Laws of Sanctification of the New Month, Chapter 12 (Auto Translated)

English

Auto Translated

Shiur Overview

Summary of Chapter 12 — Laws of Sanctifying the New Month (Rambam)

General Introduction to the Chapter — The Rambam's Method in Cheshbon HaRe'iyah

The Rambam's Words

The Rambam writes in chapters 12-17 the conclusions — the facts and numbers that one needs in order to calculate whether one can see the moon — without explaining why, from where it comes, or what disputes exist. He calls the sun and moon "holy bodies."

Simple Meaning

The Rambam's approach in these chapters of cheshbon hare'iyah is identical to his method throughout the entire Torah: he writes only "halachah pesukah" — conclusions without sources, without disputes, without explanations. So too here in astronomy he writes only the knowledge/conclusions that one needs in order to calculate.

Novel Points and Explanations

1. **"Mishnah" not "Talmud":** The chapter is "Mishnah" — finished conclusions. The "Talmud" part (understanding why the numbers are so, from where they come) is a separate study. This is the same principle as in all other laws in Mishneh Torah.

2. **The Rambam limits himself to only one question:** whether one can see the moon on a particular night. He doesn't write about the science of astronomy in general, although he holds (in Hilchos Yesodei HaTorah and Hilchos Teshuvah) that it is a mitzvah to study science in order to recognize the greatness of Hashem. The Gemara (Shabbos 75a) says: whoever can calculate tekufos and mazalos and doesn't do it — "ve'es po'al Hashem lo yabitu." But the book of Hilchos Kiddush HaChodesh is only for the practical purpose.

3. **Simplification:** The Rambam says explicitly that he's not writing for astronomers, but for simple people. When something is too complicated and not relevant, he skips it (e.g., seconds when they're not relevant). Often he gives only conclusions of a calculation without showing how one arrives at it.

4. **Rav Chaim Kanievsky's introduction to Shekel HaKodesh:** He says that his commentary tries to do on the astronomical laws what the Maggid Mishneh and other commentators do on all other parts of the Rambam: explain from where it comes, point out difficulties (such as that the Rambam's calculation doesn't match exactly with reality or with other sources), and try to resolve them.

5. **"Rambam is the easiest book in Judaism":** The Rambam is actually the easiest book to learn, because he writes only conclusions. The difficulty comes only when people want to make "shtiklach Torah" — that is, when one goes deeper into sources and questions. On the simple level it's quite straightforward, and the mathematics here is only plus, minus, times — one needs a calculator only because the numbers are long, not because it's complicated.

The Central Question of These Chapters — Re'iyas HaLevanah

Simple Meaning

The only question the Rambam wants to answer: on the thirtieth day (after 29 complete days from the last Rosh Chodesh) can one already see the moon tonight (leil sheloshim = leil re'iyah), or only tomorrow night (leil ibur — the month is 30 days). This is relevant to beis din — whether they should sit and wait for witnesses, to sanctify the month.

Novel Points and Explanations

1. **Kiddush al pi cheshbon:** The Rambam holds (will bring in chapter 18) that one can truly sanctify the month al pi cheshbon even in the time of re'iyah, if one knows clearly and witnesses haven't come. This makes the calculation even more practically halachic.

2. **The two main factors for re'iyas halevanah:** In order to know if one can see the moon, one needs to know two things — where the **moon** is, and where the **sun** is:

- **The moon should be far enough from the sun in one direction** — that there should already be a portion of the moon's light turned toward us (enough from the molad has already passed, the moon already has a shining part).

- **The moon should be far enough from the sun in another direction** — that the sky should be dark enough. Because at the beginning of the month the moon is very small, and when it's too bright one simply cannot see it. One must wait until after sunset when it becomes somewhat dark.

3. **When one sees the moon:** One sees the moon on the first night of the month always right after sunset — approximately 20 minutes after sunset until about an hour later. This is because at the beginning of the month the moon travels almost with the sun, only slightly "behind" — it sets a bit after sunset. Therefore one always looks in the western direction at sunset.

4. **Note:** The Rambam himself said (in a previous halachah) that it can happen that one sees the moon even before sunset on the first day — but this is not common.

Halachah 1-2: Mahaleich Emtza HaShemesh BeYom Echad

The Rambam's Words

The sun travels through in one day 59 chalakim (degree-minutes) and 8 shniyos (seconds). That is, slightly less than one complete degree of the 360 degrees of the galgal.

Simple Meaning

The sun moves around the sky (through the mazalos) in 365 days, but the galgal has only 360 degrees. Therefore the sun goes each day slightly less than one degree — exactly 59 chalakim (minutes of a degree) and 8 shniyos (seconds).

Novel Points and Explanations

1. **Why slightly less than a degree:** 360 degrees ÷ 365 days = slightly less than 1 degree per day. This is a simple logic — 365 days for 360 degrees means that each day covers less than a full degree.

2. **The Rambam simplifies the numbers:** In truth the mahaleich hashemesh beyom echad is not only 59 chalakim and 8 shniyos — there are also shlishiyos and revi'iyos (as learned in previous chapters). But for one day the difference is not relevant, therefore the Rambam leaves it out. For ten days however a small difference already returns — and this explains why when one multiplies 10×(59 chalakim, 8 shniyos) it doesn't come out exactly the number that the Rambam gives for ten days. The Rambam calculated the shlishiyos/revi'iyos into his finished numbers, but he doesn't tell us how he calculated it.

Halachah 2-3: Mahaleich HaShemesh for Different Time Periods (10, 100, 1000, 10,000 days)

The Rambam's Words

The Rambam gives finished numbers: for 10 days — the mahaleich. For 100 days — 98 degrees, 33 chalakim, 53 shniyos. For 1000 days — remainder mahaleich of 265 degrees, 38 chalakim, 50 shniyos. For 10,000 days — remainder of 136 degrees, 28 chalakim, 20 shniyos.

"And so if you want to make signs... for two days, for three, for four, up to ten... and it is a revealed and known matter, since you know the mahaleich of one day" — you know everything.

Simple Meaning

The Rambam gives finished tables for different time periods. For 1000 days and more he gives only the "she'aris mahaleich" — the remainder after subtracting complete circles (360 degrees), because one only wants to know where the sun stands in the sky, not how many times it has gone around. The Rambam also says that one can make tables for oneself for whatever number one wants, because if one knows the mahaleich of one day, one can calculate everything.

Novel Points and Explanations

1. **Conclusions, not calculations:** An important principle — the chapter is not written so that one should learn how to calculate, but so that one should use the finished results. The Rambam gives only conclusions (finished numbers), not the "nimtza" (the calculation process). This is different from molad halevanah in the previous chapters, where the Rambam taught the process itself.

2. **Why 10×59:08 doesn't match the number for 10 days:** Because the Rambam has in the 10-day number already calculated the shlishiyos/revi'iyos that he left out for one day. A student who thinks into it sees the difference, but for practical purposes one doesn't need to know it — one simply uses the Rambam's finished number.

3. **She'aris mahaleich for 1000 days:** For 1000 days the sun has already made more than two complete circles (2×365 = 730 days), the remainder of 1000÷~365 gives the she'aris. One only needs to know where in the sky the sun stands, not how many years have passed.

4. **Question: Why did the Rambam make 10,000 days?** The Rambam will never use the 10,000-day numbers in practice, because he will always calculate with years (as he says right after). Perhaps he brought it only in order to teach how the method works (how one calculates she'aris mahaleich, etc.), not for practical use.

Halachah 4: What One Actually Needs to Have Ready — 29 Days, Month, and Year

The Rambam's Words

"And it is proper to have prepared and known the mahaleich emtza hashemesh for twenty-nine days... and for twelve months which are the days of a lunar year when its months are in order" — 354 days (regular year).

Simple Meaning

For practical purposes one needs to have ready: (a) mahaleich of 29 days, (b) mahaleich of a month, (c) mahaleich of a lunar year (354 days when months are in order). The Rambam will immediately give the finished numbers — when he says "and it is proper to have prepared and known," he doesn't mean that you should calculate it yourself, but he will give it to you.

Novel Points and Explanations

1. **Why specifically 29 days:** Because from one re'iyah (seeing the moon) until the next re'iyah is always exactly 29 days — "for twenty-nine complete days from leil re'iyah until leil re'iyah of the next month." A full month (30 days) is only a calendar matter, but for re'iyah-calculation it is never more than 29 days. The doubt whether one will see the moon is only on the 30th day — if yes, then anyway there is no doubt (one has already seen).

2. **Regular year plus one day:** From one re'iyah of Nissan until the next re'iyah of Nissan is always a regular year (354 days), or sometimes 355 days. This is because the true month is slightly more than 29 days, 12 hours, 793 chalakim, which can sometimes bring that all months should be full, and then the year becomes 355 days.

Halachah 4 (continued): Mahaleich Govah HaShemesh (Apogee of the Sun)

The Rambam's Words

"There is one point in the galgal of the sun, and so in the other galgalim of the seven stars... that the star should be high above the earth by so much... and the point of the galgal of the sun and the other stars except for the moon makes circles equally... and its mahaleich — every ten days one shniyah and half a shniyah which is thirty shlishiyos."

Simple Meaning

Besides the mahaleich hashemesh itself (where the sun stands in the sky), there is another factor — the **govah hashemesh** (apogee), the point where the sun is farthest from the earth. The govah also moves, very slowly — one degree in seventy years.

Novel Points and Explanations

1. **Explanation of govah hashemesh according to ancient astronomy:** According to the old model, the sun rotates on a perfect circle (galgal), but **the earth is not exactly in the center of the circle** (eccentric orbit). Therefore the sun is sometimes closer and sometimes farther from the earth. The point where it is farthest is called **govah**. This is important for the calculation because it affects how fast the sun appears to move from our perspective.

2. **The govah also rotates:** The govah-point doesn't stay in one place, but it rotates around — **one degree in seventy years**. This means that a complete round (360 degrees) takes 360 × 70 = 25,200 years. This is what is called today "precession." A parable: Look at it like a mountain whose peak rotates around the world — although the galgal itself is a perfect circle, from the earth's perspective one sees a "peak" (the farthest point) that moves.

3. **Numerical values for govah hashemesh:** Mahaleich of 10 days = 1.5 shniyos (seconds); 100 days = 15 shniyos; 1000 days = 2 chalakim 30 shniyos; 29 days = 4 shniyos; a regular year = 53 shniyos. These are very small numbers because the govah moves almost not at all.

Ikar (Epoch) — The Starting Point for the Calculation

The Rambam's Words

"The ikar from which you will always begin is from the beginning of Thursday night, 3 Nissan of the year 4738." The place of the sun then: "7 degrees 3 chalakim 32 shniyos from the mazal of Aries — siman zaglav." Govah hashemesh then: "26 degrees 45 chalakim 8 shniyos from the mazal of Gemini — siman 26 mem-ches."

Simple Meaning

The Rambam establishes a fixed starting point (epoch) from which all calculations are made. He gives where the sun and where the govah hashemesh were at that moment.

Novel Points and Explanations

1. **The ikar is a fact, not a calculation:** The Rambam establishes it "like halachah without mixture" — as a fact. One must simply **believe the Rambam** that then it was so, and from there one calculates further.

2. **Why one needs an ikar:** All the numbers that the Rambam gave earlier (mahaleich for a day, month, year) are only **distances** — how much the sun travels. But one also needs to know **from where one starts**. The ikar gives the starting point.

3. **Simanim as mnemonic tools:** The Rambam uses **simanim** (mnemonic codes like zaglav, shin-mem-ches nun-hei, kaf-vav mem-ches) throughout the chapter. The point is that numbers alone (like "29, 200, 700, 3, 1") no one would remember, but a siman makes it memorable.

Example of Calculation — Mekom HaShemesh

The Rambam's Words

If one wants to know mekom hashemesh at the beginning of Shabbos night, 14 Tammuz of that year — that is exactly 100 days after the ikar. One takes mahaleich of 100 days (98 33) and adds to the ikar (7 3 32). It comes out: 105 37 25 — that is 15 degrees 37 chalakim 25 shniyos from the mazal of Cancer.

Simple Meaning

A practical example of how one calculates mekom hashemesh: take the number of days from the ikar, take the mahaleich for that number of days, add to the ikar, and you know where the sun is.

Novel Points and Explanations

1. **"Kabetz min el mino":** One adds degrees to degrees, chalakim to chalakim, shniyos to shniyos — as already learned earlier.

2. **105 = mazal Cancer:** Mazal Cancer is the fourth mazal (after Aries, Taurus, Gemini), that is it begins at 90°. 105 means 15° in mazal Cancer.

Note About Unequal Days

The Rambam's Words

The mekom emtza hashemesh that comes out from this calculation can sometimes be at the beginning of the night an hour before sunset or after sunset an hour, because one calculates according to complete days of 24 hours, but sunset is not always the same time. Don't worry — it will be completed when one comes to emtza yarei'ach.

Simple Meaning

Because one calculates according to fixed 24-hour days, the result can be a bit off from the true sunset time. This will be corrected later when one calculates emtza yarei'ach.

Novel Points and Explanations

1. The entire calculation of mekom hashemesh is only a step toward the true goal — **to know where the moon is** (re'iyas halevanah). When one will combine sun and moon, one will then equalize the difference of unequal days.

Flexibility of Ikar — One Can Make a New Ikar

The Rambam's Words

"You don't have to go with my ikar — you can make any other ikar." When you already know where the sun is on a certain day, you can use that as a new ikar. "The choice is in your hand." One can begin the calculation from the beginning of a machzor, or from a certain hundred years.

Simple Meaning

The ikar of 3 Nissan 4738 is not me'akeiv — any known point can serve as an ikar. The calculation remains the same, because one calculates everything relatively. One can place the ikar where one wants — earlier or later than the Rambam's ikar — and the result will be the same.

Novel Points and Explanations

1. **The Rambam's method in this halachah:** Earlier the Rambam calculated with ten thousand days (complete days), now he calculates with simple years. He explains that one must know what type of year each year was — regular year (354 days), year whose months are full (one day more), deficient year (one day less), leap year (29, 30, or 31 days more than a regular year). One adds or subtracts according to how many years it was, and one arrives at the desired time.

2. **Why the Rambam is lengthy on this matter — an important chiddush:** The Rambam consciously made a **new ikar** — instead of calculating from Creation (the molad

BaHaRaD or tekufas Nissan harishonah), as the Gemara calculates, the Rambam began from a later time. This can raise a claim: why did the Rambam change the ikar from the Gemara? **Therefore the Rambam is lengthy to prove that one can calculate backwards** — that one can from his ikar go back to Creation and know where the sun was then. This proves that there is no contradiction to the Gemara — it's only a practical abbreviated change, not an essential one.

3. **An alternative explanation why one would want a new ikar:** Quite practically — for a certain need it's easier to work with a number that is "even," which comes out at a different time. It's a purely practical thing, not ideological.

4. **Practical use:** When one has already calculated mekom hashemesh for today, one can from today begin calculating further, instead of always going back to the original ikar.

5. **The foundation of the entire calculation:** The entire calculation is a preface to a practical reckoning. It only works if one accepts the Rambam's premises — that the sun was in that place at that time, and it goes each day a certain amount. From there one makes plus or minus, and one arrives where one needs.

6. **The same principle applies to yarei'ach and other stars:** The Rambam says that the same method can be applied to the moon and other stars, if one knows their mahaleich.

Conclusion: With this is concluded chapter 12 of Hilchos Kiddush HaChodesh — the chapter that establishes the foundation of mahaleich emtza hashemesh, mahaleich govah hashemesh, the ikar, and how one calculates mekom hashemesh for a particular day.

Full Transcript

Laws of Sanctifying the New Month, Chapter 12 — Introduction to Calculating the Sighting of the Moon

General Introduction to Chapters 12–17

The Rambam's Approach in the Chapters on Calculating the Sighting

Rabbosai, we are learning the holy sefer Mishneh Torah of the holy Jew Rabbi Moshe ben Rabbi Maimon, the famous sage, tzaddik yesod olam, tzaddik emes. And we are learning Hilchos Kiddush HaChodesh, and we are learning chapter 12. We are going to learn about the holy sun and the holy moon. It's going to be such a holy mode. As you say that the Rambam calls them... yes, gufim kedoshim (holy bodies). There is a place where he calls them that. Yes.

Let me say approximately, because here, just as the Rambam already made his introduction essentially to what he does here in all these chapters until chapter 17, he already said essentially earlier in the previous chapter what he does, but now that we are going to say certain introductions before the actual calculation, I will say briefly what I am saying further from the holy Rambam as explained by Rabbi... I don't know what he's called, Lubavitch? No, Lumengl made a sefer Rambam HaAruch. And the Rambam Mevo'ar, it says, I don't know who the author is, it's probably a team, it's from the Lubavitchers, they call it Adirus Chitrik, but they wrote a beautiful explanation in a simple manner on Hilchos Kiddush HaChodesh. And I'm saying approximately what I understood from this topic, such a thing.

The Rambam's Method: Mishnah, Not Talmud

We have learned, our Rambam already said in the previous chapter, that we are, there is certainly a great chochmas hatechunah (science of astronomy), a great wisdom of how the world works, and whoever is not curious about this, his spirit is not proper and his mind, whatever it is, his heart errs and lacks knowledge of wisdom. This is true.

Nevertheless, the sefer Hilchos Kiddush HaChodesh is not set up to explain all the movements of the stars from kol haTorah kulah (the entire Torah) of the entire world. This is certainly a great matter to learn. And the Rambam says that it is a mitzvah, in Yesodei HaTorah and in Hilchos Teshuvah the Rambam says that it is a mitzvah, every Jew should occupy himself, now comes aseres yemei teshuvah (the ten days of repentance) soon, to learn more science, through this to know the greatness of Hashem. The Gemara says that whoever can calculate tekufos umazalos (seasons and constellations) and doesn't calculate, about him the verse says "ve'es po'al Hashem lo yabitu" (and they don't look at the work of Hashem), he doesn't want to look at the actions of the Almighty.

But, nevertheless, the Rambam's sefer is not about the entire thing, but about the one limited thing that I said earlier, I mean he's going to say it here also in this chapter again, to know the answer to one question.

We learned last night that when one learns anything, one must always keep focus to know what one wants to know, because one cannot always learn kol adam kulo (the entire person) all at once and one doesn't get anywhere. So here the Rambam wants to know the answer to one question, which is when one can see the moon. That's the whole thing.

The Rambam's Limitation: Only What Is Relevant to the Matter

He can say like this, that a Jewish sage must know all the wisdoms of the heavens, but in the Sanhedrin they had to know at least this for certain, Hilchos Kiddush HaChodesh. How much... there is a part of astronomy that every judge in the Sanhedrin had to know. Apparently, how much one would really have to know, we already discussed, it's not clear.

About this I've been going for a long time that the reason why the Rambam is so complicated, and it is indeed about the wisdom in it, but on the other hand he is tremendously limiting himself to know only the part that is relevant to this.

Now, I will say another chiddush (novel idea), an important thing. Not only is the Rambam limiting himself only to say the part relevant to the matter of the calculation, to know whether we can see the moon today, and therefore whether the Beis Din should sit, or whether they should sanctify the witnesses, or he brought that we will see in chapter 18 that the Rambam holds that one can truly sanctify al pi hacheshbon (according to calculation) even bizman re'iyah (in the time of sighting), if one knows clearly and no witnesses came, it's possible that one can sanctify al pi cheshbon (according to calculation) even. All these things.

The Rambam's Method of Learning: As in Kol HaTorah Kulah

Even this he didn't explain, he did essentially as the Rambam does in kol haTorah kulah. So the Rambam's derech halimud (method of learning) that he teaches us the science, is the same derech halimud that he teaches us Gemara and halachos of all things.

That is, that he doesn't tell us, he doesn't begin to explain to us the why and how we know and all the disputes that exist, and who says this and who is right, etc. He's not interested that they should understand this, this will certainly be the shlish baTalmud (third in Talmud), one must learn this, but now we are learning Mishnah.

So this the Rambam also wrote as Mishnah, which contains only the knowledge, the conclusive knowledge that one must know in order to be able to calculate. Certainly, the calculations that the Rambam says in the mitzvah, one must calculate oneself, because every month is a different calculation.

The Rambam didn't simply make a chart of every month that it's doubled for generations when one can see the moon. He made a luach (calendar), but a general luach is not a specific luach. No, he did make a luach, because what he makes here is basically luchos (tables), but the luach is calculations. Approximately like there is a luach in the previous chapters about when the month will be, and it says from writing the year 5786, and so he writes that there is a cycle of nineteen years and it comes out and so forth.

The same thing is here. He writes certain rules of facts, he doesn't write how we know them and who says and so on, which based on this one can simply add up what he's going to calculate at the end of the calculation how we know whether we can see the moon. So this is the great, like a summary, or halachah pesukah (decided law) that the Rambam does even in these halachos.

The Commentators' Approach: Explaining the Sources

And all the commentators, essentially, I saw Rabbi Chaim Kanievsky's introduction that we learned earlier to his sefer Shekel HaKodesh, he says that this is essentially what he tries to do in his commentary on most of the halachos, to explain as all the commentators do on all parts of the Rambam, to explain as the Maggid Mishneh does, to explain the question and answer, from where does it come?

Yes, afterwards it's difficult, there are difficulties, the Rambam says things that don't match, there are difficult Rambams in these halachos also. That is, the same sort of difficulty, that apparently, if one looks into the reality or into the sources, one sees that his calculation doesn't match exactly and so forth, such sorts of problems.

But our derech halimud is first to do what the Rambam wanted us to do.

The Simplicity of the Math in These Chapters

So therefore we have essentially all these chapters already easy, because astronomy and math is perhaps difficult, but the math that the Rambam does here is all simple math of plus minus times. It's nothing, one needs a calculator but take a pen, because they're longer numbers, one can't do it in one's head. But it's not complicated, many times he skips explicitly.

As he said, when it's too complicated and it's not relevant, he skips it explicitly. Yes, around numbers, or around means he takes, he rounds down the smaller levels, like the seconds, he doesn't tell us sometimes if it's not relevant and so forth. And he tells us many times the conclusions of a certain calculation, which he doesn't even say how one should arrive at the calculation. He only says, if you want to calculate whether one can see the moon, you will use this number. Why this number? So the Rambam said.

"Rambam Is the Easiest Sefer in Judaism"

So, they're quite easy chapters really, it's much easier than most other chapters in the Rambam. That is, essentially as easy as all chapters, because the Rambam says the conclusions. So, we will learn simply what it says. Makes sense? One doesn't need to delve deeply. I'm saying it, yes, one must simply do the... It's very simple basically what the Rambam did. So certainly this chapter is all very simple.

It only becomes really complicated much later when one comes to chapter 17, which is when the actual calculations that one must do come. But even then, he says, the Rambam did his best that whoever said it should be... How did he call the previous chapter? For whoever is not accustomed, the Rambam says clearly, I'm not making it for one who is an astronomer. One who is an astronomer, he comes up with questions on the Rambam. The Rambam makes it for simple everyone.

So, now let's... So, this is an introduction to the approach of the chapters, and in order to say it to the public in secret that it's quite easy. It's only difficult like the entire Rambam. Rambam is the easiest sefer in Judaism, ever. There is no single Jewish sefer in the world that is easier to learn than Rambam. And nevertheless, in the shiur one always hears about many Rambams. Why? Because people, Jews have some desire that it should be difficult, because then one can make shtiklach Torah (Torah insights). Yes.

The Central Question: Whether One Can See the Moon on the Thirtieth Night

So now, let me say something in another introduction that we also understood earlier. Now, what must one know? They said that they have only one question, and the question is whether, the Rambam will say it clearly, whether on the thirtieth day, that is after twenty-nine complete days from the last time there was a new moon, whether tonight one can see the moon, or only tomorrow night. That's the entire question.

Right, whether on leil re'iyah (the night of sighting) or on leil ibur (the night of intercalation), whether the month must be twenty-nine days or thirty days. Right, today one does it with a calculation, but when one did it al pi re'iyah (according to sighting) one had to know this.

The Two Main Factors for Seeing the Moon

Now, in order to know this, one must know basically two things. This is what the Rambam is going to teach us. There are really very many things that one can put into the calculation, but the Rambam made a very great simplification. One must know basically two things.

The General Rule: When and Where One Sees the Moon

So one must know the general principle. That the moon, the first night that one can see it, one always sees it right after sunset, that approximately twenty minutes after sunset, says the Rambam, and until approximately an hour later, or it depends, until it will be a part of the calculation. Because so, let's not say the reasons why, I'm only saying a fact.

The moon one doesn't see in the same place in the sky an entire month, there is a sunset and sunrise there, and the

order is that at the beginning of the month it always travels almost with the sun. A bit below the sun, so one sees it a little before the setting of the moon, which is a bit after the setting of the sun. Right?

In other words, if someone wants to go search for the moon on the first day of the month, he will go at sunset and look in the western side to see if he can see it. That's the rule.

The Two Factors: Size of the Moon and Distance from the Sun

Now, if so, one must know that there are two basic things that are relevant to being able to see the moon.

One is that the moon is already large enough, and in other words it's already far enough from the sun in the sky, which is not right at the conjunction when one cannot see it. There is already a part of the light of the moon that is turned toward us, that shines to us.

And **the second thing**, about this is relevant truly the sun which he tells us now, but both. The second thing is that one must know that it should be far enough from the sun in another way. We will see later exactly in which two ways we speak here about far from the sun, one is this way and one is that way.

Why? For a simple thing, because just as in the middle of the day usually one doesn't see the moon. Why? Simply because it's too bright, and especially at the beginning of the month. Sometimes in the middle of the month one can indeed see it if it's far from the sun and it's not too bright. But especially at the beginning of the month there is a very small moon, and when it's completely bright one simply cannot see it.

Therefore one must wait that it should become a bit dark. Although theoretically, and it perhaps happens sometimes that one can see the moon even before sunset on the first day. The Rambam indeed said such a halachah that before night, yes, it can happen. But usually one cannot.

So therefore one must know to calculate whether it will be dark at night. And in other words how long the sunset will take, with this how one calculates this, to know whether one will be able to see the moon.

The Conclusion: One Must Know Where the Moon Is and Where the Sun Is

So basically, to be ready to know the knowledge of seeing the moon, one must know where the moon will be and where the sun will be.

Chapter 12: The Average Movement of the Sun – How Fast the Sun Travels

Halachah 1-2: The Movement of the Sun in One Day – The Basic Number

Speaker 1:

Okay? Right? The first thing that one must know if so, is how does one know where the sun will be, one must know how fast the sun travels. The sun travels around the sphere every year, as we learned earlier. One must know how fast it travels each day, you will calculate where it is.

And the Rambam made the calculation very easy, as they said in the previous section, as was done with the molad, that the Rambam told you that I can start from a certain day and tell you where the sun was on that day, afterwards you will simply do plus, according to how much it goes each day and each month and each year, you will know to add, and as was taught in the previous chapter, how to do the calculations, how to do the plus with the remainders, and how to do when it becomes more than three hundred and sixty, etc. That's all, the whole thing that's in this chapter.

The Rambam says like this, yes? **How much does the sky go on the... the moon travels on the... the sun is in the sky in one day. That one day is fourteen hours.** Yes. Says the Rambam, I will indeed say the number. **It goes through fifty-nine chalakim (parts).**

What is the answer? He taught us in the previous chapter that there are... no, there are three hundred sixty degrees, one calls them ma'alos (degrees), and each day it goes a bit less than one complete ma'alah, because each ma'alah divides into sixty chalakim. And we learned that the sun, you can think this simply, that you can think that the sun goes around the world in the mazalos (constellations), yes, in three hundred and sixty-five days, and ma'alos there are three hundred and sixty. It comes out that it goes a bit slower than a ma'alah. How much is this exactly? **Fifty-nine chalakim, and from the chalakim another eight seconds.** You can call it minutes, because it's sixty from eight ma'alos and eight seconds, and the siman (mnemonic) is a river.

The Movement of the Sun for Ten Days, for One Hundred Days, for One Thousand Days

Not ten, nine, almost ten. And... right. **Fifty-one chalakim, and... and twenty-three seconds.** And it has a siman, and I'm not going to go into only the question, you will calculate you will see that it became a bit longer here, the math doesn't match exactly.

Innovation: The Rambam Simplified the Numbers

And this is one of the places where the Rambam made it simpler. That is, since truly **the movement of the sun in one day** is not only 59 chalakim and 8 seconds, there are truly also thirds and fourths, as we learned earlier that there is this, but in one day it's not relevant. And in one day it wasn't, the Rambam didn't say it. But in ten days... right.

Innovation: The Rambam Gives Conclusions, Not Calculations

But he doesn't even tell us that, because the Rambam's purpose here is not that we should know to do the calculations. He only tells us the conclusions. You can use this. If you want to know ten days later, you will believe the Rambam, you will have the right number. More or less, I know indeed. He doesn't even say it here, he doesn't even tell you how to do the math. He only tells you the conclusion.

In other words, this chapter one must learn as conclusions, not as a process. So not, therefore you should calculate, that I calculated a bit here, I wanted to see how it comes out. But the Rambam doesn't want, that's your point here. For people who don't hold by calculating this, he doesn't want to do 10x59. He wants to do 10x591, the Rambam would have had to answer immediately, but it doesn't match indeed, and he will explain to you. No, the Rambam wants that you should simply look in the Rambam's list, one day you will calculate 598. Ten days you will calculate 590 23.

Someone who thinks into it sees that here suddenly it came back again. Yes, the learners will know this, but this in order to know to calculate you don't need to know this, because the Rambam's numbers will help you for what you need to do.

Translation

He simply says how far the sun travels in one day, in ten days, in one hundred days. Yes? The Rambam says, say it in numbers, because no one knows that number. **Ninety-eight degrees, thirty-three parts, and fifty-three seconds.** That's how far the sun travels in one hundred days.

The Sun's Travel for a Thousand Days – Remainder of Travel

In a thousand days. Now, for a thousand days he doesn't say the travel, but he says the remainder of travel. Why? Because they already learned that a thousand is more than three hundred sixty-five. After three hundred sixty-five they start again from the beginning, because it goes in a circle. Therefore they only need to calculate what the remainder is when you divide a thousand by three hundred sixty-five. I only want to know where it is in the sky. I don't want to know how much time it is from three years ago.

Right, it comes out. Don't add. It comes out, there remains two hundred. What does that mean? In the thousand days it went besides the full circle twice, it went another **two hundred sixty-five degrees. And thirty-eight parts and fifty seconds.** That means, if you know where the sun was a thousand days ago, you add this number, you know where it is today.

The same thing for ten thousand days. For ten thousand days, the Rambam says, it comes out **one hundred thirty-six degrees.** Sorry. **Twenty-eight parts and twenty seconds.** And so the Rambam says, **ve'al derech zeh** you can do the math for whatever number you want.

And what is the purpose of this whole thing? Nothing. If you know a day that the Rambam will call ikar, where you start from, you'll add this, you'll know where the sun is today.

Law 3: One Can Make Signs for Any Number Oneself

Speaker 1:

The Rambam says, yes, the Rambam has now made signs that are easy, right? The same thing you can make signs yourself. He made signs for one hundred days and for ten thousand days and so on, but you can make signs for whatever number you want, **shnei yamim, lishlosha, le'arba'a, ad asara.** Yes, because you didn't do that. The Rambam only said from ten, but, the Rambam says, you can make just as easily for twenty, for two, for three, and the like. Or if you want to make for twenty, for thirty, forty, until one hundred, which he didn't make. **Ve'davar galui ve'yadua, me'achar she'yadata mahaleich yom echad,** you know everything.

Question: Why Did the Rambam Make Ten Thousand Days?

Now the Rambam says, which numbers do you really need to have? It's interesting, because the Rambam earlier made ten thousand days, and he will never use the ten thousand days numbers, because he will always go with years, as he says now. I don't know why he made the previous number. Perhaps he simply wanted to teach how the math works? I don't know.

Law 4: What You Actually Need to Have Ready – 29 Days, Month, and Year

Speaker 1:

The Rambam says, what you always need to remember is this: **Ve'ra'ui liheyot muchan ve'yadua mahaleich emtza ha'shemesh le'tish'a ve'esrim yom,** how much the sun goes through in twenty-nine days. And, that means, you should know how much the sun goes through in a month, and how much the sun goes through in a year, in a year of the moon, not of the sun. **She'hen yemei shnat ha'levana bizman she'chadasheiha kesedaran,** when the months are in order, that means the amount of pregnant months is the same amount as the non-pregnant ones, as we learned before. That's the normal, the average year overall, 354 days.

So he explains, **she'bizman she'yihyu lecha totza'ot elu muchanim,** when you know how much the moon goes through in a month and in a year, **yihye ha'cheshbon kal alecha lir'ot ha'yarei'ach,** you'll be able to see the moon more easily. **She'tish'a ve'esrim yom gemurim mileil re'iya ad leil re'iya shel chodesh haba.** Because a deficient month is twenty-nine, exactly twenty-nine days from one sighting to the second sighting. **Ve'chein bechol chodesh va'chodesh ein pachot mitish'a ve'esrim velo yoter. She'ein chovateinu bechol ha'cheshbonot ola lada'at ha're'iya levad.** It's true there is when you make an extra day, and that is however for a different calculation.

Why Specifically 29 Days

Right, the month of sighting is never more than twenty-nine and a half days, right? It must be, we make Rosh Chodesh whole days. But now when you calculate the sighting, you never need a number more than 29, because it never takes more than 29 days between one sighting and the second. That means, if yes, there's no doubt for anyone. The doubt is only the thirtieth day. Right?

Regular Year Plus One Day

The Rambam says, **ve'chein** the same thing regarding the year, from the first sighting of one month is always a regular year, or sometimes a regular year plus one day. It's never less apparently, although one needs to calculate that it works out, but so says the Rambam. If it was all full, you remember that between one month and another there's a bit more than 29 12, because of that they sometimes make a year that's three hundred fifty-five days. So therefore it can sometimes be that the moon should take another day to arrive.

The Rambam Will Tell You the Ready Numbers

The Rambam says, now, the Rambam said before that you should be ready. When he says you should be ready, he doesn't mean that you need to calculate yourself, he's going to tell you what it is.

Calculating the Sun's Travel and Height — Practical Examples

Signs for the Sun's Travel

Speaker 1:

I hold that one must say all these signs like this, because it doesn't help us otherwise. And the same thing, the regular year? Not for us? Oh yes! Do you remember 29 12 763 already? If I had said twenty-nine, two hundred, seven hundred, three and one, you would never remember. And for a regular year it comes out 34, and the sign is 348 55. That's the formula for the sun's travel.

Until now what you've carried, I'll give you numbers how many degrees, not how long a month is. How many degrees it travels in a day, and for that I said ten, a month, a year, which will help us know where the sun is any time.

The Sun's Height — What Is That?

Speaker 1:

Now there's another thing we need to know about the sun in order to calculate the calculations of the moon, because it's not

just where it is, but where the sun's height is, what one does with the sun's height, and one sees later in the calculations. But first the Rambam explains, what is the sun's height? And the sun's height also moves. That means, besides the fact that the sun simply moves in the sky, the sun's height also moves. Therefore one needs to know where that is.

He says the same thing for the sun's height, for the same calculation. The Rambam explains. **Nekuda achat yesh begalgal ha'shemesh**, in the sphere where the sun rotates there's a certain point, **ve'chein bish'ar galgalei shiv'a kochavim**, and all of them, **that the star will be high above the earth so much and so much**, there's a peak where there the sphere is the highest.

Explanation: The Eccentric Circle

Speaker 1:

Right, what that means is according to their calculation simply that they learned, they held that the moon, the sun, and all the planets rotate on a perfect circle, but the perfect circle, forget about the sphere, the perfect circle, but the perfect circle, the world is not exactly in the middle of that perfect circle. Therefore, therefore, sometimes it's slower by us, sometimes it's further if it's on the other side. When it's the furthest from us, that's called the height.

Now, the height itself, somehow there's another sphere that rotates the whole sphere, I didn't understand exactly how, somehow the sphere itself rotates. That means, where, which side of the world as it were will be the furthest, in other words, at which degree, right? Because where will be the furthest place that the sun is from the world, changes constantly. It doesn't always remain the same, it changes very slowly.

The Rambam says, **ve'osa ha'nekuda**, yes, the highest, **ve'osa ha'nekuda shel galgal ha'shemesh ush'ar ha'kochavim chutz min ha'yarei'ach**, which is the highest point thereof is always the same height, **sovevot beshava**. No, no. It rotates, it rotates equally means to say it has some kind of rotation, just as all rotations are equal, but it moves, **u'mahaleich**, that means it rotates around the world too, but it travels approximately every seventy years one degree, one degree. Not it goes higher, it changes on which side of the world. It rotates.

Parable: Like a Mountain That Rotates

Speaker 1:

You can look at it like a mountain, right? Let's say, as it were, it's not truly like a mountain, but if you look at it like a mountain, the peak of the mountain also rotates around the world. Right? Yes.

Speaker 2:

No, the sphere doesn't have a peak, all spheres are a perfect circle. The whole point of a sphere is a perfect circle.

Speaker 1:

But if you look from the world, it's as if you can see it like a mountain, because here it's the furthest. Now, where is it the furthest? At the north of the world, at the south of the world, in other words? At which degree of the world? It changes. Sometimes it's at the north, sometimes it's at the south. It moves itself on a perfect circle. The whole thing also rotates, because there's another sphere that rotates that, and that takes very long. It takes seventy years one degree, so it takes three hundred sixty times seventy years to go through the whole cycle, understand? But it moves very little by little.

Now, that point is called height, that's what it's called.

The Sun's Height Travel — Numbers

Speaker 1:

Now the Rambam says, since we're going to need to know that too, every day that we're going to calculate the sighting we're going to need to know where the sun's height is today, because that will make a difference. The Rambam says, it will make a difference, **mahalcho bechol asara yamim, shniya achat vachatzi shniya**, every ten days it goes higher, it moves around the world one and a half seconds. **She'hi shloshim shlishiyot**. Yes, that's simple.

How many seconds does it move in one hundred days? In one hundred days it's fifteen seconds. And in a thousand days it becomes two parts and thirty seconds. **U'mahalcho leyom is twenty-five parts. Ve'nimtza mahalcho letish'a ve'esrim yom four seconds. Mahalcho bashana kesidra is fifty-three seconds**. No, fifty-three righteous. In short, you'll know this in order to know where the height is.

Example of Calculation — The Sun's Travel and Position

The Ikar — The Starting Point

Speaker 1:

Now the Rambam is going to give an example of doing this calculation according to his ikar of both, not of the height, of the travel and of the height, of both. Because I've now said the total distance is. I've now said how long, how much does the sun travel in one hundred days? He said how much the height travels in one hundred days? You can simply calculate. Yes? Not how we hold now, from where one starts one's calculation.

All calculations that have learned, the Rambam's point here is... from the Rambam's, yes? All calculations here are not in order to know anything. It's plain that one must start... exactly. You just need to believe the Rambam that from there, then it was so, and therefore you'll understand.

Therefore, the Rambam says, you start from as we learned from **techilat leil chamishi**, which is **3 Nisan year 4938**, right? And then, where was the sun? The Rambam tells, **seven degrees** and **three parts** and **thirty-two seconds** from **mazal Taleh**, which is Nisan. Yes, so there's a sign **7 3 32**.

Then, that's the sun's height. The Rambam says just like the law without error, he states a fact. Then the sun's height was **twenty-six degrees** and **forty-five parts** and **eight seconds** from **mazal Te'omim**. You remember, mazal Te'omim is the third sign, it means already itself sixty degrees etc. It comes out a sign **26 45 8**.

How One Calculates from That Ikar

Speaker 1:

Now, if you want to know any calculation from today and onward, you'll do from that, you want to know the sun's position from the average travel. Now, they already learned what average travel means, as opposed to the true travel. Any time, you'll take how many days from the day of ikar, which is 3 Nisan 4938. And it will do the math, which was said before, you'll know, you'll add everything to the ikar, and it will make the same collect like to like, yes? As we learned, it comes out you know where the sun's position is for that day.

Example: One Hundred Days After the Ikar

Speaker 1:

And he gives an example, I'll go quickly, because it's all very simple in the books, it's only interesting if someone wants to actually calculate. If you want to know where the sun is, the beginning of Shabbat, which is **14 Tammuz** of that year, he means to say exactly the hundredth day after 3 Nisan, make a calculation you'll see. You'll know that this is exactly one hundred days, take the travel of one hundred days which we already said before that it's **98 33**, add it to **97**, where the sun was there. It comes out, today it's **105 37 25**.

Where is 105? 105 is mazal Sartan, because mazal Sartan is the fourth, the fifth sign, I don't remember anymore, yes, because 105 is fifteen degrees of mazal Sartan and thirty-seven parts of the sixteenth degree of the sign. Very simple.

Remark: Unequal Days

Speaker 1:

The Rebbe says, an interesting thing. You should know, that we've now calculated how much according to whole days, whole days of twenty-four hours. Now, a day doesn't always start at the same time. After one hundred days the sunset can already be much earlier or later, whatever.

The Rambam says, don't worry, we'll give advice about that later. The average, yes, the average sun's position, it comes out from this, can sometimes be at the beginning of the night at an hour, which is like if it's exactly in the same season of the year? An hour before sunset or an hour after sunset. And don't worry about that, because we'll complete it when we arrive at the average moon. You remember that the whole calculation is to know where the moon is, and they're going to combine the sun and the moon. He tells him, then one will already pay somehow for that thing, that not all days are the same.

Rules — How One Calculates Forever

Speaker 1:

The Rambam says, the same thing you'll do forever, even after a thousand years, just like today, it's already almost a thousand years after the Rambam wrote this, not quite a thousand years yet, but it's already in 785, they're already holding nine hundred years after that. You'll gather the remainder, you've added to the ikar, you'll know how to do regarding the moons. Yes, the same thing, the Rambam didn't say numbers for the moons, but any forces, the moment you know how much it goes in one day, and you know a place to start from, you'll gather how many days and how many years you start.

The same thing you'll do with the sun's height. The Rambam didn't even say now the calculation of the sun's height, but the same thing, add how much it travels each day to the ikar, and you'll know where the sun's height is today.

Flexibility — One Can Make a Different Ikar

Speaker 1:

The same thing the Rambam says, you don't have to go with my ikar, you can make any other ikar. That means, the moment you already know, you don't need to calculate—

Law 3 (Continued) — Hareshut Beyadcha: How One Sets Up a Different Ikar

The Rambam's Method: One Can Start from Wherever One Wants

Speaker 1:

You can do, hareshut beyadcha, you can start it from the beginning of a cycle, or the beginning of some hundred years, however you like. Yes, he means, hareshut beyadcha means to say the calculation will work, because it's the same thing. Right. If you want to make for this ikar, or after so many years, derech kitzur, there's no difference what you do. The way is simple, and he says it over.

Speaker 2:

What does he say over again?

Speaker 1:

No, his way is to calculate whole years. I said that before. Before he said that it goes with ten thousand days. Now he actually calculates simple years, yes, but he says that sometimes one needs to do differently, because if you want to start the ikar somewhere else, you'll need to do so.

What the Rambam Explains: The Depths of Years and How One Calculates Them

Speaker 1:

He says, you know that the sun's travel is a regular year, or twenty-nine days, or one day. And everyone knows that the year whose months are full is one day more, and the deficient is one day less. And pregnant is either thirty or thirty-one or twenty-nine days more than the regular year, from which he calculates.

In short, you'll do it simply. It's very simple, it's so simple, the Rambam isn't a kindergarten teacher here. He says, that you already know, you'll figure out how you want, you'll arrive from what I told you, you'll arrive at the year where you are. Add according to how many years it was, whether it was a shanah chaserah (deficient year), we already learned earlier how to calculate which year is the year. You'll arrive at the midpoint of whichever you want, and there you'll take your ikar (starting point) again. Or you'll do minus, you want to go before the Rambam's ikar, you'll do before the Rambam's ikar.

The same thing you'll do with the moon, other stars, if you know from how long they are. In short, lesakem yisbarach miklal devarenu (to sum up, blessed be He, from all our words), just as it says the midpoint of the sun. Yes.

Why Does the Rambam Elaborate Here? A Possible Explanation

Speaker 1:

I know that the Rambam perhaps means to say here... I don't know. But these are simple matters. Perhaps he means to say, because one remembers that there is some kind of conspiracy here about why the Rambam made a new ikar. Because the ikar that the Gemara calculates is always the creation of the world, the molad beharad or the first tekufat Nisan.

The Rambam says, you have no complaints against me, I can go back... you can calculate backwards. You know what? Go back to wherever, you'll know where the sun was at the creation of the world. Perhaps this is the secret of why he elaborates here, because you see, he elaborates also backwards.

But it could simply be that for a certain purpose it will be easier for a person to have a number that is even, that comes out some other time that should start for him. There's no difference.

The Foundation of the Entire Calculation: An Introduction to a Practical Reckoning

Speaker 1:

The whole thing is just completely practical, because he doesn't say anything about... I mean, a little bit the reality of...

Speaker 2:

Yes, it's an introduction to a practical calculation.

Speaker 1:

It only works if you believe the Rambam that the sun was in this place at this time, and it travels every day so many days, you do plus. That's the whole thing.

Speaker 2:

They learned a whole chapter of Rambam today.

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