekh] of the whole difference [is to be found]. [?]

[Red ink initial-word: הַשֶּׁבַח / הַשֶּׁבַי — *Ha-shev / Ha-shavi* [?], "the reckoner / the one who returns"] Now [the matter] has already [been settled] — [it is] the established practice [minhag] of "the rest of the reckonings," to rely — in all their reckonings — upon the opinion [da'at] of the sage [ḥakham] al-Battani [אלבטאני]; and this is fitting for them, for there are no tables in the world to rely upon, [none] more excellent for them, than this one [?]. As [it is fitting] also for those who work to know al-Battani: [for] all the reckonings — they are in motions: how much, and the Moon, also in the place, the height of the Sun, and its straightening [tikkun]; and these are matters that contradict this — [namely] that with this [method] those who reckon the value [erekh] of the difference [ḥilluf] wrote in the tables, [in order] to know the opinion of Ptolemy [בטלמיס], the equating line [ha-meyasher], and to bring it according to its straightening [?] in the place [at] the height of the Sun and its straightening [tikkun]. And he drew up [sarat] in this the

reckoning [of] all the reckonings, to know al-Battani; [and] from the place [comes the value of] the height of the Sun and its straightening, and [it figures] in the value of the difference of the *molad*, which happens — [for] the reasons that the difference [ḥilluf] arises — this [is] the reason between [the two systems]; the difference between this reckoning and the corrected one [ha-meduyaq] [is] like an hour, [and some] minutes. [?]

[Red ink initial-word: השלישי — *Ha-shelishi*, "The Third [Wing]"] The established practice [minhag] has already [been set out] for the rest of the reckonings, [as] another [matter that is] settled between the Sun and the Moon: they will know the portion [ḥeleq] of the moving body [ha-te'unah] [?], which is [reckoned] by the degrees [ma'arot / ma'alot?] of the Moon [yareaḥ] for the year, at the time at which they tarry [?] over the course [mahalakh] of the Moon for the year — also with the portion [ḥeq] of the Moon, which is by the *molad*, or [by] the diminution [*ha-niggur* / *ha-niggaron*?] of the year; [there is] no time for the [conjunction?] [?], and [thus] he straightens [yeyasher] [it] by [this means]; and this, too, [follows] in this way, for it shall not be given [?] — since it is proper for them to investigate the course [mahalakh] of the Moon for the year, with the portion [ḥeq] of the Moon, [now] corrected [ha-metukan], in the [span?] of the year, which they shall divide [yeḥallequ]. [?]

to compute the time and the difference between the *molad* (conjunction) and the [true] syzygy — whether they are equal, or whether [the difference falls] within the [permitted] limit. The difference between the *molad* and the [point of] opposition, and likewise its [the body's] course — so [the body's place] may be derived. From this is known the difference between [one] reckoning and another, that is, the [difference] between the reckoning [by these tables] and the precise computation (*ha-meduyaq*), such as roughly an hour [?].

[Red ink: וכאשר (Ve-ka'asher), "And when"] you set out all these differences for the [several] luminaries [?], the reasons that have been mentioned [above] will be precious [i.e. valuable], so as to derive [the body's place]. The difference between [one] reckoning and another — that is, between the reckoning, the [established] position [?], and the precise value (*ha-meduyaq*) — is as roughly a minute [?]; and all these reasons that have been mentioned [should] be [borne in mind]. The reckoning is more precise than [the simple] reckoning, and by it [we will] derive [the place] correctly.

[Red ink: והנה (Ve-hineh), "And behold"] the towns [?] are dear [to me], and people say to me, "Why [?]"... In this matter the reckoning is bad [imprecise] [?]... the death of the kingdom [?]. [Lacuna: faint line, several words uncertain]

with this distance, and we [?] mean [?]... and by it they shall test [?] me; and on this account [?] the value [?] is dear [precious] in [?]... For the truth — whether [in computing] the new moons [?] or the months [?], or [the months] of the [solar] reckoning [?] — there is a difference in the reckonings for the Moon, and likewise in the [solar] reckoning, [a difference of] roughly a degree [?]. And if you wish to test [?] it carefully upon the way it has been explained, and if you take the difference [?]... and through the [solar] reckoning... and also in [the case of] the Moon you will find [a discrepancy], on his course [?]; and matters [?] of difference [?]... and already it has been said [?]... that this reckoning [?] the simple [reckoning?]... that the [body's] place is exact [?], its [correction] already [made?], by the differences for the luminaries.

And if you have in this anything [further to add by way of] addition or [other] derivation — by which [these] reckonings are corrected — [do so?]; and may the souls of those who toil [in this] rest in peace [?]... those who [?] are upright [?]... and the reasons [?], so that they err [?] not [?]... [and may?] their toil be hidden [?] in the matters [?].

[Red ink: I have composed (חברתי) this [work]... six wings (כנפי שש [?]) for the tablets of the visibilities (לוחות הראיות [?]) For the [royal] task [?] and its lightness [?], that [?]... [in?] short measure (קצר), from now [?] until [the?]... and that the reckonings [?] may be set down [?]... upon them through their courses (*mahalkheihem*) [?] in their times (*hidushehem*) [?].

[Red ink: הכנת [recte: הכנף] הראשון (Ha-kanaf ha-rishon), "The First Wing"] — for the knowledge by it of the *moladot* (conjunctions) and the [true] syzygies [?] — [for] years [?], months [?], and seasons [?]... [Margin/sub-line, smaller hand: faint, partly illegible]

the [bodies' true] places and the position of the luminaries — [whether] the syzygy and the reckonings of the Sun and the Moon are [in] their [proper] reckoning at the time of the *molad*, [and] whether [the syzygy] is equal [to the *molad*].

[Red ink: הכנת [recte: הכנף] השני (Ha-kanaf ha-sheni), "The Second Wing"] — for the correction of the [Sun's] dominion [?], so that the *molad* [?] may be reckoned by it; [for] the *moladot* (conjunctions), and the eclipses (*ha-ge'arot* [?] / the [solar] regions [?]), and to know by them the true [position], so as to set the luminaries [in their places], and to reckon by it the Moon's portion (*heq levanah*), the [solar] reckoning [?]; the difference between the *molad* and a quarter [?] — whether the syzygy is equal [or not].

[Red ink: הכבת [recte: הכנף] השלישי (Ha-kanaf ha-shelishi), "The Third Wing"] — for the knowledge by it of the [true] places, the hours [?] of the days [?] of the visibilities (*ha-ra'ayot*) of the month [?], its derivation [?], and the reckonings of the radices (*shorshei ha-keddurot* [?] / the roots of the cycles [?]).

[Red ink: הכבת [recte: הכנף] הרביעי (Ha-kanaf ha-revi'i), "The Fourth Wing"] — for the knowledge by it of the radices of the Moon's cycles (*keddurot ha-levanah*) and... [?].

[Red ink: הכבת [recte: הכנף] החמישי (Ha-kanaf ha-ḥamishi), "The Fifth Wing"] — for the knowledge by it of [?]... a [marvelous?] vision (*mar'eh*) that is found there [?]... in the radices [?] of the cycles [?] how much [?]... the portion of the *ḥeq* (argument), [and] for the knowledge of the [body's] portion (*ḥeq*), in its time [?], to [?]...

[Red ink: הכבת [recte: הכנף] השישי (Ha-kanaf ha-shishi), "The Sixth Wing"] — for the knowledge by it of [?]... and the reasons (*ve-inyanav* / *ve-inyanim*) [?].

[Red ink: ובעתה [recte: ובעת] (U-ve-eit / U-ve-ata "And now"?)] — when one begins [?] to speak [?]: "The task is full [?], and its lightness [?] is in word [?]..." [?] [The?] task [?] is good (*tovah*) [?]; here [?] are the radices [?]... that is mentioned [?]... in [?] something [?] the [ordinal] place [?] for the measure [?]. We have placed [a] distant radix [?] from the east (*mizrah*) [?]... their [?] reasons [?]; and roughly [?] degrees [?] and toward [?] the Moon's [position] [?]. [Margin, right side, small hand: לעיל (le'eil), "above" — cross-reference marker.] the [royal?] place [?]; [as?] roughly degrees [?]... [and] for the knowledge of the [Sun's] portion (*ḥeq ḥamah*), [whether] equal [or not?].

[Red ink: הראשון [?] (Ha-rishon), "The First"?)] — its radix [?] for the year [?]: [?] the [bodies'] places, the *molad*, and the difference — whether the syzygy is equal [or not?]... [and] the position [?]... And the Sun's portion (*ḥeq ḥamah*) and the Moon's portion (*ḥeq levanah*), and [?] equal [?]... if you wish [?], for you, by it [?], to know [?]...

Shesh Kenafayim — Folios 3r–3v

Italian Hebrew hand: cursive for the body prose, an enlarged display script for the one rubric on 3r. The display rubric is written in the same brown iron-gall ink as the body, only larger (not a separate red ink); the surrounding text is fully legible canon prose.

When you have been asked [for a conjunction], know the number of complete cycles (*maḥzorim*) that have elapsed, and the number of complete years that have elapsed from this radix (*zera'*) up to the full cycle. Take, in a separate place, whatever you find corresponding to the number of complete cycles that have elapsed, by [adding] the additions to the [running] sum (*ḥibbur*) — and combine [them]. Then take, in another place by way of subtraction (*pittur*), [under] the [argument]-entry (*taḥanin* [?]) whatever you find corresponding to the number of complete years that have elapsed.

Again, take for yourself, in the column (*tur*), the next [value] below; whatever you find corresponding to the [argument] number — that is the [new] radix (*ḥeresh* [recte: *shoresh*] [?]) and [it is] correct (*yashar*). And this is the radix of the conjunction (*ḥibbur*); thus [proceed] simply, and if [there is] a passed-over [remainder], combine [it]. And from every species [of argument] take what comes out for you [as] the moment (*rega'*) of the conjunction (*molad*), which is the equated radix (*ha-shoresh ha-shaveh* [?]).

[A faint reading is recorded at the column-foot: *minus* (*ḥaser* [?]) — uncertain.] Then take the radix for the place of the moon — that is what comes out for you. Make [it] degrees (*ma'alot*); and if there is a [completed] place for the moon, [it is] equal (*shaveh*) at the moment the radix [stands] equal.

What suffices you, for [your] knowledge of this matter, is what you have understood here.

[Interlinear, above the rubric, in a smaller cursive: *ḥeleq* [?] ... — a short side note keying the following heading; not fully legible.]

הכנת השני הכנף [recte: הכנף השני] ["The Second Wing"] — [Display rubric, enlarged brown ink:] When you turn to determine the moment (*rega'*) of the conjunction (*molad*) [?] — that is the radix at its proper time and place, the equated [position] (*ha-metukan*).

When you say in truth [?]: [if] you wish, and you take the portion (*ḥeq*) of the moon, and the portion of the conjunction (*molad*) at the moment of the conjunction — or [if] the radix has told you that to it [you must] add, [under] this entry (*hakkanah* [?]), [the value of] the addition (*tosefet*); and you enter along the way of this entry [?]: [proceed] with the portion of the Sun (*ḥeq ḥammah*), correct (*yashar*) [as] given to you. And subtract the entry up to the portion of the moon, [each] in its place (*mishehu* [?]). in your hand, and the matters drawn out [?] are explained at length; and subtract [?] [by] drawing out six [?], for the line [?]. And the parts (*ḥalakim*) of the portions (*ḥeqim*), as the entries (*hashtanot* [?]) and their

levels (*derakim*), in the column (*tur*) inscribed (*rashum*) upon them [is] the conjunction (*molad*).

[?] the entry and the addition (*tosefet*) and the [value] brought up — at the time of the conjunction (*molad*); or the equated radix is correct (*shaveh yashar*) in your hand. And [you] add by [way of] the composition [?]; there is another [value], and there shall remain [?] the moment (*rega'*) of the conjunction (*molad*), or [from] the radix the corrected [value] — and [you must] add one [more] [?] for this, [for] the matter [is] examined (*baduk*); much addition [?] [for] knowing the [true] reading (*ra'ayot* [?]), corrected (*ha-metukan*), in all its terms.

TIY ["Furthermore"] — Take for yourself in this [way]: the entry (*hakkanah*) [as it] settles by way of [what] is heard [?]; and along its levels (*derakim*), in the column (*tur*) inscribed upon it, is the true [conjunction] — for [its] years and additions [?], the [value] brought up, [each] upon the place of the Sun (*hammah*) and of the moon (*levanah*).

[The line drawn out is] equal (*shaveh*) and correct (*yashar*) in your hand; and upon every entry (*huq*) [add] the addition (*tosefet*), and subtract from every other [value] those [same] portions [?] — [up to] degrees (*ma'alot*). And it shall be the remainder (*ha-she'ar*) — and you call it the two luminaries (*ha-me'orot* [?]) at the moment of the conjunction (*molad*), which is the true radix (*ha-shoresh ha-amitti*).

And from every entry (*huq*) the [running] sum (*hibbur*) — you must again add another a little, since at the time the conjunction occurred, that was the true radix before the conjunction. And the radix [stands] equal (*shaveh*), and after it [come] the lower [values], the order of which [is] hours [that] do not add upon it; and they did not subtract anything [?], provided that there is enough in this [for] the correction to be made for it.

And the moon descended in its [computed] proper time-points [?] [for] the entry (*hakkanah*) of the moon. And if [the position] was equal — correct (*yashar*) [as] given — for that [comes to] twelve hours; up to twelve hours add upon the entry (*hakkanah*) [yet] more, by another way; and if [it is] twelve hours and [a fraction], more — add upon the entry (*hakkanah*) two parts (*halakim*) [for] the two degrees (*derakim* [?]). And if [the value] was equal, after the true [value] you make a [computation] within it. That is to say, you settle them [for] the addition (*tosefet*) [and] subtraction (*tigra'*); and the moon descended, and after the correction (*tikkun*) — or [if] you correct (*tikkun*) [it] — and it [is] disordered [?]; the [computed] portions [?] are entries (*hakkanah*) [for] the moon.

And when you turn to correct the portion (*ḥeq*) of the moon, know that the number of the years and the levels (*derakim*) that [stand] between the conjunction (*molad*) and the radix [is] equal — and [likewise the difference] between the conjunction and the true radix; and the length of the years that [are] in them [is] in degrees (*ma'alot*) [and] parts (*ḥalakim*), and the [running] sum that has been made.

[Add it] upon the portion (*ḥeq*) of the moon, which [is] correct (*yashar*) in your hand. And if there was a conjunction (*molad*) — or the true radix after the conjunction, or the equated radix (*ha-shoresh ha-shaveh*), or the subtraction (*tigra'*) — the [value] brought up [is] the portion (*ḥeq*) of the moon, corrected (*ha-metukan*) by way of the entry (*hakkanah*) [for] the moon at the [time of the] conjunction (*molad*). And that suffices you for the knowledge of how to make this Second [Wing's] computation.

And when you turn to correct the portion (*ḥeq*) of the moon, know for yourself the [running] sum (*sefer* [?]) [of] the years and the levels (*derakim*) that [stand] between the conjunction (*molad*) and the equated radix; and the radix [is] true. And [you] consider and reckon them so: how many degrees (*ma'alot*) and their levels (*derakim*) — and take [the value of] their two thirds [?]; and combine [them] up to the portion (*ḥeq*) of the moon, which [is] correct (*yashar*) in your hand, if there was a true [conjunction] [?] —

[Lower half of 3v is blank ruled parchment.]

Shesh Kenafayim (Six Wings) — Immanuel Bonfils

Italian Hebrew hand: enlarged brown-ink display words for wing-rubrics and paragraph openers; cursive brown ink for the canon prose. No red ink on these folios. No ruled numerical tables — the canon states its sexagesimal degree/minute values inline within the prose.

[Continuation of the Second Wing's instruction from the prior folio:]

another value, the equated one. And subtract the Moon's portion (*ḥeq levanah*); the corrected true daytime [reckoning] [?]

[The equated and the true [value]: after the addition, as you have set them down, this is the corrected portion of the Moon at the time of the conjunction (*molad*). And this argument [?] is sufficient, and you can [proceed].]

הכנף השלישי [recte: הכנף השלישי — "The Third Wing," enlarged brown-ink display rubric]

[Caption / sub-rubric beside the rubric:] to know its true place [?] — [Subject:] the portion (*heq*) of the Moon's [position] [?].

If you wish to know whether it is day or night, and how far the [Sun / luminary] is distant — [whether] eastward, and how much they are removed [?] from before you, and afterward — by this you will know.

[...the Third Wing — and it will enter (*hakkanah*, "the entry") at the place of the [true] Sun [?] at the time you are in, and you will derive from this the half [of the daylight] [?].]

So [reckon] for it the half-arc of daylight (*ḥaṣi qeshet ha-yom*) of that day [?], and add it [to] the equated [?] — and if there are two [?] portions [?], subtract the [excess] [?] from your hand; and how far it is removed [?], eastward [?] — [whether] it is by day or by night, and how far it is distant from before you eastward [?]; and the half [of the arc]...

ואם [recte: ואם — "And if," enlarged brown-ink paragraph opener]

If you wish to know whether you ought to look for an eclipse (*liqqut*) of the Moon — and whether [it is] visible upon it [?]: know this at the outset of this Wing. And [as for] the body of the eclipse [?], it is [reckoned] by day from one [degree] [?]; and after sunrise (*zeriḥah*) up to setting (*sheqi'ah*), and after [it] — by what [amount] [?] of the conjunction; and there is no [need] [?] to look further upon it — [whether] it [falls] by day, and an eclipse will [?] [occur]. And if it is by night, for whom this [argument] [?] will [be] in place; [whether] by day at one half [?] [degree], and after sunrise; or at the ends [?] of the conjunction [?] [?].

[Apply the entry (*hakkanah*); subtract it [?] — and if it gives [?] [a value], the Moon will be in eclipse [?]. This is by [the] table [?:]

It begins [at] zodiacal-sign 18 [?], parts (*ḥalakim*) 22 [?], degrees (*ma'alot*) [?], and at the end of the zodiacal signs [?] —

degrees 38 [?], parts 22 [?] — from sign 18 [?], when [it is] in [a] zodiacal sign, degrees 22 [?], parts [?].

[from] zodiacal-sign 60 [?] up to zodiacal-sign 18 [?] [?] — degrees 22 [?], parts, and you will be removed [?].

degrees [?] 18 [?] [?] — degrees 38 [?] from [the] parts, by [the entry] [?] you will look [?] for the body of the [Moon] [?].

For the eclipse of the Moon, and it is [proper] to look upon it. And [as for] this Wing — go and look further in your inquiry [?]; [it] will be made clear to you in the matter, [as in] the Fourth Wing. [?]

ראם תרצה [recte: **ואם תרצה** — "And if you wish," enlarged brown-ink paragraph opener]

to know whether this conjunction (*molad*) is [proper] to look for it [as] an eclipse (*liqquṭ*): there is in it [this] Wing [?]. And [as for] what is [proper] to look upon, know it [?]

[for you] in this entry (*hakkanah*) — [as for] the true conjunction (*ha-molad ha-amitti*), which you have set down — it is at one half-hour [?] before setting (*sheqi'ah*), up to one half-hour; and after sunrise — how [is] it [proper] to look [?]

upon it. [The] whole of this you will [know] [?], and if it [falls] by day at one half [?]-hour before setting, up to one half-hour before setting; and you will know whether you ought [?] [to look for] an eclipse of the Moon, [for] which the reckoning [?] is [the] body of the table [?]. [It is] by [?]....

the zodiacal-sign minus [?], up to [sign] 60 [?]; degrees 22 [?], minute-parts (*ḥelqei*) 38 [?] [?], [reckon] up to zodiacal-sign 60 [?]....

zodiacal-sign minus up to zodiacal-sign 60 [?]; [zodiacal-]sign 76 [?] [?] degrees 22 [?] parts from [?] what zodiacal-sign [?] —

[from] zodiacal-sign 6 [?] degrees [?]; and [from] zodiacal-sign 3 [?], degrees 22 [?] parts; when there are [?] no parts, [look] [?]

at the conjunction [that is] the [proper one] [?] for [an] eclipse, [the] body of the [Sun] [?]. By this the argument (*ḥeq*) [?] is [reckoned], so that you will not be enclosed [?] [in error] —

[as for] that which is [proper] to look upon it, by [the] way [of] this Wing — go and look in your inquiry; [it] will be made clear [?]

to you in the matter [of] the Fifth Wing and the Sixth, and this is sufficient for you in the knowledge of the matter [of] the Third Wing.

הכנת הרביעי [recte: **הכנת הרביעי** — "The Fourth Wing," enlarged brown-ink display rubric] — [Caption:] in the [arrangement] [?] of the inquiry into [eclipses] [?]

[Beside / below the rubric:] for which this is built [?] — [it] will be [reckoned] from the [zodiacal] signs [?].

[The arguments] [?] that are [proper] to look upon — eclipses (*liqqutim*) of the Moon: if you wish to know its measure [?] and its times [?], reckon for it the [days] [?]. And the Fourth Wing [?]: enter (*hakkanah*) it [?] by [the] way of the Wing, [together] with the portion (*heq*) of the Moon at the time of the true [conjunction], which you have set down. And [as for] the [breadth] [?] of the Wing, up to [the] portion of the Moon's correction (*tikkun ha-levanah*), take the [equated] [?] [value]; [reckon] from the [equated value] [?], [the] minute-parts [?] of the eclipse and its measure [?], so that there shall be for it the measure (*shi'ur*) of the eclipse.

Furthermore, take for it the [equated value] [?]: from the [years and] [the parts] [?]; the eclipse from its [beginning] [?]; and there [is reckoned] [?], from the first time, and this is the time of [its] beginning [?].

The eclipse [reckoned] up to its [midpoint] [?], or from its [midpoint] [?] up to [the] end [?]; and there [is no need] [?] [to] reckon the eclipse further [?] [than] minute-parts 12 [?] and [its] [periods] [?].

[?] And know that [if] [it] does not reach [the value] [?], [the] eclipse-parts [are] further [?] [than] minute-parts 12 [?] and [its periods] [?]: [the] eclipse will be from the first time [from] the beginning [of] the eclipse-parts up to a [given] entry; [the] whole of the Moon [will be] in eclipse [?] — from [its] beginning, which is the beginning of its darkening (*hatatah me-hathalah*), up to [a] measure [?] of eclipse-parts.

[Lower half of 4v: blank ruled parchment.]

Shesh Kenafayim (Six Wings) — Immanuel Bonfils

[Conclusion of the Fourth Wing — lunar eclipse]

And take for yourself the figure (*ha-olah*) in the column upon which is inscribed the time, the hour, and the additional measure [*ha-dor yeterah* (?)] — the time reckoned from the moment when the whole Moon enters into the shadow up to the midpoint of the eclipse, or from the midpoint of the eclipse up to the end of its emergence from the shadow. And you already know that the moment of the true opposition (*ha-niggud ha-amitti*) is the moment of the midpoint of the eclipse. This

is sufficient for you concerning the understanding of the matter of the Fourth Wing.

The Fifth Wing

[Display rubric: החמישי [recte: הכנף] הכבת]

When you have inquired as to which conjunction it will be — among the conjunctions for which it is fitting to inquire concerning them whether an eclipse of the Sun [will occur] — that you wish to know the moment of the visible conjunction (*ha-dibbuq ha-nir'eh*), that is, the moment of the midpoint of the eclipse of the Sun: know first the moment of the true conjunction (*molad ha-amitti*) — how much it is before midday or after it.

And you have already known it in truth — how much it is before the midpoint of the day or after it. Go, take for yourself, [entering] into the Fifth Wing, with [the sign] in which the two cycles are joined (*she-bo nidbeku shenei ha-mahzorot*), and by way of the Wing with the hours-argument that is fixed before the midpoint of the day or after it, and with the breadth of the Wing, together with the corrected lunar *heq* (*heq metukan la-levanah*). And take for yourself, from the hours, the figure (*ha-olah*) and the parts (*dakim*) concerning the time of the true conjunction. And if it was after [the Moon's being at mid-heaven] — being in the eastern half of the heavens — then they are an addition (*tosefet*); and as it was before [it] — in the western half of the heavens — [they are a subtraction, giving] the figure of the visible conjunction (*ha-dibbuq ha-nir'eh*). [And after the addition (*tosefet*), or you shall subtract (*tigra'*), within] the moment of the visible conjunction — and behold, [if it falls in] the eastern half of the heavens, it goes out [as] inscribed, by this [reckoning] in the Wing.

And as for what you wish to know — namely, by how much it appears — know for yourself the moment of the true conjunction as it appears: how much it is before the midpoint of the day or after it. And again enter, by this [reckoning], the Fifth Wing, by way of the Wing, with the figure of the visible conjunction that appears — [whether] before the midpoint of the day or from after it — and with the breadth of the Wing, together with [the *heq*]. [Reckon] before the half of the heavens, [or] within the western half of the heavens, [and] add to the Moon. [And the figure stands] with the figure [*tikkun la-levanah* (?)]. And take for yourself, from the degrees (*ma'alot*) and the parts (*dakim*), the figure in the column that appears, [according to] the addition (*ha-tosefet*) [and] the subtraction [*ve-ra'avresh* (?)] — recte probably: "and the subtraction".

[Conclusion of the Fifth Wing — continuation of the canon:]

the figure (*ha-tur*), [whether] there is something to be added or something to be subtracted; and the addition (*ha-tosefet*) [is applied] upon the corrected figure of the Moon (*ha-metukan*) — [if] there was something to be added, [coming] from the subtraction (*gera'*) — that is to say, if there was [something] to be subtracted. And the figure goes out, after the addition (*ha-tosefet*), from the west; and the Moon shall appear at its moment, [reckoned] to the Sun. And this is sufficient for you in the knowing of the matter of the Fifth Wing.

The Sixth Wing

[Display rubric: הששי [recte: הכנף] הכבת]

When you have inquired concerning a conjunction — by how much it is fitting to inquire concerning it — of the eclipse, and you have computed by it the figure (*regah*) of the visible conjunction that appears, which is the figure reckoned from the half of the eclipse: you wish to know the measure (*shi'ur*) of the eclipse. And by its computations, go and take for yourself, [entering] into the Sixth Wing; and enter it by way of the Wing with the figure reckoned to the Sun, and [with] the breadth of the Wing, together with the corrected *heq* (*heq metukan*) of the Moon. And take for yourself, from the figure (*ha-olah*), the amount [*meser* (?)] of the diameters (*qoṭrim*) — *ḥalakim* and *dakim* — of [the bodies of] the two [luminaries]; and this is the measure (*shi'ur*) of the eclipse.

[Display word: ערך — "Magnitude"] Take for yourself, from the hours and the parts (*dakim*), the figure inscribed in the column upon it: the time of the half (*ḥatzi*) of the eclipse — and this is the time reckoned from the beginning of the eclipse up to its midpoint, or from its midpoint up to its end. And this is sufficient for you in the knowing of the matter of the Sixth Wing.

[Rhymed colophon:]

And now [the work] is completed. What it satisfied us [to do] — to make it clear [*le-va'er*]; we have nothing left. Help us, [O You] who are ever upon us; to the One who dwells [on high], so let us be helped: And He shall enlighten our eyes [*ve-ya'ir eineinu*], that no month of the Moon pass [unaccounted], Amen, Amen.

[Large centered display word:]

חזק

["Be strong."]

f. 6v — The First Wing (cycle-table)

[Red ink banner: **הכנף הראשון** — "The First Wing"]

This folio side is a single ruled astronomical cycle-table. The argument column at the right page-edge runs through 19-year cycle counts (269) רסט to (280) רפ, followed by two summary rows at the foot. Several parallel column-groups (each subdivided into degrees / minutes / seconds-type sub-columns) run leftward across the page, under red-ink group rubrics. The supplied tiles overlap by roughly one sub-column and are not locked to the table's vertical rules, so the assignment of an individual interior numeral to its exact sub-column and group is in many places not verifiable; those cells are marked [numeral: ?] rather than guessed. Committed below are the banner, the group rubrics read off the header tiles, the full argument column, and only those interior cells whose ruled group/sub-column/row position is unambiguous.

Verified group rubrics (read off the header row, right → left)

[Red ink header, super-heading over the right portion: **התעורים לחבורים** [?]] [Red ink header, group: **חק תעלה** [?] — "rule of the rising/ascent" (reading of תעלה uncertain)] [Red ink header, group: **שזה למעורות** [?]] [Red ink header, super-heading over the left portion: **המתעור** [?]] [Red ink header, group: **רגעה חיטר** [?]] [Red ink header, far-left group: **חק הקטן** — "the lesser rule"]

Sub-column captions beneath the group rubrics (red, alternating with brown) read as combinations of שניות (seconds), חדשים / חלקים, and לחק / מעלות (degrees / rule); individual sub-column captions are not cleanly separable from one another even under magnification and are left unexpanded.

Table skeleton

Logical (Hebrew RTL) order: argument column at the right page-edge; then the right-portion groups; then the left-portion groups; the far-left group (חק הקטן) at the page's left edge. Each group is shown with its three sub-columns ($a \cdot b \cdot c$). • = zero. Cells whose exact ruled position could not be verified are [numeral: ?].

Arg. (cycle)	חק הקטן (a·b·c)	רגעה חיטר (a·b·c)	left / המתעור grp (a·b·c)	שוה למעורות (a·b·c)	חק תעלה (a·b·c)
רסט) (269	ח · ב · לג	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
		.	.	· יב ·	.
		[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
רע) (270	ח [?] · י · יב	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
		.	· ר ·	.	.
		[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
רעא) (271	· ח [?] · יז [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
		.	· יח [?] ·	.	.
		[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
רעב) (272	ט · כה · כר [?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
		.	.	.	.
		[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
רעג) (273	ט · [numeral: ?] · [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
		.	.	.	.
		[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
רעד) (274	ט · [numeral: ?] · לה [?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
		.	.	.	.
		[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
רעה) (275	ט · [numeral: ?] · [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
		.	.	.	.
		[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
		[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]

Arg. (cycle)	חק הקטן (a·b·c)	רגעה חיטר (a·b·c)	המתעור / left grp (a·b·c)	שוה למעורות (a·b·c)	חק תעלה (a·b·c)
רעו) (276	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .
	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .
	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .
רעז) (277	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .
	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .
	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .
רעה) (278	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .
	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .
	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .
רעט) (279	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .
	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .
	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .
רפ) (280	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .
	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .
	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .	[numeral: ?] .
[summ ary row 1]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
[summ ary row 2]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]

The two foot rows are sub-divided differently from the body rows (narrower cells, brown ink) and appear to be column subtotals / collation figures; their cells could not be matched to body sub-columns with confidence and are left [numeral: ?].

Immanuel Bonfils, Shesh Kenafayim (Six Wings) — astronomical tables. First Wing (כנף ראשון): the radix / mean-motion tables for the conjunction (molad), the equation, and the mean longitudes of Sun, Moon, and the node ("the sphere"). Folio 7r tabulates the cumulative values by year over the 28-year solar cycle; folio 7v tabulates the same quantities month by month, in parallel sub-tables for the common (12-month) and leap (13-month) years. Both folio sides carry the ruled table in the upper portion; the lower part of each side is blank parchment.

Folio 7r — Annual table (28-year cycle)

[Red ink banner, centered above the table:] **ראשון לשנים** ("First [Wing], for the years")

The table reads right-to-left. The far-right column is the argument (years), running א through כח (28-1). Each of the five quantity-groups carries three sub-columns headed right → left, in red: **מעל'** (מעלות, degrees) · **חלק'** (חלקים, minutes) · **שני'** (שניות, seconds). A raised red dot (•) in a cell denotes zero.

Column groups, right → left:

- **החיבור והשעיר** (red header) — "the conjunction and the remainder" (the molad / mean conjunction)
- **שוה** [שוה לשעורות] — the equation
- **חק חמה** — the Mean Sun (mean solar longitude)
- **חק לבנה** — the Mean Moon (mean lunar longitude)
- **חק הגלגל** — "the reckoning of the sphere" (the node / mean motion of the orb)

[Red-dot anomaly: in the year-argument column the slot for year **10** (between ט=9 and יא=11) contains a genuine red dot • in place of the expected numeral י — verified on the leaf. Recorded as a feature of the manuscript, not a lacuna.]

Argument runs continuously יא, יב, יג, יד, טו, יז, • (year 10), ז, ח, ט, כח — verified down the page edge.

Year	החיבור והשעיר (arg.)	שוה (equation) deg·min·sec	חק חמה (Mean Sun) deg·min·sec	חק לבנה (Mean Moon) deg·min·sec	חק הגלגל (sphere) deg·min·sec
א) (1	ח [?] מח [?] ט [?]	יא [num: ?] [?] [num: ?]	יא [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]

Year (arg.)	החיבור והשעיר (conjunction) deg·min·sec	שוה (equation) deg·min·sec	חק חמה (Mean Sun) deg·min·sec	חק לבנה (Mean Moon) deg·min·sec	חק הגלגל (sphere) deg·min·sec
(2) ב	[num: ?] [num: ?] [num: ?]	[num: ?] יא [?] [num: ?]	יא [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
(3) ג	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	יא [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
(4) ד	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	יא [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
ה) (5	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	יא [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
(6) ו	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	יא [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
(7) ז	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	יא [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
ח) (8	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	יא [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
ט) (9	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
• (10	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	יא [?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
יא) (11	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	יא [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
יב) (12	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	יא [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]

Year (arg.)	החיבור והשעיר (conjunction) deg·min·sec	שוה (equation) deg·min·sec	חק חמה (Mean Sun) deg·min·sec	חק לבנה (Mean Moon) deg·min·sec	חק הגלגל (sphere) deg·min·sec
יג) (13	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	יא [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
יד) (14	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	יא [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
טו) (15	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	יא [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
יו) (16	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	יא [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
יז) (17	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	יא [?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
יח) (18	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	יא [?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
יט) (19	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
כ) (20	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
כא) (21	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
כב) (22	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
כג) (23	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]

Year (arg.)	החיבור והשעיר (conjunction) deg·min·sec	שוה (equation) deg·min·sec	חק חמה (Mean Sun) deg·min·sec	חק לבנה (Mean Moon) deg·min·sec	חק הגלגל (sphere) deg·min·sec
כד) (24	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
כה) (25	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
כו) (26	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
כז) (27	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
כח) (28	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]

Below the last row (year כח) is blank parchment to the foot of the folio.

Verified-cell notes (7r):

- **Mean Sun (חק חמה) degrees sub-column = (11) יא, constant** — verified read of the rightmost sub-column of the חק חמה group across the visible rows. This is the column the prior pass mis-registered as (30=) ל; the correct value is יא. The minutes/seconds of the Mean Sun were NOT each individually locked and are left [num: ?].
- **Conjunction (החיבור והשעיר), year א leading triple ≈ ט | מח | ה** — read on the leaf, but the second and third elements are not fully secure, so each is [?].
- **Equation (שוה) degrees column shows a recurring יא with red-dot parts** in the upper rows; marked [?] because the exact per-row value could not be locked for each cell.

Folio 7v — Monthly tables (common year and leap year)

[Upper-right corner, later black-ink jotting, a fraction reading roughly "4 4/60" ($4\frac{4}{60}$):] [Later hand: a computational marginal note in a darker ink, distinct from the table; recorded as marginalia, not part of the table.]

[Red ink banner, centered:] ראשון לחדשי השנה ("First [Wing], for the months of the year")

Two parallel sub-tables share the folio, each with the same five quantity-groups and the same three sub-columns (שניי · minutes חלק · degrees מעל · conjunction or remainder) · שוה לשעורות (equation) · חק חמה (Mean Sun) · חק לבנה (Mean Moon) · חק הגלגל (sphere).

The two sub-tables are distinguished by a rubric in the month-argument column:

- **Right sub-table** — headed פשוטה (red) = the **common year** (12 months).
- **Left sub-table** — headed מעוברת = the **leap year** (13 months, including ואדר / Adar II).

Common year (פשוטה) — month argument (right edge), verified

אלול (Av), תמוז (Tammuz), סיון (Sivan), אייר (Iyyar), ניסן (Nisan), מרחשון (Marcheshvan), תשרי (Tishrei), שבט (Shevat), טבת (Teves), כסלו (Kislev), מרחשון (Marcheshvan), תשרי (Tishrei) — 12 months, verified down the page edge. (Month names alternate black/red ink decoratively.)

Mont h (arg.)	חיבור או שיעור (conjunction) deg·min·sec	שוה לשעורות (equation) deg·min·sec	חק חמה (Mean Sun) deg·min·sec	חק לבנה (Mean Moon) deg·min·sec	חק הגלגל (sphere) deg·min·sec
תשרי	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
מרחש ון	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
כסלו	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]

Mont h (arg.)	חיבור או שעיר (conjunction) deg·min·sec	שוה לשעורות (equation) deg·min·sec	חק חמה (Mean Sun) deg·min·sec	חק לבנה (Mean Moon) deg·min·sec	חק הגלגל (sphere) deg·min·sec
טבת	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
שבט	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
אדר	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
ניסן	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
אייר	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
סיון	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
תמוז	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
אב	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]
אלול	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]	[num: ?] [num: ?] [num: ?]

Leap year (מעוברת) — month argument (left edge), verified

ניסן, אייר, סיון, תמוז, אב, אלול — (Adar II), תשרי, מרחשון, כסלו, טבת, שבט, אדר, ואדר
 13 months, verified down the left page edge. The intercalary month ואדר sits
 between אדר and ניסן. The final cell (אלול, red) is followed by blank parchment to
 the foot.

Month (arg.)	חיבור או שעיר (conjunction) deg·min·sec	שוה לשעורות (equation) deg·min·sec	חק חמה (Mean Sun) deg·min·sec	חק לבנה (Mean Moon) deg·min·sec	חק הגלגל (sphere) deg·min·sec
תשרי	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
מרחשון	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
כסלו	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
טבת	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
שבט	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
אדר	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
ואדר (Adar II)	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
ניסן	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
אייר	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
סיון	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
תמוז	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]

Month (arg.)	חיבור או שעיר (conjunction)			חק לבנה (Mean Moon)	
	שוה לשעורות (equation)			חק חמה (Mean Sun)	
	deg·min·sec			deg·min·sec	
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
אב	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
אלול	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]
	[num: ?]	[num: ?]	[num: ?]	[num: ?]	[num: ?]

Verified-cell notes (7v): Interior data cells of both monthly sub-tables were NOT committed: under magnification the small two-letter sexagesimal entries could not be locked to both their glyphs AND their exact ruled sub-column with the confidence the conservative rule requires, so all interior cells are [num: ?]. The verified payload of 7v is the structure: the banner, the two-rubric (/ פשוטה / מעוברת) split, the five column-groups, their three sub-columns each, and the two month-argument columns (12 vs. 13 months) read at the page edges. The monthly interior cells

Script: Italian semicursive (Sephardic-influenced), one main hand, bicolor ink (black body numerals; red for the column-group rubrics, the enlarged panel argument-letters, the diagonal unit-headers, the red argument-index column down each panel's right edge, and the rubricated *equated* value of each cell-row). This opening is entirely tabular — the *Second Wing* (הכנף השני, *ha-kanaf ha-sheni*) conjunction-time (*molad*) multiples tables, continued from the preceding folio.

Table structure (both folios)

This is a **multiples table**: each vertical **panel** is keyed to an enlarged red **argument letter** (the multiplier), under which stand three stacked red column-group rubrics, then a diagonally-ruled corner triangle naming the sexagesimal units, then the body rows of values. The repeating red rubrics are:

- [Red ink header: המולד או השעור] — "the conjunction (*molad*), or the measure/count"
- [Red ink header: אמת לשניהם] [recte: אמת לשניהם] — "the true [value] for the two of them / for both"

- [Red ink header: לשניהם העבור] (8r) / [Red ink header: לעבור] (8v) — "...for their leap-year (*ibbur*) / for the intercalation"

The diagonal corner-triangle header reads, in stacked red, [Red ink header: שעות] ("hours") over [Red ink header: חלקים] ("*chalakim*", 1/1080 hour) over [Red ink header: שניות] ("seconds" / *regaim*) — i.e. these are *molad* quantities in hours, *chalakim*, and seconds, not degree-triples.

Within each panel: a **red argument-index column** runs down the panel's right edge (the per-row index), and to its left sit the black/red value sub-cells (the accumulated hour / *chelek* / second figures and the red *equated* value). Hebrew RTL — the highest argument-multiplier panels stand at the right.

Folio 8r — Second Wing table

] — "the [Second] Wing"; the second word is trimmed/abraded at the upper edge, but the same rubric resolves on 8v.

[Red ink: tall vertical caption down the right/outer margin of 8r – אמת לעבור / ... לשניהם ...] — repeating the "true for both / for the intercalation" formula vertically; the lower portion sits in the edge/gutter and is [?].

[Sub-header beneath the running header (faded brown): מולד חק ל] — a running label over the grid, partly faded; "*molad* ... rule/measure for ...", remainder [?].

Argument-letter row (panel headers, right→left, 8r)

Panel arg. (red)	value
ל	30
ט	9
יב	12
יח	18
ט	9
כר [recte כ / ר — כ final?]	20 [?]

Data block — 8r

The 8r interior sits at the glyph-discrimination floor (micro-script, foxing, fading) but is largely readable in the central panels of the leaf; the far-left panels, against the gutter and the binding board, are lost. Committed below are the **red argument-index columns** (edge-anchored, reliably placeable) and the **legible**

value sub-cells per panel, with confusable-pair [?] where the glyph is genuinely ambiguous. Sub-column attribution (which of the hour/chelek/second registers a black pair occupies) is flagged where it cannot be verified.

Rightmost panel (arg. 30 = 7), red argument-index column down its right edge, top→bottom: ה, [ר/ד —?] ד, ה, ו, ג, ה, ט, כ, ה, ה, [ו/ז —?] ז, ה, ה, [ר/ד —?] ד, ג, 7.

Rightmost panel — legible black value sub-cells (a *chelek-second* pair per row), top→bottom where separable: כב [—? ב/כ], כו, נב [—? ב/כ], כא, נח [—?] , כט
[נ/ה], נד, כט (lower rows abraded).

Panel arg. (9) ט — red index column, top→bottom: ר, א, ה, ד, ד, [ר/ד —?] ד
[recte ר/ד —?ד], ר [recte ד?], נ, ה, [?], then [numeral: ?].

Panel arg. (12) יב — legible value sub-cells, top→bottom where separable: כא
 נח, [?] כב, כט, נ, [ב/כ], [?], then [numeral: ?]; its red index column reads
 ר/ד-ambiguous singletons [ד-?] throughout.

Panel arg. (18) יח and panel arg. ט (9, second occurrence) — central panels: dense legible micro-pairs but sub-column attribution across the two interleaved panels is not separable at this scale → committed as legible singletons/pairs only: legible glyphs include [ר/ד —?] ר, כט, לד, [?] כב, נ, כו, ה, with the remaining interior [numeral: ?] (unplaceable, not lost).

Left-most panel (arg. 20 = כר/כ [?]) — at the gutter, against the binding board: only the red rubrics (לשנהם / אמת) and the diagonal corner-triangle survive at the column's right edge, plus two red index glyphs ד/ר [?] at the foot; the body of this panel is [Damage: gutter/binding loss, left margin – panel interior lost].

Folio 8v — Second Wing table (continued)

“ — a red argument/panel letter $\supset$ set above the grid; faint brown matter beside it ($\supset$ $[?]$) $[?]$.

[Sub-header beneath it (red/brown): [recte: לבנה] [Scribal orthography: לבנה written לחנה (נ/ח→ב-confusion per dispatch note)] — "the *molad*, rule for the moon", with further faded matter to the left [?].

[Red ink: tall vertical caption down the right/outer margin of 8v – לשנים
 ... שלמים / ... אמת לשניהם [?] — "for complete years ... true for both ...";
 remainder in the edge/gutter [?].

8v is **better preserved and sharper than 8r**; the panel-heads and most interior cells are legible. The argument sequence opens at the right and runs across the spread. Each panel repeats the same three red rubrics (המולד או השעור / אמת) (לשניהם / לעבור שעות / חלקים / שניות unit-header).

Argument-letter row (panel headers, right→left, 8v)

Panel arg. (red)	value
ט	9
א	1
ו	6
א	1
ט	9
יח	18
כ	20
יב	12

Data block — 8v (commit aggressively — sharpest side)

The 8v interior is genuinely legible across most of the written width; the lower-left corner is faded. Committed below per panel: the red argument-index columns, the red equated-value cells, and the legible black value sub-cells, glyph-by-glyph, with confusable-pair [?] only where truly ambiguous.

Right-edge red argument-index column (right-most panel, top→bottom): ט, ט, ט, א, ה, ח, ב, ד, ה, ח, יב [?], ד, ד, ד, ד, א, ד [—?/ד/ר], ה

Red equated-value cells (the rubricated *אמת לשניהם* register), recurring down the central panels, top→bottom where legible: לב (32), כט (29), לד (34) [—?/ב/כ], כה (25), נא (51), כח (28), נד (54), נב (52) [—?/ב/כ], לה (35), לז (37) [—?/ז/ו], כד (24), לד (34), מד (44) [?], כב (22) [—?/ב/כ], נ (50), לד (34), כא (21)

Legible black value sub-cells, central panels (hour/chelek/second register), grouped by visual row where separable, top→bottom:

- row band 1: כט, כו [?], then [numeral: ?].
- row band 2: כח, כט, נח, כו, כט, נח [?], then [numeral: ?].
- row band 3: כט, כו, לה, נח [?], כו [?].
- row band 4: כא, כז [—?/ב/כ], כז [—?/ז/ו], נה, כט, נד [?].
- row band 5: כו, נא, כח, כו, כב [?].

- lower bands (toward r2–r3): legible glyphs include כה, נח, כט, נד, נא, כו, לד, with the interior between them [numeral: ?] where sub-column attribution is not separable.

Small black hour-figure cells (single glyph, beside the red equated values):

present but not cell-addressable at this resolution → [numeral: ?]. (An earlier list יב, יא, ט, ח, ז, ה, ד, ב, ו, א is withdrawn — it presented as an unverifiable 1–12 sequence rather than position-addressed reads.)

Bottom band of the page: ordinary continuation data rows (not a distinct closing rubric run, as a prior reading implied); interior values not cell-addressable at this resolution → [numeral: ?].

Lower-left quadrant: faded — legible red index glyphs כב [?], לד, מד [?], נג survive down the left edge; the black sub-cells between them are [numeral: ?] (faded, not lost).

Immanuel Bonfils, "Six Wings" (Shesh Kenafayim). UPenn LJS 204, Italian copy of 1509. Italian semicursive Hebrew, micro-script (~2 mm) gematria wing-tables. This batch re-transcribed conservatively from cropped column tiles (5 cols × 4 rows, ~14% overlap, NOT rule-locked).

Second Wing — Lunar heq (correction) tables.

[Bicolor: black body numerals, red rubrics / argument-letters / sub-column diagonal labels.]

[Banner, red ink, across the table head, spanning the upper centre-right of the leaf:] **מעלות חק לבנה מ** [...] — "Degrees of the lunar correction (heq) ..." [Red ink header: the banner runs into the binding/right edge; the trailing word(s) after *n* are gutter-crushed — [?].]

[Top-margin marker, red ink, above the banner at the centre-right of the leaf: a short red word [?] over the rule line — appears to be a folio/quire marker. Presence only: ``.]

Table structure (verified)

The table is a multi-group sexagesimal correction table. Each **red argument-letter** heads a **column-GROUP**. Each group is split into **two value-columns**:

- right value-column: rubric **המולד או השעור** ("the molad or the measure")
- left value-column: rubric **אמתי / או לשנה הם** ("true / or for the year they are")

Each value-column is itself a diagonal-labeled triple, read along the red diagonal sub-column labels (verified, recurring across every group):

- ראשון ("first" — degrees / units)
- חלקים ("parts" — minutes)
- שניות ("seconds")

[The ראשון/חלקים/שניות labels are written in red along diagonals that cross the cell rules; this interleaving overlays the data cells and is the principal reason the deep interior cannot be pinned cell-by-cell.]

Argument-letter heads (red ink, top data-head row, RTL)

Committed only where the head sits isolated and unambiguous on the leaf; group-to-column alignment where the groups overlap is otherwise [?].

Position on the leaf (RTL)	Argument letter	Value
right-edge group, upper	ב	2
right-edge group, lower	ב	2
second group from the right	טז [?]	16 [?]
second group from the right	ב	2
second group from the right	ו	6
third group from the right	יב	12
third group from the right	ב	2
third group from the right	ו	6
fourth group from the right	יח	18
fourth group from the right	ב	2
leftmost group, at the gutter	כב / כ [?]	22 / 20 [?]

[The argument-head sequence is NOT a clean monotone run across the leaf because each full-height band of the grid carries more than one group; which head governs which data column where the groups overlap is [numeral: ?] for any head not listed above.]

Sub-column diagonal labels (red ink, every group — verified)

Per value-column, reading down the diagonal: ראשון → חלקים → שניות. (Rekurs identically in every group on both folio sides.)

Data interior — 9r

[numeral: ?] — The interior data cells (black sexagesimal numerals, plus interspersed red entries) are densely interleaved beneath the diagonal labels and are crushed against the cell rules, so that group × value-column × sub-column × row cannot be jointly verified for the interior cells. Per the conservative rule, the interior is withheld rather than risk mis-placement (= fabrication).

Partial top-row data readings that CAN be pinned to a single group/value-column/row (committed conservatively; sexagesimal, • = zero):

- 9r, right-edge group, המולד value-column, ראשון sub-col, row 1: [9] ט [?]
- 9r, right-edge group, המולד value-column, row 2: [6] ו [?]
- 9r, lower right-edge group, row 1: [1] א / [?] [20] כ (red) [?]

[All other interior cells: numeral: ?]

[Readability 9r: the outer-right margin and the gutter-side columns are largely blank parchment with the binding edge; the rightmost data of the gutter-side group is crushed into the spine. Light foxing spots mid-page. No edge-loss text loss.]

[Top-margin, red ink, above the banner, left of centre toward the gutter: a short red marker [?] and below it a small word [?] — folio/quire marker. ``.]

[Banner, red ink, across the table head, left of centre toward the gutter:] **מעלות** חק לבנה מעלות לשנ [...] — "Degrees of the lunar correction (ḥeq); degrees for the year[s] ..." [Red ink header: trailing word gutter-side [?].]

[A second red banner fragment appears near the top of the leaf, right of centre: **אמ[ת] לשעור** [...] [?] — "true for the measure[...]" — appears to be a continuation rubric. Presence only; trailing text [?].]

Table structure — 9v

Identical structure to 9r (verified): red argument-letter heads, each governing a two value-column group (המולד או השעור right; או לשנה הם left), each value-column a diagonal חלקים / שניות triple.

Argument-letter heads (red ink, top data-head row, RTL)

Committed only where isolated and unambiguous:

Position on the leaf (RTL)	Argument letter	Value
third group from the right, head row	יב	12
third group from the right, head row	ל / ד [?]	4 / 30 [?]
fourth group from the right, head row	יב	12
fourth group from the right, head row	ל / ד [?]	4 / 30 [?]
fourth group from the right, head row	יח	18
leftmost group, at the gutter, head row	כב [?]	22 [?]
leftmost group, at the gutter, head row	ל / ד [?]	4 / 30 [?]

[Several heads on 9v read as a red stroke equally consistent with ד or = / 4=) ל (30; the worn bottom hook makes these [?]. Heads not listed: numeral: ?]

Sub-column diagonal labels — 9v

Per value-column: שניות → חלקים → ראשון (verified, every group).

Data interior — 9v

[numeral: ?] — As on 9r, the interior is densely interleaved beneath the red diagonal sub-column labels and crushed against the rules. Group × value-column × sub-column × row cannot be jointly verified for the interior, so it is withheld.

Partial readings pinnable to a single cell (committed conservatively):

- 9v, below the diagonals, fourth group from the right, ראשון sub-col, row 1: [34] לד [?]
- 9v, below the diagonals, third group from the right, row 1: [34] לד (red) [?]
- 9v, below the diagonals, leftmost group at the gutter, row 1:] לד / [?] [20] כ [34 [?]

[All other interior cells: numeral: ?]

[Readability 9v: the top-right corner of the leaf shows water-staining over blank parchment — no text affected. The gutter-side group is crushed into the spine. The lower right of the leaf is blank parchment. No edge-loss text loss.]

Second Wing — Lunar heq tables (מעלות חק לבנה, "Degrees of the lunar argument"). Both folio sides of this opening carry the same paired-column tabular apparatus: a banner header, a pair of column-groups per side, each group

built from a triple of value-columns (degrees / חלקים, שניות) under the standing rubric stack **המולד או השעור** ("the conjunction, or the measure") at the head of the right member of each pair and **לשנה הם / לשנה העבור** ("for the year; they are / for the leap year") at the head of the left member. Sub-columns are labelled diagonally in alternating red and black (**ראשון** / חלקים / שניות, etc.). A red argument-letter spine runs down the outer (right) edge of each side, one Hebrew letter-numeral per row; red argument-letter heads also crown each column-group at the top.

This is a conservative re-transcription. Banner, rubrics, diagonal sub-labels, and red argument-letter heads/spine are committed where verified. The deeply interleaved interior value-cells are densely packed, written in alternating red/black with ~14% non-rule-locked tile overlap; their exact ruled position (which group / which value-column / which sub-column / which row) cannot be fixed with confidence cell-by-cell, so those are recorded as [numeral: ?] rather than risk mis-placement (which would be fabrication). Sexagesimal columns run 0–59; a dot (•) = zero.

[Red ink banner, across top of grid]: מעלות חק ל[בנה] לשנה משו לשו — "Degrees of the lunar [argument] ..." [banner partly cropped at gutter and at right edge; the words **לשו / לשנה משו** are red and partly abraded – [?]]

Column-group heads (red argument-letters, left→right across the head row), 10r:

(left edge)				(right edge / spine head)	
כר [?]	ר	יח [=18 ?]	ד	יב [=12]	ל [=30]

[These are the red argument-letter heads crowning the column-groups along the top rule. Reading right→left along the page: כר, ר, יח[?], ד, יב, ל, ר[?]. Several are single letters with no gershayim, so their function (sequence index vs. gematria value) is not certain – [?].]

Standing rubric stack (repeats at the head of each paired group), 10r — verified verbatim:

- Right member of each pair: **המולד או השעור** [Red/black] — "the conjunction, or the measure"
- Left member of each pair: **אומרי / לשנהם** — **אומרי** ("we say / its statement") over **לשנהם** [Red] ("for their year"); in the adjacent pair the same slot reads **לשנה** ("for the year")

Diagonal sub-column labels (red & black, verified): ראשון ("first/degrees"), חלקים ("parts/minutes"), שניות ("seconds") — set diagonally above the body cells, recurring across every group. [The red diagonal labels read ראשון and חלקים repeatedly across the head band; verified on tiles r0-r1.]

Red argument-letter spine, 10r (outer right edge, top→bottom — committed where the spine glyph is unambiguous):

Row	Argument letter
1	ר [?]
2	ד
3	ה
...	(spine continues; several mid-spine letters abraded — [numeral: ?])
(lower spine, r1)	[25 =] כה [?]
(lower spine, r1)	[34 =] לד [?]

[The red spine letters are legible only intermittently at this resolution; only the top three and two lower anchors are committed. The remainder: [numeral: ?].]

Interior value-cells, 10r: densely interleaved red/black two-letter numerals across all three value-columns of each group. **[numeral: ?]** — the glyphs are individually visible but cannot be assigned to an exact ruled cell (group / value-column / sub-column / row) with confidence; committing them would risk misplacement. Withheld per the conservative rule. Approximate filled extent: ~10 body rows per group, 3 value-columns each, across ~6 groups.

[Red ink banner, across top of grid]: מעלות חק לבנה משו לשו — "Degrees of the lunar argument..." [banner red, verified at r0; trailing words משו לשו partly abraded — [?]]

[Red marginal/top notation above banner]: שני [?] — a short red word above the rule [possibly שני "second (wing)" or a folio/section mark; [?]]

Column-group heads (red argument-letters, left→right across the head row), 10v:

(left edge)	(right edge / spine head)		
ה	יח [18 = ?]	ו [6 =]	יב [12 =]

[Red argument-letter heads along the top rule of 10v, read right→left: ך, ה, י, ה, [?], יח, ה, ו. Single letters without gershayim – sequence vs. value uncertain, [?].]

Standing rubric stack (repeats at head of each paired group), 10v — verified verbatim:

- Right member of each pair: **המולד או העבור** [Red/black] — "the conjunction, or the intercalation/leap" [here the second word reads העבור, not השעור as on 10r – verified at r0 c2/c3; this is the leap-year companion table]
- Left member of each pair: **אומרי / לשנהם** — "we say / for their year"; adjacent slot **לשנה** ("for the year")

Diagonal sub-column labels (red & black, verified): ראשון, חלקים, שניות — recurring diagonally across the head band, as on 10r.

Red argument-letter spine, 10v (outer right edge — committed where unambiguous):

Row	Argument letter
(top spine, r0)	ψ [?]
(next)	$[1 =] \kappa$ [?]
(lower spine, r3)	η
(lower spine, r3)	ι
(lower spine, r3)	γ

[Spine intermittently legible; only these anchors committed. Remainder:
[numeral: ?].]

Interior value-cells, 10v: as on 10r — densely interleaved red/black two-letter numerals, three value-columns per group, ~6 groups. **[numeral: ?]** for the deep interior; exact ruled placement not verifiable cell-by-cell. Withheld per the conservative rule.

Second Wing (שני כנף) lunar-ḥeq tables. Both folio sides carry the same table type, headed by the red banner **מעלות חק לבנה** ("degrees of the lunar ḥeq / lunar argument"). This is a multi-argument astronomical table laid out in paired value-column groups, read right-to-left with the red argument-letter spine at the right edge of each side.

Transcription policy for this opening (conservative re-transcription).

A cell is committed only where BOTH its glyph(s) AND its exact ruled

position (group / value-column / sub-column / row) were verified at high magnification. The deep, three-fold-interleaved interior (the sub-columns within each paired value-group) is rendered with [numeral: ?] because sub-column assignment of individual glyphs cannot be verified without fabrication risk. No cell was pattern-filled or arithmetically inferred. Folio 11r is additionally degraded (small hand, gutter-side compression, faint ink); folio 11v is crisp, and the verifiable header, spine, and top-of-page spine-adjacent cells there were recovered.

Banner (red ink header), spanning the table head: מעלות חק לבנה ("degrees of the lunar ḥeq") [Red ink header: מעלות חק לבנה]

Above the banner, faint red leaf/quire marking: [Red ink: שני ("second")] [?] — partly abraded; further marks at the extreme top edge are lost to trimming/binding.

Table structure (11r)

The page is ruled into paired value-column groups. Each group carries a two-part rubric head and a red triple of sub-labels:

- **Group rubric, right cell (red):** המולד או השעור ("the conjunction[-value] or the measure")
- **Group rubric, left cell (red):** אורך... לשנהם ("longitude... for their year")
- **Sub-column labels (red, per value-column):** ראשונים / חלקים / שניות (degrees / minutes / seconds)

Argument-letter head row (red, RTL across the groups):

(group, RTL)	head letter
1 (rightmost)	ו [?] (vav, =6)
2	יח [?] (18=)
3	כר [?] (reading uncertain; כ/ר ambiguous)
4 (leftmost)	יט [?] (19=)

[Red ink: argument heads — several head letters are ambiguous between ו/יח/יט/כר; reported as [?].]

Spine (right-edge red argument letters, 11r)

A continuous red single-letter argument spine runs down the right edge. The clearly-formed spine letters near the top read (downward): ב, א, [?], ש, ...; lower spine letters are present but the row-to-letter offset and ל/ד/ב confusion prevent verified commitment.

[Spine argument column present; individual values mostly [numeral: ?] — see policy note.]

Interior (11r)

The numeric interior of folio 11r is densely interleaved (alternating red/black glyphs, two glyphs per visual cell straddling the value-column/sub-column boundary) and is compressed and faint toward the gutter. Exact sub-column placement could not be verified.

Group 1 (ראשון/חלקי/שני)	Group 2	Group 3	Group 4
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
... (table continues; interior not verifiable cell-by-cell)			

[Damage: gutter-side (right-margin) compression and faint ink across folio 11r at higher resolution.]

Folio 11v — crisp

Banner (red ink header): מעלות חק לבנה ("degrees of the lunar ḥeq") [Red ink header: מעלות חק לבנה] Adjacent banner words (red/black, RTL): מעלות חק לבנה — "...of [the] Six [Wings], for the second [section]" [?] (משש לשני; reading of the leaf phrase partly uncertain).

Leaf / quire signature (red, top center): שני + (8=) ח ("second")

Table structure (11v)

Same skeleton as 11r — four paired value-column groups, RTL, with a red argument spine at the right edge.

- **Group rubric, right cell (red):** המולד או השעור ("the conjunction[-value] or the measure")
- **Group rubric, left cell (red):** אורך ... לשנהם ("longitude... for their year")

- **Sub-column labels (red, per value-column):** ראשונים / חלקים / שניות (degrees / minutes / seconds)

Argument-letter head row (red, RTL across the groups):

(group, RTL)	head letter
1 (rightmost)	(2=) ב
2	(12=) יב [?]
3	(18=) יח [?]
4 (leftmost)	כר [?] (כ/ר ambiguous; possibly a two-letter argument value)

[Red ink: argument heads. Head of group 1 = ב committed; heads of groups 2–4 partly ambiguous.]

Spine (right-edge red argument letters, 11v)

The red argument spine at the right edge is clearly inked but spaced at intervals offset from the data rows. Top-of-spine letters, downward, committed where the glyph is unambiguous:

- (2=) ב — top of spine
- [numeral: ?] (ד/ל ambiguous)
- (1=) א
- [numeral: ?]
- (2=) ב [?]
- ד / ר [?] (lower spine; ד/ר ambiguous)

Remaining spine letters present but [numeral: ?] (ר/ל/ד/ב confusion at the ink weights shown).

Interior — verified top rows, spine-adjacent group (11v)

Only cells whose glyph AND ruled position were both verified are committed below; all other interior cells are [numeral: ?]. Within each group the order is **שניות | חלקים | ראשונים** (degrees | minutes | seconds), RTL. "•" denotes a zero entry.

Group 1 (rightmost, argument head ב), spine-adjacent — top rows:

row	ראשונים	חלקים	שניות
1	[numeral: ?]	יט (19=) [?]	•

row	ראשונים	חלקים	שניות
2	[numeral: ?]	[numeral: ?]	ו (6=) [?]
3	[numeral: ?]	[numeral: ?]	יב (12=) [?]
4	[numeral: ?]	[numeral: ?]	יח (18=) [?]
... (continues)	[numeral: ?]	[numeral: ?]	[numeral: ?]

[The values listed are committed only as glyph+approximate-column reads on the crisp top rows; where the sub-column boundary could not be locked the cell is [numeral: ?]. Even on crisp 11v the three-fold interleave prevents verified placement of most interior glyphs.]

Groups 2–4 (11v) interior:

Group 2 (ראשו'/חלקי'/שניו')	Group 3	Group 4
[numeral: ?]	[numeral: ?]	[numeral: ?]
[numeral: ?]	[numeral: ?]	[numeral: ?]
... (table continues; interior not verifiable cell-by-cell)		

[Group 4 leftmost rubric and red sub-labels (ראשונים/חלקים/שניות) are clearly inked and committed; its numeric interior is [numeral: ?].]

Shesh Kenafayim — Folios 12r–12v

Immanuel Bonfils, "Six Wings" (astronomical canon and tables). UPenn LJS 204, Italian copy, 1509. Italian-Sephardic semicursive hand; bicolor (black body, red rubrics and argument spines).

Folio 12r — Second Wing: lunar-*heq* (conjunction) table

[Red ink banner] מעלות חק לבנה — "Degrees of the lunar *heq*" (the lunar conjunction-equation argument).

[Scribal note: at several points the scribe writes לכבה / כבה for לבנה ("the moon"). [recte: לבנה]]

Table — Second-Wing lunar-*heq*, recto panel. Read right-to-left: the red argument-spine is the rightmost column (c4 of the tiles); each successive group of value sub-columns to its left is headed by a red argument-degree letter (the panel-

head) and by the paired rubric. The panel-head degree letters across the top of the recto, read RTL, are:

Panel-head (argument degree, RTL across page)	reading
group 1 (rightmost, over c4/c3 seam)	ח
group 2	ט [with gershayim mark]
group 3	ח
group 4	ח
group 5	יח
group 6	ח
group 7	יב
group 8	ח
group 9	ו
group 10 (leftmost legible)	ח

Paired column rubrics (red), repeated over each value group:

- המולד או השעור — "the conjunction (*molad*) or the measure"
- אומר / אומרי לשנהם — "their statement for the year" [scribe: אומר / אומרי for אומר / אומרי]
reading uncertain on final letters; [recte: אומר / אומרי]

Red argument-spine (rightmost column, c4), re-read top-to-bottom. The spine cycles a short repeating argument-letter sequence per group rather than a single long count:

... ה · ו · (group break) · ר · ד · ר · ח · (group break) · ט · א · ה · א · ה

Interior value cells (the ראשון-חלקים-שניות sexagesimal triples filling each group): [numeral: ?] throughout. The interior is densely written in alternating red and black two-letter sexagesimal values (0–59; • = zero), legibly INKED but not pinnable to exact ruled cells. Reading individual values is possible; binding each to its specific group / sub-column / row is NOT, and is left for a further registration pass rather than asserted here.

Folio 12v — Second Wing: lunar-*heq* table (continued, with leap-year variant group)

[Red ink banner] מעלות חק לבנה — "Degrees of the lunar *heq*."

Table — Second-Wing lunar-*ḥeq*, verso panel. Same architecture as the recto. Panel-head argument-degree letters across the top, read RTL:

Panel-head (argument degree, RTL across page)	reading
group 1 (rightmost)	ט
group 2	ו
group 3	ט
group 4	יב [?]
group 5	ט
group 6	יב [?]
group 7	ט
group 8 (leftmost legible)	כר

Paired column rubrics (red), repeated over each value group — as on the recto:

- המולד או השעור — "the conjunction or the measure"
- אומרי לשנהם — "their statement for the year"

Leap-year variant rubric (inner group, red): השעור העבור / לשנה העבור — "the measure of the embolismic (leap) year / for the leap year."

Red argument-spine (rightmost column, c4), top-to-bottom:

ב · א · א · ט · ט ... (group break) ... ה · ר ... (group break) ... ו · ו ...

Interior value cells: [numeral: ?] throughout, for the same reason as the recto — legibly inked alternating red/black two-letter sexagesimal triples that cannot be bound to exact ruled cells on the scan. Left for a later registration pass against the ruled grid.

Script: Italian (Sephardic-influenced) semicursive, with red rubrication for the head banner, panel argument-numbers, and the two-line column rubrics — a single hand consistent with the preceding folios. The interior is a true micro-hand (roughly 1–2 mm two-letter sexagesimal clusters).

Folio 13r — Second Wing (הכנף השני): degrees of the lunar *ḥeq*

Banner across the head of the page (red, partly trimmed by the binding edge and continued onto 13v): מעלות חק לבנה ... שלש ... מעלות — *ma'alot ḥeq levanah*,

"degrees of the lunar ḥeq" (the word שלש *shalosh*, "three," is partly legible in the upper band between the banner words; the head is cropped by the binding edge).

The page is a single wide ruled grid read right-to-left. It is organized into vertical **panels**; each panel is headed by a **red argument-number** in its top cell, beneath which sit two stacked **red rubrics** repeated panel-to-panel:

- [Red ink header: המולד או השעור — *ha-molad o ha-shi'ur*, "the molad, or the measure"] over [Red ink header: לשנהם — *le-shenahem*, "for their year"] — the common variant on the recto, alongside
- [Red ink header: אורך — *orekh*, "longitude"] over [Red ink header: לשנהם — *le-shenahem*] on the alternating panels.

A small black sub-label אומ' (*omet/omah* [?], an abbreviation for the column-of-entry) sits in the head row of several panels. Within each panel the entries are sexagesimal pairs (0–59; • = zero); a **red argument-letter** leads each data row.

Panel argument-numbers (red), right → left across 13r

[Red ink header: panel arguments, recto, reading order]

[?](gutter) כו (26) • יב (12) • ו (6) • יח (18) • יב (12) • כ (26) [?](20) • כר/כו

(The leftmost two panel-numbers fall toward the gutter/foxing edge; כר and the value beside it are uncertain, recorded as read.)

Committed interior — 13r

The recto interior is a tightly interleaved micro-grid crossed by a **diagonal grease/water stain** running down the right-of-centre and a **brown foxing run** along the gutter side. The red argument-letters are the most securely legible element and are committed below as **vertical runs per panel**; the black sexagesimal pairs are committed where their value *and* their column can both be pinned, and flagged [numeral: ?] where the micro-grid alignment or the stain makes the column assignment genuinely uncertain. **No fully-filled grid is asserted**, because cross-column row alignment in this interleaved layout cannot be verified cell-by-cell even under magnification — asserting it would fabricate alignment.

Rightmost panel (argument כו / כו-region), red argument-spine run, top→bottom: כו (26) • כא (21) [?] • כב (22) • כג (23) • כד (24) • כה (25) • כו (26) • כז (27) • כח (28) [?] • כט (29)

Black sexagesimal pairs read alongside this spine (first sub-column, top → bottom, where pinnable): (24) כד · [?](23) כג · (22) כב · (21) כא · (20) כ · (19) יט · (18) יח — second and third sub-columns of these rows fall under the stain / below confident column-pinning → [numeral: ?].

Centre panels — red argument-letters read in legible stretches (not necessarily contiguous): · (35) לה · (34) לד · (33) לג · (32) לב · (31) לא · (30) ל · (48) מח · (47) מז · (46) מו · [?](45) מה[?]

First-position black sub-column values read across the centre/left panels (committed values, column-pinned to "first sub-column"; row order as found): · (23) כג · (22) כב · (47) מז · (46) מו · (45) מה · (40) מ · (59) נט · (58) נח · [?](56) נו · (25) כה · (24) כד (16 or 15 — yod/vav pair)[?] · (56) נו[?]

The remaining (second / third) sub-columns of the centre and left panels are micro-clusters whose column assignment is not verifiable cell-by-cell at this resolution and are left [numeral: ?] rather than guessed.

Folio 13v — Second Wing (הכנף השני), continued

Same architecture as the recto. On the verso a **separate narrow right-hand column** (at the gutter edge) carries an isolated argument list with overbar markers — read top → bottom: שט[?] (with overbar, ≈ *sha*/seconds-marker) · · (6) ו · (24) כד · (18) יח · (12) יב, then יח/יט · (13) יג · [?](7) ז · (1) א · [?](18 or 19) שט[?] · כ · (24) כד-region — a genuine read run, given as found and **not** extrapolated past where the glyphs stop.

Panel argument-numbers (red), right → left across 13v

[Red ink header: panel arguments, verso, reading order]

יב (gutter)[?] · יא (11) · ו (6) · יא (11) · יח (18) · יא (11) · יב (12)[?] · כר/כו

Column rubrics — 13v

The two-line rubric block again alternates panel-to-panel:

- [Red ink header: לשנהם / השעור] on some panels, and
- [Red ink header: לשנהם / אורח] on the others,

with the black sub-label אומ' (*omet* [?]) in several head rows. Below the rubric block, an inner **red spine rubric** runs across the panels: [Red ink header: נשארת חלק מן הקר — *nish'eret min ha-heqef / heleq*, "what remains of the circuit, in

minutes"] (the middle word reads הֶקֶף *ha-heqef*, "the circuit/perimeter"; partly abraded → [?]).

Committed interior — 13v

The verso grid is more cleanly ruled than the recto and a larger share of cells is committable. The limiting damage is a band of **rust-red pigment offset / foxing blotches** through the lower part of the **lower-centre and lower-left** panels, which genuinely obscures the cells beneath; those are [numeral: ?]. The foot row sits at the trimmed page edge above the marbled board.

Red argument-letter runs read in legible stretches (top→bottom; recorded as found, non-contiguous between panels): מַטְ (42 or 40 — bet/kaf pair)[?] · מַבְ/מַכְ (49)[?] · נֹא (51) · נוֹ (56) · יבֹ (12) · יֹא (11) · יֹד (14) · יֹחֹ (18) · כֹּ (26) · לֹא (31)[?] · לֹבֹ (32) · לֹגֹ (33) · לֹדֹ (34) · לֹהֹ (35) · לוֹ (36)

First-position black sub-column values, committed and column-pinned (row order as found): מֹ (40) · מֹהֹ (45) · מֹוֹ (46) · מֹזֹ (46 or 15 — yod/vav pair)[?] · יֹטֹ (16 or 15) · יֹוֹ (15) · כֹּ (26) · כֹּהֹ (47) · כֹּחֹ (48) · כֹּוֹ (58) · כֹּטֹ (59) · כֹּאֹ (21) · כֹּבֹ (22) · כֹּגֹ (23) · כֹּדֹ (24) · כֹּהֹ (25) · כֹּזֹ (27)[?] · כֹּחֹ (28) · כֹּטֹ (29) · לֹ (30)

A short clearly-ruled inner run (verso, upper panels), three-pair rows committed where all three pins hold (sexagesimal triples ma'alot · ḥalakim · sheniyot, row order as found):

- (0) · · (19) יֹט · (19) יֹט[?]
- (52) נֹב · (18) יֹחֹ[?] · [numeral: ?]
- (26) כֹּוֹ/כֹּו · (18) יֹחֹ[?] · [numeral: ?]
- (59) נֹט · (17) יֹז · [numeral: ?]
- (55) נֹה · (11) יֹא[?] · [numeral: ?]
- (29) כֹּט · [numeral: ?] · [numeral: ?]

The deeper sub-columns and the rows under the rust-red offset band are left [numeral: ?] rather than guessed.

Scribal notes

The scribe's idiosyncratic spellings noted on earlier folios are not in play on this opening: the head banner is spelled normally as חֶקֶף לְבִנָּה, and the rubrics are the standard המולד או השעור / אורח / לשנה forms.

Shesh Kenafayim — Folios 14r–14v

Immanuel Bonfils, Shesh Kenafayim ("Six Wings"). UPenn LJS 204, 1509 Italian Hebrew copy. Italian semicursive hand, black ink with red rubrication.

Both folio sides continue the **Second Wing (הכנף השני)** lunar-ḥeq tables. No new wing rubric appears on either side. Each side is a single continuous multi-group numerical grid (the table continues across the opening), not prose.

Folio 14r (recto)

Banner (red ink, across the head of the table): [Red ink header: מעלות חק לבונה] ("Degrees of the lunar heq")

The recto carries a single wide ruled table in the standard paired-column groups of the Second Wing. The argument-letter spine runs down the **right** edge of the table (Hebrew RTL: the argument is read at the right and the value-groups extend leftward). Each value-group is a pair of columns under a red two-line header, each member resolving into the שניות / חלקים / ראשון sexagesimal triple.

Group header (red ink, recurring once per paired group, verbatim):

- Right member of each pair: [Red ink header: המולד או השעור] ("the conjunction [molad] or the measure")
- Left member of each pair: [Red ink header: אורם לשנהם] ("their longitude for their year") — [recte: אורכם לשנהם; the scribe writes the kaf as a tav-like form (אורתי/אורם) for אורכם, "their longitude"]

Argument-head row (red argument letters across the top of the successive groups, right→left):

(rightmost
group)

group)	...	...	...	...
[arg head: ו] (=6)	[arg head: ט (=9?) [?]	[arg head: ט (=9?) [?]	[arg head: יח] (=18)	[arg head: כר [?] (/ ?22=כב 24=כד?)

Sub-column labels (each paired member subdivided), where legible: the recurring triple ראשון (degrees/units) · חלקים (minutes) · שניות (seconds), abbreviated in the scribe's hand.

Argument spine (right edge — single letters read top→bottom where unambiguous): כד · כג · כב · כא · כ · יט · יח · יז · יו · יה · יד · יג · יב · יא · י · ט · ח · ז · ו · ז · ח · ט · י · יא · יב · יג · יד · יה · יו · יז · יח · יט · כ · כא · כב · כג · כד [?] (lower spine cells abraded/blotted → [numeral: ?])

Table interior (all value-group cells — ראשון/חלקים/שניות across every paired group, every row): [numeral: ?]

Folio 14v (verso)

[Librarian note: "218" in pencil, upper gutter]

`` (red ink, top center — partial/abraded [?]; two short lines, apparently a folio/section running marker)

Banner (red ink, across the head of the table): [Red ink header: מעלות חק לבנה] ("Degrees of the lunar heq") — continuation of the recto table.

The verso mirrors the recto RTL: the argument-letter spine runs down the **left** edge here, the value-groups extending rightward toward the gutter. Same paired-group structure and same red headers.

Group header (red ink, recurring once per paired group, verbatim):

- [Red ink header: המולד או השעור] ("the conjunction or the measure")
- [Red ink header: אורם לשנהם] ("their longitude for their year") [recte: אורכם לשנהם]

Argument-head row (red argument letters across the top of the successive groups):

...	...	...	...
[arg head: א] (=1)	[arg head: ט] (=9?) [?]	[arg head: יח] (=18)	[arg head: א] (=1) [?]

Sub-column labels (recurring per member): ראשון · חלקים · שניות (the sexagesimal triple), abbreviated.

Argument spine (left edge — single letters read top→bottom where unambiguous): יא · י · ט · ח · ז · ו · ד · ג · ב · א ... (the spine continues; lower cells abraded/foxed → [numeral: ?])

Table interior (all value-group cells across every paired group, every row): [numeral: ?]

Second Wing — Lunar ḥeq tables (מעלות חק לבנה)

Both folio sides of this opening carry the Second-Wing lunar-ḥeq tables. Each side is a single wide ruled grid with a red banner across the top, a band of red sub-rubrics naming each column-group, and red argument-letter heads above the groups. The interior is in a very small Sephardic cursive, with the numerals written in alternating red and brown/black iron-gall ink. The values are sexagesimal (0–59; a centered dot = zero), arranged in argument-groups, each group subdivided into the finer שניות / חלקים / ראשון (degrees / minutes / seconds) sub-columns.

[Librarian note: "219" — modern pencil foliation, upper-left margin]

[Red banner header (spanning the grid, partly trimmed at the right edge):] **מעלות** [חק לבנה משער לשני[הם]] ("Degrees of the ḥeq of the Moon, reckoned for their year[s] ...") — the banner is cut by the gutter/edge at the right; the medial words are visible (חק לבנה) but the head and tail of the line are abraded/trimmed [?].

Sub-rubric band (red), repeated above each argument-group, right→left:

"**המולד או השעור / לשנהם**" ("the molad or the measure / for their year[s]") alternating with "**אמרי**" ("its words / entry"). The pattern across the grid is: each group carries the paired sub-heads *אמרי* (left sub-cell) and *המולד או השעור לשנהם* (right sub-cell).

Red argument-letter heads (above each group, read right→left across the top row): כד · כב · ב · יח · ב · יב · ו · ב · ט · כ (The far-right head reads כ; the leftmost group head reads כד. Several of the middle heads are small and partly faded — the sequence כב / ב / יח / ב / יב / ו / ב is the legible run; treat individual heads as [?] where a single stroke is uncertain, especially the repeated ב heads.)

Right-edge argument spine (narrow column, far right, red, set vertically): repeats the rubric **המולד או השעור אמרי לשנהם** ("the molad or the measure — its words — for their year[s]").

Table skeleton — 15r

Logical order right → left (argument spine at far right). Each argument-group = {המולד או השעור לשנהם | אמרי}, each in turn subdivided שניות/חלקים/ראשון. Interior values are sexagesimal; committed only where both glyph and ruled position are verifiable.

(spine: argume nt)	grp כ	grp ט	grp ב	grp ו	grp יב	grp ב	grp יח	grp ב	grp כב	grp כד
head →	[nu mera l: ?]	[nu mera l: ?]	[nu mera l: ?]	[nu mera l: ?]	[nu mera l: ?]	[nu mer al: ?]	[nu mera l: ?]	[nu mera l: ?]	[nu mera l: ?]	[nu mera l: ?]
row 1	[nu mera l: ?]	[nu mera l: ?]	[nu mera l: ?]	[nu mera l: ?]	[nu mera l: ?]	[nu mer al: ?]	[nu mera l: ?]	[nu mera l: ?]	[nu mera l: ?]	[nu mera l: ?]
row 2	[nu mera l: ?]	[nu mera l: ?]	[nu mera l: ?]	[nu mera l: ?]	[nu mera l: ?]	[nu mer al: ?]	[nu mera l: ?]	[nu mera l: ?]	[nu mera l: ?]	[nu mera l: ?]
row 3	[nu mera l: ?]	[nu mera l: ?]	[nu mera l: ?]	[nu mera l: ?]	[nu mera l: ?]	[nu mer al: ?]	[nu mera l: ?]	[nu mera l: ?]	[nu mera l: ?]	[nu mera l: ?]
:	:	:	:	:	:	:	:	:	:	:

[The grid continues for roughly 25–30 ruled data rows top to bottom; the small-cursive interior numerals (mixed red/brown, in ראשון/חלקים/שניות triples per group) are present and inked throughout but cannot be localized cell-to-ruled-position from the non-rule-locked tiles. Interior committed as [numeral: ?].]

[Red banner header (spanning the grid):] **לות חק לבנה משער לשני[הם] [מע]** ("[Deg]rees of the *heq* of the Moon, reckoned for their year[s] ... degrees") — better preserved than the 15r banner; the words מעלות ... חק לבנה משער לשני[הם] are legible, with the bracketed head/tail trimmed at the edges.

Sub-rubric band (red), above each argument-group: " / המולד או השעור " **לשנהם** alternating with "אמרי" — same paired sub-heads as 15r.

Red argument-letter heads (above each group, read right→left across the top row): יב · ל · ו · ט · ל · ל · יב (legible run; the heads are single red letters set above each group. Several are faint — the right-hand head reads ל, with ו and ט among the middle heads. Treat individual heads as [?] where a single stroke is uncertain.)

Left-edge argument spine (narrow column, far left, red, set vertically): repeats the rubric **המולד או השעור אמרי לשנהם** ("the molad or the measure — its words — for their year[s]").

Table skeleton — 15v

Logical order right → left (banner runs the full width; spine label at far left on this verso). Same group structure as 15r: each argument-group = { אמרי | המולד או { ראשון/חלקים/שניות, השעור לשנהם

grp ל	grp י	grp ל	grp ט	grp ל	grp ל	grp יב	(spine: argument)
hea d →	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
row 1	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
row 2	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
row 3	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
:	:	:	:	:	:	:	:

[The grid continues for roughly 25–30 ruled data rows top to bottom, same character as 15r. Interior small-cursive numerals (mixed red/brown) are present throughout but not localizable to exact ruled positions from the non-rule-locked tiles; committed as [numeral: ?].]

[Below the last ruled data row, the foot of 15v is blank parchment — no further ruled rows or text.]

Immanuel Bonfils, Shesh Kenafayim. UPenn LJS 204, Italian copy, 1509. Italian semicursive Hebrew hand.

Conservative table re-transcription at high magnification. A cell is committed only when both its glyphs and its exact ruled position are verified; everything else is [numeral: ?]. No pattern-fill. The dense three-sub-column sexagesimal interior is intentionally left as [numeral: ?] because the micro-script, while partly legible, cannot be assigned to its exact ruled subcolumn cell-by-cell with the confidence required — misplacement would be fabrication. Structure, banner, rubrics, and the argument heads/spine are committed.

This folio continues the **Second Wing** lunar-*heq* table without interruption. No new wing rubric appears on this page.

[Red ink header (banner spanning the panels): **מעלות חק לבנה** — "Degrees of the *heq* of the Moon" (the lunar *heq*).]

The table is laid out as a series of vertical paired-column panels, read right-to-left. Each panel is headed by a large **argument-letter** (red, occasionally gold) and beneath it a shared multi-line rubric block, then **three sexagesimal sub-columns** of micro-script values per panel.

Per-panel rubric block (red ink), as read on the panel heads (top→bottom within the block):

[Red ink header: **המולד או השעור** — "the *molad* or the period" (set on three lines: *השעור / או / המולד*).] [Red ink header: **אמתי** — "true" (*amiti*).] [The middle rubric reads *אמתי* on the tiles; the expected *אורכם* ("their longitude") is **not** what is written here — flagged as anomaly (a).] [Red ink header: **לשנהם** — "for their year(s)" (*li-shenahem*).] [Red ink header: **העבור** — "the intercalation / the *ibbur*" (set under one of the paired sub-blocks; legible as...*העבור*).]

Argument-letter panel heads across 16r (large red/gold letters, right→left across the row of panel heads), as verified:

ר · יד · ר · ו · ... · ר · יח · ר · יב · ר · כר

(The heads are non-monotonic and mix single letters — *ה, ו, ר* — with two-letter forms — *כר, יב, יח, יד*. Recorded as found; some heads sit between fully-legible neighbors and are left out of this list rather than guessed. See anomaly (b).)

Table — lunar *heq* (16r)

Each panel carries the rubric block above and, below it, **three sexagesimal sub-columns** (the established *שניות / חלקים / ראשון* triple) of micro-script values in alternating red and brown/gold ink. The argument runs down the **right-edge spine** (narrow red column).

Argument (spine, right edge)	Panel rubric	ראשון	חלקים	שניות
(spine letter, per row)	המולד או השעור — אמתי — לשנהם העבור	[numeral : ?]	[numeral : ?]	[numeral : ?]

Right-edge argument spine (16r), verified red letters read top→bottom in the narrow spine column:

א · [?] · יב · יח · א · ... · יד · יח · ... · ה · ... · יח

(These are the legible spine entries only; intermediate rows whose spine glyph is not confidently placed are omitted rather than interpolated. The spine alternates red and brown; only red entries that sit unambiguously in a ruled cell are committed.)

Interior: the gold/brown/red three-sub-column sexagesimal body is dense micro-script. Individual glyphs are often legible but cannot be assigned to their exact ruled subcolumn cell-by-cell with confidence; per the conservative rule the entire interior body is marked [numeral: ?] rather than committed to a possibly-wrong position. No cells are pattern-filled. (Sexagesimal range 0–59; • = zero where it occurs.)

This folio continues the same lunar-*heq* table. No new wing rubric.

[Red ink header (banner): **מעלות חק לבנה משט לשט** — "Degrees of the *heq* of the Moon" followed by what appears to be a paired sub-banner (משט / לשט); the trailing words sit across the panel heads and are only partly legible.] [The leading word **מעלות** (then **חק לבנה**) is verified; the trailing לשט / משט is flagged — see anomaly (c).]

Per-panel rubric block (red ink), identical structure to 16r:

[Red ink header: **המולד או השעור** — "the *molad* or the period" (three lines: (המולד / או / השעור).] [Red ink header: **אמתי** — "true" (*amiti*).] [Red ink header: **לשנהם** — "for their year(s)."] [Red ink header: **העבור** — "the intercalation / the *ibbur*."]

Argument-letter panel heads across 16v (large red/gold letters, right→left), as verified:

ה · ש · ה · ... · ה · יח · ה · יח · ה · יח · יב

(Many heads on this folio are the single letter ה; two-letter forms יב, יח also occur. Recorded as found; see anomaly (b).)

Table — lunar *heq* (16v)

Same paired-column / three-sub-column structure as 16r. Argument runs down the **right-edge spine** (narrow red column, here read along the outer/foredge margin; some spine text runs vertically bottom → top in the margin strip).

Argument (spine,
right edge)

Argument (spine, right edge)	Panel rubric	ראשון	חלקים	שניות
(spine letter, per	המולד או השעור —	[numeral	[numeral	[numeral

Argument (spine, right edge)	Panel rubric	ראשון	חלקים	שניות
row)	— לשנהם — אמת העבור	: ?]	: ?]	: ?]

Right-edge argument spine (16v): the spine here is partly carried as a vertical marginal red line at the fore-edge (e.g....אמצעי לבנה אורח-type marginal label, not confidently resolved) plus per-row red letters. Verified per-row spine letters (top → bottom): ה · ... · א · ... (only the unambiguous, ruled-cell entries committed; the rest omitted rather than guessed).

Interior: as on 16r, the dense three-sub-column sexagesimal body is left [numeral: ?] cell-by-cell. The micro-script is partly legible but not confidently placeable per ruled subcolumn; no pattern-fill, no interpolation. (Sexagesimal 0–59.)

Shesh Kenafayim — Folios 17r–17v

Second Wing (*ha-kanaf ha-sheni*) — lunar-ḥeq tables, continued. Both folio sides of this opening are an uninterrupted continuation of the same multi-panel lunar-ḥeq table; no new wing rubric, no chapter/section heading, and no closing rubric appears. The content is entirely tabular and is transcribed as native pipe-tables.

Conservative-transcription note. The interior of these tables is a very fine cursive micro-script of two-letter (sexagesimal) numerals, written in alternating red and black ink with heavy local ink-bleed and foxing. The supplied tiles are cropped with ~14% overlap and are **not rule-locked**, so an interior glyph cannot be reliably tied to its exact ruled row-and-column without fabrication risk. Per the conservative mandate, only the elements I could verify by **both glyph and ruled position** are committed — the banner, the red rubric block, the diagonally-ruled argument-head cells, and the red argument-letter panel heads. The dense interior is flagged [numeral: ?] rather than pattern-filled or placed by guess. Both folio sides for higher-resolution interior recovery.

The page is ruled into several adjacent argument-panels across its width. Each panel carries the same red rubric block over three sexagesimal sub-columns, is preceded by a red argument-letter head, and is opened by a diagonally-ruled head cell.

Repeated panel rubric block (red ink):

- [Red ink header: **המולד או השעור** — *ha-molad o ha-shi'ur* ("the molad, or the measure")]
- [Red ink header: **אורכם** — *orkham* ("their longitude")]
- [Red ink header: **לשנהם** — *le-shenahem* ("for their years")]

Diagonally-ruled argument-head cells: each panel head is a diagonal cell carrying a black diagonal-script sub-label over a red **ק** (the recurring **זק / שעק** head form established in the preceding folios).

Argument-letter panel heads (red), recorded right→left as found: **ז · ש · יב · ו** (further heads **יח / ו** on adjacent panels). The heads are non-monotonic — each panel tabulates a distinct argument value rather than a single ascending spine — and are recorded as found.

[Red head]	Diagonal head cell	[Red header: המולד או השעור]	[Red header: אורכם]	[Red header: לשנהם]
ז	[שעק / זק] over red ק	[numeral: ?] (interior micro-script)	[numeral: ?]	[numeral: ?]
ש	[שעק / זק] over red ק	[numeral: ?]	[numeral: ?]	[numeral: ?]
יב	[שעק / זק] over red ק	[numeral: ?]	[numeral: ?]	[numeral: ?]
ו	[שעק / זק] over red ק	[numeral: ?]	[numeral: ?]	[numeral: ?]

[The full interior numeral grid of 17r — all rows beneath the rubric, across all panels — is fine red/black micro-script below what the scan will reliably yield under magnification. No interior cell is committed by ruled position; each is [numeral: ?]. The page-grid structure, all red rubric headers, the diagonal head cells, and the argument-letter spine are captured in full. The interior numerals await recovery at higher magnification.]

Identical panel layout to 17r: adjacent argument-panels, each with the red rubric block over three sexagesimal sub-columns, a diagonally-ruled head cell, and a red argument-letter head. The table runs on past this folio side — no Third Wing rubric and no closing rubric appears on this opening.

Repeated panel rubric block (red ink):

- [Red ink header: **המולד או השעור** — *ha-molad o ha-shi'ur* ("the molad, or the measure")]
- [Red ink header: **אורכם** — *orkham* ("their longitude")]
- [Red ink header: **לשנהם** — *le-shenahem* ("for their years")]

Diagonally-ruled argument-head cells: the same diagonal head cells, each carrying a black diagonal-script sub-label over a red **ק** (**זק** / **שעק** form).

Argument-letter panel heads (red), recorded right→left as found: יב · יח · יו · יד · יב (with a **כר** head on the gutter-side panel and a **ב** head at the top of the leftmost panel). Non-monotonic; recorded as found.

[Red head]	Diagonal head cell	[Red header: המולד או השעור]	[Red header: אורכם]	[Red header: לשנהם]
י	[שעק / זק] over red ק	[numeral: ?] (interior micro-script)	[numeral: ?]	[numeral: ?]
י	[שעק / זק] over red ק	[numeral: ?]	[numeral: ?]	[numeral: ?]
יח	[שעק / זק] over red ק	[numeral: ?]	[numeral: ?]	[numeral: ?]
יב	[שעק / זק] over red ק	[numeral: ?]	[numeral: ?]	[numeral: ?]
כר	[שעק / זק] over red ק	[numeral: ?]	[numeral: ?]	[numeral: ?]

[As on 17r, the full interior numeral grid of 17v is micro-script below what the scan will reliably yield under magnification → [numeral: ?] for every interior cell. Structure, all red rubric headers, the diagonal head cells, and the full argument-letter spine are committed; the interior is flagged, not invented. The interior numerals await recovery at higher magnification.]

Shesh Kenafayim — Folios 18r–18v

Immanuel Bonfils, Shesh Kenafayim (Six Wings). UPenn LJS 204, Italian copy, 1509. Italian Hebrew semicursive; red and gold rubrication. Second Wing (הכנף השני) lunar-heq tables — continuation.

Both folio sides of this opening continue the Second Wing lunar-ḥeq tables (*ma'alot ḥeq levanah*, "degrees of the lunar ḥeq"). The table architecture is the established Second-Wing pattern: a red display banner across the top, a row of paired-column argument groups each headed by a red gematria argument-letter and a red/gold rubric block, beneath which three sexagesimal sub-columns (ראשון / שלם / חלקים / שניות) run down each panel in diagonally-divided cells. A red argument-letter spine runs down the page edge. No closing rubric and no new-wing rubric appears on either side.

This is a conservative re-transcription. The verified skeleton — banner, running headers, column rubrics, diagonal sub-labels, and the red argument heads/spine — is committed below. The interior numeral grid is small-hand red/brown gematria set on slanted, closely-ruled lines; at the available crop resolution the individual cells cannot be locked to BOTH their exact glyphs AND their exact ruled position without risk of mis-placement, so the interior is recorded as [numeral: ?] rather than committed. Committing a value to the wrong ruled cell would be a fabrication, so the structure is laid out and the interior payload withheld. Both folio sides are flagged as for higher-resolution, rule-locked cell-by-cell recovery.

[Red ink banner, across top of table:] מעלות חק לבנה משש לשלש מעלות
("Degrees of the lunar ḥeq, from six to three degrees")

The table is divided into paired-column argument groups. Each group is headed by a red argument-letter and carries the rubric stack:

- **[Red ink rubric, group head, right sub-column:]** המולד או השעור ("the conjunction [molad] or the measure")
- **[Red ink rubric, group head, left sub-column:]** אמתי ("true")
- **[Red ink rubric, second line:]** או / השעור ("or / the measure")
- **[Red ink rubric, second line:]** לשנהם / לשעהם ("for their hour") / לשנתם ("for their year")
- **[Diagonal sub-labels within each cell-stack, red/brown:]** ראשון / שלם ("first / whole [degrees]"), חלקים ("parts/minutes"), שניות ("seconds") — written on the diagonal, each terminating in a red שלם / ק marker.

Red argument-letter heads (across the page top; RTL, leading group at the right edge):

Group head (red)	Value
כד / ק [?]	20 / 24 [?]

Group head (red)	Value
יח	18
ט / ח [?]	8 / 9 [?]
יב [?]	12 [?]
ח	8
ט [?]	9 [?]
ו	6

[The exact argument-letter sequence and the pairing of heads to columns are only partly legible; several heads are single red letters with gershayim ambiguous between adjacent values — both candidates recorded where uncertain.]

Interior numeral grid (all groups, all rows): [numeral: ?] Dense red-and-brown two-letter sexagesimal entries (שניות / חלקים / ראשון), set on slanted ruled lines. Glyphs are partly legible but cannot be locked cell-by-cell to exact ruled position at this resolution; withheld rather than risk mis-placement.**

[Red argument spine, down the left page edge:] a continuous column of single red gematria letters running the height of the table (the row-argument index). Individual spine letters are partly legible but are not committed letter-by-letter here. [numeral: ?]

[Red ink banner, across top of table:] מעלות חק לבנה משש לשלש מעלות ("Degrees of the lunar ḥeq, from six to three degrees")

Same architecture as 18r: paired-column argument groups, each headed by a red argument-letter, carrying the rubric stack:

- **[Red ink rubric:]** המולד או השעור ("the conjunction or the measure")
- **[Red ink rubric:]** אמת ("true")
- **[Red ink rubric:]** או / השעור ("or / the measure")
- **[Red ink rubric:]** לשעהם ("for their hour") / לשנהם ("for their year")
- **[Diagonal sub-labels, red/brown:]** שניות, חלקים, שלם, ראשון, each closing with a red שלם / ק marker.

Red argument-letter heads (across the page top):

Group head (red)	Value
יב [?]	12 [?]
ט	9

Group head (red)	Value
ו	6
ט [?]	9 [?]
יב [?]	12 [?]
ט [?]	9 [?]
ט	9

[Argument-letter heads only partly legible; ambiguous single-letter heads recorded with candidates.]

[Vertical red outer-margin caption, far outer edge, running bottom-to-top:] a vertical red inscription in the outer margin alongside the table. The word *הק* ("heq/correction") is legible within it; the full caption is [?] — further reading requires higher resolution. [Margin: vertical red caption, contains "...הק...", remainder illegible at this resolution]

Interior numeral grid (all groups, all rows): [numeral: ?] Dense red-and-brown two-letter sexagesimal entries (שניות / חלקים / ראשון). Glyphs partly legible; not committed cell-by-cell to exact ruled position.**

[Red argument spine, down the page edge:] continuous column of single red gematria letters (the row argument). Partly legible; not committed letter-by-letter. [numeral: ?]

Immanuel Bonfils, Shesh Kenafayim ("Six Wings"). Italian copy, 1509 (UPenn LJS 204). Sephardic-Italian semicursive; bicolor ink (carbon-black body + red rubrication, with occasional gilt/ochre argument heads).

Both folio sides carry the same astronomical table: the Second Wing lunar-heq table, whose banner gains the trailing word **משלמת** ("completed") — the marker that this lunar-heq table concludes at this opening.

This is a dense ruled sexagesimal table in small cursive gematria. Per the conservative re-transcription protocol, the skeleton below (banner, rubrics, sub-labels, degree-argument column heads, argument spine, and column triples) is committed where glyphs **and** ruled position were both verified; the interior data cells could not be locked to exact ruled positions even at high magnification (small cursive, gutter compression at the spine edge), and are therefore marked [numeral: ?] rather than risk mis-placement.

[Red ink banner: משלמת לבנה חק מעלות] — "Degrees of the lunar heq (function/argument), completed."

Table — lunar-heq, 19r

Structure (verified): The grid is organized into repeating **paired-column groups**. Each group is headed by a small **red degree-argument numeral** (the entry-argument in whole degrees). Beneath each head run the two parallel sub-headings:

- **[Red ink: המולד או השעור]** — "the conjunction (molad) or the measure"
- **[Red ink: לשנהם] / [Red ink: השעור] / [Red ink: לשעה]** — the complementary entry ("for their [value]" / "for the hour"), in the left member of each pair.

Below the rubric band, each cell holds a diagonal-split sub-label reading **[Red ink: ק ... אשר]** (the function label, partly red), above the data value. Data values are sexagesimal triples — **ראשון** (degrees/units), **חלקים** (minutes), **שניות** (seconds) — wrapping 0–59 (• = zero).

Degree-argument column heads (red, verified, reading RTL across the head of 19r):

(head)	(head)	(head)	(head)
[1] א	[6] ו	[12] יב	[18] יח

with a further head **[כ / כד ?]** [20 or 24] continuing toward the left edge [numeral: ?].

Argument spine (rightmost red column, top-of-table value verified): 1, ... then continuing downward as red two-letter numerals (the spine enters with א and runs down the right margin). Individual spine values below the first few rows are partly legible but were **not** committed cell-by-cell to ruled position — [argument spine: ? per row].

Body data (verified structure; values not position-locked):

אשר/ק · ראשון · חלקים · שניות (per column group)	...	...	...	argument
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[1] א
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[arg: ?]
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[arg: ?]

(rows continue down the full ruled height of 19r; each interior triple

אשר/ק · ראשון · חלקים ·	...	...	...	argument
שניות (per column group)	...	...	...	nt

[numeral: ?])

Interior cells of 19r are legible as ink but cannot be committed to exact ruled position on the scan, even under magnification, without risk of mis-placement; transcribed conservatively as [numeral: ?]. Marked as a for cell-level recovery.

[Foliation mark, top margin: ט-form flourish = folio 19]

[Red ink banner: משלמת לבנה חק מעלות חק] — "Degrees of the lunar ḥeq, completed." (Same banner as 19r; the trailing משלמת confirms the table's conclusion at this opening.)

Table — lunar-ḥeq, 19v (continuation/completion)

Structure (verified): Identical layout to 19r — paired-column groups, each under a red degree-argument head, the same **(השעור / לשנהם / לשעה)** rubric band, diagonal **ק ... אשר** sub-labels, and **ראשון / חלקים / שניות** data triples.

Degree-argument column heads (red, verified, RTL across the head of 19v):

(head)	(head)	(head)	(head)	(head)
יב [12]	[?]	[?]	א [1]	[?]

(The head row of 19v is partly abraded; committed heads are those legible both as glyph and ruled position — others [numeral: ?].)

Rubric band (verified): **[Red ink: המולד או השעור]** (right member) || **[Red ink: השעור / לשנהם]** (left member), recurring per pair.

Body data (verified structure; values not position-locked):

(column group)	...	...	...	argument
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[arg: ?]
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[arg: ?]

(upper rows hold data; the lower portion of the 19v grid is blank ruled parchment — the table

(column group)	...	...	...	argument
<i>ends here, consistent with</i> <i>משלמת</i>)				

[Blank: lower rows of the 19v grid are empty ruled cells / blank parchment — the lunar-ḥeq table terminates on this folio side.]

Interior cells of 19v transcribed conservatively as [numeral: ?] for cell-level recovery.

Script: Italian Hebrew semicursive (Sephardic-influenced), bicolor (black body + red rubrics / argument spines), 1509. Both folio sides carry NEW sexagesimal wing-tables (numerical gematria/sexagesimal grids), not prose. The long lunar-ḥeq table that ran continuously from 8r and was marked *משלמת* ("completed") on 19v does NOT continue here: a new table opens on 20r under a fresh enlarged red banner, and another on 20v.

Conservative-transcription note. These grids are extremely fine-ruled: each zodiac panel occupies only one or two very narrow sub-columns (~1–2 glyphs wide), the gold/light-brown rules are faded and locally lost, and the panels are tightly interleaved. Per the conservative mandate I commit a cell only where BOTH its glyphs AND its exact ruled position (panel × sub-column × row) are unambiguous. The verified structure — banners, red rubric sub-headers, the sign-name row, the diagonal column captions, and the legible panel-header letters — is committed below. The dense numeric interior could not be attributed to specific (panel × sub-column × row) cells without serious misplacement risk on this abraded, narrow-ruled grid, so it is honestly marked [numeral: ?] rather than risk fabrication-by-misplacement. Both sides for native-resolution cell-by-cell recovery.

[Red ink banner (top, centered):] *ה הכנף...* [reads "*ה הכנף...*"; per the running wing-rubric sequence the dispatch records this side as *ה הכנף השני* — "the second wing"; the surviving glyphs are consistent with that but the panel-number letter(s) are abraded at the head, so recorded verbatim as legible.]

Header structure (verified):

- A row of red panel-ordinal letters runs across the top of the data block. Legible, reading right → left across the leaf: *ט, ה, ז, ו, ד, ה, ב, ג, א* [?], [?] ... (each heads one zodiac sign-panel).

- A sign-name row sits immediately below the panel letters. Legible sign names, right → left:
- טלה (Aries)
- שור (Taurus) [?]
- התאומים / תאומים (Gemini)
- סרטן (Cancer)
- אריה (Leo)
- [further sign names to the left abraded – glyph: ?]
- Each panel then carries a **diagonal sub-column caption** (brown ink over the rule), recurring per panel, of the abbreviated sexagesimal place form ק' / נ.ש.ק — i.e. the standard place captions (מעלות "degrees" · קלים · ראשונים/שניות · קלים) repeated above each panel's number triple. [The exact per-cell expansion of the three diagonal abbreviations is consistent across panels but the individual gershayim-marked letters are faded; recorded as the recurring caption form, not re-expanded per cell.]

Argument / data columns:

- The far-right (page-edge) column carries red integer-degree values running down the full height of the grid. The column is positionally unambiguous (page edge), but its individual red letter-numerals do NOT resolve to a clean 1–30 argument index at the head — they read as data degrees (e.g. legible at the foot: red כז, כח, כט, ל... with a brown minutes cell ו לה ו [?] alongside the final row). Because the head of this column is abraded and several mid-column values are ambiguous between confusable pairs, the individual values are NOT committed: [numeral: ?] for the column interior.
- Interior min/sec sub-columns for each sign-panel: [numeral: ?] — narrow ruling and panel interleave preclude unambiguous (panel × sub-column × row) attribution at this resolution.

[Table skeleton – interior values withheld as:]

Panel (red ord.)	Sign	נ'	ש'	ק'
א	טלה (Aries)	[numeral: ?]	[numeral: ?]	[numeral: ?]
ב	שור (Taurus) [?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
ג	התאומים (Gemini)	[numeral: ?]	[numeral: ?]	[numeral: ?]
ד	סרטן (Cancer)	[numeral: ?]	[numeral: ?]	[numeral: ?]

Panel (red ord.)	Sign	נ'	ש'	ק'
		[?]	[?]	[?]
ה	אריה (Leo)	[numeral: ?]	[numeral: ?]	[numeral: ?]
ו	[?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
ז	[?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
ח	[?]	[numeral: ?]	[numeral: ?]	[numeral: ?]

[Rows: ~30 ruled data rows per panel; interior numerals withheld – see conservative-transcription note.]

[Red ink banner (top, centered):] הכנף הרביעי [reads "הכנף הרביעי" – "the fourth wing"; glyphs verified on the scan under magnification (" + "...הכנף הרביעי...").]

Header structure (verified):

- A red rubric sub-header runs below the banner: חק לשנה ותיקן / חק לשה [?] ותיקן ("ḥeq for the year and its correction" — the term תיקן/ותיקן partly abraded; recorded verbatim). This side reads as a ḥeq-correction-style table, though it likewise carries the per-panel diagonal sexagesimal captions.
- A row of red panel-ordinal letters: red א legible at right; further letters to the left [?].
- A sign-name row below: שור (Taurus) legible at the page edge (written טור/שור), [further sign names: ?].
- Black-ink descriptive column sub-headers appear between panels (e.g. "...חק", "...מעלות..."), partly legible; [full expansion: ?].
- The recurring diagonal place-captions ק' ש' נ' appear above each panel, as on 20r.

Data columns: [numeral: ?] throughout — same narrow-ruling / interleave / abrasion conditions as 20r; individual cells not committable without misplacement risk.

[Table skeleton – interior values withheld as:]

Panel (red ord.)	Sign / sub-header	ח	ש	ק
א	שור (Taurus) [?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
[?]	[?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
[?]	[?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
[?]	[?]	[numeral: ?]	[numeral: ?]	[numeral: ?]

[Rows: ~30 ruled data rows; interior numerals withheld – see conservative-transcription note.]

Shesh Kenafayim — ff. 21r–21v

Corrected lunar-ḥeq sign-panel tables (חק לבנה מתוקן). Both folio sides are dense, very-small-hand zodiacal sexagesimal tables: a red argument-index column at the page-edge, several per-sign deg/min/sec panels each headed by diagonally-written red sub-rubrics, a mid-table red mid-heaven band, and an outer הוסף ("add") column.

[Banner, red ink, top of page:] **[Red ink header: הכנף הרכב]** ("the compound wing")

[Sub-rubric, red ink, beneath banner:] **[Red ink: מעלות חק לבנה מתוקן]** ("degrees of the corrected lunar ḥeq")

[Column structure — Hebrew RTL. Right page-edge: red argument-index column running 1–30. Interior: a series of per-sign panels, each subdivided into deg/min/sec sub-columns headed by diagonally-written rubrics. A mid-table red band (mid-heaven: חצי השמים / השמים). The diagonal per-panel sub-rubrics are written in alternating red/brown and read as a repeating triple — recorded below where legible; on this page they are abraded/cramped at the panel heads and individual sub-rubric words are largely [?].]

[Argument-index column (red, page-edge, c4): the 1–30 running index is present and structurally clear; individual numerals along it are at the discrimination floor and are not individually committed — [numeral: ?] per row. Mid-heaven red band (חצי השמים / השמים) appears mid-table, verified as a structural band but its label is abraded — [?].]

Table skeleton — 21r (corrected lunar הַעֲקָה, הכנף הרכב)

Logical layout, RTL: argument index at right; per-sign deg/min/sec panels across; הוֹסֵף column at outer left. Interior cells [numeral: ?] (not committable with verified position).

Arg (red)	Panel P1 (deg·min·sec)	Panel P2	Panel P3	Panel P4	הוֹסֵף ("add")
1 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
2 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
3 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
4 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
5 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
6 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
7 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
8 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
9 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
10 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
11 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
12 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
13 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
14 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]

Arg (red)	Panel P1 (deg·min·sec)	Panel P2	Panel P3	Panel P4	הוסף ("add")
15 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
[Mid-heaven red band: חצי / השמים השמים [?]]					
16 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
17 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
18 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
19 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
20 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
21 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
22 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
23 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
24 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
25 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
26 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
27 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
28 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
29 [numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]

Arg (red)	Panel P1 (deg·min·sec)	Panel P2	Panel P3	Panel P4	הוסף ("add")
30 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]

[Banner, red ink, top of page:] **[Red ink header: הכנף החמשי]** ("the fifth wing")

[Sub-rubric line, brown ink:] מקום אורך ("place of longitude") · מורה ל · [?] · [sign-
header, brown:] **טלה** ("Aries")

[Sub-rubric, red ink:] **[Red ink: מעלות חק לבנה מתוקן]** ("degrees of the corrected
lunar heq")

[Diagonal per-panel sub-rubrics (red/brown, written on the slant at each panel
head) read as a repeating triple — legible here as the recurring sequence **מעלות / חלקים / שניות** [degrees / seconds / parts], confirmed across multiple panel heads. Outer-left column header (brown): **הוסף** ("add"), with a red sub-column header beside it (לבנה / זרע [?]). The argument-index column (red) again runs the page-edge.]

[Sign-header confirmed on this page: **טלה** (Aries). Additional sign-panel headers across the page are abraded at the panel heads — [?] / positional P1–P4. The diagonal sub-rubric triple מעלות/שניות/חלקים repeats per panel.]

Table skeleton — 21v (corrected lunar heq, הכנף החמשי)

Logical layout, RTL: argument index at right; per-sign panels (Aries טלה committed as the first/right sign; others positional, headers abraded) each headed by the diagonal triple מעלות/שניות/חלקים; הוסף column at outer left. Interior cells [numeral: ?].

Arg (red)	טלה (Aries) — מעלות·שניות·חלקי ם	Sign P2 [?]	Sign P3 [?]	Sign P4 [?]	הוסף ("add")
1 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
2 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
3 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
4 [numeral: ?]	[numeral: ?]	[numer	[numer	[numer	[numeral:

Arg (red)	טלה (Aries) — מעלות שניות־חלקי ם	Sign P2 [?]	Sign P3 [?]	Sign P4 [?]	הוסף ("add")
		al: ?]	al: ?]	al: ?]	?
5 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
6 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
7 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
8 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
9 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
10 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
11 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
12 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
13 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
14 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
15 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
[Mid-heaven red band: השמים / חצי השמים [?]]					
16 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
17 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
18 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
19 [numeral: ?]	[numeral: ?]	[numer	[numer	[numer	[numeral:

Arg (red)	טלה (Aries) — מעלות־שניות־חלקי ם	Sign P2 [?]	Sign P3 [?]	Sign P4 [?]	הוסף ("add")
		al: ?]	al: ?]	al: ?]	?
20 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
21 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
22 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
23 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
24 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
25 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
26 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
27 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
28 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
29 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]
30 [numeral: ?]	[numeral: ?]	[numer al: ?]	[numer al: ?]	[numer al: ?]	[numeral: ?]

Corrected lunar **heq** (חק לבנה מתוקן) zodiacal sign-panel tables.

Script: Sephardic/Italian semicursive, bicolor (black body + red rubrics and alternating red/black numerals). This opening carries a single dense astronomical sign-panel table of the same design on each side: a red argument-index column (1–30); per-sign degree/minute/second panels written as diagonally-slashed triples in alternating red and black; a mid-table red band (חצי השמים / מעלי היום, "mid-heaven"); an outer additive (הוסף) column; and a header band reading מקום / אמצעי לשנה / מעלות חק לבנה מתוקן.

Folio 22r (page 1) — sign panel: בתולה (Virgo)

Header band (top, right-to-left, red + black):

- [Red ink header: חמשי] ("Fifth" — wing rubric; recorded verbatim, appears erratically)
- [Red ink header: מקום אמצעי לשנה] ("Mean/average place for the year")
- [Red ink header: מעלות חק לבנה מתוקן] ("Degrees of the corrected lunar ḥeq") — black, with מעלות and מתוקן in red
- Sign name: [Red ink header: בתולה] ("Virgo") [recte: בתולה — scribe writes כתולה with kaf for bet]
- Sub-header (right of header band): לשעות [= לשעות, "for the hours"] · · ז מאונס [reading uncertain; per-degree/per-hour sub-argument] [?]

Table skeleton (logical right-to-left):

הוסף (additive)	Virgo panel — sec	Virgo panel — min	Virgo panel — deg	... (further sign sub- panels)	Argument index (red, 1– 30)
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	(1) א
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	(2) ב
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	(3) ג
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	(4) ד
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	(5) ה
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	(6) ו
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	(7) ז
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	(8) ח
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	(9) ט
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	(10) י

הוסף (additive)	Virgo panel — sec	Virgo panel — min	Virgo panel — deg	... (further sign sub- panels)	Argument index (red, 1– 30)
?]]	?]]	?]]	?]]		

[Mid-table red band — mid-heaven, spanning the panel: [Red ink: חצי השמים] / [Red ink: מעלי היום] ("mid-heaven" / "degrees of the day")]

הוסף (additive)	Virgo panel — sec	Virgo panel — min	Virgo panel — deg	...	Argument index (red, continued)
[numeral: ?]]	[numeral: ?]]	[numeral: ?]]	[numeral: ?]]	[numeral: ?]]	יא (11)
[numeral: ?]]	[numeral: ?]]	[numeral: ?]]	[numeral: ?]]	[numeral: ?]]	יב (12)
[numeral: ?]]	[numeral: ?]]	[numeral: ?]]	[numeral: ?]]	[numeral: ?]]	יג (13)
[numeral: ?]]	[numeral: ?]]	[numeral: ?]]	[numeral: ?]]	[numeral: ?]]	...

[The argument index continues through the full 1–30 range across the lower half of the panel; individual lower-half index numerals and all interior triples are not committed — see QA note. The column alignment shifts in the lower half, increasing mis-placement risk.]

Folio 22v (page 2) — sign panel: מאזנים (Libra)

Header band (top, right-to-left, red + black) — clearer than 22r:

- [Red ink header: חמשי] ("Fifth" — wing rubric; recorded verbatim)
- [Red ink header: מקום אמצעי לשנה] ("Mean/average place for the year")
- [Red ink header: מעלות חק לבנה מתוקן] ("Degrees of the corrected lunar heq") — black, with מעלות and מתוקן in red
- Sub-header: לשעות [= לשעות, "for the hours"] · מאונס · ז [?]
- Sign name (upper right of panel): מאזנים (Libra) [partially abraded/red; reading consistent with the Virgo → Libra sequence] [?]

Column-header sub-row (left side, red):

- [Red ink header: טורי] ("columns of" / column-rubric) [?]

- לבנה ("of the Moon")
- [Red ink header: הוסף] ("additive")

Table skeleton (logical right-to-left):

הוסף (additive)	Libra panel — sec	Libra panel — min	Libra panel — deg	... (further sign sub- panels)	Argument index (red, 1– 30)
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	(1) א
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	(2) ב
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	(3) ג
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	(4) ד
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	(5) ה
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	...

[Mid-table red band — mid-heaven, spanning the panel: [Red ink: חצי השמים] / [Red ink: היום] ("mid-heaven" / "the day")]

הוסף (additive)	Libra panel — sec	Libra panel — min	Libra panel — deg	...	Argument index (red, continued)
[numeral: ?]]	[numeral: ?]]	[numeral: ?]]	[numeral: ?]]	[numeral: ?]]	...
[numeral: ?]]	[numeral: ?]]	[numeral: ?]]	[numeral: ?]]	[numeral: ?]]	...

[The argument index continues through the full 1–30 range across the lower half of the panel; the lower-right corner is degraded by gutter-shadow and bleed-through. Individual lower-half index numerals and all interior triples are not committed — see QA note.]

Corrected-lunar-reckoning (חק לבנה מתוקן) zodiacal sign-panel tables.

Conservative re-transcription: only cells verified for BOTH glyph-form AND exact

ruled position (sign-panel + sub-column + row) are committed; all others are flagged [numeral: ?]. No pattern-filling. Sexagesimal columns (0–59).

Folio 23r — Corrected lunar reckoning, sign-panel table

Script: Italian (Italianate) semicursive Hebrew, small hand; structural rubrics in red. The table occupies the upper ~two-thirds of the page; the lower third is blank parchment. A diagonal stain/foxing crosses the lower-middle region.

Header band (verbatim, red + brown)

- Top banner (brown): **מקום אמצעי לשנה הס** [...] — *mekom emtza'i la-shanah ha-s[...]* ("mean position for the year ...")
- Second banner (red + brown): **מולד חק לבנה** — *molad heq levanah* ("conjunction; corrected lunar reckoning")
- Third banner (red): **ה מתוקן** [...] — *...[levana] mutaqan* ("...corrected")

Column / panel structure

The body is organized as a series of zodiacal **sign-panels** running right-to-left across the page. The far-right column carries the rubrics for the argument and the additive entry:

- **שורי** (*argument-index rubric; reading uncertain* — [?])
- **לבנה** (*levanah* — "moon")
- **הוסף** (*hosef* — "add"; the additive column)

Below the argument rubrics, the sign-panels are headed by single red sign-number letters. Legible across the top row (RTL, panel 1 → panel 6):

Panel	Sign-number letter (verbatim)
1	(1) א
2	(2) ב
3	(3) ג
4	(4) ד
5	(5) ה
6	(6) ו

A second header row beneath the sign-number letters carries further single letters (some legible: ז, ו, ה ... in places), [numeral: ?] where abraded.

Each sign-panel is internally divided into three sub-columns, headed by a **diagonal red rubric band** repeated across every panel:

- **מעלות** (*ma'alot* — *degrees*)
- **חלקים** (*ḥalakim* — *minutes/parts*)
- **שניות** (*sheniyot* — *seconds*)

Mid-table red band

Across the middle of the table, a red rubric band reads:

- **חצי השמים** — *ḥatzi ha-shamayim* ("mid-heaven")

A companion rubric in the far-right argument column reads **חצי היום** — *ḥatzi ha-yom* ("midday/noon").

Data rows

The interior is a dense grid of two-letter (sexagesimal) gematria values in a small cramped hand, with deg/min/sec triples per sign-panel. Under the conservative rule, individual interior cells could **not** be reliably pinned to BOTH their exact panel/sub-column AND verified glyph-by-glyph even under magnification (cramped micro-script, diagonal stain). They are therefore not committed.

Argument	Panel 1 (א) deg / min / sec	Panel 2 (ב)	Panel 3 (ג)	Panel 4 (ד)	Panel 5 (ה)	Panel 6 (ו)
(1–30, red argument index)	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]

[Damage: diagonal stain across lower-middle of the ruled area; gutter intrusion at inner (left) margin obscures the innermost panel's foot.]

[Lower third of 23r below the ruled table: blank parchment.]

Folio 23v — Corrected lunar reckoning (continued), sign-panel table

Same table genre, **mirrored layout**: the argument/additive rubrics sit at the **left** edge and the sign-panels run rightward. Table occupies the upper portion; a faint **rust-red offset** (set-off from the facing page) overlies the middle panels — this is bleed/offset, not primary ink, and is ignored. Inner (right) margin shows gutter/edge intrusion.

Header band (verbatim)

- Top corner rubric (red): **חמשני** — *ḥamish[i]* ("fifth" — running-header / wing marker) [final letter abraded; [?] on the yod]
- Top banner (brown + red): **מקום אמצעי ל[שנה]** — *mekom emtza'i la-shanah* ("mean position for the year")
- Second banner (red + brown): **מולד חק ל[בנה] מתוקן** — *molad ḥeq l[evanah] mutaqan* ("conjunction; corrected lunar reckoning")

Column / panel structure

Argument rubrics at the left edge (verbatim):

- **שורי** (*argument-index rubric; reading uncertain* — [?])
- **לבנה** (*levanah* — "moon")
- **הוסף** (*hosef* — "add")

Sign-number header letters across the top row (logical RTL order): partial sequence with **(5) ה**, **(4) ד**, **(3) ג** clearly legible; remaining panel letters [numeral: ?] (abraded / under offset).

Diagonal sub-column header band, repeated per panel (same as 23r):

- **מעלות** (degrees) / **חלקים** (minutes) / **שניות** (seconds)

Mid-table red band

- **חצי השמים** — *ḥatzi ha-shamayim* ("mid-heaven") — clearly legible across the middle panels.
- Companion far-column rubric: **חצי היום** — *ḥatzi ha-yom* ("midday/noon").

Data rows

As on 23r, the interior is a dense small-hand grid of sexagesimal deg/min/sec triples per sign-panel. Cells could not be committed under the conservative both-glyph-and-position rule (cramped micro-script + rust-red offset overlay + seam overlap). Skeleton committed; interior flagged.

Argument	(sign-panels, left → right across page) deg / min / sec
(1–30 index at left edge)	[numeral: ?] (all interior triples)

[Damage: rust-red offset overlying the central panels; inner-margin gutter intrusion on the right edge; faint creasing near the gutter.]

[Lower portion of 23v below the ruled table: blank parchment.]

Shesh Kenafayim — Folios 24r–24v

Immanuel Bonfils, Shesh Kenafayim ("The Six Wings"). UPenn LJS 204, Italian copy, 1509.

Both folio sides carry the corrected-lunar- ḥeq (חֶק לְבָנָה מְתוּקָן, *ḥeq levanah metukan*) zodiacal sign-panel tables. The layout is a multi-panel sexagesimal grid: a red argument-index column at the right edge, several deg/min sign-panels each headed by a diagonal red rubric stack, a mid-table red **חֲצִי הַשָּׁמַיִם** (*ḥatzi ha-shamayim*, "mid-heaven") band crossing the grid, and an outer additive **הוֹסֵף** (*hosef*, "add") column. The upper header band reads **מָקוֹם אֲמֻצְעֵי לְשָׁנָה** (*makom emtza'i la-shanah*, "mean place for the year") over **מַעְלוֹת חֶק לְבָנָה מְתוּקָן** (*ma'alot ḥeq levanah metukan*, "degrees of the corrected lunar ḥeq ").

The interior is written in a very small hand and is heavily abraded; the panel-header rubrics that key each deg/min sub-column to its sign are mostly lost. Under the conservative re-transcription rule for this folio, an interior cell is committed **only** where both its glyphs and its exact ruled position (sign-panel and sub-column) can be verified together. The header band, panel rubrics, the mid-heaven band, the diagonal panel sub-headers, and the legible header-letter row are committed below; the deg/min data interior — whose per-panel assignment cannot be established from the abraded headers — is laid out as a skeleton with cells marked [numeral: ?]. Values are sexagesimal (0–59); • = zero. This folio is a for the data interior.

The folio carries a sign-panel table occupying roughly the upper two-thirds of the writing area; the lower band of the grid (page foot) is ruled but blank parchment.

Header / rubric band (red and gold, top of grid)

Committed banner text (read across the upper header rows):

- **[Red ink header: מָקוֹם אֲמֻצְעֵי לְשָׁנָה]** (*makom emtza'i la-shanah*, "mean place for the year")
- **[Red ink header: מַעְלוֹת חֶק לְבָנָה]** (*ma'alot ḥeq levanah*, "degrees of the lunar ḥeq ") — the trailing **מְתוּקָן** ("corrected") of this banner is committed from the parallel band on 24v
- **[Red ink header: חֲצִי]** (*ḥatzi*) — left fragment of the **חֲצִי הַשָּׁמַיִם** band; see the mid-table band below

Diagonal panel sub-header (red, repeated across each panel)

Each deg/min panel is headed by a diagonal red rubric stack split by a gold slash, with a large red ק-shaped glyph at its foot. The stack is committed as the recurring panel sub-header; its abraded upper line is [numeral: ?]:

- **[Red ink header: ...ש[?]]** (upper line of the diagonal stack — abraded; candidates שניות *sheniyot* "seconds" / a sign label) [?]
- large red ק-glyph at the foot of each panel sub-header (committed as present; its expansion [?])

Sub-column header-letter row (gold/red, bottom of header band)

A single row of single-letter sub-column headers runs across the foot of the header band. Reading right → left across the visible cells (Hebrew RTL):

...	ה	ר	ל	כ	א
header letter	ה	ר	ל	כ	א

(These single letters head the per-panel sub-columns; א, כ, ל, ר, ה committed where each sits whole in a cell. Cells to the left/right of this run that fall in the gutter or under abrasion: [numeral: ?].)

Mid-table band (red, crossing the grid)

- **[Red ink band: חצי השמים]** (*ḥatzi ha-shamayim*, "mid-heaven") — committed; spans the central panels, dividing the upper data block from the lower.

Argument-index column (red, right edge)

The right-edge argument-index column (1–30) is the spine of the table. Individual index letters are visible in the right-hand cells, but on this folio the column is interrupted by abrasion and the gutter roll, so its run cannot be committed digit-by-digit against the rows without risking mis-row assignment. Committed as: **red argument-index column, values 1–30 top→bottom**; individual cell values [numeral: ?]

Data interior (deg/min sign-panels)

The interior consists of paired deg/min letter-numeral cells arranged in per-sign panels above and below the mid-heaven band. The panel-to-sign keying is lost to abrasion, so individual cells are **not** committed to a specific panel/sub-column. Skeleton (upper block, above חצי השמים):

(panel ?)	(panel ?)	(panel ?)	(panel ?)	argument
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	1
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	2
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	...
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	(continuing to the חצי השמים band)

Skeleton (lower block, below חצי השמים), same structure:

(panel ?)	(panel ?)	(panel ?)	(panel ?)	argument
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	...
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	(continuing to the foot of the data block)

[The grid's lowest band on this folio is ruled but blank.]

The folio carries the continuation of the same sign-panel table, with the header band repeated.

Header / rubric band (red and gold, top of grid)

Committed banner text (clearer on this side than on 24r):

- **[Red ink header: מקום אמצעי לשנה]** (*makom emtza'ī la-shanah*, "mean place for the year") — with a panel argument-label **ל / רל** [?] in red at its left
- **[Red ink header: מעלות חק לבנה מתוקן]** (*ma'alot ḥeq levanah metukan*, "degrees of the corrected lunar ḥeq") — **מתוקן** ("corrected") committed here
- **[Red ink header: חצי]** (*ḥatzi*) — left fragment of the mid-heaven band rubric

Diagonal panel sub-header (red, repeated across each panel)

As on 24r: a diagonal red rubric stack split by a gold slash with a large red **ק**-glyph at the foot, repeated across each panel. Upper line of the stack abraded: [numeral: ?].

Sub-column header-letter row (gold/red, bottom of header band)

Reading right → left across the visible cells (Hebrew RTL):

...	ה	ר	ל	כ	א
header letter	ה	ר	ל	כ	א

(Same single-letter sub-column headers as 24r; committed where each sits whole in a cell.)

Mid-table band (red, crossing the grid)

- **[Red ink band: חצי השמים]** (*ḥatzi ha-shamayim*, "mid-heaven") — committed; clearly legible on this folio, crossing the central panels.

Argument-index column (red, right edge)

Committed as: **red argument-index column, values 1–30 top→bottom** (the column's red index letters are present along the right edge). Individual cell values [numeral: ?] — the row-to-value assignment cannot be verified cell-by-cell against the abraded interior without risk of mis-row placement

Data interior (deg/min sign-panels)

Same structure as 24r: paired deg/min letter-numeral cells in per-sign panels above and below the mid-heaven band, with the panel-to-sign keying lost to abrasion. Skeleton (upper block, above חצי השמים):

(panel ?)	(panel ?)	(panel ?)	(panel ?)	argument
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	1
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	2
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	...
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	(continuing to the חצי השמים band)

Skeleton (lower block, below חצי השמים), same structure:

(panel ?)	(panel ?)	(panel ?)	(panel ?)	argument
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	...
[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	(continuing to the foot of

(panel ?)	(panel ?)	(panel ?)	(panel ?)	argument
]	]	]	]	the data block)

Shesh Kenafayim — folios 25r–25v

Conservative table re-transcription. The two folio sides carry the corrected-lunar-ḥeq (חֶק לְבִנָּה מְתוּקָן) zodiacal sign-panel tables. Per the conservative mandate, a cell is committed only where both its glyphs AND its exact ruled position (sign-panel / sub-column / row) were verified at high magnification. Cells whose placement could not be verified — the great majority of the dense micro-script sexagesimal interior — are marked [numeral: ?] rather than pattern-filled or guessed into position. The verified skeleton (banners, rubrics, mid-heaven band, argument index, sub-headers, and a minority of unambiguous interior cells) is laid out below.

The hand is Italian Sephardic-style semicursive (not Arabic script).

Folio 25r — recto

Physical orientation. The leaf is bound so that the spine/gutter lies at its left edge; the table reads right-to-left with the red argument-index running down the table's right side. The upper roughly two-thirds of the page carries the table; the lower third is blank ruled parchment (light foxing/staining, no text).

Header bands (verified)

- [Red ink header, top right] חמשי ("[the] fifth") — surviving fragment of the upper banner; the remainder of the top banner is abraded/faded [?].
- [Header band] מקום אמצעי לשנה ("mean position for the year") — מקום אמצעי in brown, with a faded continuation [?].
- [Header band, red] חק לבנה ("lunar ḥeq") with brown מתוקן ("corrected") → חק לבנה מתוקן ("corrected lunar ḥeq").
- [Right-margin column heads, brown] עורי [reading uncertain — possibly עזרי or a column rubric [?]] / לחדש ("for the month") — small column-caption stack at the head of the argument column.

Mid-table red band (verified)

- [Red ink band, mid-table] חצי השמים ("mid-heaven"; lit. "half of the heavens").

Table skeleton

The table is built as: a red **argument-index** column (1–30), then a series of **per-sign panels**, each panel headed by a diagonally-divided cell carrying the sub-column descriptors **קשת / מעלות** ("degrees / arc") with a red **ק** and a **ל.ק.מ** abbreviation-stack, and each panel's data given as stacked sexagesimal triples (degrees / minutes / seconds) per argument value, in alternating red and brown ink. An outer additive **הוסף** ("add") column stands at the table's edge.

Verified argument-index values (red, right column), top block, reading down:

Arg. (red)

- (1) א
- (2) ב
- (3) ג
- (4) ד
- (5) ה
- (6) ו

(The argument column continues 7–30 down the panel; individual index glyphs below row 6 sit in the gutter-side strips and against bleed/foxing, so the exact glyph of each is [numeral: ?] — though the 1–30 sequence is the established structure of this table.)

Sub-header row (verified, repeated across each sign-panel): diagonally-divided cell reading **מעלות** ("degrees") above the diagonal and **קשת** ("arc") with the **ל.ק.מ / ק** stack below — present and legible in each of the panels across the row.

Interior data cells (sexagesimal triples): the per-panel degree/minute/second triples are written in micro-script and partly legible as individual glyphs, but their exact assignment to a specific panel + sub-column + argument-row could not be verified cell-by-cell even under magnification without risk of mis-placement. Per the conservative rule they are recorded as structure-present, values [numeral: ?]:

Panel (R → L)	deg	min	sec
Panel 1 (rightmost)	[numeral: ?]	[numeral: ?]	[numeral: ?]
Panel 2	[numeral: ?]	[numeral: ?]	[numeral: ?]
Panel 3	[numeral: ?]	[numeral: ?]	[numeral: ?]

Panel (R → L)	deg	min	sec
Panel 4	[numeral: ?]	[numeral: ?]	[numeral: ?]
Panel 5	[numeral: ?]	[numeral: ?]	[numeral: ?]

(Each panel's interior runs the full argument depth with stacked deg/min/sec rows; the structure is uniform across panels.)

Verified interior anchor cells (committed where row + position were unambiguous):

- First data row, degree sub-row across several panels reads (9=) ט repeated — the leading degree value at the head of the upper block. [Committed: leading deg = ט on the topmost data row of the upper block.]

Folio 25v — verso

Physical orientation. Mirror of the recto: the spine/gutter lies at the right edge of the leaf, so on this side the red **argument-index** column runs down the table's **right** side with the panels extending leftward. Upper two-thirds carries the table; the table runs nearly to the foot of the written area, with blank ruled parchment below (water-staining at the head, foxing at the foot, no text).

Header bands (verified)

- [Red ink banner, top] הכנף הששי ("The Sixth Wing") [reading: הכנף ה... with הששי partly water-stained [?] on the final word; the work's title is *Shesh Kenafayim*, "Six Wings," and its sections are the individual "wings"].
- [Header band, red] חק לבנה ("lunar ḥeq") with brown מתוקן ("corrected") → חק לבנה מתוקן ("corrected lunar ḥeq").
- [Right-margin column heads, brown] עורי [reading uncertain [?]] / לחדש ("for the month").

Table skeleton

Same construction as the recto: red argument-index (1–30) at right, then per-sign panels each headed by the diagonally-divided קשת / מעלות sub-header (with the ק / מ.ק.ל stack), and stacked sexagesimal triples in the body, red and brown alternating.

Verified argument-index values (red, right column), top block, reading down:

Arg. (red)

[numeral: ?]

(5) ה

(11) יא

ג... [numeral: ?]

(The right-edge index sits partly in the binding shadow on this side; committed values are those whose glyphs and row were clear, the rest [numeral: ?].)

Sub-header row (verified, repeated across each sign-panel): diagonally-divided קשת / מעלות cells with the red ק and ל.ק.מ abbreviation-stack — legible across the panels. Below several sub-headers a brown descriptor line (the sign / column name) is present but too small to assign confidently [?].

Interior data cells (sexagesimal triples): present and densely written in micro-script; individual glyphs partly legible, but exact panel/sub-column/row placement not verifiable cell-by-cell. Recorded as structure-present, values [numeral: ?]:

Panel (R → L)	deg	min	sec
Panel 1 (rightmost)	[numeral: ?]	[numeral: ?]	[numeral: ?]
Panel 2	[numeral: ?]	[numeral: ?]	[numeral: ?]
Panel 3	[numeral: ?]	[numeral: ?]	[numeral: ?]
Panel 4	[numeral: ?]	[numeral: ?]	[numeral: ?]
Panel 5	[numeral: ?]	[numeral: ?]	[numeral: ?]
Panel 6	[numeral: ?]	[numeral: ?]	[numeral: ?]

Verified interior anchor cells (committed where row + position were unambiguous):

- First data row, degree sub-row reads (9=) ט repeated across panels — the leading degree value at the head of the verso block. [Committed: leading deg = ט on the topmost data row.]

Script: Sephardic semicursive (single hand), black-brown body ink with red rubrication for headings and table panels.

Folio 26r — Closing canon (colophon prose)

The upper third of the page (top two strips) is very faint: the primary ink has abraded and is overlaid by bleed-through from the reverse. A red rubric heading sat at the very top of the written area but only scattered red strokes survive [Illegible: red rubric heading, top of page]. A short, mostly faded prose block follows it before the main legible passage begins.

[Lacuna: top ~4 lines, abraded primary ink — only isolated words recoverable]

[?] ... and [?] ... so that the matter may be [?] ... [Illegible: ~3 lines]

The continuous, legible portion of the closing canon reads:

These are the words of [?] Yosef [?] ... [?] ... Shlomo [?] ... this composition [?] was written ... so that the reader [?] may understand [?] and find in it ease in the working-out [?] of his calculation, and in his examination of this science [?] and the knowledge of [?] this wisdom [?]. The recognition of [?] truth is in its [?] ... and we have made [?] ... so that one may [?].

For when the wise of heart [?] examine [?] and consider these tables [?], they will see that the labor [?] and the calculation [?] ... in every [?] ... and at every time, for the years [?] ... [?] what we have set down [?] and the reckoning [?] ... near to it in the [?] ... the days [?] ... the testimonies and the demonstrations are within it, drawn close [?] ... in [?].

And though [?] we have [?] ... there will be [?] matters of [?] errors [?] ... small [?] ... and a passing [?] slip [?] in them — [?]. For things [?] are bound to occur [?], and the matter is near [?] to be made easy [?]; the building of this science [?], its [?] grace [?] is in [?], with [?] favor [?]. By the path [?] of [?] ... may it be [?].

So has labored [?] and toiled [?] ... in the explanation [?] of [?] the *Mishkan* [?] [recte: probably המכון, "the establiher / composer"], the author [?], of blessed memory (ל"ר). Accordingly [?] [Interlinear or marginal addition: illegible], and if he [?] will look [?] into his error [?] ... another [?] ... and there is for him [?] ... after [?] ... [?] ... and he placed [?] ... gates [?] for [?] its standing [?].

[The passage from here to the foot of the page is faded and only partially legible:]

[?] ... the path [?] of [?] ... and as it is [?] ... which was [?] to him [?] ... to compose [?] this [?] ... [?] to fix [?] the establisher [?] of [?] ... the wonders [?] ... for [?] he [?] is wondrous [?] ... by [?].

[?] to compose [?] this [?] for the sake of [?] ... [?] and [?] we shall [?] establish [?] ... [?] upon [?] ... [?] ... the shortness [?] ... from the day [?] ... [?].

[?] ... [?] ... [?] ... [?] after [?] [?] ... the establisher [?] is obligated [?] to know [?] in [?] the choosing [?] ... the preparation [?] ... the establishers [?] ... the matter [?], and according to [?] his way [?] ... the conjunctions [?] [recte: probably המולדות, "the new-moon conjunctions"] ... the ancients [?] [recte: probably הקדמונים] ..., the establisher [?] says [?]: ...

[?] ... gone out [?] ... from [?] [?] ... a [?] matter [?] ... [?] correct [?], and he ascends [?] ... he will say [?]: only [?] [?] so [?] [?] wise [?] [?] ...

So [?] ... from the labors [?] ... in the science [?] ... and [?] ... [?] ... the small [?] [?] ... [?] ... with [?] ... [?] ...

the [?] many [?] and the stars [?] ... forever [?] and ever [?] [?].

And now [?] may He be blessed [?] who has made [?] ... its [?] ... the eternal tables (הלוחות הנצחיות) for the author (למחבר), in all the writing [?] of the planets [?] [?] ... [?] [Illegible: end of line] [?].

For your [?] [?] ... [?] ... [?] ... blessed forever [?] (ברוך).

[No explicit scribal date (e.g. 3 Av 5269 / 1509) is legibly present on this page. The lower half of the leaf below the final benediction is blank parchment with foxing/staining.]

Folio 26v — Luminary sign-panel table (solar correction by zodiac sign)

Red banner across the top of the written area:

[Red ink header: [?] ... האומ' לחמה — "... the *omed* / measure for the Sun" (the head of the banner, to the left, is abraded; only the right portion ... האומ' לחמה is securely legible).

This is a double-argument sexagesimal table. The **argument index runs 1–30** down the far-right column (rubricated). Each zodiac **sign occupies a panel** of paired sub-columns (degrees / minutes), with red sign-names in the panel

headers, reading right-to-left across the page. The body cells are sexagesimal pairs in black and red ink.

Verified header structure (RTL, right → left across the page):

Header band	Verified content
Banner (red)	[?] ... האומ' לחמה ("... for the Sun")
Row-1 labels (red/black)	מאורם [?] · צבריל [?] · גר [?] · נואו [?] · [?] בען [?] · גולגול [?] · אונש
Sign-panel names (red)	התאומים · שור (Taurus) · טלה (Aries) (Gemini) · סרטן (Cancer) · אריה (Leo) — reading RTL across the panels
Sub-headers (red)	(degree/minute and direction sub-labels, mostly abraded) [?] רגר [?] · אהריך

Verified sign-panel names, right to left: **טלה** (Aries), **שור** (Taurus), **התאומים** (Gemini), **סרטן** (Cancer), **אריה** (Leo). Further panels to the left carry additional signs whose red headers are abraded [numeral: ?].

Argument-index column (far right, rubricated) — argument 1–30:

The rightmost column is the running argument 1 through 30 (the degrees within the sign / row index). Index cells visible at the page foot confirm the high-twenties / thirties run (...לא ... כב, כא at the bottom edge), consistent with a 1–30 argument. The full index is recorded structurally as **1–30**; specific worn cells are [numeral: ?].

Table body — skeleton (CONSERVATIVE: interior NOT committed):

The interior is a dense grid of sexagesimal pairs (degrees/minutes per sign-panel, per argument row). At this resolution the individual cells cannot be assigned to their exact ruled (sign-panel × sub-column × argument-row) position with confidence — committing them would risk mis-placement (= fabrication) and pattern-fill. Per the conservative rule, the interior is recorded as structure only:

Arg (1 –30)	...Leo (אריה)...	...Cancer (סרטן)...	...Gemini (התאומים)...	...Taurus (שור)...	...Aries (טלה)...
1	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
2	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]
...	...	...	...	...	...

Arg (1 –30)	...Leo (אריה)...	...Cancer (סרטן)...	...Gemini (התאומים)...	...Taurus (שור)...	...Aries (טלה)...
30	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]	[numeral: ?]

This is the final opening of the manuscript. Both folio sides carry astronomical tables of the *Shesh Kenafayim* type (sexagesimal letter-numerals, with red ink used for the argument-index values, the zodiac-sign banners, and the column rubrics; black/brown ink for the sub-column rubrics and the canon-prose lines). The 27r side is a single dense, fine-ruled luminary/sign table; 27v carries the four seasonal-*tekufah* tables with short canon-prose lines above the panels. The lower portion of each side is blank ruled parchment.

This transcription is **conservative**: the 27r grid and the 27v *tekufah* panels are written in a very small hand on a finely ruled grid, and even under magnification the interior cells frequently cannot be assigned to an exact ruled position with confidence (the sub-column boundaries are barely distinguishable, and the red ink is partly bled and foxed). Where both the glyphs **and** the exact ruled position are verifiable, the cell is committed; otherwise it is marked [numeral: ?]. Banners, sign/section headers, the argument-index column, and the canon-prose lines are committed where legible. A verifiable minority of interior cells plus honest [numeral: ?] is the correct result for these panels — pattern-filling is not attempted.

[Red ink header / top banner, reading right-to-left across the head of the page, in several segments separated by the grid's vertical rules:]

[Red ink header: ה' ו' ר'... — banner segment, leftmost block] [?] [Red ink header:...האורך — "...the longitude" (*ha-orekh*)] [?] [Red ink header:...לחמה — "...for the sun/moon" (*la-ḥammah*)] [?]

The body of 27r is one wide, finely ruled grid. Across the head run red-ink column-banners; each block is subdivided into degree / part / second sub-columns, with brown/black sub-rubrics in the form מעלות / חלקים / שניות (*ma'alot / ḥalakim / sheniyot*) — written as the abbreviated stacked rubrics מ' ח' ש' in several blocks. A red-ink **argument-index column** runs down the right (page-edge) side, 1–30 in gematria (א, ב, ג, ..., ל). Roughly the upper two-thirds of the writing area is filled; the lower third (below the last ruled argument line, in the inner/lower corner) is blank ruled parchment with foxing.

[Red ink: secondary banner words legible in the header band, right → left:]

- מאזנים — *Mozna'im* (Libra) [?] (the word מאזנים appears in red in a header block) / כסרטן / סרטן — *Sartan* (Cancer) [?] (red banner block)
- additional red banner words in the head band are not legibly resolvable [numeral: ?]

[Sub-column rubrics, brown ink, recurring under each banner block:]

- מעלות — degrees (*ma'alot*)
- חלקים — parts (*halakim*)
- שניות — seconds (*sheniyot*)

[Red-ink argument-index column (page-edge), committed where the gematria letter is unambiguous; runs top → bottom:]

Argument (red)

- (1) א
- (2) ב
- (3) ג
- (4) ד
- (5) ה
- (6) ו
- (7) ז
- (8) ח
- (9) ט
- (10) י

[numeral: ?] (continues; rows 11–30 of the index are partly cropped at the gutter/page-edge)

...

(30) ל [the foot of the index reaches ל in the lower committed rows]

[Table interior — the multi-block deg/parts/sec data filling the grid:]

The interior of the 27r grid consists of many adjacent narrow sub-columns of two-letter sexagesimal gematria values (degrees 0–29, parts/seconds 0–59). Even under magnification the sub-column boundaries are barely distinguishable, and the red interior values cannot be assigned to an exact ruled (row, sub-column) position with confidence without risking misplacement. The interior is therefore recorded structurally and its cell values are flagged:

[numeral: ?] — interior values of the 27r luminary/sign grid (multiple degree/part/second sub-columns $\times$ ~30 argument rows). Legible sample values are present in red throughout (e.g. two-letter forms in the כה / כא / יט / יח / יו range are visible in the upper blocks), but individual cell placement is not verifiable cell-by-cell at this resolution. for native cell-grid tiling.

[Blank folio: lower third of 27r — ruled but unwritten parchment below the last argument line; light foxing/staining in the lower-inner corner.]

The 27v side carries the **four seasonal-*tekufah* tables**, laid out as four short panels reading right-to-left across the page, each introduced by a red two-line banner and preceded (above the panel band) by a short black/brown canon-prose line. Each panel is a short table of a few argument rows with red argument-index values and degree/part/second sub-columns. The lower ~40% of the page is blank, stained parchment with a few very faint, largely effaced brown-ink words in the lower margin (see colophon note below). The four banners are recorded verbatim with the readings flagged where uncertain.

Canon-prose line (above the panel band, black/brown ink)

[A short run of canon prose precedes the *tekufah* panels. Legible fragments, right→left:] "... וכל עברנו ... מילים ... / רסת ... הקף רגעי בתחלת... / וכל עברנו ... מילים ... / רסת ... הקף רגעי בתחלת..." — the prose explains how to enter the *tekufah* tables (the cycle of *regaim* at the start of the season, the accumulated excess, and the correction). Several words are faded; the sense is procedural (entry/correction instructions for the seasonal *tekufah*), but a continuous reading is not recoverable. [Much of this line is faint; partial reading only — [?]]

Panel 1 (rightmost): The *tekufah* of Nisan

[Red ink banner, two lines:] [Red ink header: התקופת ניסן — "The *tekufah* of Nisan"] [Red ink header: כחרש ואורש — second banner line (sign/entry word); reading uncertain — recorded verbatim] [?]

[Sub-column rubrics, brown ink: שניות / חלקים / מעלות (degrees / parts / seconds).]

[Panel rows — red argument-index at right, deg/parts/sec to the left. Committed where verifiable; the panel has ~4 argument rows:]

Arg (red)	מעלות (deg)	חלקים (parts)	שניות (sec)
(1) א	י [numeral: ?]	לא [numeral: ?]	מח / א [numeral: ?]

Arg (red)	מעלות (deg)	חלקים (parts)	שניות (sec)
(2) ב	יא [numeral: ?]	ו [numeral: ?]	יב / מח [numeral: ?]
(3) ג	יא [numeral: ?]	לד [numeral: ?]	לח [numeral: ?]
(4) ד	[numeral: ?]	כא [numeral: ?]	כ [numeral: ?]

[Interior values verified as legible red two-letter forms but not all assignable to an exact sub-column at this resolution — flagged per cell above.]

Canon-prose line (above Panel 2)

[Short black/brown prose line, right → left, fragmentary:] "זה הנה ההלוך... תוד..." — procedural note for the next panel; faded, partial reading only. [?]

Panel 2: The *tekufah* of Tishrei

[Red ink banner, two lines:] [Red ink header: התקופת תשרי — "The *tekufah* of Tishrei"] [the first banner word reads התקופת; the season-word reads תשרי with some uncertainty] [?] [Red ink header: כחרש בטל — second banner line; reading uncertain — recorded verbatim] [?]

[Sub-column rubrics, brown ink: מעלות / חלקים / שניות.]

Arg (red)	מעלות (deg)	חלקים (parts)	שניות (sec)
(1) א	[numeral: ?]	שו / יש [numeral: ?]	ש [numeral: ?]
(2) ב	[numeral: ?]	שו / ר [numeral: ?]	[numeral: ?]
(3) ג	[numeral: ?]	ל [numeral: ?]	ב [numeral: ?]
(4) ד	[numeral: ?]	[numeral: ?]	לש [numeral: ?]

Canon-prose line (above Panel 3)

[Short black/brown prose line, fragmentary, right → left:] "לשול דם... וחמשה... טוס... נטוע היוע... עשלה...ה' / הקשים... והעל...טוס... / נטוע היוע... עשלה" — procedural note; heavily abbreviated and faded; partial reading only. [?]

Panel 3: The *tekufah* of Tammuz

[Red ink banner, two lines:] [Red ink header: התקופת בשרי / תמוז — first line reads התקופת; the season-word is uncertain (per the panel sequence it is the Tammuz

tekufah) — recorded verbatim as legible: כחרש [Red ink header: ?] [התקופת בשרי ?] שטורי — second banner line; reading uncertain — recorded verbatim] [?]

[Sub-column rubrics, brown ink: מעלות / חלקים / שניות.]

Arg (red)	מעלות (deg)	חלקים (parts)	שניות (sec)
(1) א	[numeral: ?]	שא [numeral: ?]	כ / יו [numeral: ?]
(2) ב	שצ / לר [numeral: ?]	כב [numeral: ?]	יו [numeral: ?]
(3) ג	שר / ד [numeral: ?]	רר [numeral: ?]	יר [numeral: ?]
(4) ד	[numeral: ?]	[numeral: ?]	שו [numeral: ?]

Canon-prose line (above Panel 4)

[Short black/brown prose line, fragmentary, right → left:] "נן שיר ה' מן כה ... — procedural note; faded; partial reading only. [?]

Panel 4 (leftmost): The *tekufah* of Nisan (second / supplementary)

[Red ink banner, two lines:] [Red ink header: ניסן / ... — first line reads the season-word is uncertain — recorded verbatim as legible] [?]
[Red ink header: כחרש רדישרי — second banner line; reading uncertain — recorded verbatim] [?]

[Sub-column rubrics, brown ink: מעלות / חלקים / שניות.]

Arg (red)	מעלות (deg)	חלקים (parts)	שניות (sec)
(1) א	[numeral: ?]	[numeral: ?]	[numeral: ?]
(2) ב	[numeral: ?]	[numeral: ?]	[numeral: ?]
(3) ג	[numeral: ?]	[numeral: ?]	[numeral: ?]
(4) ד	[numeral: ?]	[numeral: ?]	[numeral: ?]

[Panel 4 sits at the inner (gutter) edge; its interior is the least legible of the four panels — values not verifiable at this resolution.]

Lower portion of 27v

[Blank folio: lower ~40% of 27v — ruled-out / unwritten, with extensive purple-grey staining and foxing. A few very faint brown-ink words are discernible in the lower-middle margin (e.g. an isolated two-word fragment around mid-page), but they are too effaced to read and do not form a continuous line.]

Colophon search (final opening): No scribal colophon — no scribe name, no dated formula (no א"ה/א"ט year, no 3 Av 5269 or any other date), no place-name, and no *ḥazak ḥazak* / completion display — is legibly inked anywhere on 27r or 27v, including the margins and the blank lower halves. The faint brown traces in the lower-middle of 27v are isolated, effaced words, not a dated colophon. The manuscript ends with the *tekufah* tables and blank ruled parchment. Stated explicitly: **no colophon or date is present/legible on this final opening.**