Laws of Sanctification of the New Month, Chapter 17 (Auto Translated)

English

Auto Translated

Shiur Overview

Summary of Shiur on Hilchos Kiddush HaChodesh, Chapter 17

Introduction to the Chapter — The Goal and the Approach

The Rambam's Words

"All the matters that we have introduced... so that they will be ready and prepared for knowledge of the sighting."

Explanation

Chapter 17 is the "conclusion" of all the calculations from chapters 11–16. The entire goal is to answer one question: **Will we be able to see the moon tonight** — the potential first night of Rosh Chodesh according to kiddush al pi re'iyah (sighting), not according to the calendar calculation.

Insights and Explanations

1) Two conditions for re'iyas halvanah — not one:

Simple logic says that in order to see the moon, the sun must be far enough from the moon. But in truth there are **two separate conditions**, although they are strongly connected:

(a) Sufficient distance (remoteness) between sun and moon — this makes it possible at all for the moon to have an illuminated surface that can be seen.

(b) Sufficient time between sunset and moonset — because we see the moon only about 20 minutes after sunset. If the moon sets together with (or soon after) the sun, there is no time-window to see it.

The chiddush: The time is **not entirely dependent** on the distance. Sometimes the moon is theoretically far enough from the sun, but because of other factors (season of the year, angle of the ecliptic, etc.) the moon sets faster, and we don't have enough time to see it.

2) Approximate calculation vs. true calculation — the Rambam's method:

All the calculations from chapters 11–16 were **approximate** — not exact. Just as the difference between emtza'i and amiti by the sun (where one must correct the "govah hashemesh"), so too here there are still details that have not yet been factored in.

The Rambam's method: Instead of erasing the previous calculation each time and starting anew, one calculates **first** the approximate calculation, and **then** adds corrections. The approximate calculation is also something true — it represents a real sphere or movement, just without all the details.

Practically: For cases where the distance is very large or very small, the approximate calculation is sufficient. But for the "in-between" cases (not clear whether one can see or not) one needs the **true calculations of sighting** — with additional corrections.

[Digression: Mussar haskel in derech halimud] — This is a principle in learning in general: in cheder one learns approximately, in yeshiva one learns more precisely. This doesn't mean that what one learned earlier is false — one has arrived at the correct "city," now one must find the correct "house." One should not erase what one learned earlier.

Halacha 1 — The Beginning of the Calculation

The Rambam's Words

"All the matters that we have introduced... so that they will be ready and prepared for knowledge of the sighting. When you wish to know this, you shall begin and calculate... and extract: the true position of the sun, the true position of the moon."

Explanation

One begins with the previous calculations and produces: (1) mekom hashemesh ha'amiti — the true position of the sun (including the govah hashemesh, tekufah, etc.); (2) mekom hayare'ach ha'amiti — the true position of the moon (including all changes — small sphere, etc.).

Insights and Explanations

The Rambam emphasizes "ha'amiti" — to exclude the emtza'i which doesn't change. One needs the true position, with all the corrections that have already been learned in the previous chapters.

Halacha 2 — The Three Basic Numbers and Orech Rishon / Rochav Rishon

The Rambam's Words

One calculates three things: the true position of the sun at the time of sighting, the true position of the moon at the time of sighting, and the position of the head at the time of sighting. "Subtract the true position of the sun from the true position of the moon, and the remainder is called orech rishon." "You shall know... the latitude of the moon... whether it is northern latitude or southern... and it is called rochav rishon."

Explanation

All three are calculated for the time of sighting (sunset). The "mekom harosh" is the point where the orbit of the moon crosses with the orbit of the sun — which serves to calculate the rochav hayare'ach.

One subtracts the mekom hashemesh from mekom hayare'ach — the difference is called "orech rishon" (how many degrees between sun and moon). From the mekom harosh and mekom hayare'ach one calculates the "rochav hayare'ach" — how many degrees the moon is north or south of the ecliptic — this is called "rochav rishon."

Insights and Explanations

1) "Lish'as hare'iyah" applies to all three: One must know all three specifically for the time of sighting.

2) "Rishon" — because corrections will come: The orech is called "rishon" because the Rambam will arrive at an "orech chamishi" — correcting the calculation five times. So too the rochav is called "rishon" because there will later be a "rochav sheni."

3) The word "orech": Means here "length" — how many degrees between sun and moon.

Halacha 3 — "Veyizaher" — Why the Rambam Gives Names

The Rambam's Words

"And be careful with this first orech and first rochav and keep them before you."

Explanation

The Rambam warns to be careful with the numbers and to set them aside, because they will still be needed.

Insights and Explanations

1) "Variables" — like modern programming: The Rambam gives names to "variables" so that one can return to them. Instead of saying each time "that which we calculated from the sun...", one can say "orech rishon."

2) Two meanings in "veyizaher": (a) Be precise in the calculation, because everything depends on it; (b) remember/keep the numbers, because they will be needed later.

Halacha 4 — The Boundaries: When One Certainly Cannot See, When Certainly Yes, and When It Is Doubtful

The Rambam's Words

"Calculate and contemplate this first orech. If it comes out to nine degrees exactly or less – know with certainty that it is impossible ever for the moon to be seen on that night in all the Land of Israel and you do not need another calculation. And if the first orech is more than fifteen degrees – know with certainty that the moon will be seen... and you do not need another calculation."

"In what case is this said – when the true position of the sun is from the beginning of the sign of Capricorn until the end of the sign of Gemini. But from the beginning of the sign of Cancer until the end of the sign of Sagittarius – if the first orech was ten degrees or less, it is impossible for it to be seen. And if it was more than 24 degrees – it will certainly be seen."

Explanation

Period A (Capricorn–Gemini, approximately Shevat–Sivan): If the orech rishon is 9 degrees or less — certainly cannot see; more than 15 — certainly can see; between 9–15 — doubtful, must calculate further.

Period B (Cancer–Sagittarius, approximately Tammuz–Kislev): Less than 10 = certainly not; more than 24 = certainly yes; between 10–24 = doubtful, must calculate.

Insights and Explanations

1) Why 9 is the minimum: The Rambam calculated that even after adding all five corrections (until orech chamishi), it will still come out to less than approximately 6 degrees, which is not possible to see at all. Therefore it is not worthwhile to calculate further.

2) The language "chashov vehitbonen": The Rambam said earlier "lachshov velada'as" by the mitzvah, and here he says "lachshov vehitbonen" — look into this orech rishon.

3) "Tisha ma'alos veshaveh": This means exactly nine — even a bit more is already different. "Veshaveh" means exactly nine.

4) "Bechol Eretz Yisrael": The Rambam emphasizes this because all calculations are specific to Eretz Yisrael. In other places the numbers can be different.

5) The main difference between the two periods: In the "good" period (Capricorn–Gemini) the "place of doubt" is small — only 6 degrees (9–15). In the "bad" period (Cancer–Sagittarius) the place of doubt is large — 14 degrees (10–24). This means that in the bad period it is much harder to see the moon.

6) The reason — the tilt of the moon's orbit: The orbit of the moon is tilted in relation to the orbit of the sun (ecliptic), with a head and a tail. Half a year the moon is "lower" by default, and half a year "higher." When the moon is lower (Cancer–Sagittarius), one needs more degrees of orech for it to be high enough to see. When it is higher (Capricorn–Gemini), it is easier to see.

7) "Place" vs. "time": The difference between the two periods has two aspects: (a) place — how many degrees in the sky the moon is above the horizon; (b) time — how much time the moon remains in the sky after sunset. **The Rambam himself never speaks explicitly about "time"** — he speaks only in degrees (degrees/place). The mefarshim help explain the time aspect, but the Rambam himself leaves it out.

8) Months vs. signs: The Rambam speaks in signs, not months, because the signs go according to the sun and the months according to the moon, and the connection between them is only approximate.

Halacha 6 — Shinui Hamar'eh (Parallax) — Orech Sheni / Rochav Sheni

The Rambam's Words

One must subtract parts from the orech according to which sign the moon is in (Aries 59 parts, Taurus one full degree, Gemini 58, Cancer 52, Leo 43, Virgo 37, Libra 34, Scorpio 34, Sagittarius 36, Capricorn 44, Aquarius 53, Pisces 58). After this subtraction one has the "orech sheni." "And why do we subtract these parts? Because the place of its true appearance is not the place where it will be seen, and this is called shinui hamar'eh." By rochav: if the latitude of the moon was northern — subtract the parts of shinui hamar'eh from the first rochav; if southern — add. This gives the "rochav sheni."

Explanation

All calculations until now were calculated from the center of the earth. But people stand on the surface of the earth. Because the moon is not so far (unlike the sun), the difference in standpoint makes a real difference — this is "shinui hamar'eh" (parallax). One must subtract parts from orech

(always subtract) and by rochav — subtract or add, depending whether it is northern or southern.

Insights and Explanations

1) The foundation of shinui hamar'eh — parallax:

The Rambam says this "mamash behel'amah" — he doesn't say explicitly that all previous calculations were calculated from the center of the earth, but this is the foundation. One draws a line from the center of the earth to the sky and says "at such a degree stands the moon." But the observer stands on the surface, and from there the line is different.

2) Why by the sun it doesn't matter but by the moon it does:

The sun is so far that the difference between the center of the earth and the surface is negligible. But the moon is closer, and the earth is large enough, that the difference in standpoint is significant.

3) Parable of two eyes (parallax illustration):

Hold a finger before your face, close one eye — the finger "jumps" to one side. Close the other eye — it jumps back. The small difference between the two eyes is enough that it looks like the finger is moving. The same principle: center of earth vs. surface of earth — two different "eyes" that see the moon in a slightly different place.

4) Why one always subtracts by orech (and not sometimes add, sometimes subtract):

The Rambam doesn't explain why, but the reason is because **the moon is always "behind" the sun** from the perspective of parallax. When one looks at the diagrams, it always comes out that the orech becomes shorter, never longer. This is a chiddush that the Rambam leaves unexplained.

5) Why the shinui mar'eh changes according to signs:

The moon doesn't travel uniformly through all signs. Therefore the parallax correction changes according to which sign the moon is in. The chart goes approximately in a circle: it goes up until Taurus (60 parts = 1 degree, the maximum) and then down until Libra/Scorpio (34 parts, the minimum) and back up.

6) By rochav — sometimes add, sometimes subtract:

By orech one **always** subtracts, but by rochav it changes: **Northern** (the moon is higher/north of the ecliptic) — one subtracts, because it is already "further" in that direction. **Southern** (lower/south) — one adds, because one must compensate more.

7) The rochav chart is smaller than the orech chart:

The numbers for rochav shinui mar'eh are smaller than for orech — this is logical because **the entire rochav cannot be more than 5 degrees**, therefore the corrections are proportionally smaller.

8) Why the chart looks "random" but isn't:

The numbers go approximately around in a cycle, but not perfectly symmetrically. The reason: **the zodiac circle is tilted relative to the equator** from which one calculates. Also, not all signs travel at the same speed throughout the year, which affects the numbers.

9) The Rambam's style — he says it "backwards":

The Rambam gives first the charts and practical instructions, and only afterwards the reasons. He presents the material "backwards" — first what to do, then why.

Ma'agalei Hayare'ach — Tikun Harochav (Rochav Shelishi)

The Rambam's Words

One must subtract from the second rochav a certain amount according to which sign the moon is in, because of the inclination of the circle. Examples: from Aries until 20 degrees — 2/5; from 20 degrees Aries until 10 degrees Taurus — 1/3; at 15 degrees Gemini — do not add or subtract.

Explanation

The moon doesn't travel on a straight path, but slightly curved. Therefore one must fix the rochav in order to arrive at a more precise rochav. The Rambam gives a chart with percentages of how much one subtracts according to the sign.

Insights and Explanations

1) The reason for this correction: The signs don't travel on a straight line — they travel slightly curved. Relative to us it is not straight, although in truth it is not curved. Therefore one must fix the rochav according to the curvature.

2) The Rambam himself doesn't explain why — he only gives the facts. The explanation is complicated and difficult to explain without charts.

Orech Shelishi — Adding Ma'agalei Hayare'ach to Orech Sheni

Explanation

After one has the correction of ma'agalei hayare'ach, one must add it or subtract it from the orech sheni, and one gets an "orech shelishi."

Insights and Explanations

1) Rochav and orech are truly "the same thing": Both make the moon further from the sun. Originally they are two dimensions, but when one wants to calculate how long it takes for the moon to go down, it is one thing: if it is curved, it takes longer; if it is straight, it takes faster.

2) Rule of north/south: If the rochav hayare'ach is north (higher) — one subtracts the ma'agalei yare'ach from the orech sheni. If south — one adds. **But** this is only from the beginning of Capricorn until the end of Gemini. From the beginning of Cancer until the end of Sagittarius it is reversed: north — one adds; south — one subtracts. The Rambam himself doesn't say why — he only gives the fact.

3) When one is in a sign where one doesn't need to add (like 15 degrees Gemini), the orech sheni remains the same as the orech shelishi.

Orech Revi'i — Correction According to Sign

Explanation

One must make another correction to the orech shelishi, according to which sign one is in, in order to arrive from degrees on the signs to degrees relative to the horizon. This result is called "orech revi'i."

Insights and Explanations

1) The Rambam doesn't say why one must do this. This is still from the same problem — we haven't calculated precisely enough until now.

2) Examples: Sign of Pisces or Aries — add 1/6; Aquarius or Taurus — 1/5; Capricorn or Gemini — 1/6; Sagittarius or Cancer — leave as is; Scorpio or Leo — subtract 1/5; Libra or Virgo — subtract 1/3.

3) The entire purpose of all corrections (orech sheni, shelishi, revi'i): To convert from degrees on the zodiac path to degrees relative to the horizon.

Manas Govah Hamedinah — Correction for Jerusalem's Latitude

The Rambam's Words

One takes 2/3 of the first rochav hayare'ach — this is called "manas govah hamedinah."

Explanation

All calculations until now were based on the equator (kav hashaveh). But Jerusalem is approximately 30 degrees higher than the equator, therefore one must fix.

Insights and Explanations

1) The foundation: At the equator the zodiac circle (the sun) travels straight, but everywhere else the entire circle travels tilted — a bit higher. Therefore one must fix for this.

2) Rule: One always takes 2/3 of the first rochav hayare'ach. Afterwards: if rochav hayare'ach is north — add the manas hamedinah to the orech; if south — subtract.

Keshes Hare'iyah — The Final Calculation

Explanation

After one adds (or subtracts) the manas govah hamedinah from the orech revi'i, one gets the **keshes hare'iyah** — the true arc (keshes) between sun and moon as one sees it from Jerusalem.

Insights and Explanations

1) Boundaries of keshes hare'iyah:

- **Nine degrees or less** — one certainly **cannot** see the moon.

- **More than 14 degrees** — one **must** see it, it is visible at night without any doubt.

- **Between 10 to 14** — then one needs another calculation with **ketzavos hare'iyah**.

2) Ketzavos hare'iyah: When the keshes hare'iyah is between 10–14, one calculates how much more the keshes hare'iyah is than the orech rishon, and according to this one makes a calculation according to special numbers that the Rambam gives. For example: if keshes hare'iyah is between 9–10 and orech rishon is 13 — one sees; less — not.

The Rambam's Summary — Why It Is So Complicated

The Rambam's Words

"You have already seen from these actions how many calculations there are in it, and how many additions, and how many subtractions, after much effort" — all this is after I have already made **"close paths that have in their calculation only a little approximation."** The reason is **"because the moon has great disturbances in its degrees"** — the moon doesn't travel straight. **"And therefore the Sages said the sun knows its setting but the moon does not know its setting"** — Chazal say that the sun knows its way but the moon does not. **"And the Sages said sometimes it comes in length sometimes it comes in shortness."**

Insights and Explanations

1) "Shemesh yada mevo'o": This doesn't mean that the sun "knows" literally, but that it is simple to calculate. "Yare'ach lo yada mevo'o" — it is not simple to know.

2) "Pe'amim ba be'arukah pe'amim ba biktzarah": This appears in the Gemara, and the Rambam doesn't mean that the moon truly goes sometimes faster sometimes slower, but that the **calculations** — sometimes one must add, sometimes subtract — until one hits the keshes hare'iyah. The keshes hare'iyah itself is sometimes long and sometimes short, according to the seasons of the year, according to the place, etc.

3) The Rambam says explicitly that he has already simplified — "drachim kerovim" — and therefore it is still so complicated. This shows how difficult it truly is to calculate the movement of the moon.

End of the Chapter — The Reason for the Calculations and Their Sources: "Ein Choshin Lemechaber"

The Rambam's Words

"The reason for all these matters... this is the wisdom of tekufos and gematriyos that the sages of Greece composed many books about, and they are those found now in the hands of the sages. But the books that the sages of Israel composed who were in the days of the prophets from the sons of Issachar did not reach us... since all these matters are clear proofs that have no defect and it is impossible for a person to doubt them, we do not worry about the author, whether prophets composed them or whether gentiles composed them. For anything whose reason has been revealed and whose truth is known through proofs that have no defect, we do not rely on this person who said it or taught it, but on the proof that was revealed and the reason that became known."

Explanation

The Rambam answers a question: where do all these rules come from? He answers: This is chochmas tekufos ugematriyos, which we learned from the books of the sages of Greece that still exist with us. The books of the sages of Israel (sons of Issachar) did not reach us. But since these are clear proofs, it doesn't matter who the author is.

Insights and Explanations

1) The Rambam's approach in learning from the sages of Greece:

The Rambam establishes that he has not only decided halachos, but an **algorithm** — a practical method that can be executed. And he admits that its source is from the books of the sages of Greece. The Rambam assumes that the sons of Issachar ("yodei binah la'itim") also wrote books that explain the same wisdoms, but they were lost.

2) The foundation of "ein choshin lemechaber" — the Rambam's epistemological principle:

When something has **clear proofs that have no defect** — proofs that cannot be refuted, that have no flaw — it **doesn't matter who the author is**. One doesn't rely on the person

but on the proof itself. Therefore there is no difference whether prophets wrote it or gentiles.

The Rambam connects this with his language in other places where he speaks of books that **"have defects"** — there one is indeed concerned who the author is, because one can doubt them.

3) The precise distinction — not math against sevara, but truth against doubt:

One might think that the distinction is between math (where everything is provable) and sevaros/ideology (where one must consider who the person is). **But this is not the Rambam's distinction.** The Rambam's distinction is between **things that one knows with clear proofs** (in whatever field it may be — math, philosophy, or something else) **against things that one doesn't know and cannot know** (that have no proofs). By the second type — **trust a person**, one must know who is saying it. By the first type — **don't trust the person at all**, because the person is only a vessel, a "machine" that calculated it; the truth stands on its own.

The main chiddush: A **prophet** and a **gentile** are in this matter **the same thing** — because it is not the prophet and not the gentile, but **what is true**. When something is proven, it is the fact that speaks, not the person.

Full Transcript

Chapter 17: Calculating the Possibility of Sighting — Introduction and Basic Calculation Principles

Introduction: The Purpose of the Chapter

Gentlemen, the matter is as follows: We are now going to learn the seventeenth chapter. There are many chapters in Hilchos Kiddush HaChodesh, it goes up to nineteen. In seventeen we arrive at the conclusion — can we call it a conclusion? I'm not entirely certain now whether we should call it that — in any case, the end of the calculation that we need to have in order to answer the one question, which is: **Will we see the moon tonight**.

When do we mean tonight? The potential first night of Rosh Chodesh. Rosh Chodesh from the molad, yes? Not from the calculation, because the calculation doesn't turn today on the sighting, but if one was mekadesh based on sighting, that night.

This is what our chapter is about.

Review: What We Have Learned Until Now

And let us recall what we have learned until now, that is not the details of the calculations, but what we have learned about.

What we have learned about until now, we have divided into two things. We have learned how to find **where the sun is** and **where the moon is**. Yes?

The First Condition: Distance Between Sun and Moon

And we have already explained, and it is also simple with common sense, that in order to be able to see the moon, the sun must be far enough from the moon. If it's too close that means the conjunction, yes? When it's completely close, that is what is written as molad, which at that time one cannot see it. It must be a bit far.

The Second Condition: Enough Time Between Settings

Besides the fact that it must be literally a bit far — it's actually almost the same thing, but in this chapter we will see more clearly why it's not the same thing — is, there must also be, let's call it this way, besides the fact that it must be far, which makes it so that it should at all be possible that there should be a moon, that is the moon after the molad, there must also be **enough time between the two things**.

Because we have learned that the moon is seen the first night only a bit after sunset, let's say approximately twenty minutes after sunset. Now, until when? If it has already set at that time, the moon, that is the moon is already together with the sun, let's also call it now close, but let's say the same time that the sun, sunset, is also the moon's setting, you don't have any time when to see the moon. If there is a lot of time, there a whole hour, everyone will see it, because the moon will be high enough in the sky, it will be a whole tikkun, one will be able to see it.

Discussion: Two Conditions or One?

Speaker 1: Yes, yes, we need to learn this chapter, see it, it's not two reasons, it's... it can be called two reasons, but it's not the same thing. The closeness means, it turns out to be like the same closeness, but it's a different sort regarding calculation. Call it the same distance from the sun and the moon, but what they have learned until now from the sun and the moon doesn't yet give us to figure out properly the true distance, which that will make the... how is it called? The time of the settings should be completely different, it should be more pushed. I don't know about the time, it shouldn't be able to be pushed.

Yes, yes. Yes, that the moon should be high enough in the sky, or long enough in the sky, that one should be able to see it. That is, I mean always at night, that is, if it's not at all close, the question already begins. Even when it's once far enough, he already speaks perhaps could be seen, but because it's too close. There isn't enough time.

In certain periods of the year, or in certain situations, there isn't enough time. It can be even the moon, the moon is theoretically far enough from the moon, but there isn't enough time. We will see that the time is not entirely dependent. The Rambam doesn't explain the reasoning, but the fact is that **the time is not entirely dependent on how far it is**, because sometimes it goes faster and shorter also, according to certain other things. It can be that it takes faster, therefore you don't have time to see it, even though it is yes theoretically exactly as far.

Which we need to arrive at now.

The Method of Study: Approximate Calculation and True Calculation

That is, until now the Rambam has said nothing about this. He has only told us how he finds out where the sun is. He has taught us that there is an average, an emtza'i and an amiti. He has only told us. This is only a way how to know where the true sun is. In order to know the true sun, not only the emtza'i, one must have govah hashemesh. And in order to know the true moon, not only the amiti, one must know another bunch of things that were taught in the previous chapters. One must also know not only the orach hayareach, which is how high it

is. The word high now catches that it's not the right word that I'm calling, but how far it is. From the beginning of degree 0, which degree it is in the sky. And one must also know the rochav hayareach, right? This they have already learned also. That is, how far removed the moon is from the path on which the sun travels. This they learned in the previous chapter. All these things they have learned.

Now, we still don't know at all what to do with all these things. The Rambam will tell us first of all, let's say on the simple thing that everyone can understand, in this chapter the Rambam will say, make a calculation if so, how far the sun is from the moon. He hasn't said this at all until now. And according to this calculation the Rambam will tell you rules. If it's so many degrees between one can see it, if it's not one cannot see it, and so on.

The Approximate Calculation

Until here it would have been very simple, and this is indeed the first thing, not the first se'if, the first rule in this chapter in halacha gimmel states this. He indeed says the numbers, when it's simple, if there is so much space between the sun and moon one can certainly not see it, if there is much less space one can certainly not see it.

Now, the problem is, and this doesn't hold the problem for all sorts of days. Why? Indeed if it's completely far enough one can certainly see it, and it's completely not far enough one can certainly not see it. This is indeed enough. The basic number that you will make met, you will make minus, subtract and see from the moon, will indeed come out very simply how much space there is in between and how much one can see it.

The Need for True Calculation

But... there are also in between the times that are certain, there are many such as distances, which the Rambam calls an orach, a distance, a long link between the sun and moon, which is not clear enough according to this. Why not? Seemingly it would indeed have been such a kind of enough. Didn't he just now say that everything is dependent on how far the moon is.

The answer is, that **everything that we have learned until now has only been approximate**. This is what goes all these calculations, just as it went regarding the amiti and the emtza'i earlier, one can discover today yet at least four levels of ways how it wasn't precise the calculation that we have learned until now. Everything that I told you that the moon is on this orach. Or that the sun is so far, and so on, all things were only approximate. Therefore, when it's large enough, true, that is enough, because it's all not huge differences, it's smaller differences. But if you want to know precisely, which many times will indeed be necessary to know precisely, you must begin to calculate much more things in order to fix the numbers.

The Rambam's Method: Step by Step

So the way that the Rambam does all these things is, instead of every time that one catches that the number is not precise, one should throw out the whole thing and make another calculation. The method of study and the method of calculation is one of the tricks that he uses to make everything easier. Is first one calculates... first one makes the approximate, can you run a calculation? Always.

The interesting thing is, always the approximate calculation is also something true in the sky, and something a sphere, and something a way. There is a huge reason why the approximate calculation is never not, or almost never not. There were calculations for example in the... yes, as I say, but the fact is that in all these calculations, in the previous dreams, there were calculations that the Rambam said advice how to calculate the tekufos, if I remember, there were things that were just to find out mets, tricks, as you say. But here all things that steps are true things, at least according to the Rambam's astronomy, and also light our nefesh, are true things, only there are still more details that one has still forgotten to calculate actually.

Parable: City and Block

So, when there are two ways to say that it's not exact, there is a thing just that it's not calculated well. You have here to say, for example, by way of parable street, someone will tell you, which city do you need to go to next? In which block do you need to go? It's not a contradiction, it's calculated approximately. It comes indeed already precisely, you indeed need to know more things. And there is sometimes that the block also changes the city, because it's in something another angle, one must add another detail to know.

Moral of the Lesson: Method of Study in General

Anyway, this is what he does, and this is a great lesson moral of the lesson in Judaism. First one should do approximately. That which many times, I mean to be better, many times, the method of study indeed always goes like this: You go to cheder, you go to yeshiva, they tell you, everything that you learned in cheder is not precise. Yes, and it's all true. But it doesn't mean that what was learned earlier is not good, because it was approximate. It indeed taught more or less, you arrived at the right city, now comes the right house also. There is a whole... but different than many times to arrive, this one must erase, here one doesn't need to erase. Always, I mean that yes, in this process works very much, even in a thing understanding. There are very many things that one knows indeed everything already, one knows yet approximately, is indeed already also something.

Anyway, this is the thing. So let's learn first the simple thing, which everyone understands, I mean more or less is easy to understand. Afterwards one will go to more calculations, which the Rambam calls true calculations of sighting, which this is for the situations that the simple calculation doesn't yet help, and one must add more things. Yes?

Halacha 1: The Numbers Prepared for You

The Rambam says, **"All the things that we have introduced"**, all these things that we have now learned until now, from chapter 11 until chapter 16, is **"in order that they should be ready and prepared for knowledge of the sighting"**. They indeed didn't want to just say how the moon travels, it's not our topic, our topic is knowledge of the sighting.

Therefore the Rambam begins to say instructions how to do it. The Rambam says, **"When you want to know this"**, certainly you want to know, because you are indeed a heart prepared and a generous spirit. No, perhaps he means to say... no, I mean that it means to say which day, because you need to make a calculation for any day when you want to know it.

He says like this, **"Begin and calculate"**, begin to calculate, and they begin the previous calculations that I taught you, **"and produce"**, make the... no, produce is the language that

the Rambam... yes, find, arrive at the conclusion, he calls produce, arrive, as one says "product" as if the... yes, product the number.

What is What?

First of all you will know **"the true place of the sun"**. Okay, where is the sun? In other words, you have arrived at a degree, yes? Where is "the true place of the sun", which we call true, as opposed to the average which doesn't change throughout the year. The true is already with calculating which season one is in, and how the height of the sun, and so on.

Second, **"the true place of the moon"**, further not the average, but that which is also calculated with all the changes of the moon, with the small sphere and the other...

Halacha 2 – The Three Things That One Calculates for the Time of Sighting

A third thing you will calculate, "the place of the head for the time of sighting". That is the head, do you remember that the head is there where the path of the moon meets with the path of the sun and begins to go up. This is the "place of the head for the time of sighting". This will help us to know all three things.

Basically, seemingly "for the time of sighting" seemingly goes on everything. All these things you will know at the time of sighting. Because do you remember indeed that for example in order to know a "place of the moon for the time of sighting" or "place of the sun", one must add corrections according to which season in the year one is in, because the calculations that the Rambam gave is only for six o'clock etc.

The "place of the head" will only help us on the next step, which we will know afterwards the width of the moon. But this is the first three things that you will calculate. This we have already learned how to calculate.

Orech Rishon

Afterwards you will do a simple thing. **"Subtract", you will subtract, make minus, "the true place of the sun from the true place of the moon".** Yes, the sun for example comes out to be... it can't indeed be more than ninety, usually only up to sixty-two degrees, I remember. In short, it can indeed only be, let's say, thirty degrees. Let's say the sun is thirty degrees, and you subtract it from the place of the moon, which is, let's say, forty degrees, comes out ten in between.

And what remains, that which remains between the sun and moon, is called orech rishon. "Orech" means the length, how long it is from the sun to the moon, and "rishon" because the Rambam will soon arrive at the fifth orech. That is, "rishon" he means the first level of calculating the orech, because the orech we have now learned only approximately for several reasons, but the rishon, the first orech, will be called so. So you know the orech rishon.

Rochav Rishon

The same thing, if so you know the place of the head, we have indeed learned, you know where the head is, which was learned the last chapter how one knew the head, this means from where the moon begins to go, from where it met the sun. And the place of the moon, and you also know what the place of the moon is, which was already now learned earlier, and the place of the moon.

You will also know the width of the moon. The width of the moon means with how many degrees the moon is to the north or to the south from the circle of the sun, as the Rambam called it. **And he will know whether it is northern width or southern,** all according to the chart that he gave the previous chapter. **And this width you will call and it is called rochav rishon.** Why? Because the width itself is also only approximate for one huge thing that we will soon learn. Therefore, if one wants a precise calculation, one will make a rochav sheni also. But meanwhile, let's call it rochav rishon.

Halacha 3 – "Yizaher" – Why the Rambam Gives Names

The Rambam gives a name for each thing. I mean that today in math or in programming, you give a name for a variable. Let's give it a name. Let's give this a name, so you know what I'm talking about. I won't need to say "that which was calculated the sun how it travels". For this he gives... one asks earlier why one gives names. This is simply a method of study of... yes. It makes it easier to work, because on your notebook where you make the calculation, you will write "rochav harishon is the number", and you will be able to go back to it.

The Rambam says, **and be careful, yes, be careful, hold it, yes, this orech hazeh harishon, and the rochav harishon, and both places before you.** Make sure that it's precise, because on this it will be dependent. Perhaps this means "yizaher", or he means remember it, because this is what one must remember.

Halacha 4 – The Boundaries: When One Certainly Doesn't See, When Certainly Yes, and When It's Doubtful

Therefore the Rambam says like this, now comes in... the Rambam said that the mitzvah is to calculate and to know, he says here **to calculate and contemplate, look into, this orech hazeh harishon.** It should be so, **if it comes out to you, if it comes out to you, nine degrees and equal or less, exactly nine or less degrees.** That is exactly, because perhaps a bit more is already different, but exactly nine degrees. Or less? That the moon is nine degrees away ahead from the sun as it were, right? It's always ahead, right? Because the sun is already in the west and the moon is still a bit more east.

Know with certainty that it is impossible ever that the moon should be seen on that night in all the land of Israel, and you don't need another calculation. Less than nine degrees, not possible. That is even the nine approximate degrees, the Rambam thought, calculated, that however much it will indeed be, however many fixes one will make five times arrive for the need of five, it will still always be less than I mean approximately six degrees, and then it's not at all possible to see the moon.

The Question Begins in Eretz Yisrael

The question now begins in Eretz Yisrael, because in other places it's different. Soon we'll see why there are differences between Eretz Yisrael and other places, but the Rambam already said that all his calculations are for Eretz Yisrael. And if it's less than 9 degrees, is it simple that the sun and the moon are too close? That which we can't see? Too close, and it's too fast, whatever. He can, that is, it's enough of a small number, it can never, it won't help you at all, you'll add. I'm not saying. Therefore, if that's the number, you've finished the calculation, you can go home, you know that today the beit din can close their... yes, and so forth.

And conversely, **"And if the first arc is more than fifteen degrees,"** it's more than fifteen degrees. **"Know with certainty that the moon will be seen in all of Eretz Yisrael, and you don't need any other calculation."** You know, certainly, that you will indeed be able to see it. But, very good, but if it's from nine to fifteen, then you'll take out your pen and paper and start calculating. Then you will **"lidrosh ulechakor"** (investigate and examine) **"mecheshbonot haRochav"** (from the calculations of the latitude) **"ad sheteda yira'eh lo yira'eh"** (until you know whether it will be seen or not).

Two Periods in the Year with Different Boundaries

Now I'll know, it's an interesting thing, I want to say something very important. This whole thing that we just discussed, the numbers that we say that from 9 to 15 there is the doubt, less than 9 is certainly not, and more than 15 is certainly yes, this only applies approximately in the spring, half the year. There are other periods of the year when the numbers are not the correct numbers. Which numbers? One must say different numbers. Let me say what he says, if I'll remember how it will be explained also, but this is the fact.

"Bameh devarim amurim" (When does this apply), there are no months. You know that everyone knows that the mazalot (constellations) according to the months is only approximate, because the mazalot is the sun and the months are the moon. Bameh devarim amurim, when are nine and fifteen the numbers? **"When the true place of the sun was,"** yes, the number that we calculate all the time that the sun is true. **"From the beginning of mazal Gedi (Capricorn),"** yes, they say approximately from Shevat, **"until the end of mazal Te'omim (Gemini), approximately until Sivan,"** that means six months from Gedi to Te'omim, six mazalot.

But if it's **"from the beginning of mazal Sartan (Cancer), until the end of mazal Keshet (Sagittarius),"** then it's different. Then it's like this, **"and the first arc was ten degrees or less,"** then, only if it's less than ten, even if it's ten or less, you know that it can't be seen. And then also, if the first arc is more than only twenty-four, then it can certainly be seen. But from ten to twenty-four, then there will be the doubt.

The Reason – The Tilt of the Moon's Orbit

In other words, let me say simply, what I told you that there's a number when it's certainly yes, and there's a number when it's certainly not, and there's a number that's in between, there are two periods in the year for this. There's a period that is like, you can call it a good period, when it can be seen even from nine, or even, that is, only from nine to fifteen it can be seen. That is, it's, how shall I call it? There's a smaller area of doubt, right? There are many more times when it can indeed be seen, very small the area of doubt.

There's another period in the year when the area of doubt is larger, it's from ten to twenty-four, right? So for example, as was said, even only from twenty-four it can certainly be seen, or even from ten it certainly can't be seen, although in other periods from one it can be seen.

And the difference is built on the principle that we're going to learn soon, or that we already remember, I don't know if we've already discussed this, that the way the moon travels. We learned, not equal with how the sun travels, or not equal with the equator, it has its own thing, and it's tilted. We learned this, there's a head with a tail, whatever, the whole thing we learned, it goes tilted.

So it comes out that half the year the moon is lower by default, the whole thing is lower. So since the whole thing is lower, in order for you to be able to see it, more degrees are required, more space is needed, it takes more time. When it's initially higher, then it's easier.

So the period from Gedi to Te'omim, then it's initially higher, therefore it can be seen more easily. The period from Sartan to Keshet, is initially lower, therefore it's harder to see, one needs, more is required, more space. That's approximately the reason, it's also common sense, everything here is common sense, I mean.

Discussion: Space or Time?

Now he says like this... interesting, the space here has two things: one is space space, and one is time. He doesn't mix this and that at all, is it relevant at all about space, or about time? How long it takes for the moon to be on the horizon.

Yes, they already said this. The Rambam never says the word time here. It's very interesting, he doesn't explain anything. The Rambam only says the... I said this with the commentators so one should understand, but yes.

It's simple, you understand that if it's initially in a period when the moon travels low,

Halachot 5-6: Shinui HaMar'eh – The Foundation of Parallax

Now, if... in short, then there's a doubt, then you'll start needing to make more complicated calculations.

Now it's like this, the Rambam is going to say, he says it backwards, but let me say what he's going to say in halacha 6, the main point, and then the thing.

The Rambam is going to say in halacha 6 that there are times when one must subtract parts from the arc. The arc is not so long. Why not? Why must one always subtract it? One must subtract. Why?

The Foundation: Calculations from the Center of the Earth

Because let's just establish a principle. Let me say, we're now going to discover one thing that wasn't exactly the arc that we calculated. Or in other words, the true place of visibility, which we already thought was already true, it doesn't begin, it's not true at all.

Why? Because the true visibility we calculated, as if, the Rambam doesn't say this clearly, but he says this in complete concealment, that's what it means. We calculated the moon everything, like all calculations, as if one calculates how one sees the moon from the middle of the earth, the middle, exactly the center point. From there one makes a line, one says at what degree the moon is, and so on.

The reality is however that people don't live in the middle of the world, they live outside, on the outside of the world, yes. Most people, everyone I know, don't live there in the center of the earth.

The Difference Between Sun and Moon

The earth is a big ball, but it's quite large, and the moon is not so far that it shouldn't make a difference. Regarding the sun for example this makes no difference, because the sun is far enough that everywhere on the world is approximately the same regarding where one can see the sun.

But the moon is not so far, let's say, and the world is quite large, so there's a big difference. This is the difference we're now going to learn. There's a big difference from the middle of the world, from where the calculation is, until outside the world. We're not yet holding from where you live on the world.

Actually this is also the truth, but the Rambam, it could be he calculates it into his calculation here, could be not, but the Rambam doesn't say clearly the correction here.

Memutza – The Middle of the Sphere

First he speaks of the fact that all calculations that we discussed we discussed memutza (average). Memutza means that one looks as if the world is one point, one speaks of the middle of the sphere, not the sphere according to them, yes, where the world is, in any case from the middle.

The problem is that the moon is not seen in the middle of the world, it's seen on the world. And the difference, everyone, I made a chart, but I don't have the strength to show, it can take me for heavy, it's drawn out, but it's very simple to imagine a ball that's not here. That one sees it from the distance, you'll see that if someone stands outside the ball, he'll see at a different time.

Now, the line that goes out from there is not the same line as the line that goes out from the top of the ball. So therefore, so therefore one must calculate with this. This the Rambam says, is called shinui mar'eh (change of perspective).

Parable: Two Fingers and Two Eyes

One can see a simple way to see the difference, if a Jew takes his two fingers and he puts it in front of his eye, and he closes one eye, he sees the finger stands differently. Why does it stand differently? Because he's looking from the other side. Even the small difference, it looks as if the finger moves.

When one does this, it's in English parallax. Parallax means that where you see, where you stand things look different, depends where you stand. And therefore the moon from where it is in the middle of the world, where our calculations were, is not where we actually see it.

Halacha 5: Shinui Mar'eh HaOrech – Orech Sheni

Now, therefore one must add, the arc becomes shorter. Why does it always become shorter? Because the Rambam doesn't explain, but that's the fact. The main point is because the moon is always, always behind the sun. Therefore, if I tell you to look at the pictures, to see that it comes out that it must always be less.

The Chart of Shinui Mar'eh HaOrech

And the Rambam says, gives you a chart like always, he simply gives charts. And the charts depend on which mazal the moon is in. Again, why? Because the moon, I mean I remember, doesn't travel uniformly, it travels in each mazal it travels differently, that is, as we learned. Therefore it depends, small differences, but it depends on the mazalot how much one must subtract in order to fix the thing.

So go into a chart, and:

- Mazal Taleh (Aries) one subtracts 59 parts
- Mazal Shor (Taurus) a whole degree
- Te'omim (Gemini) 58
- Sartan (Cancer) 52
- Aryeh (Leo) 43
- Betulah (Virgo) 37
- Moznayim (Libra) 34
- Akrav (Scorpio) 34
- Keshet (Sagittarius) 36
- Gedi (Capricorn) 44
- Deli (Aquarius) 53
- Dagim (Pisces) 58

It goes in a circle because we come back here, see? It becomes bigger and smaller, around as if mazal Shor, there it's a whole degree.

The Rambam's Language

And what you'll subtract the numbers, now you have a thing called orech sheni (second arc), that is the second arc, simply one has better calculated the moon not from where in the middle of the world, but from where we stand outside the world. This is the orech sheni. Right? Yes.

And the Rambam explains, **"And why do we subtract these parts? Because the place of its true appearance, is not the place where it will be seen."** Shinui yishma, no, baruch bruchvo. He doesn't explain why, but I'm telling you now, **"and it's called shinui hamar'eh."** This is called the difference of where the moon is. And how we can see it, as if because we are outside the world, is called shinui hamar'eh, **"and the shinui mar'eh of the arc, at the time of visibility we always subtract it from the arc,"** always it subtracts.

That is, we learned earlier, the changes many times here that one must add or subtract, the subjects always subtract from the arc in order to go. From orech rishon (first arc) to orech sheni, since there is the shinui mar'eh and one must take that, one always subtracts it.

Halachot 7-8: Shinui Mar'eh HaRochav – Rochav Sheni

Now you'll understand that the problem exists both in the arc and in the latitude. The latitude is the same problem, that it was calculated from the middle of the world, and meanwhile you stand outside the world.

Tzefoni and Dromi – Subtracting or Adding

But the difference is, on the shinui mar'eh of the latitude one must indeed sometimes subtract and add. Why? Look, you can see, **"If the latitude of the moon was northern, then one subtracts the parts of shinui hamar'eh from the first latitude."** Why? Because north means it's higher, therefore one must subtract it, because it's already closer, it's already traveled further, it's already in the correct sun.

But southern means it's lower, therefore one must add the parts of shinui mar'eh of the latitude to the first. Therefore you have the same thing, after the first latitude will become a second latitude.

The Chart of Shinui Mar'eh HaRochav

And he gives a chart for the second latitude also according to the mazalot how many parts are needed. You see that it's a bit smaller than the previous one, from the difference of the arc, because the whole latitude is very small, it can't be more than five degrees we learned.

So the parts that one adds or subtracts by the latitude, depending whether it's north or south, according to how one learned how one knows if it's north or south, is:

- Taleh nine parts
- Shor ten

- Te'omim sixteen
- Sartan twenty-seven
- Aryeh thirty-eight
- Betulah forty-four
- Moznayim forty-six
- Akrav forty-five
- Keshet forty-four
- Gedi thirty-six
- Deli twenty-seven
- Dagim twelve

In short, you know now, you have here the chart, if you know the chart, you'll subtract or add, depends if it's north or south, you'll have the second latitude. How do you already know if it's north or south? Says the Rambam, you already know, what you learned in the previous chapter.

Discussion: Why Does the Chart Look Random

Question: Does the chart have some kind of pattern as if? Does it double?

Answer: No, it looks like it's random. No, there is what goes up. It's all averages, look, it goes around approximately. It goes approximately around, but the reason is because technically here it has to do with that in short, the sphere of the mazalot is inclined relative to the equator that we make our calculations from. Therefore, but it's similar to what we learned by the, do you remember the same picture we had by the moon from the... So, it goes down and up, exactly. So, approximately, it's inclined with a few degrees.

But also it depends throughout the year that not all mazalot travel the same speed, about that actually therefore it has with this. Anyway, and you already know if it's north or south, and you already know how many degrees and parts will be the second latitude, you'll remember the rochav sheni (second latitude), because soon it can be used. Okay.

Halacha 10: Me'agal HaYare'ach – The Third Correction

Now, says the Rambam, but we still haven't solved the problem, we've already fixed one problem, but there are still more problems. The Rambam doesn't say what the problem is.

The Rambam says like this: **"And after that you take,"** you must remember that the second latitude, they've now fixed, now have a true latitude. Remember, what does latitude mean? Latitude means how far the moon is from the... path that the sun travels on, right?

Now, about this it comes out that the... where am I here? About this it comes out, I mean, this is basically what the... what the... what the... what the latitude says, that the moon is inclined from its circle, it doesn't travel on the belt, it goes up and down in its path.

Therefore one must still fix it, in order to find out where is the true place of the moon, as if, regarding what we now want to know, how long it's going to take to go down, how much one must subtract. Must one change, must one subtract a bit depends on according to how it is, subtract. I already know the latitude, but one must subtract a bit from the latitude so it should come back to a more precise latitude.

The Rambam doesn't explain here precisely why, I have the book on this that it's a bit complicated.

Correction of the Latitude – Me'aglei HaYare'ach (Third Latitude)

Not because I already know the latitude, but one must subtract a bit from the latitude so it should come back to a more precise latitude. The Rambam doesn't explain here precisely why. The explanation for this is a bit complicated. It has to do with that it was said that the mazalot don't travel on a straight line, they travel a bit inclined, so therefore one must know to fix the latitude also according to the inclination. It's not inclined, yes, but relative to us it's not straight.

He says, the Rambam gives a chart how much one must subtract, still minus from the latitude, because of the inclination of the circle, this is the moon travels up and down relative to its sphere, and this itself is the latitude. You understand that this itself is the latitude, but what he means to say here is only that one must subtract it from the latitude, because we want to truly arrive at how long it takes, and we last learned that the whole situation is not straight, therefore one must still add it.

The Rambam's List of Corrections According to Mazal

English Translation

And he gives further a list, he says:

- If the moon is from Aries until twenty degrees of Aries, or from Libra until twenty degrees, you subtract two-fifths.

- If it's from twenty degrees of Aries until ten until Taurus, or from always the second side is the same as the side, right? Or, yes, opposite of Aries is Libra, for example everyone knows Nissan and Tishrei. Ten degrees until Scorpio, you subtract a third from the rochav sheni (second latitude). You take the same calculation, you reduce it a bit.

And so on, I don't have the patience to say the whole list.

In short, you see in the list that it depends which constellations - you subtract a percent, a third, a fifth, two-fifths, a sixth, a long list, of how much you subtract from the rochav sheni. What you subtract, this is called in by the ma'agal hayareach (circle of the moon), meaning since the moon travels on a circle, the correction that you make in honor of the ma'agal hayareach.

Adding Ma'aglei Hayareach to Orech Sheni — Orech Shlishi

Now, what do you do with this number? He says, if it's north, the rochav hayareach is north, you will take the rochav hayareach, you will subtract it... We now have the rochav hayareach, right? We have already done two corrections to a rochav, right? We have a rochav sheni, and we have a rochav shlishi as it were, called ma'aglei yareach, it's the same thing.

Rule of North/South — Capricorn until Gemini

And now he says, we take the rochav hayareach, the original one that we learned earlier, which is? If it's north or south. If it's north, subtract the number of the ma'aglei yareach from the second orech (longitude). Remember the orech is how far the moon truly is from the sun? You need to subtract this.

Why? You will think, you will understand that the rochav with the orech are truly the same thing, they both make the moon further from the sun. And I don't have the strength to explain, it's not possible to explain without looking at charts, and I don't have prepared charts that can properly explain this. In any case, you must add the rochav to the orech, it's not truly two... that is, it is originally two dimensions, but now what we

want to calculate how long it will take for the moon to go down, is the same thing, because we understand that if it's curved, it takes longer to go down. If it's straight, it takes faster to go down. Yes? It's a simple thing. Everyone understands that. So you need to know this.

Rule of North/South — Cancer until Sagittarius

Therefore the Rambam says, if it's north, meaning higher, subtract the ma'aglei yareach from the second orech, and if it's south, you add it. But this is only for half a year. This is when the moon is from the beginning of Capricorn until the end of Gemini. But if it's from the beginning of Cancer until the end of Sagittarius, it's reversed. If the moon is north, you add it, and if it's south, you subtract it.

So this troubles one... and one must, with God's help, if I will have the nerves sometime to show clearly the charts, we will understand this. I don't believe anyone understands the why, but by the way, the Rambam himself didn't say why, but he states a fact, and we understand more or less the Hebrew meaning of what he says.

Result — Orech Shlishi

Therefore now you have, after you have subtracted or added the rochav, which I call rochav shlishi, or what the Rambam calls ma'aglei yareach, from the orech sheni, you have a third number which is called orech shlishi. Yes? The Rambam says, you will know that not always, there is a time when there is no netiyat hama'agal (inclination of the circle), as the Rambam gave here when one doesn't add, if I remember, he didn't say by any of the... yes, for example, if it's from the fifteenth in the constellation of Gemini, lo tosif velo tigra (neither add nor subtract), isn't it, because this depends on which... again, where you hold on the circle, certain places it's the same. If so it won't be, then the orech hasheni will be the same as the orech shlishi, because you don't need to add anything. Yes?

Orech Revi'i — Correction According to Constellation

Now, all this is not enough. You must still add, make an orech revi'i (fourth longitude). Why? The Rambam says. Afterwards you will further see thus: if the orech shlishi, which is the degrees between the sun and moon, look which constellation you are holding now. The Rambam doesn't say why you do this, I don't remember why. This is still all part of the same thing, that we haven't calculated well precisely until now.

The Rambam's List of Corrections According to Constellation

He says, it depends which constellation you are in:

- If you are at the constellation of Pisces or Aries, you add a sixth.

- If you are Aquarius or Taurus, you add a fifth.

- If you are Capricorn or Gemini, you add a sixth.

- If you are Sagittarius or Cancer, you add... leave it as it is.

- If it's Scorpio or Leo, you subtract a fifth.

- If it's Libra or Virgo, you subtract a third.

In short, and afterwards it's called orech revi'i.

This all must be done, the truth is, all this must be done in order to arrive from the degrees on the constellations to the degrees relative to the horizon. If someone understands what I'm saying, it will be quite simple, but this is what must be done.

Menat Govah HaMedinah — Correction for Jerusalem's Latitude

Now, now, you must remember, all this was not enough. Why was all this not enough? Because they still forgot that all these calculations are... how did they make all these calculations? They said how far is the sun from the moon, where is the sun. All this was spoken about on the equator, which is called kav hashoveh (line of equality). But Jerusalem is not on the equator, it's approximately thirty degrees higher. So the whole calculations are shifted entirely.

Why? Because we live in Jerusalem, and it's different. And you will understand, by the equator approximately the galgal hamazalot (zodiac wheel), the sun travels straight, but everywhere else the mazalot, the whole galgal travels curved. Therefore, it's a bit higher. That is, therefore you need to add, you need to fix for this.

Calculating Menat Govah HaMedinah

The Rambam says, how will you do this? You will go to the rochav hayareach harishon, the first rochav, and you will subtract two-thirds, always. Vezeh nikra menat govah hamedinah (and this is called the portion of the city's height). You remember, menah is a word that the Rambam uses for fixing, the fixings of a calculation, right? I must go, this means I must go. But anyway, this is called menat, the menah of govah hamedinah, because the medinah, meaning the city of Jerusalem, is higher than the equator, therefore one must subtract this.

Adding Menat HaMedinah to the Orech — Keshet HaRe'iyah

And afterwards, all this is still not enough, it depends. If the rochav hayareach is to the north, you must add the menat hamedinah. On the rochav hayareach you certainly must add menat hamedinah. But regarding that which you must add it to the orech, it depends. If the rochav hayareach is north, you must add it. If it's south, you must subtract it. And then you remain with a calculation which is called keshet hare'iyah (arc of visibility). Keshet hare'iyah, this is... keshet means literally, a keshet is the shape that you get between two degrees, right? It's not a straight line, it's a keshet. The length is called keshet hare'iyah.

Keshet HaRe'iyah — The Final Calculation

And now you would think that you will now know if you can see the moon? I say, no, I tell you, I know approximately. Good, it's still a bit too long, I will stop and continue the lecture tomorrow.

Example from the Rambam

But now, I will tell you what the Rambam will now do for you, and he will give you an example from one of his days that he uses as an example, and he will tell you what you will know. He will give you an example on that day, and he will tell you thus: the whole case, I skip the example for now, simply so one should understand the structure, but the example is simply he gives an example how to calculate everything I have said until now.

Rules According to Keshet HaRe'iyah

And afterwards he says thus: you have the keshet hare'iyah, you will know thus:

- If it's nine degrees or less, this is more correctly nine degrees, you know that you certainly cannot see.

- If it's more than fourteen, you see, it has become more precise, then you must see it. That is, it's a gilui (revelation),

it's a gilui, it's a gilui, it's nir'eh balailah (visible at night), no doubt that you see it.

Ketzot HaRe'iyah — Between Ten and Fourteen

But, if it's between ten and fourteen, then it's thus, you want to make a calculation, you should calculate how much more is the keshet hare'iyah, longer than the orech rishon, and according to this you will make a calculation according to certain rules that the Rambam calls ketzot hare'iyah (limits of visibility). Ketzot hare'iyah are such numbers that the Rambam said that you must know what the keshet hare'iyah and what the original orech rishon is, and through this you will see.

He says for example, if the keshet hare'iyah is between nine and ten and the orech rishon is thirteen, you will certainly see, but less not. And if it's from ten to eleven, etc. etc., he gives numbers as gezeirat hakatuv (divine decree) according to how much the orech re'iyah plus the keshet, you must know both, both the orech rishon and the orech chamishi you can call it, called keshet hare'iyah, with ketzot, ketzot like times, and he gives an example on this.

The Rambam's Introduction — Why It's So Complicated

And the Rambam explains, since people get lost, this the Rambam says, **"Kevar ra'ita min hama'asim ha'elu kamah cheshbonot yesh bo, vechama tosafot, vechama geri'ot, achar sheyigenu harbeh"** (You have already seen from these calculations how many calculations there are in it, and how many additions, and how many subtractions, after much effort). The Rambam says, what you are struggling with now, this is after I have already struggled to make for you **"derachim kerovim she'ein becheshbonam ela karov me'at"** (close methods that have in their calculation only a slight approximation). He says, the reason for this is **"shehayareach yesh lo kilkulim gedolim bema'alotav"** (that the moon has great irregularities in its degrees), the moon doesn't travel straight. **"Velafikach amru chachamim shemesh yada mevo'o, aval yareach lo yada mevo'o"** (And therefore the Sages said the sun knows its setting, but the moon does not know its setting). It means lo yada, it means we don't know, but as if it's not simple to know. **"Ve'amru chachamim pe'amim ba ba'arukah pe'amim ba biktzarah"** (And the Sages said sometimes it comes in length sometimes it comes in shortness). It means, and this stands in Rambam the innovation, in the Gemara it says that sometimes the moon comes ba'arukah sometimes biktzarah. The Gemara speaks of how long between

[The lecture is cut off here]

Explanation of the Rambam's Words: "Sometimes Long Sometimes Short"

Apparently, the Rambam means to say not that the moon truly goes long and short, but the calculations - sometimes you must add and sometimes you must subtract until it will only hit the keshet hare'iyah. And sometimes the keshet hare'iyah is long and sometimes short, when it's at the time of visibility. It changes according to the times of the years, according to where you are, and so on.

Now the Rambam explains, and if we will have time tomorrow and review the last half, I will just explain it, the Rambam explains, why do you do all these things? Ta'am kol elu (the reason for all these), why here do you add, there do you subtract? How did they know all these things? And the proofs for all these things, the Rambam truly didn't say here halachot just like that, but an algorithm that can be done.

The Rambam's Language: Source of the Calculations

The Rambam says, this is chochmat tekufot vegimatriyot (the wisdom of seasons and geometry), which the Greek sages made in many books, and we still have the books. The Rambam says, but the Sages, the books that the sages of Israel... no, no, we still have these, lafikach the next thing. We still have the books, and from this we learned it. But the books that the sages of Israel, from the days of the prophets and the sons of Issachar, the Rambam means, it says benei Yissachar yodei binah (the sons of Issachar who understand), yes, they knew how to calculate tekufot of constellations. The Rambam imagines that they also wrote books that explain all these books. The Rambam says, what should we do? We don't have their books!

The Rambam's Foundation: "We Don't Worry About the Author"

You will have difficulty, well, in the holy book of the Rambam, there is brought from Greek books, the Rambam says, I will explain to you, since all these things are clear proofs, it's calculation, there's no defect, ve'i efshar le'adam lehareher achareihen (and it's impossible for a person to doubt them). Yes, otherwise, you remember the Rambam's language about books that can be doubted, so he says there is yesh bo dufi (there is a defect in it). It's a thing... so therefore, the Rambam says, he explains:

"Me'achar shekol eleh hadevarim hen re'ayot berurot she'ein bahen dufi" (Since all these things are clear proofs that have no defect in them) - there are no doubts in it, you cannot introduce doubts into it, **"ve'i efshar le'adam lehareher achareihem"** (and it's impossible for a person to doubt them) - everyone who does the math comes to the same conclusion. So if so, **"ein choshin anu lamechaber"** (we don't worry about the author) - we don't care who the author is, **"bein shechivru otam nevi'im bein shechivru otam goyim"** (whether prophets composed them or whether gentiles composed them) - no difference if prophets made it or gentiles.

Why? The Rambam says, **"shekol davar sheniglah ta'amo venoda'ah amitato bire'ayot she'ein bahen dufi"** (for anything whose reason has been revealed and whose truth has been known through proofs that have no defect) - every thing whose reason has become clear, and the truth of it has become known with proofs she'ein bahen dufi, proofs that cannot be refuted, that have no flaw, so when you take it, you don't take from that person, **"ein somchin anu al zeh ha'ish she'amru o shelimdu, ela al hare'ayah sheniglitah vehat'am shenoda"** (we don't rely on this person who said it or taught it, but on the proof that was revealed and the reason that became known).

Explanation: The Difference Between Things We Trust and Things We Don't Trust

The Rambam says here, that when someone says something as a matter of ideology, of reasoning, you must think who is the person, from where does he take his reasoning, you must think if he is righteous or not. But when it's very obvious, when you do it with math, the one who did it is only basically a tool, which machine did it.

Note: This Is Not a Distinction of Math Versus Reasoning

This is the rule, the Rambam didn't say what you're saying. The Rambam doesn't say such a distinction of math and reasoning, what the Rambam says is a distinction of true things and false things. Things that you don't know, that you cannot know, that have no proofs, trust a person. You still don't know it, after you trust him also not, trust him, trust a person.

But a thing that a person tells you a proof, don't trust him at all. It's no difference if it's a proof in math or in philosophy or in anything else. If yes, it's not a matter of relying on the person, it's a matter of the fact.

Conclusion: Prophet and Gentile Are the Same Thing

Therefore, the Rambam says that there's no difference if a gentile said something or a prophet. A prophet or a gentile is the same thing, because it's not the prophet and not the gentile, it's the... it's the... it's what is true. This is apparently the idea.

Yes. Okay.