Laws of Sanctification of the New Moon, Chapter 16 (Auto Translated)

English

Auto Translated

Shiur Overview

Summary of Shiur — Hilchos Kiddush HaChodesh, Chapter 16: The Latitude of the Moon

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General Introduction and Context

Where We Are in the Process

The shiur deals with **Chapter 16** of Hilchos Kiddush HaChodesh. After chapters 16 and 17 (calculations) comes chapter 18 (general halachos built on the calculations), and then Hilchos Taaniyos.

The Value of Learning the Calculations

Even if one only gains a **desire** to understand how the Ribbono Shel Olam's creation works, that itself is a great thing. One should not say that "today's science knows better" before having thoroughly learned the Rambam. **The Rambam's calculations are all more or less accurate** — if one says this after learning it well, one has at least accomplished something; if one says it right at the first line, it means one is not taking it seriously at all.

The One Question That All the Calculations Answer

Will we be able to see the moon tonight, the thirtieth night? To know this, one needs to know:

1. **Where the sun is** (emtza hachama, hachama ha'amitis)

2. **Where the moon is** (emtza hayarei'ach, hayarei'ach ha'amiti)

3. **How far the moon is from the sun** — this is the key, because too close and we can't see it (the sun hides it), and too far is also not relevant.

Chapters 11–15 are **introductions** — each chapter teaches a foundation, and **Chapter 17** will bring everything together to calculate cheshbon hara'iyah.

[Digression: Why Does the Rambam Elaborate So Much?]

A **slight contradiction** in the Rambam's approach: **On one hand**, the Rambam clearly says that looking at the heavenly bodies themselves is a mitzvah — **"po'al Hashem lo hibitu"** — and he wants to arouse a desire for astronomy. **On the other hand**, he didn't make a book of science/astronomy, but rather a halachah book. He **found a topic relevant to halachah** (Kiddush HaChodesh) and within it he elaborates. This is compared to chadarim that teach children about planting and plowing when learning the 39 melachos — an opportunity to learn broader topics within a halachic context. After a whole day of thinking whether the Rambam could have made shortcuts, it's **not clear** that it was practical — because in order to state the memutza la'amito, one needs many details that cannot be cut out.

The Structure of the Calculation — A Consistent Method

The cycle of the moon's latitude is complicated to calculate, just like all other cycles. **Why?**

1. **The cycle itself changes** — one must first know where one is in the cycle.

2. **Within the cycle itself, not all times are equal** — just as the sun doesn't travel at the same speed at every time of year. Therefore, the emtza (average) is not enough — one must add a **manah** (correction).

The structure:

- First one calculates the **emtza** (approximate).

- Then one calculates the **maslul** (where one is in the cycle).

- According to the maslul, one adds the **manah**.

- This gives the **true** location.

The Rambam's method is **dartzah haRambam lehakel al Yisrael** — he makes it easier through a consistent structure (pattern) and through charts for everything.

Halachah 1 — The Moon's Circle and Its Relationship to the Sun's Circle

What is Rochav HaYarei'ach?

Until now we learned the **orech hayarei'ach** (longitude) — where the moon is between east and west, i.e., at which mazal/degree it is located. The Rambam later calls this **"orech"** because it crosses the sky like a length (east to west). Now we learn **rochav hayarei'ach** (latitude) — how far north or south from the **kav hashemesh** (ecliptic) the moon is located.

The Concept of Rochav

Words of the Rambam: The circle on which the moon always travels — it is inclined above the circle on which the sun always travels, half of it inclines to the north and half inclines to the south.

Explanation: The moon travels on its own circle (circular path) every month. The moon's path is **inclined** (at an angle) relative to the sun's path. Half of the moon's path is north of the sun's path, and half is south.

Insights and Explanations:

1. **How to visualize this:** One should imagine two hula-hoops (rings), one lying under the other, and one is slightly tilted relative to the other. The orange circle is the sun's path (yearly), the green circle is the moon's path (monthly). In the middle is the earth.

2. **"Noteh me'al" — not literally above:** The Rambam says "noteh me'al" — this doesn't mean it's literally above, but rather it's at an angle. Sometimes the moon is higher (north) than the sun's path, sometimes lower (south).

3. **North/South = Above/Below:** In the world, one always looks at north as above and south as below, therefore when we say "higher" we mean north, "lower" we mean south.

4. **Why is rochav hayarei'ach relevant?** Because **the moon doesn't have its own light** — it depends on the sun for us to be able to see it. Therefore, we always look **in relation to the sun**. In order to calculate **cheshbon hara'iyah** in Chapter 17, one must also know the rochav.

Halachah 1 (Continued) — Rosh and Zanav (Two Points)

Words of the Rambam: The two points where the two circles intersect each other… when the moon is at one of the two [points], it is found traveling on the sun's circle opposite the sun equally. And when the moon exits from one of the two points, it is found traveling north of the sun or south of it. The point from which the moon begins to incline north of the sun is called rosh. And the point from which the moon begins to incline south of the sun is called zanav.

Explanation: Two circles that intersect have two intersection points. At the two points, the sun and moon are on the same path. The point where the moon begins to go north is called **rosh**, and the point where it begins to go south is called **zanav**.

Insights and Explanations:

1. **"Sovev be'igulah shel shemesh keneged hashemesh beshaveh"** — when the moon is at one of the two points, one cannot distinguish which path it's traveling on, because at that point both paths are one.

2. **Rosh = face up, Zanav = face down:** The simple reason why it's called "rosh" — because at that point the moon goes with its face up (north, looking toward the sky). "Zanav" — because at that point it goes with its face down (south, looking toward the depths). This fits with the Rambam's language. There are other explanations for why rosh and zanav, but we stay with the simple one.

3. **The teli is also called "nachash"** — because it has a **rosh** (ascending node) and a **zanav** (descending node), just like a snake.

4. **[Digression: Eclipses]** — At the two points (rosh and zanav) is the key to eclipses. Every month there is a molad (conjunction — moon between sun and earth) and a 15th (opposition — moon fully illuminated). One asks: Why isn't there a solar eclipse every month at the molad and a lunar eclipse at the 15th? **Answer:** Because the moon doesn't travel on the same road as the sun — it's offset several degrees north or south, enough to see but not enough for an eclipse. **An eclipse happens only when the molad or 15th occurs at the rosh or zanav**, when both are exactly on the same path. The eclipse cycle is not yearly — because the sun's cycle is yearly and the moon's is monthly, but for them to meet at the rosh or zanav at the right time is a rare thing. **The eclipse cycle is essentially the cycle of the rosh/zanav** — because the rosh and zanav themselves change (they move).

Halachah — Mahalach HaRosh: The Rosh Moves

Words of the Rambam: The mahalach of the rosh and its average in one day — three chalakim and eleven shniyos. And it goes through the mazalos backwards.

Explanation: The rosh itself is not fixed — it moves. The average mahalach of the rosh is 3 chalakim (of a degree) and 11 shniyos per day. "Average" means the average movement, as if it goes exactly evenly. The rosh goes **backwards** through the mazalos — normally one goes from Taleh (Nissan) to Shor etc., but the rosh goes from Taleh back to Dagim.

Insights and Explanations:

1. **The rosh lies on a wheel that rotates** — "dreidels with dreidels with dreidels, everything rotates." This means that **the moon's circle rotates in the opposite direction from the moon itself**. Not every month do the sun and moon meet in the same mazal — sometimes in Mazal Taleh, sometimes in another mazal.

2. **Because we want to know how far the moon is from the rosh** (north or south), we must **first know where the rosh is**. One cannot simply calculate because the rosh itself moves.

3. **"Achoranis" — against the direction of the mazalos:** While the moon and sun go from west to east (in the mazalos), the teli/rosh goes from east to west. Therefore **one subtracts** instead of adding.

Halachah — Mahalach HaRosh: Numbers for Different Time Periods

Words of the Rambam: The Rambam gives numbers for 10 days, 100 days, 1000 days, 10,000 days, and 29 days.

Explanation: 29 days is especially important because one calculates month-to-month: **1 degree, 32 chalakim, 7 shniyos** — siman **alef-lamed-beis-dalet**.

Halachah — Shanah Sedurah

Words of the Rambam: In a regular year it comes out: 18 degrees, 44 chalakim, 42 shniyos.

Halachah — The Ikar of Mekom HaRosh

Words of the Rambam: The average of the rosh on leil ha'ikar (Thursday night, 3 Nissan year 4938) was at 180 degrees, 57 chalakim, 28 shniyos.

Explanation: One calculates from the ikar-point. Because the rosh goes **backwards**, one subtracts the mahalach from 360 (not adds). What remains is the mekom harosh.

Halachah — Kenegdo Yiheyeh Mekom HaZanav

Words of the Rambam: Opposite it will be the place of the zanav. Always there will be between the rosh and the zanav half the circle equally. Therefore, every mazal in which you find the place of the rosh, the zanav will be in the seventh mazal from it, like the count of degrees and chalakim equally.

Explanation: The zanav is always exactly 180 degrees opposite the rosh. Both circles are exact circles, so the opposite is simply 180 degrees.

Example — Erev Shabbos 2 Iyar

Words of the Rambam: The Rambam gives an example: one wants to know where the rosh is on erev Shabbos 2 Iyar of the year of the ikar.

Explanation: From 3 Nissan to 2 Iyar is 29 days. One adds the mahalach of 29 days (1 degree, 32 chalakim, 7 shniyos) to the ikar (180, 57, 28), comes out 182 degrees, 29, 37. **Then one subtracts it from 360** (because the rosh travels backwards), remains **177 degrees, 30 chalakim, 23 shniyos**.

Insights and Explanations:

1. **One must subtract from 360** (not add) because the rosh goes achoranis through the mazalos.

2. This comes out **in Mazal Besulah** (27 degrees, 30 chalakim). The zanav is opposite — **in Mazal Dagim**, also 27 degrees, 30 chalakim. Besulah is the mazal of the month of Elul, Dagim is Adar — exactly opposite.

3. **[Digression: "Al Tifnu El HaElilim"]** — The pasuk "al tifnu el ha'elilim" is mentioned as a melitzah — the Rambam says "al tifnu el hachalakim" (one should not calculate with seconds when one doesn't need to), which is a language from that pasuk.

Halachah — Hisbonen Bisheloshtam (Position of the Moon Relative to Rosh and Zanav)

Words of the Rambam: Contemplate the three of them — if you find the moon at the place of the rosh or at the place of the zanav within one degree and one chelek, this means the moon is not inclined from the sun. If before the place of the rosh — to the north of the sun. If before the place of the zanav — to the south.

Explanation: One takes the three numbers — mekom hayarei'ach ha'amiti, mekom harosh, mekom hazanav — and one looks where the moon stands relative to them:

- If the moon is **at the rosh or at the zanav** — it is on the same maslul as the sun (not inclined).

- If **before mekom harosh** (after the rosh, i.e., between rosh and zanav) — the moon is **to the north** of the sun.

- If **before mekom hazanav** (on the other side) — it is **to the south**.

Insights and Explanations:

1. **The Rambam's calculation works with numbers, not with pictures.** "Lifnei" means that the number of mekom hayarei'ach is less than one number and more than the other. For example: rosh is at 150, zanav at 330 — if the moon is between 150 and 330, it's after the rosh (north); if the opposite, it's south.

2. **Why does one need to know the zanav also?** Because one must know if the moon is north or south of the sun, and therefore one needs both reference points.

Halachah — Rochav HaYarei'ach: Concept and Terminology

Words of the Rambam: The inclination that the moon inclines to the north of the sun or to its south — it is called rochav hayarei'ach. And if it inclines to the north it's called rochav tzefoni, and if it inclines to the south it's called rochav deromi. And if the moon is at one of the two points, it will have no rochav.

Explanation: "Netiyah" means how far the moon is offset from the sun's circle (ecliptic). When the moon stands exactly at one of the two points (rosh or zanav), it has no rochav — it is exactly on the sun's circle.

Insights and Explanations:

1. **"Netiyah" here is not the direction of movement, but the distance** — how far the moon is from the sun's circle. This is the opposite of "nekudas hapegi'ah" — at the point of intersection the rochav is zero, and the farther from it, the more rochav.

Halachah — Maximum Rochav: Five Degrees

Words of the Rambam: The rochav of the moon will never be more than five degrees, whether north or south. The moon moves away gradually from the rosh, **until it has no rochav when it reaches the zanav**, and then it becomes distant again.

Explanation: The maximum rochav of the moon is 5 degrees, whether north or south. The moon starts at the rosh (rochav = 0), goes up to 5 degrees, comes back down to the zanav (rochav = 0), goes down to 5 degrees on the other side, and comes back to the rosh.

Insights and Explanations:

1. **Analogous to the sun's netiyah:** There are four "steps" (quarters): (1) from rosh up to maximum north, (2) back down to zanav, (3) from zanav down to maximum south, (4) back up to rosh. This is the same structure as with the sun's netiyah.

Halachah — Maslul HaRochav: Calculation

Two Methods to Calculate the Maslul

Words of the Rambam: The maslul of the moon for rochav at the shoresh is 180 degrees. Every full month the maslul moves 13 degrees, 3 chalakim, 54 shniyos. The maslul is calculated by: average place of the moon minus average place of the teli.

Explanation: The "maslul harochav" is how far the moon has traveled from its rosh — this tells us where it stands in its rochav-cycle. If maslul harochav is between 0 and 180 — it is tzefoni; more than 180 — deromi; exactly 180 or 360 — no rochav.

Insights and Explanations:

1. **Two methods:** The Rambam gives two ways — (a) one can calculate the maslul directly with its own shoresh and movements, or (b) one can take the already-calculated emtza yarei'ach and subtract the emtza teli. **Both ways come out the same.**

2. **Why the shoresh of the maslul is exactly 180:** At the shoresh-time, the emtza yarei'ach was 180 (approximately) and the teli also 180, and the difference between them is approximately 180 (or 0, which is the same in a 360-degree system). 180 degrees means the moon was **exactly at the zanav hateli** (opposite the rosh).

3. **The maslul's movement of 13 degrees, 3 chalakim, 54 shniyos:** This comes from the movement of the moon (which goes forward) **plus** the movement of the teli (which goes backwards). Because one subtracts the teli, and the teli goes backwards (thus becomes smaller), the difference between moon and teli is **greater** with each month — therefore the maslul's movement is **greater** than the moon's own movement.

4. **The maslul is only an average (emtza'i), not the true one.** One must add a **manah** (correction) in order to get the true rochav. The Rambam gives no explanation for why the manah is what it is — it's like a "gezeiras hakasuv" from the Rambam. One must learn more sefarim (like the Maggid Mishneh and other mefarshim) to understand the reason.

5. **An important difference from other manos:** Here the manah **is the rochav itself** — one doesn't need to add the manah to the maslul and then calculate again, but the manah is already the rochav.

Halachah — Table of Manas Maslul HaRochav

Words of the Rambam: He gives a list for every 10 degrees of maslul harochav (up to 90):

- 10° → 0° 52'
- 20° → 1° 43'
- 30° → 2° 30'
- 40° → 3° 13' (approximately)
- 50° → 3° 50'
- 60° → 4° 20'
- 70° → 4° 42'
- 80° → 4° 55'
- 90° → 5° 0'

Insights and Explanations:

1. **The numbers go up to 5 degrees at 90°** — which fits with the rule that maximum rochav is 5 degrees.

2. **The Rambam only gives up to 90°** because one only needs to know one quarter — the other three quarters can be calculated through symmetry.

3. **Why does the Rambam give numbers for every 10 degrees and not just for 90?** Because the relationship is **not linear** — one cannot simply divide 90 equally. Between every 10 degrees, however, it's accurate enough to interpolate.

Halachah — Interpolation Between Tens

Words of the Rambam: He gives an example: if maslul harochav = 53°, then: at 50° it's 3° 50', at 60° it's 4° 20'. The difference is 30 chalakim over 10 degrees = 3 chalakim per degree. 53° is 3 degrees over 50°, so 3×3=9 chalakim to add. Result: 3° 59'.

Explanation: Standard linear interpolation between the two nearest values in the table.

Halachah — Calculating for All Four Quarters

Words of the Rambam: He explains how to handle maslul harochav greater than 90°:

- 90°–180°: subtract from 180°
- 180°–270°: subtract 180°
- 270°–360°: subtract from 360°

Insights and Explanations:

1. **This is different from with the sun**, where the Rambam said 180° (plus/minus). Here with rochav hayarei'ach one only needs up to 90° because it's symmetrical in all four quarters — it goes up and down on both sides.

2. **Examples from the Rambam:**

- Maslul = 150° → 180 - 150 = 30° → manah = 2° 30'
- Maslul = 200° → 200 - 180 = 20° → manah = 1° 43'
- Maslul = 300° → 360 - 300 = 60° → manah = 4° 20'

Halachah — North or South

Explanation: After knowing the rochav, one still needs to know whether it's north or south. This is already known from the maslul harochav itself: under 180° = north, over 180° = south.

Insights and Explanations:

1. **Why 0-180 is north and 180-360 is south:** At 0 degrees maslul the moon is at the rosh hateli (it crosses the ecliptic going northward), at 90 it's at maximum north, at 180 it's at the zanav (it crosses going southward), at 270 it's at maximum south, and at 360 it's back at the rosh.

2. **The whole point is that one should be able to calculate everything far in advance** (even four years), without looking at the sky. The Rambam doesn't want one to wait a few days and see in which direction the moon is moving.

Practical Example — Rochav HaYarei'ach for Leil 2 Iyar

Words of the Rambam: The Rambam gives an example from the same year, month of Iyar, leil erev Shabbos.

Explanation: The calculation yielded a maslul of **231 degrees and ten chalakim (231° 10')**. The Rambam says that for a maslul the chalakim are not relevant, therefore one calculates only with 231 degrees. Because the maslul is **more than 180**, one subtracts 180, and one remains with **51 degrees**. That it's more than 180 means the rochav is **deromi**. One looks up in the table the manah of 51 degrees, and that is **3° 53'** — this is the **rochav hayarei'ach** for the night of 2 Iyar, a southern rochav.

Conclusion

With this one has already **figured out the rochav hayarei'ach for all days of the world**, according to the Rambam's rules.

[Digression: Kabbalistic Hints] Whoever doesn't understand the matter of **teli** (the snake with the rosh and zanav) can learn **according to Kabbalah** what it means. **Rosh Hashanah is coming soon** and we say **"sheniheyeh lerosh velo lezanav" — there are great secrets** in this matter of rosh and not zanav, connected with the teli, but in the shiur we learned only the **simple meaning** for now.

Full Transcript

Chapter 16: The Latitude of the Moon — How to Calculate the Moon's Inclination North and South of the Sun's Path

General Introduction: Where We Are in Sefer Zemanim

Good day, dear Jews, we are holding today in the holy book, the sacred book of Rabbi Moshe ben Maimon, Sefer Mishneh Torah, Sefer Zemanim, Hilchot Kiddush HaChodesh, **Chapter 16**.

If people are getting bored, there are only two more chapters of calculations, 16 and 17. After that comes one more chapter,

18, which is more general halachot that are built on the calculations, and after that we go further to... what comes after that? Hilchot Ta'anit. Hilchot Ta'anit comes after that. Okay.

The Importance of Learning the Calculations

But it's very important, and one learns a little each time, in any case one gets a desire to understand better how the Almighty's creation works. Even if one only gets a desire to question the Rambam, shall we say that today's science knows better about something, although it's not true.

It's not true regarding the calculations. Yes, the Rambam's calculations are all more or less accurate. It depends how one says it. If one says it after thoroughly learning the Rambam, you've at least accomplished that you've learned the Rambam well. If one says it right at the first line, it's clear that you're not taking it seriously at all.

One says that it makes a person curious to understand, he's already accomplished something. Yes, curiosity, but truly to learn it, not just to be discouraged, to say discouraged, anyway things that I don't understand. Or just anyway things that are outdated today, it's not outdated. It's outdated, and one needs to fix some detail. Yes, exactly, even if a detail is outdated, or a certain example is outdated, but the essence of the matter... that the moon comes every month is still all true. Much more than that, many more details of it are true.

Overview: The Structure of Chapters 11-17

The One Question That All the Calculations Want to Answer

Okay, so let's recap where we're holding, in a general way, so that we should keep in mind where we're holding.

We remember, as the Rambam says, we're holding one chazarah, all these calculations, in order to answer one question: **Will we be able tonight, the thirtieth night, to see the moon?** That is the only thing we want to know.

In order to know this, one needs to know a bunch of things:

- **One needs to know where the sun is** — for this we learned several chapters, to find out where the sun is.

- **We need to know where the moon is** — we learned several chapters, and we already know where the moon is.

But now, one needs to know an interesting thing: that where the moon is has several details. There are still things that we need to learn.

Orech HaYareach: The Moon's Position from East to West

But the last two chapters basically, and we found out where the moon is, one can say in terms of from east to west, okay? We usually call this the height, between east and west, for a point the longitude. How high the moon is, that is, I call it high, but let's call it from east to west, it will be the clearest.

From east to west, the moon travels each month from west to east, just as the month, the course of everything, is from west to east throughout the mazalot, and they calculated in the previous chapters how to know at which degree, in other words, at which mazal, the moon is located today. Right? That's what they learned now.

Why One Needs to Know How Far the Moon Is from the Sun

Now they've figured out an interesting thing. Since the main thing that causes one to be able to see the moon has to do with how far exactly the moon is from the sun.

Because if it's too far it's not relevant, if it's too close one can't see it:

- Either if it's too close simply because the sun hides it, it doesn't shine on it, it's against it

- And also because sometimes there isn't enough time in the day, if it's too close. In other words, there will only be twenty minutes between the sunset and the setting of the moon. In the time when one can see the moon, the moon is already below the horizon, one can't see it anymore.

So in order to calculate this, one needs to add several more things that one needs to know.

What One Learns in Chapter 16 and How It Fits into the Entire Calculation

The Rambam in this chapter doesn't tell us at all yet why we need to know what we're going to learn, but we're going to explain what it is. We'll see in the next chapter how one uses this to calculate how much time there will be, how far the moon is on this path, and consequently how much time remains between the sunset and the setting of the moon, which causes one to be able to see the moon.

That will be the next chapter, where he's going to put together all the things we've learned until now, to calculate the one question we want to know. And we in this chapter, right?

That is, basically, the Rambam wrote 11, 12, 13, 14, 15, 16, five chapters of like introductions. Now one learns the first page generally how one calculates, the other four learn how one calculates certain fundamentals, each one of them he gives a name: emtza haYareach, haYareach ha'amiti, emtza haChamah, haChamah ha'amitit, etc. etc.

And after that you'll write down as if the conclusion of each one of these chapters, he'll teach you the mass in the next chapter what one does with all this in order to find the answer to whether we can see the moon today.

Investigation: Is the Purpose Only to Know When One Can See the Moon?

It's hard for me to say that the purpose here is only to know when one can see the moon, because the Rambam surely could have made many shortcuts and arrived much more directly to the specific point.

There's a bit of a contradiction here, because the Rambam says clearly that looking at the heavenly systems itself is a mitzvah, **"po'al Hashem lo hibitu"** and so forth. But on the other hand, he didn't make a book of science, he didn't make a book of astronomy.

He found a topic that's relevant to halachah, but within that topic he expands to show how great astronomy is. Like, I mean he plays here as if it's all within Hilchot Kiddush HaChodesh, but his greater goal is to show astronomy, to show as part of his goal that a person needs to know astronomy, because it's the work of Hashem.

I want, let's say, I have a thought about this. Let's say, I don't want to now so much, this is the last chapter and this is already more relevant. I want to talk about this later in the next chapter, I mean the next chapter, the last chapter, the last chapter.

Back to the Practical Question: Could the Rambam Have Made Shortcuts?

In any case, what let's say what's relevant to what I said, it's certain that it could be that the Rambam has other purposes, one needs to be precise. I'm not sure that he could have shortened the way. I thought at night, I thought a whole day, I thought of some other advice that the Rambam could have

had, but it may not have been practical. I'm not clear to myself that he had some way.

In any case, in order to say the average name he says truly, and there are many things that he wouldn't have been able to cut out. Okay, let's think, let's think, there might be a way. We're thinking about it.

The Precision of the Calculations

In any case, what I'm saying yes is in any case that all these calculations are only precise or only in the part and so forth enough that one should be able to, it goes without saying, one should be able to predict this. One can say more details that the Rambam doesn't bring because they're not relevant now. Whether it's truly only so that the beit din should know, that's already another investigation a bit.

It could be the Rambam indeed wrote as I said, so that one should always get a desire. He gives a taste of astronomy, and he does it within the halachot. The Rambam does nothing mi she'libo nokfo, yes? Like the schools that want to teach children a bit about the field, sowing, plowing, they do it when one learns the 39 melachot. They have a good opportunity to learn things. Okay.

Yes, I'm saying like the Rambam began with the desire to explain, and they want to arouse the desire. Okay. It's not us that we can't clearly enough this, it will certainly be an arousal of desire. Okay.

Chapter 16: Rochav HaYareach — The Moon's Inclination North and South

But now let's go back to the chapter. And the chapter the Rambam is going to teach us how to calculate one thing. What is the one thing? The one thing is called, as it says in the heading, **rochav haYareach**.

What Does Rochav HaYareach Mean?

One can say, until now we learned **govah haYareach**, for this **orech haYareach** the Rambam calls it later. Why does he call it orech? Because that's what one says, between east and west. It goes every day. Not every day. Nothing is there every day. We're not coming about every day, we're only coming about the... every day it moves a bit. Every day it moves a bit.

When they speak of the galgal, of the ma'agal hachodshi or hashanshi of the sun. The orech is as if between east and west and orech, because that's like the height that goes as if across the sky.

Now we're going to learn the **rochav haYareach**. In other words, how far the moon is from the sun, that's the main thing. What does from the sun mean?

The Road Where the Sun Travels: The Galgal HaMazalot

In other words, the sun travels every day in the sky on a certain, let's call it a certain **road** — that's the metaphor that makes the most sense to me. The sun doesn't travel every day, throughout the year the sun goes through all twelve mazalot, and from west to east, right?

And it doesn't travel just anywhere in the world in the sky, it travels essentially the **galgal hamazalot** itself — the place where the sun travels, because there are many more stars. Once they used to count 48 forms of stars, constellations, such pictures, one can find more pictures, the twelve pictures that are in the galgal hamazalot, that's where the sun travels. That's the road where the sun travels.

The Moon Doesn't Always Travel on the Same Road as the Sun

It's the moon among all the planets, truly travels more or less on the road. But here they knew that the moon doesn't always travel on the same road as the sun. That is, it travels on the same road, but sometimes a bit up or a bit down. Up and down I mean to say north and south, which is now called **rochav**, on the width, the other way.

This is like **two highways that travel to the same place, and somewhere they come together**. Say, if one looks at the moon, one sees that the moon isn't always on the same line, on the same road, it doesn't always travel the same road as the sun. Sometimes it's up, sometimes it's down, and sometimes it's north or sometimes south of the sun. This we call here **rochav**.

Why Is Rochav Relevant?

Because we want to know also the rochav haYareach in order to calculate our calculation of visibility in the next chapter, we need to know how to calculate the rochav haYareach.

If the moon had its own luminosity, it would be little relevant, but since the moon is dependent on the sun for us to be able to see it, we look the whole time in relation to the sun. This has to do with why we need the whole thing. But in any case, you want to know where the moon is, you need to know also the rochav.

How Does One Calculate the Rochav HaYareach?

The Rambam is going to teach us how to calculate this. Now, how does one calculate this? Okay?

So, says the Rambam, "The circle..." I don't want to say it yet, I want to say the summary of how this is going to work, because he'll understand. And let's try to leave out the more picture that I want to make a bit complicated picture.

Let's try to say just like this: there's a certain course, forget about how it works, there's a certain course of how the rochav haYareach travels. Let's say, it changes throughout the month, truly not only throughout the month, throughout time it changes how high or low, I'll call it now just right and left let's call it, truly, how north and south from the line of the sun, from the road where the sun travels, the moon changes on a certain cycle.

It doesn't change randomly, nothing in astronomy changes randomly, it changes on a certain cycle. Consequently, if we want to know where the moon will be today regarding the rochav, right or left...

General Introduction to the Chapter — Structure of the Calculation

Speaker 1:

Right? Now, the cycle, just like all other cycles we've learned until now, is complicated to calculate. Why? If it would go straight every month, for example, the first day it would be a bit higher, the second day a bit lower and so forth. I'll have to say right or left, first day right and first day left, it would be easy, you would say, it's three, or the time in the year, whatever it is, you'll know that it will be there.

The problem is that it's not so simple. For several reasons it's not so simple. And consequently, what the Rambam is going to do is a bit of a complicated calculation. Why? Because he's going to need to first tell us how to calculate the cycle, how the cycle itself changes. You need to know where the cycle is first

of all. After you know the cycle, there will further be a thing that, as we learned before, an average and a true. Why? Because the cycle itself changes.

It's wheel upon wheel the... like approximately, that the average, goes the emtza and the exact, is wheel upon wheel. First of all, it travels on a cycle, but the cycle doesn't always start from the same place, you need to know where the cycle is holding this year or this minute and so forth. Second, in the cycle itself it's not all times of the cycle the same. As we learned, the sun doesn't travel the same speed every time of the year, the moon doesn't travel the same speed every time of the month, consequently the average isn't enough.

We need to add a correction that the Rambam calls a... what's the code called for the correction? Hamoneh. Hamoneh tells us how far the average is from the exact, and we need to know how to calculate the hamoneh. So consequently the Rambam is going to tell you how to calculate the hamoneh, after that you'll add the hamoneh to the average you'll arrive at the true. That's more or less the whole chapter.

I said in the introduction, so that one should grasp that the Rambam's structure, the Rambam wants here to make it easier for everyone, ratzah haRambam lehakeil al Yisrael. And he always makes it the same structure. Every calculation, since every calculation has the exact and the approximate, you understand that there's a certain structure, a certain pattern, first calculate it approximately, then add the exact.

But here comes another complication, because to know where one is holding in the calculation, which pattern one is holding at all one needs itself a calculation. So one needs to know that, after that you'll know that, you'll calculate the difference of that and something else to make what we call the maslul, which according to the maslul always comes, according to each maslul one adds the maneh, and by adding the maneh you'll know the true. So that's the verses of this chapter.

And as the Rambam comes now, he's going to give for each thing a chart, he's not going to need to calculate anything, he's going to give a chart to say everything that it is. So let's first learn the first halachah and understand a bit. Says the Rambam.

Halachah 1 — The Circle of the Moon and Its Relationship to the Circle of the Sun

Speaker 2:

Yes.

Speaker 1:

The highway, as Reb Yitzchak called it, or the path, the circular path. Iggulah is a term of igul. The circular path, the round path **that the moon always circles on**, that the moon goes on always in its monthly cycle, where it goes through the same circle every month, where is the circle?

Says the Rambam, **it is inclined from the circle that the sun always circles on**. Also the sun has such a circle on which it rotates yearly. And the circle of the moon is noteh me'al. Bent, it's sometimes below, but noteh me'al he means to say... I won't show the picture yet the word. Not next to. It's... at an angle, holler? Inclined? No, it's crooked. It's at an angle relative to it. Let's say like this, okay.

Translation

Just as you imagine two half-circles, one lying under the other, and one is a bit to the side of the other. So **chatzi noteh letzafon v'chatzi noteh ladarom** (half inclines to the north and half inclines to the south). The circle is chatzi noteh letzafon v'chatzi noteh ladarom. It's no longer exactly straight, but there are places where it goes up, where it goes in another direction. Where is my picture? I'll show you the pictures to understand. I think one can't say the Hebrew translation without a picture. I brought here a little picture which will be this. Okay. So where is my picture? My picture even moves, we'll be able to see what is meant. Not only does everything move, even the picture moves.

Speaker 2:

Yes.

Picture of the Two Circles

Speaker 1:

So if let's say, you see an orange circle, yes, here is the world, the sun travels around the world. Here is the sun.

Speaker 2:

Yes.

Speaker 1:

In the middle is the earth, the... It doesn't turn otherwise. Because it does turn, yes. You see the sun travels around the world? It travels around, yes. The sun is the orange ball, it travels around the world. The sun goes steadier, and the moon goes more slowly. The sun is a yearly al hagal. So the sun travels on this.

Now, the moon travels on the green circle that you see. But you'll see that it's not the same place, here it is higher. So when the moon is at this part of its cycle, it will be higher than the sun. Right? Letzafon (to the north). I call it here higher, but it will be more to the right as if, or it will be more to the left. We call it now higher, because that's how the redemption looks. And it's actually higher.

The truth is, we call it orech and rochav (length and width), so I say calculations, but in the world, usually, tzafon and darom (north and south) is higher. That's how one looks at the world, right? One always looks at the world that tzafon is up and darom is down, so it's lower. When it's down, yes, right. These are the two circles. I think it's very easy to see if so... And on the picture are the two places where they meet, but we'll learn that already.

Speaker 2:

Yes, we're learning...

Speaker 1:

I even brought here the Rambam, so we shouldn't have to move away.

Two Points — Rosh and Zanav

Speaker 1:

Says the Rambam, so **shtei nekudot** (two points).

Speaker 2:

Yes, I can say from here.

Speaker 1:

In the two points where the two circles meet together, **shebahem** means **pog'ot shtei igulot zo bazo** (where the two circles touch each other), where the sun and the moon meet on the same street, in the same place, in the same circle. It always means in relation to the mazalot (constellations), right? It doesn't mean that the sun and moon meet, yes?

Because the sun goes with a course of a yearly thing. But the street, the highway, where the sun travels, and the highway where the moon travels, they meet together.

Says the Rambam, **lfikach** (therefore) it comes out, **k'sheyihiyeh hayare'ach b'achat mishtayim** (when the moon is at one of the two), when the moon is at one of the two circles meeting, **nimtza sovev b'igul shel shemesh keneged hashemesh b'shaveh** (it is found circling in the circle of the sun opposite the sun equally), then it looks, if someone would look then he won't even know on which highway the moon travels, because at that small point it's the same, they meet. Then it's exact. He says "sovev b'igul shel shemesh." Yes, the two circles meet.

Digression: Eclipses

Speaker 1:

You understand that then is the eclipse. Okay, it doesn't come in now, but we spoke that every month there are two times in the month. One time when the moon is the kibbutz (gathering), the molad (birth), when the moon is opposite between the sun and the world, then we don't see, because it's completely hidden, right? And the other side is the opposite, when the moon is completely open, then it's completely illuminated.

Everyone asks a question, if so there should be every month a likui chamah (solar eclipse) at the molad, and a likui levanah (lunar eclipse) at the opposite, at the 15th of the month. Answer, why isn't there? Because they don't travel on the same street. So even though it's opposite, it's not opposite, it's a few degrees moved, so one sees. Enough to be able to see, and not enough to make an eclipse.

Exactly, when is there an eclipse? When Rosh Chodesh or the 15th of the month meet at the rosh or at the zanav, which then is exactly, and then one truly can't see.

Speaker 2:

Must this be once a year?

Speaker 1:

Not once a year, because this isn't a yearly cycle. Ah, the sun is a yearly cycle and the moon is a monthly one, but that they should meet together is a rarer thing. It comes out that when they meet, they meet regularly together. The question is do they meet here, at which angle does the world strike.

By the way, you can see, I didn't make it right, but I'll make it exactly. For example, here it meets basically, right? Now, if it meets here, yes, you see, both are, let's say approximately, yes, if both are here, it's opposite the world. But it's not a problem, because one is here and one is here. You need that they should meet here. Right? And that doesn't happen, my chart isn't exact. If it were exact, it could show when there will be an eclipse, when they meet when it's there.

And that they don't always meet at the same time, this has to do with what we'll learn the next section, that this itself changes. And the eclipse cycle is truly the cycle that one learns the next piece. This is only to explain the basic structure. It comes out that this is very simple. One imagines two circles, it's very clear to see that there are two places where they meet.

Continuation of Law 1 — Rosh and Zanav

Speaker 1:

And, he says, the two places where they meet, you can see in which direction the moon goes. **"Uch'sheyetze hayare'ach me'achat mishtei hanekudot, nimtza mahalach letzafon hashemesh o lidromah"** (And when the moon exits from one of the two points, its course is found to the north of the sun or to its south). When it comes to the rosh, then it will go further higher. And when it meets at the... you know that it will go further under the sun, darom (south) of the sun.

Says the Rambam, the Maharsha says, **"Hanekudah shemimenu yatchil hayare'ach lintot letzafon hashemesh, hi hanikre'et rosh"** (The point from which the moon begins to incline to the north of the sun, it is called rosh). There are the two nekudot (points). One we call rosh, that which is up, that which we see as up, closer to tzafon. It's not up, it's more that when the moon is there, it comes higher than the sun. Therefore it's called rosh, as if it goes with its face upward.

"V'hanekudah shemimenu yatchil hayare'ach lintot lidarom hashemesh, hi hanikre'et zanav" (And the point from which the moon begins to incline to the south of the sun, it is called zanav [tail]). Because then it's at the... with the face downward, then it goes said and we go down.

Speaker 2:

Yes.

Speaker 1:

There are other explanations for why it's called rosh and zanav, but we say the simple one.

Explanation: Why Is It Called Rosh and Zanav?

It's not up, it's more that when the moon is there it comes higher than the sun. Therefore it's called rosh. As if it goes with its face as... it goes with its face upward.

V'hanekudah, the point from which the yare'ach begins lintot lidarom hashemesh shenikra zanav, because then it's at the... and with the face upward, then it begins to go down.

There are other explanations for why it's called rosh and zanav, but we say the simple meaning which agrees with the Rambam, yes? This is the simple meaning, except that rosh means one should be with the face upward, one is still in the middle. One should look to the heavens as the Rambam says, one shouldn't look to the depths. Okay.

Innovation: The Rosh Itself Changes

Now, says the Rambam, in the course, now, he said an interesting thing: the rosh itself changes! This one can't see in the picture yet, with God's help, at some point one will be able to see it. Perhaps here? Let's see. I want to show you, the rosh itself changes.

You saw that the rosh changes?

Yes.

No, I want that the rosh itself should move. Understand, the piece that stands as rosh should travel? I don't see yet that it travels. Understand? The whole thing turns. So... the place where they meet, let's say once in whatever, the sun and moon meet. They won't always meet, but every month there are two times a month, they meet on the same area, right? They're not there, but they meet.

This won't happen every month in the same mazal (constellation). Sometimes they meet in mazal Taleh (Aries), and sometimes in another mazal. Why? Because the rosh itself moves. The rosh lies on a wheel and it moves. How it moves,

not in the subject, the whole dreidel turns. Understand? It's dreidels with dreidels with dreidels, everything turns and turns and turns. But this also travels on a certain course. This is the point. He doesn't show it here. So anyway.

Law 1: V'holech Bamazalot Achoranit

This says the Rambam, **v'holech bamazalot achoranit** (and it goes in the constellations backward), it goes backward on the mazalot. That means, normally when one says mazalot one goes from everything beginning from Taleh to Shor and so on. Taleh is Nisan and Dagim is Adar, instead of going from Dagim to Taleh, one goes from Taleh to Dagim and backward.

It means, the igulat hayare'ach (circle of the moon) turns in the opposite way from the yare'ach itself. Whatever, the makom (place), let's say exactly, the rosh, the place where they meet, goes backward.

If you want now to think as seichel hayashar (straightforward logic), since we want to know whether the rosh is letzafon ulidarom (to the north or south), we would have a simple way to calculate to know how far it is from the rosh. Let's say, every day it moves from the rosh two degrees, you add so many days. The problem is though, you don't know where the rosh is. So first one must determine where the rosh is, one must figure out where it is, afterward from there one can calculate. This the Rambam will say further.

Let's go back to the Rambam, I don't want more pictures on this chapter for now.

Law 2: Mahalach HaRosh HaEmtza'i B'yom Echad

What does the Rambam say so? How much does the rosh move? He says, **mahalach harosh v'emtza'o b'yom echad** (the course of the rosh and its mean in one day). Mahalach shaveh (equal course), yes. That means, shaveh means that it travels straight. It's not random, it's not a calendar. **Mahalach harosh v'emtza'o b'yom echad**, how much does the rosh move in mahalach emtza'i (mean course), not just a course that we see, right?

Emtza'i always means as if, let's say, that it goes exactly. Perhaps in practice it doesn't go exactly, for that one must add more portions, as we always see what we say by nekudat hachamah (the sun's point). But the emtza'i is that every day it goes with **shloshah chalakim, three chalakim of a ma'alah (degree), v'achat esreh shniyot** (and eleven seconds).

Mahalach HaRosh for Different Times

And in ten days it comes out one and thirty, and in a hundred days with change, and in a hundred days it comes out five ma'alot with seventy chalakim, because one has come from to a hundred three hundred and sixty already, one only asks the next. In a thousand days it's fifty-two, and ten remainder.

He says, sorry, I'm wrong, chamesh ma'alot is much more than chalakim. Chalakim is only a sixtieth of a ma'alah, no problem. Chamesh ma'alot is much suited to chamesh ma'alot. Afterward at a thousand one is already at remainder. Fifty-two ma'alot, ten thousand is one hundred and sixty-nine ma'alot.

29 days is... in short, the Rambam gives signs and numbers for all these things. It's not any matter to say this, because no one will remember it anyway. It comes that 29 days, which is... yes, is like ma'alah achat (one degree). This is named so one can calculate where one is today, because you won't calculate every month anyway. It means, if you go from last month, because you make the month from every month, the Rambam said, from this he tells you always the numbers of 29 days, simply you should remember, you should stop calculating yourself. 1 ma'alah and 32 chalakim and 7 shniyot. Sign alef-lamed-bet-dalet. Remember, alef-lamed-bet-dalet. There's an Israeli company Elbit, that's it. Anyway.

Nimtza (it is found), one is in a shanah sedurah (regular year), a year that has the same amount of leap months with not, it comes out that yud-chet mem-dalet mem-bet, 18 ma'alot.

Law 2 (Continuation): Emtza HaRosh B'leil HaIkar

Now, since we want to know where it is today, says the Rambam, where was the emtza harosh on leil ha'ikar (the night of the epoch), which we then spoke about in Tammuz. Not in Tammuz, on the 3rd of Nisan, leil chamishi shnat dalet-tav-tav-kuf-lamed-chet (Thursday night of the year 4938). Then is the ikar (epoch) of the Rambam, this one must already remember. And then it was at 180 nun-zayin kaf-chet.

It comes out, you want to know since then, simply, you will calculate from as you make a shemesh from yare'ach, you will subtract 360, you will divide 360, what remains, that is the makom harosh (place of the rosh).

Law 6: Kenegdo Yihiyeh Makom HaZanav

Now, **kenegdo yihiyeh makom hazanav** (opposite it will be the place of the zanav). I think kenegdo yihiyeh makom hazanav. This is an important thing, one must also know when the zanav is. Why? I don't know, soon one will see why one must know it. But it's understood, the zanav is always exactly opposite the rosh. It's very simple, right? It's two circles, both are all circles that we calculate here are exact circles. The opposite is 180 degrees from the rosh is the circles, it's so simple, right?

Laws 3-5: Example — Erev Shabbat 2 Iyar

Says the Rambam an example. Imagine, you want to know where the rosh is erev Shabbat 2 Iyar of the shnat ha'ikar (year of the epoch)? It comes out how much time was 29 days, yes? Between 3 Nisan and 2 Iyar. Make the emtza, that means, what does make the emtza mean? Add to 29 days which was said earlier how much it is on the ikar. It comes out the emtza rosh will be 182 ma'alot kaf-tet lamed-zayin, right?

Take away this from 360. Why must one take away? Because 360 was an exact offset. No, because now I'm still talking about the rosh, not the zanav. You simply must go because it goes backward. You remember that one must take it away, not add it, because the rosh travels backward in the mazalot. So one takes it away from 360, remains 177 lamed-gimmel. V'zeh makom harosh (and this is the place of the rosh) today, opposite everything.

You don't need to calculate with the seconds, and this calculation isn't so important. It comes out, it's a melitzah (figure of speech), no? From "al tifnu el ha'elilim" (do not turn to idols), no? Shniyot is... one thought of this. But here it simply means, the Rambam says earlier "al tifnu el hachalakim" (do not turn to the parts). Yes, because this is a lashon (language), it was such a lashon hapasuk (language of the verse).

Nimtza, it comes out, where is the rosh at the time? B'mazal Betulah (in the constellation Virgo). Why mazal Betulah is at the time? According to makom kuf-zayin, you will calculate, you will see, at 27 ma'alot and 30 chalakim. V'hazanav is kenegdo, it's exactly seven mazalot from the other side. It

comes out the other, everyone knows Betulah is the mazal of the month of Elul, this is a mazal that one learns from Bnei Yissachar, "v'etbonen al betulah" (and I will contemplate the virgin) certainly. Yes, and Dagim is Adar, is exactly opposite, the other side, there is the zanav. And also in the same exact ma'alot, 27 ma'alot and 30 chalakim, which is exactly opposite.

Law 6: Explanation — L'olam Yihiyeh Bein HaRosh U'vein HaZanav Chatzi HaGalgal B'shaveh

And the Rambam explains. The Rambam is a very kind Jew, he explains at length. Says the Rambam, **l'olam yihiyeh bein harosh u'vein hazanav chatzi hagalgal b'shaveh** (always there will be between the rosh and the zanav half the wheel equally). Simple. Chatzi hagalgal means a half world, a half circle. **Lfikach, kol mazal shetimtza bo makom harosh yihiyeh hazanav mazal shevi'i mimenu** (Therefore, every mazal in which you find the place of the rosh, the zanav will be the seventh mazal from it). It means six moved, it's in the seventh. **K'mo minyan hama'alot v'hachalakim b'shaveh** (like the count of the ma'alot and chalakim equally). It has so, **im yihiyeh harosh b'eser ma'alot b'mazal peloni, yihiyeh hazanav b'eser ma'alot b'mazal shevi'i mimenu** (if the rosh will be at ten ma'alot in such-and-such mazal, the zanav will be at ten ma'alot in the seventh mazal from it), you will count the seventh from that one.

Law 7: Hitbonen Bishloshtan — Makom HaYare'ach in Relation to Rosh and Zanav

Now we need to figure out where is the makom hayare'ach (place of the moon). Where? It means, we don't want to know just where the rosh is, we want to know where the moon is, how far is it from the rosh, right? It's very simple. We already know how to calculate the makom harosh and the makom hazanav, we know how to calculate the makom hayare'ach ha'amiti (true place of the moon).

Now says the Rambam so: **Hitbonen bishloshtan** (Contemplate the three of them), calculate together the three numbers. We need to know the zanav also, every time we need to know the zanav equally also, right? Why? **Im matzata hayare'ach b'makom harosh o b'makom hazanav b'ma'alah achat v'chelek echad** (If you found the moon in the place of the rosh or in the place of the zanav at one ma'alah and one chelek), if it's in the same place, this means that the moon is not noteh (inclined) from the shemesh. Because you remember that bizman harosh v'hazanav (at the time of the rosh and zanav), these are the times when they are equal, the moon meets with the street of the sun.

Digression: How Long Are They Equal?

And how long are they equal? He didn't tell us. For every day, what is a difference? It's one day. Today, it travels with the day, it travels every day a bit. And both don't travel everything how. How quickly this happens between the two traveled. It's not for a second, it's enough times. We always make for a certain time, all calculations are for a certain time, we already learned for the sha'at hara'iyah (time of sighting). So at that time is, again, it doesn't change more over the length of a day, it's always approximately the same time.

Continuation of Law 7: Im Lifnei Makom HaRosh — Letzafon HaShemesh

Chunk 3 of 3

If you saw the place of the moon, whether it's at the tail or the head, you know that at that time is the moon. You want to know where the moon is? It's the same place where the sun was. If you see that it's before a quarter of a quarter, it's going to the tail, that means it's already after the head, yes, **lifnei mekom harosh**, you know that it's **litzfon hashemesh**, because then, and remember, after it's at the head it continues to go up.

But conversely, if **lifnei mekom hazanav**, yes, the Rambam says "lifnei" simply because you know the numbers. So if it's less than that number and more than that number, that's what it means, yes? Everything here goes with numbers, we're not looking at any pictures in the Rambam's calculation.

So he says, let's say the head is at one hundred and fifty, and the tail is two hundred and eighty after that, yes, which is three hundred and twenty. You'll know that if it's between the two numbers, then after the head it's toward the north. If it's the opposite, it's toward the south.

Introduction: What is the Latitude of the Moon

Speaker 1:

If it's less than that number and more than that number, that's what it means, yes? Everything here goes with numbers, we're not looking at any pictures in the Rambam's calculation. So he says, let's say the head is at one hundred and fifty, and the tail is two hundred and eighty after that, yes? Which is... three hundred and twenty, you'll know that if it's between the two numbers, then after the head it's toward the north. If it's the opposite, it's toward the south. Toward the south, yes. Yes, you know that you're reaching toward the south.

Definition of Terms: Netiyah and Rochav

Speaker 1:

The Rambam says, learn the words. **"Hanetiyah shenoteh hayare'ach litzfon hashemesh o lidromah"**, the netiyah, the way that it goes... not the way that it goes, the distance that it is from the ecliptic of the sun. How far, netiyah means how much it's moved away from the sun.

Speaker 2:

No, netiyah doesn't mean distance.

Speaker 1:

Yes, it means distance. Distance. How far is... the opposite of the point of intersection, that's called netiyah.

Speaker 2:

Right, exactly.

Speaker 1:

If it's a bit moved away from the sun, we call that rochav hayare'ach (latitude of the moon). Because the width, not the width of the moon itself, it's how far away the moon is from the ecliptic of the sun. From the... the orbit of the moon from the ecliptic of the sun.

Speaker 2:

Stick to English, the ecliptic of the sun.

Speaker 1:

"Ve'im hayah noteh litzfon nikra rochav tzfoni". He's just saying words, what he'll call it. **"Ve'im hayah noteh ladrom nikra rochav dromi. Ve'im hayah hayare'ach be'achat mishtei hanekudot"**, when it's at one of the two points of intersection, as the second rabbi says, **"lo yihyeh lo**

rochav", it doesn't have any other latitude, it's not far from the ecliptic of the sun.

Maximum Latitude: Five Degrees

Speaker 1:

The Rambam says, **"Le'olam lo yihyeh rochav hayare'ach yoter al chamesh ma'alot bein batzafon bein badrom"**. The orbit of the moon doesn't go far away from the ecliptic of the sun more than five degrees. That means the farthest is five degrees. **"Ela kach hi darkah, yitracheik min harosh"**, how does it distance itself little by little? It moves further from the ecliptic of the sun, but at a distance, and the distance only goes up to a certain distance, which reaches five degrees. From the point of intersection it moves further and further, but somewhere it starts to come back down, and it becomes closer and closer again. The farthest is five degrees. As I say, I had little by little, **"ad shelo yihyeh lo rochav keshehegia lazanav"**. When it comes to the tail it has no latitude, it's not further. And then it distances itself again little by little.

There are two places after the point of height where it becomes further again. The Rambam says this so that he should understand that there are four steps here basically, right? There is, as we learned by the sun similarly, right? There is a period where it becomes further until it's the farthest, which is five, then it becomes closer, then it becomes further again toward the south, and it becomes closer. The same thing.

Calculating the Course of Latitude

Speaker 1:

Now, the Rambam says, if you want to know, they don't yet know what to figure out where the moon is. We don't yet know the latitude of the moon, right? Let's catch up, what have we calculated? They calculated where the head and tail are, where the head is, therefore where the tail is, because it's exactly opposite. We already know that, yes? We also already know how far the moon is from the head, yes? We know that, but we don't yet know more than that. I still want to know the latitude, right?

So the answer is very simple: make the number, right? That is the maslul (course). Remember, maslul is always the number that tells us the difference between one thing and another, how far it is already on its way, so to speak. Maslul is the way by the Rambam, not the street, but the way that it has traveled.

So the Rambam says like this: make the calculation of how far the head is from the true moon, right? That's the maslul, that's how far it is from the latitude. Right? Yes? Now, according to how far it is, you automatically know how far the latitude is, because it's in a fixed manner, but not fixed, because there are four other parts where it can be, right?

Therefore you need to see it simply. If it's between one and one hundred eighty degrees, the latitude, maslul harochav, right? Maslul harochav means how far the moon has traveled from its head... from its head, whatever you want to call rosh hama'agal, then you know it's tzfoni (northern), because remember, from the head it starts to go up. If it's more than 180, that means it's already passed through the tail, you know it's below. And if it's exactly 180 or 360, you know it's equal. Yes?

Menat Maslul Harochav — The Correction

Speaker 1:

Now, very good, you already know where the moon is in its maslul harochav. The problem is that the maslul harochav is not exact, because the maslul harochav is only an average. Remember, average is not good, we need to know exactly. What do you do? You add a menah (portion).

And here we're going to go further with gezeirat hakatuv (decree of Scripture) from the Rambam, because we don't understand why the menah. The menah is the difference between the average and the true here as well. That is, the entire calculation that we learned from the head of the moon, from the whole thing, is only an average, emtza'i. The Rambam calls it emtza'i, let's call it emtza'i. But we want to know the true place, and therefore the Rambam gives us codes. He doesn't tell us why, you know why he needs to learn more? Look, as it were, as the Maggid Mishneh from those chapters, the commentator explains a bit, and more books come.

And the Rambam gives you a menah that you need to add to the maslul harochav, which will tell you, after you add or subtract according to the calculation, this will tell you where the actual latitude of the moon is.

The Rambam says, "vetachzor vetir'eh," after you know the maslul harochav, you'll see how much the menat maslul harochav is, "vehi shi'ur netiyatah latzafon veladrom." That's how far it is to the north or south, "vehu hanikra rochav hayare'ach hadromi hatzfoni kemo shebeiarnu." That is, by this, the Rambam says, you don't need to add the menah to the maslul, simply at each place the menah is already equal to the latitude, understand? That's how I understand it.

Table of Menat Maslul Harochav

Speaker 1:

"Vekamah menat maslul harochav," he says, he gives a list:

- If it's ten degrees, that is it's ten degrees away, then the menah is 52 chalakim (parts)

- If it's 20, it's one whole degree and 43 chalakim

- If it's 30, it's two degrees and 30 chalakim

- If it's 40, it's three degrees and 30 chalakim

- If it's 50, yes, it's three degrees and 50 chalakim

We notice that it's already going back down, right? If it's 60, it's 4... sorry, here it's still going up. It's still going up. The greatest is five, as said, it's the greatest. Ah, very good.

- Four degrees and 42 chalakim

- If it's eighty, it's four degrees and 55 chalakim

- If it's ninety, ah, very simple, because ninety is a quarter

Every quarter, very good. So we only need to know a quarter. Very good. So I remember earlier the Rambam... you could when you can say a quarter, and from there go down. Okay. That's what he does. That's what he does. His numbers only go by a quarter.

Speaker 2:

No, you need to know exactly where it is at every ten degrees.

Speaker 1:

As the Rambam always makes the... he helps out. From ten degrees, then you have to calculate between them.

Speaker 2:

You can't calculate.

Speaker 1:

Because it changes, remember? It's not exact, you can't divide the whole ninety. You have to believe the Rambam that approximately between the tens is precise enough in the Rambam's calculation that you'll arrive between the tens. Because if you just say divide ninety, you won't arrive at the correct one, that's still the average, and you want to know the menah, you want to know the exact. Therefore you need to know the menah.

Example: Interpolation Between Tens

Speaker 1:

The Rambam says, if you're at one, you'll do the calculation that was done before. And he gives an example. I don't know why he needs to give an example. Let's say the maslul harochav comes out thirty-five degrees, and you already know... sorry, fifty-three, and you already know that fifty is the menah three degrees fifty chalakim, and sixty is four degrees and twenty chalakim.

It comes out, how much is between three degrees and fifty and four and twenty? Fifty, exactly right? Sorry, thirty, yes? From fifty to twenty is thirty, there are sixty chalakim in a degree. It comes out, what's in between is thirty? It comes out, each degree there is in the tens, in the decade, each degree becomes three chalakim. Now, the menah of fifty-three is three degrees and fifty-nine chalakim. Right? Instead of fifty, add nine.

So, in short, the Rambam makes very simple math. So you'll know at every number what the menat hamaslul larochav is.

Calculating for All Four Quarters

Speaker 1:

Therefore, here it's a bit different than... why it's different I don't know, but here it's a bit different than by the sun where the Rambam said 180, he says on the other side you'll do minus instead of plus. Here he only says 90, because it's exactly the opposite of the other, which goes up and up and up and down.

It comes out, you know up to 90, you know everything. Why?

- If it's from 90 to 180, subtract 180, and you know, make minus

- If it's more than 180 to 270, which is the third quarter, subtract 180 and you know the menah

- If it's from 270 to 365, subtract it from 365, you'll know the menah

Yes? And he gives an example for the whole thing.

Examples from the Rambam

Speaker 1:

"Keitzad?" For example, the maslul is one hundred and fifty, subtract it from 180, there remains 30, and you know that 30 is the menah two degrees and 30 chalakim, you know that this is the menah of one hundred and fifty, two degrees and thirty chalakim.

What is two hundred? Two hundred is how much? It's more than 180. Therefore you subtract 180, there remains 20. And 20 you already know the menah of that, which is one degree and 43 chalakim. The same thing two hundred, yes, that's approximately the menah of two hundred, that's a word.

If it's three hundred, further, you subtract it from three hundred and sixty, you subtract sixty, and you already know the menah of sixty, because that's in all menah.

North or South

Speaker 1:

Now, you only need to know one thing, whether it's in northern latitude or southern latitude, we haven't yet calculated that. You need to know, the Rambam says, first you need to know the direction and the wind before, it's a northern or southern wind, and he gives an example.

He has another way to become aware by waiting a few days and going in which direction it goes, no? But he wants to know now. He waited a few days, one can probably always. We need to know tonight if the moon comes. We're waiting for tomorrow, the whole calculation is already over, we don't need to. He can once see if the moon is there. The whole thing... he could also have looked a few days back, but I want to say, he gives you an example when you look now.

The Rambam wants to be able to calculate for four years around so that they should sanctify the month then. I said, never look at the moon, yes? I said that we don't yet know north or south, we already know that, we already know that we're more than 180 degrees, that's not a problem.

What we need, the Rambam simply gives an example from the same year, the second month from his principle, the month of Iyar, yes, from the eve of Shabbat night, the second day.

Continuation of the Practical Calculation for the Night of the 2nd of Iyar

Speaker 1:

What is that? Two hundred and thirty-one degrees and ten chalakim, 231:10.

Yes, and the Rambam says, by a maslul the chalakim don't matter.

It comes out, the menah is from how much? From one hundred thirty-one, which you need to subtract one hundred eighty. You remain with one hundred thirty-one we said that it's the menah of what?

Well, what if I come to a number that's after one hundred and eighty?

Speaker 2:

Yes, two hundred.

Speaker 1:

And what did the Rambam say here, **"Shmuel matzil Yisrael Yosef me'ah shmonim,"** you subtract one hundred eighty, right? You remain with how much? Twenty, yes, twenty-one, here, because you said that it was... you know? Two hundred and thirty-one.

Speaker 2:

Ah yes, you remain with fifty, right?

Speaker 1:

And you already know that the menah of fifty is three degrees and fifty-three chalakim, and that's the latitude of the moon from the night of the 2nd of Iyar. And you also know that this is southern. Why? Because it's more than one hundred eighty, and more than one hundred eighty is the southern side.

Conclusion: The Rules of the Latitude of the Moon for All Days of the World

Speaker 1:

Until here we have already figured out the latitude of the moon for all days of the world, according to the Rambam's rules. And this is very simple.

And what one doesn't understand, he can learn according to tradition what the teli means, the serpent with the head, because soon comes Rosh Hashanah, we need to say "shenihyeh lerosh velo lezanav" (that we should be for a head and not for a tail), there are great secrets in the head and not the tail, but we've learned there from the simple meaning meanwhile. Yes?

Speaker 2:

Yes.

Speaker 1:

It's simple, right?

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