Laws of Sanctification of the New Month, Chapter 10 (Auto Translated)

English

Auto Translated

Shiur Overview

Summary of Shiur — Hilchos Kiddush HaChodesh Chapter 11

Introduction to the Chapter: Why Does the Rambam Bring Two Calculations of Shnas HaChamah?

The Rambam's Approach: Two Calculations

The Rambam gave in Chapter 9 the first calculation of shnas hachamah (365 days with a quarter — known as "tekufas Shmuel"), and in Chapter 11 he gives the second calculation, which is a bit more precise — a difference of a few minutes (known as "tekufas Rav Ada").

Pshat: The Rambam says there was a machlokes between chachmei Yavan and chachmei Paras, and also among chachmei Yisrael themselves, regarding the precise length of a shnas hachamah. Both calculations are "b'kiruv" — not exactly correct.

Chiddushim and Hisborus:

1) The Rambam's custom not to bring names:

The Rambam doesn't bring the names "Shmuel" or "Rav Ada bar Ahava" — he simply says "chachmei Yisrael." This is k'darko b'chol makom — he doesn't bring names (except Rav, whom he mentions by name regarding a mistake). One shouldn't make any "conspiracies" from this — the Rambam simply holds that it's not nogeia who said it, but what was said. However, it's possible that the Rambam was skeptical whether the calculation is actually from Rav Ada bar Ahava.

2) L'mai nafka minah two calculations?

Neither of the two calculations is nogeia halacha l'ma'aseh today, because we go according to a fixed luach. Even bizman shekideshu al pi hara'aya, one only needed to use the correct calculation. Why does the Rambam bring the "false" calculation?

First teretz (which is rejected): The Rambam says that chochmas hatechuna is itself a mitzvah — not just to know how to do it, but to understand the wisdom itself (unlike lulav, where one doesn't need to know how it grows). But this only answers why we bring the correct calculation — not the false one.

3) Various halachos that are dependent on tekufas Shmuel:

- **Birchas hachamah** — every 28 years, when according to the calculation the sun returns to the same point (Wednesday night, beginning of mazal Taleh). Kashya: What's the big deal of birchas hachamah? The sun hasn't changed anything — it's only our calculation that comes out even. It's no more logical than making a berachah every 19 years for the machzor of ibur hashanah. Teretz: Perhaps the berachah is "more on us" — that we notice our calculations — not on the sun.

- **She'eilas geshamim** — in chutz la'aretz one begins 60 days after the tekufah. The Rambam brings the halachah but doesn't explicitly say it goes according to tekufas Shmuel.

- **Not drinking water b'sha'as hatekufah** — a minhag based on astrological reasons (because the malachim switch). The Shulchan Aruch says this goes according to tekufas Shmuel. But this is certainly not what the Rambam meant.

Maskana: That tekufas Shmuel is nogeia for birchas hachamah is a "funny" reason why the Rambam should bring the calculation specifically here in Hilchos Kiddush HaChodesh. The true reason why the Rambam brings tekufas Shmuel is because he needs to bring what's stated in the Gemara. The Rambam's chiddush comes at the end of Chapter 11, when he says "yireh li" that the beis din would indeed have relied on the more precise calculation.

The Source of "Tekufas Rav Ada" — Historical Analysis

Chiddushim and Hisborus:

1) The Sefer Ha'ibur of R' Avraham bar Chiya:

The first one who mentions the calculation of "Rav Ada bar Ahava" is the Sefer Ha'ibur of Rabbeinu Avraham bar Chiya — an astronomer and astrologer from Sefarad. He relates that there is a "baraisa" attributed to Rav Ada bar Ahava with a different calculation of the tekufah.

2) Skepticism regarding the "Baraisa d'Rav Ada":

- **No one has ever seen the baraisa** — it's not in any Gemara. Whoever learns only Gemara knows nothing of this second calculation.

- **An Amora doesn't make baraisos** — Rav Ada bar Ahava is an Amora, and a baraisa is a Tannaitic source. The teretz is that "baraisa" here simply means a sefer michutz laseder (baraisa = external), but this itself is a sign that "something is fishy."

- **It's unclear which Rav Ada bar Ahava** — there were at least two Amoraim with this name, and no one knows which one is meant.

3) The lashon "tekufas Shmuel b'farhesya u'tekufas Rav Ada b'tzin'a":

The Rishonim bring a mesorah that b'farhesya they used tekufas Shmuel, but b'tzin'a they used tekufas Rav Ada. The reason: Shmuel also knew the more precise calculation, but he didn't publicize it, because if one knows the precise tekufos, one can calculate when the sun is in mazal Taleh, and from that one can do kishuf (an astrological reason).

4) Against the "conspiracy theory" that they always knew the true calculation and kept it hidden:

The approach that the Chachamim always knew the more precise calculation but kept it hidden is sharply rejected. The rule is: when someone says "they knew but kept it hidden," that's a diplomatic way of saying they didn't know. The simplest way to understand is that tekufos are very difficult to calculate precisely, and for hundreds of years — even among the greatest chachamim in the world (the Greeks, even before

Ptolemy) — tekufas Shmuel was the best known calculation. It's a "tremendous chiddush" that they arrived at this with their instruments.

5) Hipparchus and the temporal question:

Hipparchus came up with a more precise tekufah already long before the Gemara and before the Tannaim. But this doesn't mean Shmuel had to know it — just as with many things, it takes hundreds of years until a discovery enters the "curriculum" and becomes popularized. It's not necessary that Shmuel spoke of Hipparchus's calculation, although he could have.

6) The beis din calculated with the best science of their time:

This is not an "injustice" to say. It's much more degrading to the Chachamim to say they were stubborn and didn't look at reality, than to say they didn't know everything. They were anshei emes, and as astronomy developed more, the Chachamim kept up with the best version.

7) Against the forced teretz that "l'Shmuel it's be'erech":

Later chachmei Yisrael, when they discovered that tekufas Shmuel is not precise, wanted to say that the true calculation (tekufas Rav Ada) was actually used, and Shmuel's calculation is only "be'erech." This is rejected as a great dochak, because there's no real halachah that depends on the precise minutes. The claim that a simple Jew can't calculate with another two minutes is called "a very weak Torah."

8) Nevuah and chochmas hashamayim:

The assumption that nevuah must relate chochmas hashamayim is rejected. There's no reason at all that Hashem would have had to tell Moshe Rabbeinu the precise tekufah. Hashem wants people to discover things — that's how it looks in reality. Even Rabban Gamliel said "mekubalani mibeis avi aba" — he doesn't say "I heard from Moshe Rabbeinu." Especially regarding tekufah, where basically we want Nisan to be in aviv — the small differences are less nogeia.

9) The main subject of calculation — prediction:

The main subject of cheshbon hatekufos is that one should be able to predict what one can see oneself. A simple Jew needs to go outside and see if there's a levanah — a chacham can tell him "tomorrow there will be a levanah." This is literally a kind of nevuah — but a nevuah that happens always, because it's built on the teva that Hashem made precisely: "chok u'zman nasan lahem shelo yeshanu es tafkidam." The more one learns, the more precisely one figures out how it works.

[Digression: We're accustomed that everything is easy to know — one looks at a luach, it says when shkiah will be for a whole year. But thousands of years ago, people didn't take to figuring out that one can know this.]

[Digression: The mashal of Columbus — he predicted a likui chamah because he knew astronomy, and the local Americans held him to be a ba'al ruach hakodesh.]

Chapter 9 — Two Shitos in Shnas HaChamah (Introduction to Chapter 11)

The Rambam's words: "L'mi she'yomar sheyehei pachus merevi'a."

Pshat: The Rambam brought in Chapter 9 two shitos: (1) 365 days with a quarter (tekufas Shmuel), (2) pachus merevi'a (tekufas Rav Ada). Now in Chapter 11 he's going to calculate according to the second shitah.

Chiddushim:

Earlier the Rambam spoke of a machlokes between chachmei Yisrael and chachmei umos ha'olam. The shitah of 365 and a quarter is either a shitah of chachmei Yisrael or of chachmei umos ha'olam. But the shitah of pachus merevi'a — this is specifically from chachmei Yisrael, and this is actually more precise.

Halachah 1 (Chapter 11) — Shnas HaChamah According to Chachmei Yisrael

The Rambam: "Shnas hachamah l'fi chachmei Yisrael hi shalosh me'os vachamishah v'shishim yom vachamesh sha'os u'tsha me'os v'shiv'ah v'tish'im chalakim u'shmonah v'arba'im rega. V'harega echad mishishim v'shiv'im bachelak."

Pshat: The Rambam brings the calculation of chachmei Yisrael (tekufas Rav Ada) for the length of shnas hachamah: 365 days, 5 hours, 997 chalakim, and 48 rega'im. A rega is 1/76 of a chelek.

Chiddushim and Hisborus:

1) Why does the Rambam bring specifically the calculation of chachmei Yisrael?

Within the shitah of pachus merevi'a, there are different calculations — chachmei umos ha'olam (like Hipparchus) gave other precise numbers. But the Rambam goes with the calculation of chachmei Yisrael, not with Hipparchus's numbers.

2) How close is the calculation to a quarter day?

An hour has 1,080 chalakim. The calculation says 997 chalakim — that's only 83 chalakim from 1,080, a very small difference from a full revi'a hayom. Plus another 48 rega'im. The difference of one year is only a few minutes, but over many years a few days of difference accumulates, and this becomes greater and greater.

3) Tosefes shnas hachamah al shnas halevanah:

The Rambam: "L'fi cheshbon zeh, tosefes shnas hachamah al shnas halevanah: asarah yamim v'achas v'esrim sha'os u'me'ah v'esrim v'echad chalakim u'shmonah v'arba'im rega'im. V'siman lahem yud kaf-alef kuf-kaf-alef mem-ches."

The Rambam gives a siman (10, 21, 121, 48) to remember the numbers — like a password of three-four numbers.

Halachah (Continuation) — Tosefes HaMachzor: No Remainder in 19 Years

The Rambam: "V'lo timtza tosefes b'machzor shel tsha esreh shanah."

Pshat: According to the calculation of tekufas Rav Ada, no remainder is left after a machzor of 19 years. The 235 months (12 shanim peshutos + 7 shanim me'ubaros) match precisely with 19 shenos chamah.

Chiddushim and Hisborus:

1) The great difference between tekufas Shmuel and tekufas Rav Ada — the machzor:

According to tekufas Shmuel (365.25 days), after every machzor of 19 years a tosefes of sha'ah alef taf-peh-ches remains. This accumulates over many machzorim and creates a problem — there's no halachah that one adds to this extra. This itself is a proof that one must go with tekufas Rav Ada, because only according to this calculation does the machzor match precisely without any tosefes.

2) The source of tekufas Rav Ada — a fundamental chiddush:

All later mefarshim say that it appears that the source of tekufas Rav Ada is from this itself — from the fact that the machzor of 19 years must match precisely. The one who made tekufas Rav Ada didn't independently measure shnas hachamah (which is very difficult to do precisely), but he did a simple thing: he divided 235 months (each kaf-tes yud-beis taf-shin-tzadik-gimmel) by 19 years, and thus calculated how long a shnas hachamah must be so it should fit in precisely. This means: the calculation is not an independent measurement of shnas hachamah, but a mathematical consequence of the assumed machzor.

3) The source of the machzor of 19 years:

The machzor of 19 years with 7 iburim is not stated in the Gemara. It's a kabalah from zman hage'onim. In the Gemara it only says kaf-tes yud-beis taf-shin-tzadik-gimmel (the length of a chodesh levanah), but not the system of nineteen-year machzorim. Once upon a time, they would decide each year separately regarding ibur.

4) Why precisely rega'im of 1/76?

This is the key chiddush: when one divides 235 months by 19 years, 12/19 of a chelek remains for each year. Because one wants to know tekufos (quarter year), one must divide by 4. This gives 12/(19×4) = 12/76 of a chelek for each tekufah. Therefore a rega is defined as 1/76 of a chelek — so that one should come out with whole numbers:

- For a year: 4 × 12 = 48 rega'im

- For a tekufah: 12 rega'im

- 4 × 19 = 76, therefore 1/76

This is a strong proof that the entire calculation is built on dividing the machzor, not on an independent measurement of shnas hachamah.

5) Is tekufas Rav Ada a kabalah or a calculation?

There's a machlokes: some hold that tekufas Rav Ada is a kabalah (halachah l'Moshe miSinai or something like that), and others hold that it's simply a mathematical construction. "All apikorsim" (jokingly) — that is, all who don't believe it's a secret kabalah — say that it's simply a calculation of dividing the machzor.

6) Hipparchus's number as a possible influence:

It's possible that the one who made tekufas Rav Ada perhaps saw Hipparchus's number (1/300 of a day), but adjusted it a bit so it should fit into the machzor of 19 years. Therefore the number is a bit different from Hipparchus.

Halachah (Continuation) — The Length of Each Tekufah

The Rambam: "Bein kol tekufah u'tekufah l'fi cheshbon zeh — echad v'tish'im yom v'sheva sha'os v'chamesh me'os u'tsha asar chalakim v'echad u'sheloshim rega'im. Siman lahem: tzadik-ayin-tav zayin-dalet-kuf-tav lamed-vav."

Pshat: Each tekufah (of the four tekufos in a year) is exactly 91 days, 7 hours, 519 chalakim, and 31 rega'im. This is a bit less than half an hour more than by tekufas Shmuel (where each tekufah is 91 days and 7.5 hours).

Chiddushim:

The difference from tekufas Shmuel: instead of simply 91 days with 7.5 hours (as by Shmuel), one calculates here with rega'im — a bit less than half an hour. It's mentioned that the Ramban perhaps adjusted his number from tekufas refa"ch (288) so it should fit with the machzor-calculation, therefore it's a bit different from other sources that have a number of 1/300.

Halachah 2 — Tekufas Nisan HaRishonah

The Rambam: "Tekufas Nisan harishonah haysah b'shanah rishonah shel yetzirah, kodem molad Nisan b'tesha sha'os v'shesh me'os v'arba'im u'shnayim chalakim. V'chen hu l'olam."

Pshat: The first tekufas Nisan was 9 hours and 642 chalakim before molad Nisan of shanah rishonah. And because the machzor of Rav Ada comes out exactly even (without any remainder), every first year of every machzor has the same relationship — tekufas Nisan is always 9 hours 642 chalakim before the molad.

Chiddushim and Hisborus:

1) Why do we calculate tekufos from Nisan:

The calculation of tekufos begins from Nisan, because Taleh (Aries) is the first mazal, and the seder hatekufos begins from Nisan. This is l'chol hade'os so, even when one calculates molados from Tishrei.

2) B'Nisan nivra ha'olam vs. b'Tishrei:

For molados one calculates from Tishrei (like R' Eliezer), but for tekufos one calculates from Nisan (like R' Yehoshua). The Nisan that one calculates is the Nisan **before** the Tishrei of brias ha'olam — half a year earlier when the world didn't yet exist. But this doesn't matter because the calculation is not a historical fact but a mathematical system.

3) Proof that the calculation is only a reckoning system:

In Gemara Avodah Zarah it's mentioned that Adam HaRishon related to tekufas Teves — which can only fit with the calculation if one begins in Tishrei. This proves that the machlokes b'Nisan/b'Tishrei nivra ha'olam is not only a historical machlokes, but also a machlokes how one calculates cheshbonos — with nafka minos for practical calculations.

4) The great difference between Shmuel and Rav Ada — the machzor:

By Rav Ada every machzor (19 years) comes out exactly even — no remainder is left over. Therefore every first year of every machzor is identical: tekufas Nisan is always 9 hours 642 chalakim before the molad. By Shmuel, where the machzor has a remainder (alef taf-peh-hei), this changes every machzor.

5) The difference of 7 days:

By Shmuel the first molad was 7 days, 9 hours, 642 chalakim after the tekufah. By Rav Ada it's only 9 hours 642 chalakim (without the 7 days). The reason: Shmuel holds b'Tishrei nivra

ha'olam (R' Eliezer), but for tekufos he calculates from Nisan (R' Yehoshua). He needs to calculate back 6 months, and because the world was created on Wednesday (yom revi'i), he must add 7 days so it should come out on a Wednesday. By Rav Ada, who holds b'Nisan nivra ha'olam, the beginning of tekufas Nisan was right at the beginning of yom revi'i (when nisalu hame'oros), and the molad was 9 hours 642 chalakim later.

6) [Digression: The midrash of "lechi u'ma'ati es atzmech"]:

The mefaresh (on Ketzos HaChoshen, b'shem a kesav yad of Rishonim — "peirush Rama"zal", which was thought to be the Rambam but is apparently a second Rabbeinu Moshe or Rabbeinu Meir) gives a remarkable pshat in the well-known midrash:

- **The kashya on the midrash:** What does it mean that sun and moon were both "shnei hame'oros hagedolim" and afterwards the moon became smaller? The moon and sun have no connection at all in size — the moon only receives light from the sun, it's a completely different type of celestial body.

- **The pshat:** "Lechi u'ma'ati es atzmech" means that the moon was created when it was still "large" — i.e. visible, not at its molad (when it's invisible). It was created 9 hours 642 chalakim **before** its molad, when it was still a bit illuminated. Right after creation it began becoming smaller (mema'et) until the molad — this is "lechi u'ma'ati es atzmech."

- This gives a natural pshat in the midrash: the moon becomes smaller every month until the molad (kibutz), when one can't see it at all. At creation it was created at a stage when it was still visible, and immediately began to become smaller.

Halachah 3 — How to Calculate Tekufas Nisan for a Given Year in the Machzor

The Rambam: "Im tirtzeh leida masai tihyeh tekufas Nisan l'fi cheshbon zeh b'chol shanah shetirtzeh — teda minyan hashanim she'avru min hamachzor, v'tikach l'chol shanah mehem tosefes [hasiman yud-chaf alef v'chu'], u'kabetz kol harega'im chalakim, v'chol hachalakim sha'os, v'chol hasha'os yamim... v'tigra min hakol tesha sha'os v'shesh me'os v'arba'im u'shnayim chalakim, v'hanishar tashlichehu al kaf-tes yud-beis taf-shin-samech-gimmel, v'hanishar she'ein bo chodesh levanah tosifeihu al molad Nisan shel oso hashanah."

Pshat: Two methods to calculate tekufas Nisan for a specific year:

- **Method 1:** From tekufas Nisan of the first year in the machzor, add 91 days 7 hours 519 chalakim 31 rega'im for each tekufah, until you reach your year.

- **Method 2 (easier):** Take how many years have passed in the machzor, add to it the tosefes-siman for each year, combine all rega'im/chalakim/hours/days, subtract 9 hours 642 chalakim (the distance from tekufah to molad), divide by a chodesh levanah (29 days 12 hours 793 chalakim), and the remainder add to molad Nisan of that year — this is when tekufas Nisan falls out.

Chiddushim:

- The calculation is parallel to what we learned earlier by tekufas Shmuel, just with the more precise numbers of Rav Ada (with rega'im).

- The main advantage of tekufas Rav Ada is that the machzorim are "perfect" — no remainder is left over, which makes the calculation systematically easier over long time periods.

End of Halachah — End of the Calculation of Tekufas Nisan

The Rambam: "V'hanishar tashlichehu... u'varega shehigi'a haminyan bo tekufas Nisan shel oso hashanah."

Pshat: One divides by kaf-tes yud-beis taf-shin-tzadik-gimmel, the remainder that's left (which is not a whole chodesh levanah) one adds to molad Nisan of that year, and the rega that one arrives at — that is tekufas Nisan.

Chiddushim:

The calculation here is the same calculation as earlier in the chapter, just much simpler. One doesn't need to know the remainder from brias ha'olam — one just starts from the beginning of the machzor, calculates how much tosefes hachamah al halevanah remains, how many months have passed, and one knows when tekufas Nisan comes out.

Halachah 12 — "Mera'in Li HaDevarim" — The Rambam's Chiddush L'Halachah

The Rambam: "Mera'in li hadevarim she'al cheshbon tekufah zo hayu somchin u'mabrin es hashanah, l'fi shecheshbon zeh hu ha'emes yoser min harishon, v'hu karov ladevarim shenitba'aru ba'itztagninot yoser min hacheshbon harishon shehaysah bo shnas hachamah shalosh me'os vachamishah v'shishim yom u'revi'a yom."

Chiddush 1 — "Mera'in Li" vs. "Nireh Li" — The Rambam Has No Kabalah

The Rambam doesn't say "nireh li" but "mera'in li hadevarim" — that is, **the calculations themselves show me**. When it comes to calculation, the calculation speaks for itself. But the main thing he means with "mera'in li" is "lo kibalti" — **he has no mesorah on this**. The Rambam is not somech on the mesorah that attributes that tekufas Rav Ada bar Ahava is a kabalah that was actually used in practice. He only says that it seems to him simple that it's a better calculation, and therefore he likes it more.

Chiddush 2 — L'Halachah: The Beis Din Has (or Will) Use the Better Calculation

The Rambam says that when they actually were me'aber the shanim according to tekufos, they used **the second calculation of Chapter 11** (tekufas Rav Ada), because:

- "Cheshbon zeh hu ha'emes yoser min harishon" — both calculations have truth in them, but this is **more precise**.

- "Karov ladevarim shenitba'aru ba'itztagninot" — it's closer to what the chachmei astronomy calculated.

The Rambam understands that the beis din would have had to use the correct calculation, **but he has no source for this** — he doesn't believe in the mesorah that there is such a kabalah. He only says: since he knows it's more true, he thinks that probably l'halachah one must go with this.

Chiddush 3 — What About Tekufas Shmuel?

The Rambam doesn't explicitly say what happened with the earlier calculation. Basically it's a mistake — it's only a bit easier to calculate. The Rambam tries to say it b'derech kavod: first they used the earlier one, afterwards they developed it more.

Chiddush 4 — Even Tekufas Rav Ada Is Not Precise

The Rambam reveals that even tekufas Rav Ada is only "karov ladevarim shenitba'aru ba'itztagninot" — **not exact**. "The astronomers know a bit better." There are also differences of a few minutes. Perhaps the Rambam himself didn't know the exact number, but he says that it appears that this is more true.

Chiddush 5 — A Practical Nafka Minah L'Asid

Perhaps the Rambam means with "hayu somchin" not a historical event, but: **if there will be a beis din, this will be used**. When Jews will have a Sanhedrin, they'll see what is the best calculation, they'll give credit to Shmuel and Rav Ada bar Ahava on whom we stand, and they'll do according to the best. **This is the entire reason why the Rambam teaches us all the calculations** — so we should know, and be able to make the best calculations for our time.

End of Halachah 12 — Mahalach Emtza'i vs. Mekom HaShemesh Ha'amiti

The Rambam: "Hakol b'kiruv, v'hu b'mahalach hashemesh ha'emtza'i v'lo mekomo ha'amiti. Aval b'mekom hashemesh ha'amiti tihyeh tekufas Nisan bizmanim eilu k'mo shnei yamim kodem shetihyeh tekufah sheyotzei mecheshbon zeh, bein mecheshbon mi shemechashvo revi'i yom gamur bein mecheshbon mi shemechashvo pachus merevi'i yom."

Chiddush 1 — Explanation of "Mahalach Emtza'i" vs. "Mekomo Ha'amiti"

The Rambam doesn't mean by "emtza'i" simply an average. The chachmei astronomy had an **assumption that the sun travels in a perfect circle** (the first one who was mechadeish otherwise was Kepler). If it's a circle, all four tekufos must be equal — a quarter of a circle.

But l'ma'aseh, when one looks at the sun, one sees that it **doesn't** arrive at mazal Taleh precisely in so many days after mazal Teves — there are differences of **whole days** between tekufah and tekufah. So they came up with a theory (which will be learned in later chapters): somehow the sun does indeed travel on a circle, but there's something that makes **us see** the sun differently than it truly is.

- **Mahalach emtza'i** = the true movement of the sun on its circle (according to their theory).

- **Mekomo ha'amiti** = the place of the sun **in relation to the twelve mazalos** as it appears from the earth.

Chiddush 2 — Tekufas Nisan Comes Two Days Earlier According to Mekom HaShemesh Ha'

Chiddush 2 — Tekufas Nisan Comes Two Days Earlier According to Mekom HaShemesh Ha'amiti

According to mekom hashemesh ha'amiti, tekufas Nisan comes out **approximately two days earlier** than the calculation says — whether according to tekufas Shmuel or according to tekufas Rav Ada. This means that **tekufas Teves lasts longer than the other tekufos** — the four tekufos of the year are not truly equal.

This is a **great nafka minah l'halachah**: the beis din only calculated tekufas Nisan (for ibur hashanah), and the two-day difference can make a whole difference.

Chiddush 3 — "Bizmanim Eilu" — The Difference Changes Throughout History

The Rambam says "bizmanim eilu" because he **knew that the two-day difference changes over time**. This depends on "govah hashemesh" (which will be learned later). In the time of the Rambam it's two days, but in other periods it comes out differently. Today it's not exactly two days.

Chiddush 4 — The Difference Is Not Cumulative — It's Only Within the Year

An important clarification: the two-day difference **doesn't accumulate each year**. The orech hashanah is almost precise — the calculation of the machzor remains the same. The difference is only **within the year**: the four tekufos are not precisely a quarter of the year. Tekufas Nisan comes earlier than a quarter year after tekufas Teves, but the whole year is indeed the same. It doesn't add up two days each time.

[Digression: The Ramban relates that there's a "sod" that when one will make a new Sanhedrin, one shouldn't go with any calculation — not Shmuel, not Rav Ada — but if the tekufah comes out on the 15th or 16th, you should know it's still good. One needs to know if it's the amiti or the emtza'i that concerns us — and it must be the amiti, because "shamor es chodesh ha'aviv" — aviv means the real spring.]

Until here Chapter 11.

Full Transcript

Laws of Sanctifying the New Moon Chapter 11: The Second Calculation of the Solar Year — The Tekufah of Rav Ada

Introduction: Why Does the Rambam Bring Two Calculations?

Speaker 1: Good. We are learning the Rambam, Laws of Sanctifying the New Moon, Chapter 10. 11? 11. Very good.

And what are we going to learn today? We are in the middle of the topic of how one calculates the solar year, which is relevant regarding intercalating the year.

In the previous chapter, Chapter 9, the Rambam gave us a basic calculation, calculation number one, of how one calculates how long a solar year is, how one should know how to intercalate the year. Yes?

He began that there are two ways to calculate it. They are very close, they differ by nine hours. Not nine hours, how many hours? A few minutes is the difference. A quarter, or... six hours in the day? Question, or six hours and a bit, a bit less than six hours, excuse me. A small difference.

And the Rambam said that this was a dispute between the Greek sages and the Persian sages, and also between the Jewish sages and the Jewish sages. The Rambam doesn't bring

the names, but the Jewish sages - it is assumed that in the previous chapter he stated the calculation of Shmuel, and here he is going to tell us the calculation of how it comes out a few minutes less.

The Rambam's Method: Not Bringing Names

The Rambam, in his way, didn't hold that it's important to know the names of who said things. He doesn't say here the names, not of the Jewish sages, not of the Greek sages. It could be that the Rambam was skeptical whether it's really Rav Ada bar Ahava.

You remember that the Rambam doesn't say names, it's not his practice to ever say names. Rav mentions him by name, with an error in an incident. He never says a dispute. This is the Rambam's way. Don't come to any conspiracies, and understand why the Rambam doesn't say who he is, because it's not relevant who he is. There are sages who say this way, there are sages who say that way, both were great sages, but one of them is wrong, of course.

The Rambam himself says that both are wrong, but that means, he doesn't say clearly that both are correct. Both are approximate, he says. Both are not exact. We'll see what he says exactly. To say exact, they don't say exactly and correctly. The same thing, it's just said more politically correctly. Could be.

Question: What's the Practical Difference Between the Two Calculations?

In any case, yes, so, here in this chapter he's going to bring a second calculation. One must understand. Why does the Rambam bring the two calculations? That is, neither of them is relevant today for practical halacha, because we intercalate according to a calendar. At that time when one needed to know the calculation, apparently one needed to use only the correct one, as the Rambam says at least. So why does the Rambam need to bring two calculations at all? What's the practical difference between the two calculations?

Perhaps we'll talk about this at the end of the chapter when we see what the Rambam says, because one can see then. I think we already know a bit, because the Rambam says that this is a mitzvah of... not just the wisdom of astronomy, but knowing the wisdom of astronomy is a mitzvah. That means, other laws one only needs to know how to do, one needs to know how to take a lulav. One doesn't need to know how a lulav grows. But regarding the wisdom of astronomy one needs to know how the wisdom behind it works.

We'll see more about this at the beginning of the next chapter too, what the mitzvah is, but it doesn't help, because that only answers for the correct one. I agree with that, one really needs to know the correct calculation. Here it's more like the history of the three orbits, the two orbits at least. Why does one need to know the incorrect one? What's the practical difference? It doesn't do anything.

Various Laws That Depend on Tekufat Shmuel

So, one must know, there are many people who say, all the commentators here basically say, that the previous calculation which is called Tekufat Shmuel, this is stated in the Gemara, Shmuel said that between one tekufah and another tekufah there are these 91 days, the calculation that we learned.

So, there are those who say that it's relevant for halacha even nowadays for various things, such as Birkat HaChamah.

Birkat HaChamah — A Question on This Matter

There is something called Birkat HaChamah, the Rambam brings it in the Laws of Blessings. Ah, that this is built according to the calculation that we learned in the previous chapter, which we mentioned that the sun every twenty-eight years comes to the same... doesn't come anywhere, by the way. The sun doesn't do anything with the calculation of Birkat HaChamah, the sun is no different. The whole thing is that it comes to the same time and the same day of the week. Tuesday night, then the sun enters Aries, that is, Tekufat Nisan begins at the same hour of the day. This is the cycle.

Why in honor of this should one make a blessing I have no idea? If someone can explain to me the next time there is a Kiddush HaChamah, what is the great significance of it? That is, it makes as much sense as to say, there is a nineteen-year cycle of the moon, right? That is, of intercalating the year, one should make some blessing at the beginning of every nineteen years, because it starts again. What's the connection? It says nothing.

It's a blessing that one says anyway, Baruch oseh ma'aseh bereishit, as the Rambam said, one says when one sees great mountains, I mean, it's often this is another blessing that one makes on nature. That we can calculate when this is approximately.

Speaker 2: Yes, there's nothing with your door, there is with your calculation.

Speaker 1: I'm saying, if it were some new blessing, you would have a stronger question. But it's a general blessing on the wonders of the Creator, on the wonders of creation. One says it at the time, we'll note again that ah, we have some calculations. I don't understand it. It could be that the blessing is more on us, because we have calculations, than on the sun, because the sun hasn't changed at all. Only we, ah, where, I notice that... I have a process for it.

Speaker 2: One should make a portion and thoughts for evil. What is for evil? For evil, for evil, for evil. Okay.

Speaker 1: In short, I don't understand. But no, I mention this only to say, because whoever looks through the calculation will see, as we saw here, that calculation goes according to Tekufat Shmuel, not according to the second tekufah that we're learning now.

Why the Rambam Brings Tekufat Shmuel — A Strange Answer

Therefore people say, the Rambam had to bring that calculation which is relevant for halacha regarding the Laws of Blessings. It seems to me that this is very strange. First of all, the Rambam had to say this, but he would say it, because the calculation is adjacent to the matter of Birkat HaChamah. The Rambam doesn't say this. We can just be that it doesn't seem so right to me to say that because of this the Rambam brings this calculation, because it's relevant to the matter of Birkat HaChamah. It's very strange, you understand that it's strange.

Other Laws That Go According to Tekufat Shmuel

But earlier the Rambam also said that there are things that one can calculate more than one way. In Chapter 6 didn't he have two ways how one can calculate the molad?

Speaker 2: No. No, not that I know. It wasn't one correct, one incorrect. But he did say one calculation, and he said another way how one can say it.

Speaker 1: No, just about how to make a calculation, which works. But this isn't two processes, it's the same thing, it's just

a small difference in it. It doesn't change the reality. The Rambam had an idea how you can calculate, only you know only the day of the week, you don't have nerves to calculate small numbers. I mean, fractions, that's complicated.

But here you're saying something where there's a fact, there's something called the tekufah, right? And the Rambam says a false way to calculate. For what purpose should one know the false way? It's very strange.

And there are other laws, as people say that there are other laws, such as, okay, there's some strange custom, that during the tekufah one doesn't drink water, because the angels are changing, and meanwhile they're in the middle of changing, one can't know who's taking care, so one must be careful. And the Shulchan Aruch states that this goes according to Tekufat Shmuel. But okay, this is certainly not what the Rambam meant.

There is the topic of asking for rain, which in the Diaspora, in Babylonia, one conducts oneself sixty days after the tekufah. Also, the Rambam brings that law, but he doesn't say that one goes according to Tekufat Shmuel. We assume that it's so, but it doesn't state this.

So let's see what one can understand about this. I think the secret is so very simple. It's certain that... That is, let me tell a bit of the story, the conspiracy that I'm saying.

The Source of "Tekufat Rav Ada" — Historical Analysis

The Sefer HaIbbur of Rabbi Avraham bar Chiya

The second calculation is called in the Rishonim. The first who said it is the Sefer HaIbbur of Rabbi Avraham bar Chiya, who was an astronomer and an astrologer, and an interesting Jew.

Speaker 2: No, a bit later. He was in Spain, he lived.

Speaker 1: The Rambam, it could be that he brings him, he never brings by name, because he doesn't bring any names. There is a place where the Rambam mentions that he learned some book from one of the sages of Spain, which is a very good book on intercalation, and also a very large portion of the Laws of Sanctifying the New Moon looks like it goes according to his calculations, according to his order. There are those who say that the Rambam took from him, he certainly took, he read things, he didn't think of it himself, but he doesn't bring any names.

In any case, the book is the first that tells that there is some Baraita that is attributed to Rav Adir bar Ahava. That is, he says that there is a Baraita of Rav Adir bar Ahava, and there is stated a different calculation, not the calculation of the tekufah.

In other words, when one learns Gemara, he only knows the previous calculation. He doesn't know anything about any other calculation. Therefore regarding all matters, one must apparently, one apparently goes with that calculation, because that's what one knows.

Speaker 2: The law, you mean to say regarding asking for rain or Birkat HaChamah?

Speaker 1: No, Shmuel, because Shmuel speaks about intercalating the year. The... I mean, I want to speak about this, that all the laws that are real laws of tekufah, not small laws, in the Gemara one doesn't know of any other calculation.

Question: How Can There Be a "Baraita" from an Amora?

Certain Rishonim come, they tell a story which is such a wonder, he says that there is a Baraita — no one has ever seen the Baraita — that in the Baraita is stated a different calculation, and it even states a name.

First of all, it doesn't make sense, an Amora didn't make Baraitot. So how can there be a Baraita of Rav Ada bar Ahava, I have no idea. He means to say some Baraita, some book that isn't in the Gemara. Often one calls it a Baraita because it's outside the order.

Speaker 2: Can you think of another thing that one calls a Baraita that's from an Amora? Midrashim. One calls it a Midrash often.

Speaker 1: Okay, Midrash is Midrash. Midrash is Torah. The word Baraita, yes. It's already a bit of a sign that something is fishy, in my opinion, because what's the connection of a Baraita of Rav Ada bar Ahava?

And in short from what one doesn't know who Rav Ada bar Ahava was, that is, there were in any case two Amoraim who were called Rav Ada bar Ahava, no one knows which. So they bring it, and this is the second calculation that we're going to learn.

"Tekufat Shmuel Publicly and Tekufat Rav Ada Privately"

And now, there is a phrase that is brought in the Rishonim that they said that "Tekufat Shmuel publicly and Tekufat Rav Ada privately." They assumed, so the commentators in Kiddush HaChodesh and other people learn, that essentially the Jewish sages knew, as if Shmuel also knew the more correct calculation, but he didn't want to say it publicly. Privately one used Tekufat Rav Ada, but publicly one said to the world Tekufat Shmuel.

And he also says a reason according to astrology why: because if one knows the tekufot, one can know exactly when the sun is in Aries and the like, and according to this one can do some sorcery.

Tekufat Shmuel Versus Tekufat Rav Ada — The Precision of the Solar Year

The Historical Background of Tekufat Shmuel

Speaker 1:

Just as Columbus did against the locals, against the Americans. He did sorcery? He told them that then and then there will be a solar eclipse, because he was an astronomer, he knew. No, they held him to be a prophet. No, he says that if one knows one can know, in short, and one can be harmful, so it's better that one doesn't know.

Okay, this is a bit of a conspiracy. But you just need to remember that the difference is very very small. People think that one is speaking of two different... one is speaking of a few minutes. That is, over many years a few days of difference can accumulate, but... The difference is a big difference. I mean, from one year it's a small difference, but from a whole year it becomes a bigger difference, and so on.

Against the "Conspiracy Theory" — The Simplest Way to Understand

Speaker 1:

Now, the reality is apparently, in my humble opinion, the simplest way to think about this is very simple. One doesn't need to come to any conspiracies. I'll speak about why one needs to make such strange theories that everyone once knew and it was kept secret. Everyone knows that the rule is, when someone says one knew but it was kept secret, it means in

Yiddish, as you say, a diplomatic way to say that one didn't know.

What is the answer? Tekufot we learned in the previous previous chapters. It's not an easy thing to know, it's very hard to calculate exactly when the tekufah is. And it's true that for hundreds of years, the greatest sages in the world, they spoke of the Greeks, what was his name? Ptolemy? Or before him? Much before Ptolemy.

Speaker 2:

Yes, and before him there was a second one that they spoke of, I don't remember his name.

Speaker 1:

Everyone went with Tekufat Shmuel. This was the accepted one. It's approximately, it's almost, a few minutes are missing. It's a tremendous innovation they arrived at this. We are accustomed to arrogance, because... anyway, they arrived at very very precise calculations according to their instruments. One is dealing with three hundred sixty-five and a quarter days. No, it's not so hard to arrive at a quarter day. But anyway, this was the accepted calculation by all people, and presumably in their time, the Beit Din also only knew of this, and they calculated with this as much as they calculated with the tekufah.

It's no wrongdoing, I don't know why it's a wrongdoing to say this, that one calculated with the best science that was then.

Hipparchus and the Temporal Question

Speaker 1:

Later there became better sages, and later I mean already in the time of the Geonim. I mean, the truth is that Hipparchus who came with a more precise tekufah, was already very much, already much before the Gemara, already much before the Tannaim. It's not true that it was revealed in the time of the Geonim, that from then we have Tekufat Rav Ada, it's much earlier.

The Gemara could have already known, but it's no proof from tradition. Perhaps it wasn't yet popularized. This is something that was revealed from Arabic and was translated, and the like. I'm not speaking of the book, the book itself, it was later, but the book of Hipparchus, I don't know, it's not necessary that Shmuel spoke of it. It's just that it was, if he could have, it's not simple that one only discovered it later, but like many things, it takes hundreds of years until such a thing enters the curriculum and more... It's not a simple thing.

The Jewish Sages Caught Up with the Better Version

Speaker 1:

But later, the Jewish sages already knew that Shmuel is not correct. Did they have a problem. How can it be that the Gemara states a calculation that is not precise? They said, and there is a giant, there is also a giant reason, why they arrived at this calculation of Rav Ada, which we'll see, we'll see in the Rambam inside, almost explicitly. They wanted to say that this calculation was actually used, and for Shmuel it's approximate.

English Translation

It's a forced answer. You understand why it's a very forced answer? Because there's no real halacha at all. One could say that a simple Jew, let's say a simple Jew finds it harder to calculate the more precise calculation. Yes, because a simple Jew knows what Birkat HaChama means, right? That's easy for him to calculate, but two more minutes he can't calculate. Excuse me, it's a very weak Torah.

The truth is simply that they once meant tekufat Shmuel, and about this the Rambam also brings it, because the Rambam has to bring what's stated in the Gemara. The Rambam, it's true that here is the science, but it's built on the Talmud, and the Rambam knew that in the Gemara only this calculation is stated, and the Rambam at the end of the calculation says a chiddush, that yirah li that with the Beit Din they indeed relied on the more precise calculation.

That means, he says that if... he means to say, not history. When the Beit Din would do the calculation, he would have said, but if the Beit Din that knows this, must reckon with this.

Anshei Emet — Not Stubborn

Speaker 1:

It's much more degrading for the Chachamim to say that they're stubborn and they don't look at reality, than to say that they didn't know everything. They are anshei emet, and what looks like the most truth? That's what they're on truth. But when the wisdom of astronomy wasn't yet so strongly developed, the more it became developed, the Chachamim caught up with the best version, yes, that's how it looks sometimes.

And one must understand also that... but what then, there's an am ha'aretz that one may not tell them this thing, so one says it was b'tzinah, like many things. Like one says, many times when someone argues with someone before him, it says talmud toar kazavin. Not always does he really mean that he should talmud toar kazavin, but he doesn't want to say, because someone who will learn it with a klalut harosh will now think an am ha'aretz. Here from his friend. He doesn't have enough respect to know that... yes.

Nevuah and Chochmat HaShamayim — Hashem Wants People to Discover

Speaker 1:

This is because we have people, we don't know how one learns. You must remember that astronomy is by nature, as the Rambam also says, he even speaks regarding Aristotle, that the nature of the thing is that it takes hundreds of years to figure out, because how was one precise about how long a year is? Only through calculation over hundreds of years. And this means that one must also be the same institution, one must go on for hundreds of years, one must be able to calculate, one must be able to from their... and there are the institutions that hold the papers, that hold the drawings, chutz k'ilu.

It seems to me that the assumption of other people is that it should have been like a halacha l'Moshe miSinai, that Hashem should have told Moshe Rabbeinu the precise tekufah. I don't know where we see that nevuah must tell chochmat hashamayim. There's no reason at all, I don't see why. Hashem wants people to discover things, that's how it looks in reality.

He takes people, you say that if someone would say that he says that one and one is three, one can easily see. But this is something that one cannot see. It must be that the longer one has better calculations, one knows better, because it takes time to figure it out.

About the moon you could perhaps say that when Hashem showed harei baetzba perhaps that means. He said that it's 29 days, 12 hours, 793 chalakim. Why? That was calculated later. I don't see why. Even Rabban Gamliel said mekubal ani mibeit

avi aba. That means, I heard from someone. He doesn't say, I heard from Moshe Rabbeinu.

Especially about the sun, after all basically we want that Nissan should be in aviv. All these small differences are less relevant. It's not even relevant to real halacha, because if however much it will actually be, it will be too hot or too cold, one will see. One only calculates even a half hour, what doesn't fit?

The Main Topic of Calculation — Prediction of Reality

Speaker 1:

As we see, the main big problem of the sod ha'ibur that we learn here is that the calculation should be easy. At the time when one didn't go according to calculation, the whole thing isn't lacking at all. So when the Rambam says earlier in Hilchot Kiddush HaChodesh, one could be me'aber the year based on tekufah and on the other things. One doesn't have to mean the exact calculations of tekufah, but it means yes. It means yes. It means yes. It means yes.

Speaker 2:

No, no, tekufah there always means calculation. Yes.

Speaker 1:

But I'm just saying that in practice regarding the halachot it's not lacking. It's not that the calendar will be wrong if one won't know the calculation. The calculation is only to know the reality. So one must explain it even better. The main topic of calculation is that one should be able to predict what one can see oneself.

What is the whole advantage of a simple Jew calculating tekufat hamachzor? It's a simple Jew, not a scientist, not a chacham. One must go outside and see if there's a moon. A chacham can tell you, like you told about Columbus, that's the wisdom. I can tell you, tomorrow there will be a moon.

And the truth is, it's literally a wonder, we're very accustomed. We learn a kind of nevuah, a kind of nevuah. A chacham has such a great memory from Sinai, because the nevuah happens always. All these answers that the Rama had about nevuah sometimes happening, not sometimes happening, yes? This happens always. "Chok uzman natan lahem shelo yishanu et tafkidam". Exactly, because it's built on the nature that Hashem made precisely. But, again, the more one learns, one figures out precisely how the precision works, and things change, not everything is a million percent precise always.

But we're somehow terribly accustomed that everything is easy to know. One looks at a calendar, it says when the sunset will be for a whole year. Do you grasp that for thousands of years one didn't take to figure out that one can know what time the sunset will be for a whole year?

Discussion: The Calculation Regarding Beit Din — Ramban's Shita

Speaker 2:

But the calculation is perhaps important for another thing. According to the shita that the earlier Chachamim were mekadesh every year, they can only do it if they have a good calculation, chochmat hacheshbon.

Speaker 1:

But the Ramban... first of all, the Ramban doesn't have this shita. I'm saying, according to the Ramban one can only do it if one understands calculation, one can just as well be me'aber the year for a thousand years ahead and for now.

Halacha 1: Shnat HaChama According to Tekufat Rav Ada

Speaker 1:

Okay, let's talk about this in a second. Let's first learn what's stated here. Let's not talk about this, because here one will see another important thing about the second calculation.

Okay. The Rambam says like this, learn for the state two states. **Shnat hachama**... the shnat hachama, how many days is the shnat hachama? Says the Rambam, **yesh mi mechachmei Yisrael... lemi she'omar... lemi she'omar**... ah, the Rambam, in perek tet the Rambam said that there are two shitot. Says the Rambam, one shita is that it's three hundred and sixty-five days with a quarter, and there are those who say that it's a bit less than a quarter.

Says the Rambam, **lemi she'omar, according to the second shita, that which you called shitat Rav Ada bar Ahava, sheyihyeh pachot merevi'a. Sheyihyeh pachot merevi'a according to the chachmei Yisrael.** The one from the chachmei Yisrael who hold this way, he will say this way. I will say the secret that he means. I'm only translating the words, I think that this is the translation.

Earlier it was said that there's a machloket between chachmei Yisrael and between chachmei umot ha'olam how long the year is. Now, there's this, there's one shita, which is either a shita of chachmei Yisrael, or of chachmei umot ha'olam, as we spoke last time, which says exactly the day. There it's the same. Now, here those who say that it's less than a quarter, that's actually more precise. Regarding that shita there are different shitot. The chachmei Yisrael who go with that one, generally pachot merevi'a, the Chachamim have.

Shnat HaChama According to Chachmei Yisrael – 365 Days, 5 Hours, 997 Chalakim, 48 Rega'im

The chachmei umot ha'olam, Hipparchus, who made a more precise calculation, didn't say that. He said it's off by a few seconds, he said other numbers.

From this the Rambam says, that within the shita that it's pachot merevi'a, he will tell us the calculation of chachmei Yisrael. Because chachmei umot ha'olam, either the very old ones, or in the time of the Rambam there were already others, they said slightly different calculations from this more precise calculation. Right.

He says like this, the language is a bit, because he can say "lemi mechachmei Yisrael she'omer"? No, because "omer pachot merevi'a" is there already. Also is the school of thought of pachot merevi'a, the Jewish part of this. Okay.

"Omer sheshalosh me'ot vachamisha veshishim yom vachamesh sha'ot utesha me'ot veshiv'a vetish'im chalakim ushmonah ve'arba'im rega."

I'll say like this: omer, that one says, the chachmei Yisrael will say that the shnat hachama is shalosh me'ot vachamisha veshishim yom – three hundred and sixty-five – plus chamesh sha'ot, utesha me'ot veshiv'a vetish'im chalakim ushmonah ve'arba'im rega.

We already learned that an hour has how much? Eighteen hundred chalakim? One thousand and eighty. One thousand and eighty, excuse me, I remembered something eighteen. One thousand and eighty.

So, this is with there something like two hundred less. Tesha me'ot shiv'a vetish'im chalakim ushmonah ve'arba'im rega.

Nine hundred and ninety-seven. How many chalakim less is it? From 1,080? It's 83 chalakim less. It's a very small... right? And a bit more, in 48 rega'im.

How many rega'im are there in a chelek? Says the holy Rambam, **"veharega echad mishishim veshiv'im bachelek"**. A rega is one of 76 in a chelek.

Soon we can discover what such a funny number came about. Why does one divide the chelek further too? No, because in order to... the answer you'll already see, let's finish.

Addition of Shnat HaChama Over Shnat HaLevana

He says, **"lefi cheshbon zeh"**, the bigger thing is to calculate the shnat... this is the tachlit of ibur shanah, that the shnat chama and shnat levana should work together.

He says, **"lefi cheshbon zeh, tosfet shnat hachama al shnat halevana"**, how much will the shnat hachama be longer than twelve levana months? Will come out ten days, a bit less than according to the previous calculation. A bit less, with those several ninety chalakim less.

Will come out **"asarah yamim ve'achat ve'esrim sha'ot ume'ah ve'esrim ve'echad chalakim ushmonah ve'arba'im rega'im. Vesiman lahem yud kaf-alef kuf-kaf-alef mem-chet"**.

They give numbers to remember. Instead of passwords they also give you many times sets of three numbers, and this he can remember. In short, ten days, twenty-one hours, one hundred twenty-one chalakim, with forty-eight rega'im.

The Chiddush: No Addition Remains in the Machzor

It comes out, this is the important thing, it comes out according to this calculation, **"velo timtza tosfet bamachzor shel tesha esreh shanah"**.

The Rambam taught us earlier that we calculate the moladot in cycles of nineteen years. Yes, but really, in other words, and they spoke about this earlier, that according to tekufat Shmuel, where the year of shnat hachama is like three hundred sixty-five and a quarter days, it comes out that even after the whole machzor of nineteen years that one made seven months of ibur, there still remains an hour with 748 chalakim addition of the machzor.

About this, when one calculated then the moladot, they had to add this the whole time, because this remains over in each machzor more. There are many machzors together.

But with this machzor no extra hours remain. The machzor is precise. Throughout the period the machzor of iburim is precise.

It comes out, each machzor of nineteen years, shanei hachama, shanei halevana, peshutot veham'ubarot, in other words, two hundred thirty-five months, which is nineteen years, shebahem twelve shanim peshutot and seven shanim me'ubarot, is precisely the same.

It divides, in other words, it divides two hundred thirty-five times 29 days, 12 hours, 793 chalakim, it divides precisely on the same amount of... if you divide it on twelve... not on twelve, on two hundred thirty-five, it divides precisely on a year of shnat hachama, which is the calculation that we just spoke of a bit less than a quarter of a day.

The Source of Tekufat Rav Ada: A Wonder

Now you will discover a wonder, that it seems, say all later commentators, that it seems that the source of tekufat Rav Ada is actually from here.

Because you must remember that it's very hard to calculate how long the sun is, how long precisely when shnat hachama is, it's very not a simple thing to calculate. And even if yes, there can further be differences. Today's shita is still a bit different from the calculation.

Seemingly, the one who made tekufat Rav Ada, what he did is, he simply saw, he thought like this: presumably the machzor, we make a machzor over. The machzor of nineteen years also doesn't stand in the Gemara. It's a kabbalah, I don't know from where one started it, but it's the Jewish system of ibur shanim.

Yes, but the Jewish cheshbon ha'ibur doesn't stand anywhere. It stands in the Gemara 29 days, 12 hours, 793 chalakim, it doesn't stand anywhere in the Gemara that every nineteen years one makes seven iburim. That doesn't stand in the Gemara. This was accepted from the time of the Geonim.

Once one used to make an ibur every year, you see clearly in the time of the Gemara, also according to the tekufah, but a machzor doesn't stand. The fixed machzor of nineteen years is a Jewish order, this is how our calendar has been for a long time.

Discussion: Why Exactly Nineteen Years?

Now, one must think on what the machzor is built? Why exactly nineteen years?

Now, if one goes with tekufat Shmuel, it also makes sense. There's about this a machloket whether the machzor was made according to tekufat Shmuel or according to tekufat Rav Ada. That means, it could be that the closest one can come is in the calculation of nineteen years one made it so.

But in any case, according to a minute, according to tekufat Shmuel one will need to add a day once in... no, no, one doesn't add. One doesn't add. We spoke about this in the previous chapter.

This is a big question, that if the calculation would have been according to tekufat Shmuel, it doesn't fit. It comes to hold together later, every bunch of machzorim. And you bet, there's no halacha that one adds.

Specifically from here you have a proof that it must be that one goes with Rav Ada, because it shouldn't be that one should add.

The Shita: One Divided the Machzor

Therefore there are others who say that perhaps he thought, the one who made the calculation of tekufat Rav Ada, that presumably the calculation is built on a precise calculation. So therefore he did a simple thing, he divided nineteen years on precise years, that means with the total chama levana should fit.

So he came up that the shnat hachama is not a bit more than the whole... it doesn't remain... exactly, it must be a bit clearer.

According to this calculation it comes out precisely to the... it goes into nineteen years. It comes out that after nineteen years one doesn't need to add anything. It makes very much sense.

Who says this? It makes very much sense on when this comes. This is what all apikorsim say, all people who don't believe that there was some kabbalah halacha l'Moshe miSinai secret, which no one heard until Rabbi Avraham bar Chiya. Shkait shtira.

Anyway, there is yes the... in short, there is an inyan of this whoever wants to learn investigations with history can learn, but this is certainly the calculation.

Why Exactly 76 Rega'im in a Chelek?

And according to this one also understands why there are precisely the rega'im. Already see in the next piece, it looks even better. But in any case, the reason why there are the rega'im is simply so that one should be able to calculate a precise number.

So, basically like this, if you divide the two hundred thirty-five months precisely on the nineteen years of the machzor, it will come out that you know this on twelve, so this is a twelfth of nineteen. That means, it comes out nineteenthly one must divide, because a whole chelek doesn't remain in the end, one must divide by nineteen.

Now, twelve nineteenths, each year remains twelve nineteenths in a chelek.

Now, since we want to know the tekufot, we don't just want to know the year, the main calculation here is to know the tekufot, one must divide a year by four.

Nineteenths, but four times nineteen, which is seventy-six. Therefore one said that a year, the end is forty-eight, that means there are twelve, four times twelve is forty-eight, four times nineteen is seventy-six.

It comes out, one says that each year is 48 rega'im, from here comes the calculation of rega'im. And this is a great proof that the whole calculation is built on dividing the years. Not that he counted the shnat hachama and it will come out so, but he divided the years of the machzor of nineteen years, so it came to him that one must have this sort of rega'im.

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Why not? Because we always want that at the end of the calculation there should be a whole number, not a half number.

If you want to go to a month, for example, you would have, he says, a third of a rega, because a tekufa is three months, it comes out to a third of a rega. But that's not relevant for the calculation.

This is the calculation of why the regaim come out. The regaim are never used any other way, only here. This is the calculation of... And the thing is, as the Rambam will say that the calculation is also not one hundred percent accurate as we'll see, so, whatever, it's more accurate.

A Possibility: Hipparchus's Number as an Influence

The Rambam says further, between each tekufa and tekufa... I would have explained before this, it could be that the one who made tekufat Rav Ada, it could be he also saw, for example, Hipparchus's number of one in three hundred, but he wanted to fit it in here, so it's a bit different from that, in order that the calculation of this should fit.

It comes out, according to this calculation, it was between each tekufa and tekufa.

Law 2: The First Tekufat Nisan and the Difference from Shmuel

Speaker 1:

So whatever, it's more accurate, the Rambam says further.

Between each tekufa and tekufa, he wants to explain, before this it could be that the Rambam made tekufat 288, it could be he also saw for example Hipparchus's number of one in three hundred, but he wanted to fit it in here, so it's a bit different from that, in order that the calculation of the cycle should fit.

It comes out, according to this calculation, it comes out that **between each tekufa and tekufa according to this calculation is ninety-one days, and seven hours, and five hundred and nineteen parts, and thirty-one regaim. Their sign is tzaet tzedeket lach.** Yes, this is each tekufa the same length, four times like this in a year.

When you know a tekufa from the tekufot when it was, he says now, when you want to know any tekufa when it began, you can know from this any other tekufa. **You will calculate from that rega, you will calculate from that rega this number, and you will know the tekufa that follows it in the way that we explained regarding the tekufa of the year which is a quarter.** The same thing as a quarter. Only you will go according to the calculation, you will subtract the bit from the quarter, and you will know to subtract the same repetition.

I will calculate, instead of tekufat Shmuel which we simply calculate 91 days with 9 hours, right? Here you will make plus for the number. With the regaim. You will make the number, not the half hour, a bit less than a half hour, you will calculate according to the number. Yes. So, he now goes in.

The Beginning of the Calculation of Tekufot — The First Tekufat Nisan

Just like the previous section, we need to know, where does the entire calculation of the first tekufat Nisan begin? I said, **the tekufat Nisan according to this calculation, the first tekufat Nisan was in the first year of creation, before the molad of Nisan**. The first tekufat Nisan, do we go here with the view that the world was created in Nisan?

Yes, we already spoke also in the previous chapter, because the calculation of tekufot begins from Nisan. This is the order of the tekufot, we say that Aries is the first constellation, the tekufot of the year begins from Nisan. So, according to all the views of the calculation of tekufot, Nisan is the first.

It's a problem that the calculation of the creation of the world, we all learn, regarding the calculation of the constellations, the moladot were calculated from Tishrei. The Nisan is a Nisan from before the Tishrei, so we calculate as if. Eh, there was no world? What's the difference? The calculation is not a real calculation. The calculation is... This is according to the view of Shmuel.

There is a dispute among the commentators whether Rav Ada also holds that the world was created in Tishrei. The truth is, all these things make no difference. When we say all calculations, everything is... We're not speaking in order that we should be able to begin the calculation clearly.

I have a proof, because the actual, in the Gemara, when Adam related to the tekufa, it's tekufat Tevet, and that can only be with the calculation that he began in Tishrei. He began with the calculation of tekufa. That means, it's also a midrash, right?

Speaker 2:

Yes, yes, yes, a Gemara in Avoda Zara, yes.

Speaker 1:

Yes, but it's not... In short, it could be that the dispute of Rosh Hashana about whether the world was created in Nisan is also a dispute about how we will calculate the calculation. That means, it's not necessarily that it's a historical dispute or the plain meaning in the portion of Bereishit. It could be the reason for that dispute is also because there's some practical difference when we make calculations later, because it's not just a dispute.

A story question, and we can't come up with, according to midrash one can say many teachings, but... Anyway, it comes out according to this approach, I calculate... I mean, the whole story of... It says there "and they shall be for signs and for appointed times and for days and for years," that the calculations there, what's not relevant to our matter, is for the calculations.

Speaker 2:

True, but... The history itself is hidden, it's holy things. What does it say there?

Speaker 1:

Okay, okay.

In short, according to this calculation, according to tekufat Rav Ada, we calculate tekufat Nisan in the first year we calculate it nine hours and six hundred and forty-two parts before the molad of Nisan. That means, we learned when the molad of Nisan was, which we learned in a previous chapter.

In other words, really, the way to say this is the other way around, because tekufat Nisan is when Rosh Chodesh Nisan begins, is when the world was created, that's when it begins. So, the other way you can say that the molad was nine hours with 642 parts after the world was created, after the beginning of tekufat Nisan. Or... right?

Now, according to this calculation comes out an interesting thing, **and so it is forever**. That means, according to the previous calculation, each tekufa, each cycle comes to 1485, one needs to add a whole time to know when the beginning, when the tekufa begins in that cycle. But according to this cycle it ends completely. So each cycle, not each year, each first of the cycle, it comes out that tekufat Nisan is exactly nine hours and six hundred forty-two parts before the molad, because each cycle comes to zero according to this calculation. Right?

The Difference Between Shmuel and Rav Ada — The Seven Days

Now, you will notice that the entire difference of this method with the previous method is that according to the previous method, the difference of the first, the first molad, according to the view of Shmuel, was seven days and nine hours, six hundred forty-two parts after the tekufa, and according to him there are no seven days, it's only the nine and 642.

Speaker 2:

And the commentator also comes by each cycle it will be the same thing?

Speaker 1:

No, because according to Shmuel each cycle changes, because the cycle has a remainder. Not according to here, it's completely different according to each cycle. According to this method each cycle begins the same.

But the first was the same day, because the answer is, as the commentator explains, that this method holds, like Rabbi Yehoshua, that the world was created in Nisan, so the midrash is the first day of the world that the first cycle on the fourth day, the fourth day when the luminaries were hung, the beginning of the fourth day was when the sun was at the beginning of tekufat Nisan, because that's what Rabbi Yehoshua means.

And the moon, there is some tradition, he says, that the moon was not created at the same time. That means, it was created at the same time, but the molad of the moon was not at the first minute of the creation of the world. The moon was not created at its molad. The moon was created exactly nine hours and 642 parts before the molad.

Digression: The Plain Meaning in the Midrash "Go and Diminish Yourself"

And the commentator says that this is the plain meaning of the well-known midrash, that there was first "the two great luminaries," and afterwards the Almighty said to the moon "go and diminish yourself." He says that the plain meaning is, what is the meaning of "go and diminish yourself"?

Everyone who knows a bit of the laws of sanctifying the month asks on this midrash, that it's a miraculous thing, the moon with the sun have no connection at all, the moon receives much light from the sun, it's completely a different kind of thing from the sun. What does it mean to say that they were both the same size, became smaller? What does that mean? It's a wondrous midrash. Of course, according to Kabbalah one can understand it, but according to the plain meaning.

He says, the commentator on Ketzot HaChoshen, perhaps he took it, he says there he took it from a commentary of Rabbeinu Moshe z"l, a manuscript from the Rishonim. They thought this was the Rambam, but apparently it's not the Rambam. It's another Rabbeinu Moshe or Rabbeinu Meir, or I don't know who, who said that the plain meaning of this midrash is that the moon was created when it was still a bit large.

The moon becomes diminished each month. At the end of the month it becomes smaller and smaller, until it becomes smaller, it looks smaller, until the molad is the smallest, it's the conjunction, you can't see it at all. He says that it's a tradition, the midrash explains that nine hours larger the moon was at creation than at the time of its molad. So, right at the creation of the world the moon began becoming smaller until it was reborn, and Adam still sanctified the month on Friday, I couldn't see anymore, whatever.

In any case, this is a plain meaning, it's a good plain meaning on the midrash, because otherwise the midrash doesn't make sense.

Back to the Difference Between Shmuel and Rav Ada

Anyway, this is the thing. However, according to Shmuel, Shmuel calculated that the world was created in Tishrei, as Shmuel is explicit in the Gemara that for tekufot we calculate like Rabbi Yehoshua, but unlike Rabbi Eliezer, for moladot we calculate like Rabbi Eliezer. So he had to calculate six months earlier, but he knows that the world was created on Wednesday, as it says in the Torah, it must be a Wednesday earlier.

So he added seven days to his calculation, that the world was created a week earlier, with another nine hours after the

beginning of the tekufa, as if before the beginning of the tekufa it was created, it was seven days, a whole week before the molad. But according to tekufat Rav Ada it was only the same day, but only nine hours before the molad.

Speaker 2:

You can say that in this it also turns out that according to Rav Ada each cycle begins at the same time as the creation of the world? And according to Shmuel it can't happen, because the first time it also wasn't at a time.

Speaker 1:

No, yes, true. But again, all these things are still calculations, but the truth is that the main advantage of tekufat Rav Ada is this, that the cycles are perfect, there's no remainder left over.

Law 3: How to Calculate Tekufat Nisan in a Given Year

He says, if you want to know **tekufat Nisan of the first year of the cycle, you will calculate from it**, you will calculate, **ninety-one days and seven hours and five hundred and nineteen parts and thirty-one regaim for each and every tekufa until the end of the cycle**. That means, the moment you know tekufat Nisan of the first first, which you know, which is stated in the previous law, and you know how long each tekufa is, you will calculate there four times nineteen tekufot until the end of the cycle. In short, you will calculate until you will know when tekufat Nisan is in a given year, you will add that many numbers.

But if you want to make it a bit easier, you can **know when tekufat Nisan will be according to this calculation**? That means, you want to know when the next will be... not the next, the next will always be a year in the middle of the cycle. He says like this, you can simply add how many years you know have passed, but he says a somewhat clearer way.

He says what should you do? **The number of years that have passed from the cycle**, how many years have already gone through. **And you will take for each year from them an addition**, you will add the sign that he said before, the 10, 1 and further. **And gather all the regaim into parts**, the regaim will already have enough regaim to make parts, and from the parts hours, **and all the hours into days, in the way that you calculate for moladot**, as we learned before.

And you will subtract from everything, and afterwards you will subtract, **nine hours and six hundred and forty-two parts**, which is how much before the tekufot from the molad. **And the remainder you will cast upon 29, 12, 793**, you will divide by 29, 12, 793. **And the remainder that doesn't have a lunar month you will add to the molad of Nisan of that year, and at the moment that the number arrives, then comes tekufat Nisan of that year**.

Yes, correct. It's very simple the calculation that he says.

Chapter 13 — The Calculation of Tekufat Rav Ada bar Ahava: Completion of the Calculation, Excellence of the Calculation, and Average Course versus True Position

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Law 11 — Completion of the Calculation: How One Calculates Tekufat Nisan

And the remainder you will cast, you will divide it by 29, 12, 793, **and the remainder that doesn't have a lunar month you will add to the molad of Nisan of that year, and at the moment that the number arrives, then is tekufat Nisan of that year.**

Yes, correct. It's very simple. The calculation that he says is the same calculation that he made before, only here it's much simpler, because you don't need to know the remainder from the creation of the world, you only need to start from the beginning of the cycle and divide by how much remains the addition of the sun over the moon, how many months have passed, you know from when you begin tekufat Nisan this year.

Law 12 — "The Things Appear to Me": The Rambam's Innovation in Law

Now the Rambam says a great innovation: **The things appear to me**, yes? He doesn't say "it appears to me," he says, the calculations show me. When it comes to calculation, the calculation speaks for itself. It speaks. He says an innovation in law, not an innovation in calculation. He says, the calculation shows me, because it's such a good calculation. But what he means to say "it appears to me" means to say "I did not receive it." It seems here that the Rambam is not relying on the tradition that states that tekufat Rav Ada bar Ahava. He doesn't believe this. He says, it appears to me myself. It appears to me simply that it's a better calculation, and therefore I like it more.

He says, what does he say? **The things appear to me**, that what? **That on this tekufa calculation they relied and intercalated the year**, that when they actually made the intercalation of years, according to the tekufa, as the Rambam learned before, according to which calculation? According to the calculation of the last, the second calculation of chapter 11. **Because this calculation is more true than the first**, the calculation fits better than the previous one. It's more true. It's more true. Both have truth in them, but this is more precise. **And it is close to the things** this is close to the things. The Rambam says many times "close to" instead of where we are accustomed to say "close to." It's close to the things **that were clarified in astronomy more than the first calculation in which the solar year was three hundred and sixty-five days and a quarter of a day.** Since the new calculation is a bit less than the quarter, it's a bit better aligned with astronomy, with the science of calculation, I believe that the Sages used the wiser one.

Innovation: The Rambam Has No Source for This — It's Only His Reasoning

So here you see very clearly, the Rambam understood that the court would have had to use the correct calculation, but he has no source for this. That means, he doesn't believe in the tradition that there's some council or that there's such a tradition that we find that they used this. He only says that since he knows that it's true, and this he also says as a secret, it's not. The astronomers have an even more accurate calculation. Ah, close to the things, completely he means in reality. The reality is a bit different, but the calculation is closer, and the calculation is also a piece of tradition. He thinks that probably in law one must go with this. Eh, what about the previous one? He doesn't say what happened with the previous one. The previous one is a mistake, basically. It's only a bit easier to calculate, but the practical difference...

The Rambam says, that first they did the previous one, and afterwards they refined it more. And he tries to say it respectfully, because I have no other translation, Hebrew translation. So, because I don't have a Great Court, but as long as there was still a court, it means, let's say, at the end of the court they already grasped the better one. No, no, by the way, he doesn't say histories. He says, yes, they relied. But perhaps he means, if there will be a court, they will use this. He doesn't say any story. Apparently comes out from here also a law that he wants to tell us, but he doesn't tell us, that when we will have a court, when we will have a Sanhedrin, when Jews will be able to come together and not be so scattered, we will then see what is the best calculation. And of course, we will give credit to Shmuel, Rav Ada bar Ahava, who are the foundation, on whom we stand, and we will make according to the best, as according to the Rambam, so it says here apparently. Otherwise there's no plain meaning why he teaches all these laws. All these laws are so that we should know, and afterwards we should be able to make from this the best calculations for our time.

Innovation: Even Tekufat Rav Ada Is Not Exact

As the Rambam states in the calculation, Tekufat Rav Ada is a bit more exact, but all in all the differences are a few minutes more exact than Tekufat Shmuel, it's also not exact. The astronomers know a bit better. So says the Rambam. Perhaps the Rambam himself didn't know, it's hard to know, but the Rambam says that it seems that this is more true, but it's possible he didn't know truly. So there are also differences of a few minutes. Today you can ask, well, it's also a few minutes difference. That's first of all. But now one must know another thing, that the entire calculation that one makes of tekufot (seasons) according to both, no matter which calculation, is never completely and exactly accurate. Why? Because the four tekufot of the year are not truly the same. We divide them into four perfect slices, but in truth it's not so.

End of Halacha 12 — Average Movement Versus True Position: The Four Tekufot Are Not Equal

Says the Rambam, the Rambam explains, all these tekufot that have been explained how one makes the calculations, **hakol bekiruv**, it's all close to the truth, it's close to the exact when the sun comes to the same place and so forth, **vehu bemahaleich hashemesh ha'emtza'i**, it's according to the calculation that we make an average of how the sun goes, **velo mekomo ha'amiti**, not when the change happens in reality.

Explanation: What Does "Average Movement" Mean Versus "True Position"?

What the Rambam means to say is, because I will tell him briefly, and one will learn in later chapters the true explanation of this, that when he says emtza'i he doesn't mean an average. It's true that it's an average, but that's what he means. What he means is, that the scholars of astronomy that the Rambam learned from tried to explain this very thing, because they had an assumption, an assumption where the first one who innovated not like the assumption was Kepler, but all these astronomers had an assumption that the sun with all the heavenly bodies must go in a perfect circle. So they had an assumption, that the sun travels in a circle. There were theories why, that was their reasoning. If it's a circle, it must be that all tekufot are the same, it's a quarter of a circle, it can't be otherwise.

Ah, now, in practice, when one looks at the sun one sees that it's not so, one sees that it doesn't come to the mazal Taleh (Aries) exactly in so many days after it comes to the mazal of Tevet and so forth. There are differences, yes, of whole days there are differences between one tekufah and another tekufah, how long the tekufah was. So they came out with a theory, one will see later what the theory is, that somehow it's true that the sun travels on a circle, but there's something else that makes us see the sun differently than it truly is. So the emtza'i that he says here is the true thing in heaven according to the sun itself, but according to how it appears to us, according to how it connects with the mazalot (constellations) to us, there's another thing, which he calls mekomo ha'amiti. Mekomo ha'amiti means its true position in the mazalot. In other words, according to their theory, the place where the sun is in the mazalot is not the same as the sun's circle that it travels itself, for whatever reasons.

Innovation: Tekufat Nisan Comes Two Days Earlier According to the True Position of the Sun

Therefore he says that the calculation and the tekufot are all according to the mahaleich ha'emtza'i, how it itself travels, but the position of the sun is truly different. **Aval bimkom hashemesh ha'amiti**, if one will calculate with the true position of the sun — position means in relation to the twelve mazalot — then **tihyeh tekufat Nisan bizmanim eilu**, bizmanim eilu means current times, **kemo shnei yamim kodem shetihyeh tekufah sheyotza'ah mecheshbon zeh**. But Tekufat Nisan will come out a bit quicker. That is, Tekufat Tevet lasts a bit longer than the other tekufot.

Shorter. Longer. Ah, shorter, yes. Tekufat Nisan moves up two days earlier, **bein cheshbon mi shemechashvo revi'i yom gamur, bein cheshbon mi shemechashvo pachot merevi'i yom.** That is, the one who calculates less than a quarter day is indeed better that the nineteen years should come out whole, but if we will look at the reality of when the sun comes to the place relative to the mazalot, then every year it moves with Nisan. Not that it moves every year, but Tekufat Nisan is always two days longer. That is, always two days earlier than the calculation. That is, even the next few minutes won't solve the problem, it's a difference of two whole days.

Practical Halachic Implication: Tekufat Nisan Is the Only One That Matters

But it's interesting, because this has to do with a completely different thing, because not all four tekufot are truly equal, at least according to the mazalot. That's the innovation. And the true reason is why? Not only because the sun isn't exactly a ball, or because the whole... I'm not saying what the true... But the interesting thing is that the only one that matters is Tekufat Nisan, and it turned out to be a great practical halachic implication, that when the Beit Din calculated, they only calculated Tekufat Nisan, and the two days can make the whole difference.

Digression: The Ramban's "Secret" — When One Will Make a New Sanhedrin

True, true. The Ramban relates that there's a secret that when one will make a new Sanhedrin, one shouldn't go with the calculation, not Shmuel, not Rav Ada bar Ahava, but if the tekufah comes out the 15th or 16th, you should know, but in practice you're still good. One must know if it concerns us the amiti or the emtza'i. No, it must concern the amiti, because

"shamor et chodesh ha'aviv." Aviv means approximately spring. I don't know.

"Bizmanim Eilu" — The Difference Changes Over Time

And what he says "bizman zeh," because besides this difference there's another thing that changes throughout the history of the world, which is called govah hashemesh (solar altitude), which we will also learn later, which in the time of the Rambam it's two days, and other times it comes out differently. Today it's not exactly two days, it's some other number, which I don't know what. But the Rambam says "bizmanim eilu," because the Rambam already knew that this itself changes over time.

Clarification: The Difference Is Not Cumulative — It's Only Within the Year

But the Rambam doesn't say that we will need to fix as if now. That if we will now make it exact, we will have hundreds of days to fix, yes? Because every year... No, no, it's not cumulative. The two days is only within the year. I said, the length of the year is almost exact. The calculation of the cycle remains the same calculation, not only of the cycle, of the whole year. One must recalculate two days earlier. What's written in the halacha is only that the four tekufot of the year are not exactly a quarter of the year. Tekufat Nisan comes earlier than a quarter year, but the whole year is indeed the same. It doesn't add up two days each time.

So, until here Chapter 13.