

History (or Prehistory) of the Jewish Calendar During the Talmudic Period

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It was always believed that the transition from the observation to the fixed calendar was clear-cut, with the fixed calendar immediately adopting its definitive form. In the present paper, we outline the true history of the Jewish calendar from the end of the Mishnah period—roughly the beginning of the third century—until ca. 432 C.E. We show substantial Talmudic evidence for this evolution; the systematic study of this material was never undertaken. We explore the progressive evolution, hardly seamless and immediate, toward the precedence of calculation and predictability upon observation and empiricism. We show that from ca. 325 C.E. onwards, the data of the coming year were sent in advance to Babylonia. By this time, the Babylonian community knew the fixing of the month.

The transition from a variable to a fixed and predictable calendar occurs during the first half of the fourth century and ends by the middle of that century. The rule of this calendar, however, remained concealed and known only by the initiates, under the jealous supervision of the Palestinian calendar committee having its seat in Tiberias.

The fixed calendar was not set immediately but it evolved over several centuries. It was not set definitively before the tenth century.

*The evolution of the Jewish calendar during the post-Talmudic and the Geonic period was examined in detail in our paper, “A Short History of the Jewish Calendar,” *Hakirah* 20, Winter 2015, pp. 133–190.¹*

¹ I express my gratitude to Hebrewbooks.org, an exceptional virtual Jewish library, which renders an invaluable service to the community of scholars and Torah students.

The present study is limited to the Jewish rabbinic calendar which developed around the Sanhedrin and the Pharisees and later around the Patriarchate and

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I. Communication by Fires

As far as we know, during the time of the Mishnah, the calendar was established by testimony of people who witnessed the new moon. We have evidence that Rosh Hashanah and Yom Kippur could fall on any day of the week.² The neomenia (*Rosh Hodesh*) communicated to the people of the Diaspora via fires, informed them that the former month was defective (29 days). They lit these fires on hills, which allowed for rapid communication³ to Babylonia,⁴ reminiscent of the optical telegraph used ca. 1870 C.E. The Jews who lived on the roads near the hills received the information of the date of the neomenia on the same evening and all could know the dates of Yom Kippur and the other festivals with certitude.

the Talmudic academy of Tiberias. The history of this calendar is outlined from Talmudic and rabbinic material. A more general and critical study of this subject, including concurrent non-rabbinic Jewish and Christian calendars, referencing also non-Jewish and non-rabbinic extant material, is beyond the scope of this study; see Sacha Stern, *Calendar and Community* (Oxford University Press, 2001). It has been assumed in this paper that unless we have explicit doubt about the authors or the contents of quotations, we can rely on the historicity of the mentioned facts and on the Talmudic attributions.

Unless otherwise specified, all the Talmudic quotations are according to the reference of the Vilna edition of the Babylonian Talmud and the text of the Krotoshin edition (1886) of the Jerusalem Talmud. (Occasionally the reference of the Vilna edition of the Jerusalem Talmud is also mentioned in brackets.)

² See the following references in the Mishnah: *Shabbat* XV, 3 and 19; *Menahot* XI, 7 and 9. See further Maimonides' commentary on the Mishnah *Menahot* XI, 7 and *Tosafot Yom Tov* on *Sukkah* V, 5.

³ This communication mode could be used only in areas comprising hills; it also required a Jewish population along the way. These requirements restricted the effectiveness and the possibility of using the system. Most of the Jews of the Diaspora had no reliable information and they sufficed with a schematic calendar based on the observation of the moon or later with a schematic fixed calendar as described in *Tosefta, Arakbin* I, 8 (I, 4 in the Vilna edition). R. Isaac Israeli (*Yessod Olam*, edition B. Goldberg 1848, 4: 5, p. 8d and 4: 6, p. 10d) had already suggested that the Babylonians observed a calculated calendar based on the conjunction which differed systematically by one day from the Palestinian *keviyah*, as the latter was based on the sighting of the new moon. They needed additional information to know the intercalated years. The Talmud mentions letters sent on this subject by the Patriarch Rabban Gamliel to Galilee, the South, Babylonia, Media, and the whole Diaspora, see *B. Sanhedrin* 11b, *Y. Sanhedrin* 18d and *Tosefta, Sanhedrin* II, 18d6.

⁴ See *B. Rosh Hashanah* 22b-23a and *Y. Rosh Hashanah* II, 2, 58a. Stern (2001) examines the problem (pp. 162-163). He wonders if the beacon procedure was ever carried out, and if so, whether it could have been effective.

Those who lived further away from this road had no information and had to rely on an empirical calendar of months of 29 and 30 days successively. Unsure, they observed two festival days, and they worried continuously that their calendars would indicate a difference of a month from the Palestinian calendar, due to a difference of intercalation. Even as the Temple still stood, an enactment was adopted which restricted the Court's office hours for examining witnesses' testimonies of viewing the moon, until *Minḥab*,⁵ the time of the offering of the afternoon sacrifice (*Tamid*). Later testimonies were delayed to the following day. After the destruction of the Temple, Rabban Yoḥanan ben Zakkai re-established the prior policy of the Court, examining testimonies until nightfall.⁶

II. Communication by Messengers

The Mishnah *Rosh Hashanah* II:2 tells us that the Samaritans were lighting fires when it was not appropriate, i.e., when the month was a full month, to frustrate the communication of the calendar. In response, a radical change in the way the Jewish calendar was communicated to Babylonia became necessary. Rabbi Yehudah the Patriarch⁷ (second half of the second century) suppressed the communicative fires and this obliged the Babylonian population to adopt the principle of two festival days out of doubt about the correct date.⁸ Nevertheless, and without waiving the former principle of respecting two festival days, it became the rule to have Elul⁹ and probably also Adar¹⁰ defective, so that the Jews of the Diaspora and the Palestinians might celebrate Yom Kippur together. The case of Elul was specifically aimed to synchronize the fast of Yom Kippur. We have no data allowing us to date this new custom which is presented in the Talmud as having found its origin during the time of Ezra. This system had certainly existed for a few centuries.

⁵ Probably 9.5 temporary hours, i.e., 15h 30m at the equinox.

⁶ Mishnah, *Rosh Hashanah* IV, 4.

⁷ *Y. Rosh Hashanah* II:1, 58a (11b in the Vilna edition).

⁸ As mentioned above, the beacon system could have been more theoretical than effective and therefore the principle of two festival days "out of doubt" may have been much older and may have concerned all the regions of the Diaspora, which were out of reach of calendrical information.

⁹ *B. Rosh Hashanah* 19b and *Y. Sanhedrin* I, 2, 18d, 5b in the Vilna edition.

¹⁰ *Y. Sanhedrin* I, 2, 18d (5b in the Vilna edition). See also a passage in *B. Rosh Hashanah* 19b where the rule of Adar is subject to a dispute.

III. Transition from an Empirical to a Fixed Calendar

The chronological classification¹¹ of the following Talmudic passages shows that the transition from the empirical calendar to a fixed calendar was much more progressive and less clear-cut than currently believed.¹² It shows that before the institution of a fixed calendar in the year 358/359 C.E., an early version of a pre-calculated calendar was communicated to Babylonia beginning in approximately 325 C.E. In fact, even before 325 C.E., the calendar committee of Tiberias used calculations and sets of rules to establish the neomenia (fixing of the new moon) at the expense of the traditional empirical observations.

III.A. Before 210 C.E.

III.A.1 Rabbi (also called R. Yehudah ha-Nasi, died ca. 210-220 C.E.)

R. Yehudah ha-Nasi suppressed the fires (see above).¹³ He eliminated the obligation to intercalate in Judea to Galilee, to enhance the prestige of the patriarchate whose seat was in the Galilee.¹⁴

During the life of Rabbi, the Sanhedrin became more lenient, with respect to the strictness of Rabban Gamliel, in examining the witnesses of the new moon (and therefore laxer in declaring a new month). For example, in *B. Rosh Hashanah* 25b,¹⁵ Rabbi sent R. Hiyya to sanctify the new moon of Tishrei, although it was certain that the new crescent could not yet be seen.¹⁶ This witnessing was obviously wrong, but Rabbi and R. Hiyya accepted it to respect the rule that Elul and Adar should be defective (29 days).¹⁷ The purpose of this rule was to help those people who were out of reach of the calendar envoys to observe the true holidays together with their Palestinian peers. It also aimed to make them more comfortable by fasting Yom Kippur together with the Palestinians.

¹¹ I am aware of the limits of this method because of the uncertainties about the name of the authors of the different quotations. However, the Talmudic material remains the only internal source of information allowing the outline of the evolution of the Jewish calendar during the fourth and the fifth centuries.

¹² Stern (2001) has also suggested that the transition from an empirical to a fixed calendar may have been slow and gradual (p. 180 and p. 240) but his assumption remained unsubstantiated.

¹³ *Y. Rosh Hashanah* II:1, 58a.

¹⁴ *Y. Sanhedrin* I:2, 18c.

¹⁵ See paragraph 2 just below.

¹⁶ *B. Rosh Hashanah* 25a. Another version is found in *Yalkut Shimoni*, chap. 191.

¹⁷ Elul: *B. Rosh Hashanah* 19b and *Y. Sanhedrin* I, 2, 18d (5b); Adar: *Y. Sanhedrin* I:2, 18d. (5b).

The next passage of *Y. Avodah Zarah*¹⁸ probably relates to this period:

אמר רבי יודן, קרייא מסייע למה דאמרי חברייא, וביום עשרים וארבע לחודש השביעי נאספו בני ישראל בצום ובכי ושקים ואדמה עליהם. ולמה לא אמר בעשרים ושלשה, משום בריה דמועדא. אין נימר דהוה בשבתא, לית יכיל דאת מחשב ואת משכח צומא רבא בחד בשובא. ומה בה ולית רבי חוניה מיקל למאן דמעבר ליה מן אתריה. אמר רבי יוחנן בר מדייא אנה חשב יתה ולא הוה בשבתא. R. Yudan said, the text [of Nehemiah] supports what the group [of Rabbis] said. On the twenty-fourth day of the seventh month, the Israelite sons gathered to fast and cry with sacks and earth on themselves. Why did it not say on the twenty-third? Because of the “birth of the festival.”¹⁹ Should we explain that [it did not occur on Tishrei 23] because it was a Shabbat; that is impossible. If you calculate you will find that the Great Fast [Yom Kippur] is on Sunday! And so what? Does not R. Hunia hold in contempt those who intercalate the year [to displace Yom Kippur] from its place [Sunday]? Said R. Yoḥanan bar Madia,²⁰ “I made the calculation and [Tishrei 23] did not fall on the Sabbath.”

Apparently, this passage is related to the situation when the *deḥiyot* or postponements *lo DU Rash* (לא ד"ו ראש) were not yet enacted but there were already voices in their favor. Perhaps this passage corresponds to the time of Rabbi when this *deḥiyah* was not yet practiced; R. Hunia could correspond to the *tanna* חורן דברת חורן,²¹ an expert and member of the council of intercalation;²² and R. Yudan to R. Yehudah bar Ilai.²³

¹⁸ *Y. Avodah Zarah* I, 1, 39b, (4a).

¹⁹ This is certainly the origin of the custom of אסרו חג.

²⁰ R. Yoḥanan ben Madia was a Palestinian Amora of the fifth generation, contemporary of Rabbi Mana II, second half of the fourth century. He lived more than 100 years later than R. Hunia. In his time fixing the calendar by observation was no longer in use and the new precalculated calendar was operational.

²¹ R. Hunia was a Tanna of the last generation. The Palestinian Amora'im of the first generation were his pupils. He was a member of the council of the *Ibbur*, see Aaron Hyman (1862-1937), *Toledot Tanna'im ve-Amora'im*, 3 vol (1901 – 1911) repr, 1964. Vol. 1, p. 4123.

²² See *Y. Avodah Zarah* III, 1, 42c, (18a). כד דמך רבי חנינא דברת חורן איתבזע ימי טבריא. אמרין כד הוה סליק לעיבורא הוה ימא מתבזע קומי.

²³ Rabbi Yehudah was older than R. Hunia, but he lived to an old age, and survived Rabbi Meir. The latter attended the marriage of Rabbi's son. R. Yoḥanan bar Madia was a later Amora of the time of R. Mana. His statement is from after the establishment of the fixed calendar. He made a retroactive calculation, using the rules of the new calendar and extrapolating it to the past, to prove that the 23rd of Tishrei was not a Sabbath.

III.A.2 Rabbi (Yehudah ha-Nassi) and Rabbi Ḥiyya

Rabbi and R. Ḥiyya state in *B. Rosh Hashanah* 25a:

רבי חייא חזיא לסיהרא דהוה קאי בצפרא דעשרים ותשעה, שקל קלא פתק ביה, אמר: לאורתא בעינן לקדושין ואת קיימת הכא, זיל איכסי. אמר ליה רבי לרבי חייא: זיל לעין טב וקדשיה לירחא ושלח לי סימנא, דוד מלך ישראל חי וקיים.

R. Ḥiyya once saw the waning old moon (rising eastward, before sunrise) in the sky on the morning of the twenty-ninth of the month (of Elul).²⁴ He took a clump of earth and threw it at the moon saying: this evening we need to sanctify you²⁵ and you are still standing here! Go and cover yourself for now. R. Yehudah ha-Nassi thereupon said to R. Ḥiyya:²⁶ go to Ein Tav²⁷ (the Good Spring) and sanctify the new moon there and send me the watchword “David, king of Israel, lives and endures.”²⁸

In *Y. Rosh Hashanah* II, 4 (Vilna edition p. 12b) we find the following, and likely related, passage:

²⁴ The sanctification of the new moon of Elul is of the highest importance as the fixing of the Tishrei festivals depends on it. The text does not mention that it was in Elul, but it is implicit. Rashi understood it the same as we can deduce from his justification of the adopted neomenia (*Rosh Ḥodeesh*) to avoid Yom Kippur being adjacent to Shabbat.

²⁵ This evening we should see you towards the west after sunset and you are still visible this morning eastward before sunrise! This evening will be the beginning of the thirtieth day of Elul, and we want Elul to be defective.

²⁶ Apparently the two passages are related. In fact, the decision to sanctify Tishrei on the next evening was definitive. See Rashi who explains that Rabbi knew that the moon would not be seen in its proper time (“*bi-zemano*”) on the evening at the beginning of the 30th day of Elul, but he nevertheless decided to fix Rosh Hashanah on the thirtieth day of Elul, to avoid Yom Kippur falling on a Friday or a Sunday (Rashi) but also not to derogate the rule of Elul defective, in order not to deceive the Diaspora. Indeed, the Diaspora fixed the date of the festivals of Tishri based on the rule that Elul is always defective.

²⁷ For the location of Ein Tav and a discussion of this passage, see Nachman Levine, “*David Melekh Yisrael Hai Ve-Kayam: Kiddush Ha-Levanah, Midrash, Archeology and Redemption*,” *Hakirah* 28, pp. 83-100. We can assume, based on the name of the place, that it was a spa town. The Rabbis were accustomed to gather, make their decisions, intercalate the years, and fix the calendar in spa towns, so as not to attract the attention of the authorities. It should not be forgotten that the maintenance of an independent calendar, independent of the state calendar, maintained and kept by the Jews of Palestine and the Diaspora, represented a form of resistance and sedition to the Roman authority.

²⁸ To confirm successful execution of your mission, without incident.

רבי חייא רבה הילך לאורו של ישן ד' מיל.

R. Ḥiyya the Great, walked in the light of the old [moon] four miles (72 minutes).

In *Yalkut Shimoni, Remez* (chapter) 191 (*Bo*), we find both quotations interwoven:

מעשה ברי חייא הגדול שעלה הירח ערב ראש השנה והלכו הספנים לאורו מהלך ג' מילין. ראה אותו רבי חייא, נטל צרורות ועפר והיה זורק בו, אמר: למחר אנן מבקשים לקדשך ועלית לך עכשיו, מיד נבלע במקומו.

R. Ḥiyya once saw the old moon rising (westwards before sunrise) and the sailors sailed in its light during three miles (54 minutes). R. Ḥiyya saw the old moon; he took stones and earth, and he threw them at the moon and said: tomorrow (this evening) we want to sanctify you and you just rose now, immediately it disappeared.

We see thus that Rabbi was adamant and even in a case when certainly the moon could not be seen in the evening at the beginning of the 30th day of Elul, he had decided to leave the month of Elul defective, so as not to violate the rule of Elul defective and to preserve unity with the Diaspora in the keeping of the festivals.²⁹

The origin of the problem was, undoubtedly, that they had adopted too many defective months during the last year, which proves that their means of calculation and anticipation were limited.

According to the reading of *Yalkut Shimoni*, the moon rose about $3 \times 18 = 54$ minutes before the sun; this would correspond to an arc of vision (*kesbet ha-re'iah*) of $54/4 = 13.5^\circ$, very near to 14° , warranting an evident

²⁹ The explanation of Rashi, according to which the purpose was to avoid Yom Kippur adjacent to Shabbat, seems anachronistic, as we don't find such a preoccupation before R. Yoḥanan and Ulla. Similarly, the explanation of Rabbeinu Ḥananel, based on the statement of Rabban Gamliel in the name of his homonymous grandfather at the beginning of the Gemara on the same page 25a, according to which the time of the moon vanishing is variable, is undoubtedly ingenious, but it cannot justify seeing the old moon very distinctly in the morning and later the new moon on the evening of the same day, and especially on a day close to the equinox. In any case, it is impossible to see the moon twice on the same day, in the morning and in the evening. (See my book [Hebrew] J. Jean Ajdler, *Hilkhot Kiddush ha-Hodesh al-pi ha-Rambam* [Jerusalem, 1996] pp. 364-382. A copy of the book is available at the Dorot Library, Public Library of New York, Manhattan, 42nd Street. A copy is also available at the library of Yeshiva University and of Harvard University.)

seeing of the new moon without any further calculation.³⁰ We know further that the old moon rises each day, on average $1440 / 29.5306 = 48.76$ ³¹ minutes after the rising time of the former day. Thus, according to the data of *Yalkut Shimoni*, on the morning of the 30th day the moon rose 54 minutes before the sun and the true conjunction would happen about 1.11 days or 26.58 hours later. In Tishrei the minimum span of time between the true conjunction and the vision of the new moon is about 19 hours,³² so that the new moon could not be seen before the evening at the beginning of the 33rd day of Elul, at the beginning of Tishrei 4. This is theoretically unacceptable.³³ In conclusion, we must consider whether the span of time during which R. Hiyya saw the old moon is a mere exaggeration or that the number of defective months in that year had been seriously excessive. Therefore, at the first glance, the first solution should be preferable because it corresponds to a better mastery of the Jewish calendar by the intercalation council. Furthermore, this exaggeration would be coherent with the last statement of *Yalkut Shimoni*, that the moon immediately vanishes, which is certainly hyperbolic. Nevertheless, after close examination of the problem, the information given by the *Yalkut Shimoni*, that the sailors sailed during 54 m at the light of the old moon, and that the new moon of Tishrei was seen only in the evening, at the beginning of Tishrei 4,³⁴ is perhaps correct. First it is interesting to note that Rashi ad locum (*B. Rosb Hashanah* 25b) writes that the procedure of sanctifying the new moon on the evening at the beginning of day 30, when the old moon was seen so easily and clearly on the morning of day 29, was performed in a little-known village, because Rabbi was ashamed of the situation and wanted to avoid a scandal. More concretely, the *Yalkut* solution probably better corresponds to the situation prevailing at the end of an ordinary year of 352 days comprising 4 full months and 8 defective months. Therefore, at the end of that year, the first seeing of the new moon, which normally must occur on the evening at the beginning of the 30th or the 31st day of the month of Elul, was delayed to the beginning of the 33rd day of Elul, i.e., Tishrei 4. Although this situation is, in principle, unacceptable and shows a lack of control of the situation, we find another case, during the reign of Rabbi, with a comparable imprecision, see infra n° 4.

³⁰ See *Hilkhot Kiddush ba-Hodesh* XVII, 15, Ajdler (1996) pp. 106-107 and Jacob Loewinger (1994), “Vision of the new moon: Maimonides’ theory with regard to modern astronomy” (Hebrew), p. 473, *Tehumin* 14 (1994), pp. 473-486.

³¹ 1440 minutes is the length of a day and 29.5306 days is the length of the average lunar month. A complete shift happens during a lunar month.

³² See Ajdler (1996) p. 208. Rabbi Raphael ha-Levi from Hanover gives 20h 30m.

³³ See *Arakbin* 9a.

³⁴ Both situations are considered unacceptable, see *B. Arakbin* 9a.

III.A.3 *Mishnah Arakbin* II:2.

אין פוחתין מארבעה חדשים המעוברים בשנה ולא נראה יתר על שמונה.
We do not consider less than four full months and not more than eight full months in a year.

In our modern calendar, an ordinary year of 12 months can have 353, 354 or 355 days. It corresponds to a year of 5 full months and 7 defective months, 6 full months and 6 defective months and finally to a year of 7 full months and 5 defective months.

In the modern calendar a leap year of 13 months can have 383, 384 or 385 days. It corresponds to a year of 6 full months and 7 defective months, 7 full months and 6 defective months, and finally 8 full months and 5 defective months.

In the observation calendar we could have an ordinary year of 4 full months and 8 defective months, hence a year of 352 days and a year of 8 full months and 4 defective years, hence a year of 356 days. The length of 12 average lunar months is $12 * 29.5306 = 354.3671$ days. The year of 352 days is then 2.3671 days shorter, and the year of 356 days is 1.6329 days longer, than the corresponding average lunar months.

Similarly, we could have a leap year of 4 full months and 9 defective months, hence a year of 381 days and a year of 8 full months and 5 defective months, hence, a year of 385 days. The length of 13 average lunar months is $13 * 29.5306 = 383.8977$ days.

The year of 381 days is then 2.8977 days shorter, and the year of 385 days is 1.1023 days longer, than the corresponding average lunar months.

III.A.4 *Tosefta, Arakbin* I:4.

אין פוחתים מארבעה חדשים המעוברים בשנה, לא נראה להוסיף יתיר על שמונה.³⁵ מעולם לא נראו ששה חדשים המעוברים בשנה זו אחר זו. במקום שאין מכירים זמנו של חדש, נוהגים אחד מעובר ואחד שאינו מעובר, וכן בגליות נוהגים אחד מעובר ואחד שאינו מעובר.³⁶ היו נוהגין תמוז בזמנו והאב מעובר

³⁵ This assertion, which appears also in *Mishnah Arakbin* II: 2 is repeated and copied in H.K.H. 18: 9.

³⁶ This assertion is repeated and copied in H.K.H. 18: 8. I had thought that it was Maimonides' own logical appreciation, but it appears that it is an explicit statement of the *Tosefta*. Rambam has generalized the statement to the cases where the *Beit Din* itself was not able to know the situation because the moon was not seen in its proper time and witnesses had not arrived. Furthermore, Maimonides invokes it as a "*halakhab le-Mosbe mi-Sina?*", i.e., a Mosaic tradition from Sinai, in H.K.H XVIII: 10, but this seems to be Maimonides' own appreciation because there is no element in the *Tosefta* which alludes to such an origin. Note that

ואחר כך נודע להן שאב בזמנו, מניחין אותו ומונין מכאן ואילך אחד מעובר ואחד שאינו מעובר. עצרת פעמים שחל להיות בחמישה ובששה ובשבעה, לא פחות ולא יותר.

We do not consider less than four full months and not more than eight full months in a year. We never saw six consecutive full months. In the places where they do not know the fixing of the month (the exact day when the month began because they don't know the length of the preceding month) they count one full month

Rambam had also invoked a tradition from Sinai in H.K.H V: 2. He was probably influenced by Rabbi Saadiah Gaon, who used the same argumentation in his fight against the Karaites. Due to this statement and the described procedure, it sometimes becomes difficult to analyze à posteriori the events to know if a decision was the result of a voluntary decision to manipulating the calendar or the result of the application of this rule of alternate months in the case of absence of the moon's visibility. A rabbinical and scholarly reviewer made this challenging objection. In the case of a particular event, this objection may, if need be, constitute an objection and the effect of chance could be invoked. Similarly, in the case of Rabbi Ḥiyya, examined above, it could be argued that Elul was made defective because the number of full months was sufficient, otherwise Elul would have been made full. In truth, the possibility of moon invisibility must not be overestimated, and the accumulation of concordant indices should not be underestimated.

- Before the reign of R. Yoḥanan, Elul was always defective. See statements of Rabbi and Rav.
- Before the reign of R. Yoḥanan, all the days of the week could be adopted for Tishrei 1 and for Yom Kippur (Tishrei 10).
- During the reign of Rabbi Yoḥanan we find, for the first time, different situations with a full Elul. The possible invisibility of the new moon during a long span of time could not explain this situation.
- Following this new situation (as per my explanation), we find different Amora'im fasting on Yom Kippur, for two days, out of doubt. The possible invisibility of the moon during a long span of time could not explain this new situation.
- Then in about 305 C.E., Rav Ḥisda insists that it is (no longer) necessary to doubt about the day of Yom Kippur fast two days.
- A new situation then occurs and the Babylonians suddenly begin knowing the fixing of the moon.
- Finally, a fixed calendar is instituted.

This slow, progressive, and irreversible evolution appears indisputable. It is not weakened or questioned by the possibility given, in the *Tosefta*, by the Tanna'im of continuing the calendar, by a simple calculation, alternating defective months of 29 days and full months of 30 days, in the event of impossibility of seeing the new moon.

followed by a defective month. Similarly, abroad, they count one full month followed by a defective month, and so on.

They were accustomed to considering a defective month for Tammuz and a full month for Av. Now if they were later informed that Av was a defective month, they let it as a full month and from now on they consider defective and full³⁷ months alternatively: Shavuot (is the 50th day of the Omer or Nissan 51st and therefore, it can be) the 5th, the sixth or the seventh day of Sivan.

The purpose of the procedure described by the *Tosefta* in the case of the moon's invisibility, is to keep a fictive calculated calendar in agreement with the movement of the moon to allow the following first visibilities of the new moons to occur on the evening at the beginning of the 30th day of the preceding months (*bi-zemano*) or on the 31st day of these preceding months (*be-leil ibburo* or *le-or ibburo*).

III.A.5 Rabbi and his Son R. Shimon

The Gemara in *Arakhin* 9b bottom and 10a top quotes Rabbi and R. Shimon:

מעשה ועשה רבי תשעה חסרים ונראה חודש בזמנו והיה רבי תמיה ואומר עשינו
תשעה חסרים ונראה חודש בזמנו. אמר לפניו רבי שמעון בר רבי: שמא שנה
מעוברת הייתה ועיבור שנה ל', אישתקד עשינו שניהם מלאין, דל תלתא לבהדי
תלתא וקם ליה בדוכתיה. אמר ליה: נר ישראל כן הוה.

It once happened that Rabbi made nine deficient months in one year and nevertheless the new moon of Tishrei still appeared in its proper time.³⁸ And Rabbi was surprised and said: we made (last year, the year N – 1) nine deficient months and still the new moon has appeared in its proper time! R. Shimon the son of Rabbi said: perhaps the last completed year (the year N – 1) was a leap year, and the intercalation month (Adar I) had 30 days. In the preceding year (the ordinary year before, the year N – 2) we made two full months more than usual (eight full months instead of six months). Thus, over the two last years, we had three full months more than usual. Subtract three deficient months from the total of nine deficient months of the leap year N – 1, and you find the seeing of the new moon in its

³⁷ I translated according to the commentary of *Haẓon Yehezkel* (Abramski): they begin with a defective month of Elul, considering that the *Beit Din* in Israel will probably decide that Elul should be a full month to compensate the defective month of Av.

³⁸ See further, it was in fact on the evening at the beginning of Tishrei 2 (*be-leil ibburo*) but however, the situation has been corrected and it was again acceptable.

proper place. Rabbi said to his son: Light of Israel, that is exactly how it was.³⁹

If we consider the set of the two consecutive years which the council of intercalation, chaired by Rabbi, had examined, and controlled and which is discussed in *B. Arakbin* at the bottom of page 9b and the top of page 10a,⁴⁰ we can conclude that the council of intercalation directed by

³⁹ Thus, Rabbi did not remember that the completed year was a leap year! In fact, the reasoning of Rabbi Shimon is oversimplified. After subtracting three defective months, we remain with a period of 6 defective months and 4 full months, hence a period of 294 days. But this period is balanced if it comprises 5 full months and 5 defective months amounting to 295 days. The span of time of 294 days ends one day before the balanced period. In conclusion, the two consecutive years end one day too early and the first visibility of the new moon of Tishrei of the year N, which should happen on the evening at the beginning of Elul 30 or Elul 31, occurs a day later at the beginning of Elul 31 = Tishrei 2 or Elul 32 = Tishrei 3. Therefore, the words *ויקם ליה בדוכתיה* must be understood, on Tishrei 2 instead of Tishrei 1. The moon was seen in its time apparently means that it was still seen at an acceptable moment. The possibility that the moon is seen only on the second possible day, is not considered in the Gemara and the commentaries. *Tosafot* (5 last lines of the first *Tosafot*, on top of *B. Arakbin* p. 10a) reached the same conclusion following a more complicated reasoning. The reasoning of Rabbi Shimon, the son of Rabbi, would have been exact and the correction would have been perfect if, in the leap year N – 1, they had made 8 defective months (instead of 9) and 5 full months (instead of 4). But this has not been noticed by anyone.

⁴⁰ Rabbi and his son discussed in a certain year N, the set of the two former consecutive years N – 2 and N – 1. The year N – 2 was an ordinary year of 356 days comprising 8 full months and 4 defective months. The year N – 1 was a leap year of 381 days comprising 4 full months and 9 defective months. In H.K.H. XVIII: 6 – 8, Maimonides explains how the alternate succession of a full and a defective month nearly perfectly emulates the lunar calendar and allows to predict the first vision of the new moon in the evening at the beginning of the 30th or the 31st day (as already noted, the Gemara considers only the first eventuality) of the previous month, especially at the end of a year made up of an equal number of full and defective months. Therefore, at the end of year N – 2, which is two days longer than the balanced year, the vision of the new moon shifts by two days and will occur on the evening at the beginning of the 28th or the 29th day of Elul. Now the complete set of the two years N – 2 and N – 1, comprises 12 full months and 13 defective months and we see that the situation has been compensated, even overcompensated as the length of the set of two years is 737 days, compared with 738.2648, the length of 25 average lunar months. Therefore, the first vision of the new moon of the year N is shifted on the evening of Tishrei 2 (or Tishrei 3) (see the end of the former note). This is a simple explanation of this complicated Talmudic passage.

Rabbi, did not always show a perfect mastery in the construction of the empirical calendar in agreement with the first sightings of the new moons and especially the new moons of Tishrei. The council of intercalation found itself twice in the delicate position of nearly losing control of the calendar, first at the end of the year N – 2 in *B. Arakbin* 9b when the first sighting of the new moon of Tishrei was advanced by no less than two days before the end of Elul and then at the occasion of the sanctification of the new moon of Tishrei in Ein Tav in *B. Rosh Hashanah* 25a, when the first sighting of the new moon of Tishrei was delayed by 3 days in the beginning of Tishrei.

III.B From 210 until ca. 300 – 305.

III.B.1 Rav

In *Y. Avodah Zarah* 1:2, 39c Rav is quoted:

רב אמר, סטורנלייא לפני תקופה שמונה ימים, קלנדס לאחר תקופה ח' ימים.⁴¹
Rav said: The Saturnalia begin eight days before the *tekufah* and the Calenda is eight days after the *tekufah*.

The Saturnalia were on December 16, 17, and 18 and the Calenda was on January 1. The *Tekufah*, considered here, is the ancient Roman *Tekufah* introduced by Julius Caesar in 45 BCE and corresponding to the *Tekufah* of Samuel. The *Tekufah* of Tevet falls on December 24 except in the years which are a multiple of 4, when the *Tekufah* falls on December 25. For a normal year, when the *Tekufah* is on December 24, the Calenda is on January 1, eight days after the *Tekufah* and the Saturnalia begin on December 16, 8 days before the *Tekufah*. It is this same *Tekufah* of Samuel that is considered and described in detail in *B. Erubin* 56a. It is still to this *Tekufah* that Abayé refers in *B. Berakhot* 59b for the Benediction of the sun all the 28 years.

It appears now that the council of intercalation had lost the mastery of the situation in the year N – 2 but it succeeded to correct it in the year N – 1 by courageous and aggressive decisions (according to Rashi on *Arakbin* p. 9a, 13 lines from bottom, this procedure was even excessive and unauthorized) very different than Maimonides' instructions in H.K.H. XVIII: 8 – 9. Rabbi's ingenuous reflections and his apparent loss of memory cast doubt on whether he had the mastery of the situation. Probably, he rested on a competent and faithful collaborator, responsible for the details and the execution—perhaps R. Ḥiyya?

⁴¹ In the text of the *Yerushalmi* the Calendas are before the *Tekufah* and the Saturnalia are after the *Tekufah*. *Pnei Moshe* on the Mishnah corrects and places the Calendas after the *Tekufah*, and the Saturnalia before.

III.B.2 R. Shimon ben Yehotzadak

דאמר רבי יוחנן משום רבי שמעון בן יהוצדק שמונה-עשר יום בשנה יחיד גומר בהן את ההלל ואלו הן, שמונת ימי החג ושמונת ימי חנוכה ויום טוב הראשון של פסח ויום טוב של עצרת. ובגולה עשרים ואחד יום, ואלו הן, תשעת ימי החג ושמונת ימי חנוכה ושני ימים הראשונים של פסח ושני ימים טובים של עצרת.

R. Yoḥanan taught in the name of R. Shimon ben Yehotzadak:⁴² We read the complete Hallel on eighteen days a year, eight days of Sukkot, eight days of Hanukah, the first day of Pesah and the day of Shavuot. In the Diaspora we read it on 21 days, nine days of Sukkot, eight days of Hanukah, the two first days of Pesah and the two days of Shavuot.

We see thus that before the leadership of R. Yoḥanan, there was already one unique rule in the Diaspora for the three festivals. As soon as the messengers of Tishrei did not reach in time, they held two festival days on the three festivals;⁴³ there were no intermediary solutions. The second festival days of Tishrei were held out of doubt;⁴⁴ the second festival days of Pesah in Alexandria and the second festival day of Shavuot even in Babylonia were held because of this rabbinical enactment and were considered as a doubt of rabbinical order.⁴⁵

III.B.3 R. Yoḥanan, from 239 C.E. until 279 C.E.

Under the leadership of R. Yoḥanan, the calendar was still empirically based on the observation of the new moon. Nevertheless, R. Yoḥanan introduced a new rule to avoid Yom Kippur falling on a Friday or Sunday, therefore, the first day of Tishrei cannot fall on Wednesday or Friday. This rule is mentioned in the declaration of Ulla (*B. Rosh Hashanah* 20a):

כי אתא עולא אמר, עברוה לאלול, אמר עולא, ידעי חברין בבלאי מאי טיבותא עבדינן בהדיהו

⁴² *B. Ta'anit* 28b and *B. Arakbin* 10a.

⁴³ Maimonides writes in *Hilkehot Kiddush ha-Hodesh* III: 12, that to avoid any difference in the keeping of the festivals, one must keep the two festival days on the three festivals, even on Shavuot, as soon as the messengers of Tishrei could not arrive in time. The commentators give as Talmudic reference the passage in *B. Rosh Hashanah* 21b: ...מכריז רבי יוחנן. However, the remark "even on Shavuot" is not commented and seems to be Maimonides' own reasoning. Apparently, the true reference is the quotation of Rabbi Yoḥanan on his master's behalf in *B. Ta'anit* 28b and *B. Arakbin* 10a.

⁴⁴ ספק דאורייתא.

⁴⁵ ספק דרבנן.

When Ulla arrived in Babylonia, he said that Elul had been made full [thirty days]. Ulla said: our Babylonian colleagues know what a pleasure we are making for them [by taking the necessary measures to prevent the occurrence of Yom Kippur near to Sabbath].

Before this time, all weekdays were suitable for Rosh Hashanah.⁴⁶ Now, Wednesday and Friday were no longer suitable, requiring some manipulations⁴⁷ of the testimony by the witnesses (*B. Rosḥ Hashanah* 20a):

שלה לי רבי יהודה נשיאה לרבי אממי, הווי יודעין שכל ימיו של רבי יוחנן היה
מלמדנו, מאיימין על העדים על החודש שלא נראה בזמנו, אף על פי שלא
ראוהו, יאמרו, ראינו

R. Yehudah II sent a message to R. Ammi: you should know that during all the years of his reign, R. Yoḥanan taught us to frighten the witnesses in the case of a new moon that has not been seen in its proper time [the eve of the thirtieth day], so that they testify that they saw it even if they did not.

Therefore, if it was necessary to have a defective month, they resorted to frightening the witnesses (*kiddush le-tzorek*).⁴⁸ If it was necessary to have a full month of 30 days, they could frighten the witnesses to annulling the testimony (*ibbur le-tzorek*). They could also, if they were reluctant to unfairly frighten witnesses,⁴⁹ reach the same result by delaying the procedure until the night. Ultimately, we find three to five cases in the Talmud, in which Elul was not defective,⁵⁰ and all these cases correspond to this period. The Babylonians were not only displeased, but in fact embarrassed,⁵¹ contrary to Ulla's assertion. They were distraught because they

⁴⁶ *Mishnah Shabbat* XV, 3 and IX, 5, *Mishnah Menahot* XI, 7 and XI, 9, see also *B. Sukkah* 43b and the commentary of Maimonides on *Menahot* XI, 7.

⁴⁷ The purpose is to prevent *Yom Kippur* from occurring on Friday or Sunday because of the difficulty of remaining for two days without fresh vegetables or without the possibility of burying the dead due to the co-occurrence of *Yom Kippur* and the Sabbath.

⁴⁸ The problem is debated. It was apparently easier, religiously speaking, to arrange for positive testimony about something false than for negative testimony about something true.

⁴⁹ There remains much incertitude in the Talmud and in Maimonides' *Hilkhot Kiddush ha-Ḥodesh* about the way the council of intercalation used these rules.

⁵⁰ *B. Rosḥ Hashanah* 21a: the case of R. Naḥman; *B. Rosḥ Hashanah* 21a: the case of R. Rava; *B. Rosḥ Hashanah* 20a: the case of Ulla; *B. Rosḥ Hashanah* 21a: the case of Levi; *B. Rosḥ Hashanah* 21a: the case of R. Eibu bar Nagadi and R. Ḥiyya bar Abba.

⁵¹ The situation was worse than before. The former situation (when *Yom Kippur* could fall on any day, even on Friday and Sunday) gave them a certain comfort

did not understand the rules adopted by the Palestinians and they could not reconstruct them. Their situation was worse than before. Previously they could refer to the statistic and their doubt was of rabbinic order but now they were completely lost, and their doubt had become of Torah order.

III.B.4 Other statements of R. Yoḥanan, *B. Rosh Hashanah* 21a:

Another decision of R. Yoḥanan was a decree obliging those areas which the envoys of Nissan reached but beyond the reach of the envoys of Tishrei (because of the difference of two days of travel, one day due to Rosh Hashanah—only one day in the place of the calendar committee—and another day for Yom Kippur) to observe two festival days even in Nissan.⁵² However, it is likely that this *takanah* is more ancient and was already enacted before the leadership of R. Yoḥanan, according to the teaching of R. Shimon ben Yehotzadak (see above).

III.B.5 R. Yose

R. Yose in *Y. Sanhedrin* V, 3, 22d reads:

וַאֲמַר רַבִּי יוֹסֵא, כַּגּוֹן אֲנִי דַמֵּן יוֹמוֹי לֹא צְלִית מוֹסַפָּא מִן דְּלֵא יָדַע אִימַת יִרְחָא.

R. Yose said: for example, someone as me, who never prayed *Mussaf*⁵³ on Rosh *Hodesh* when I didn't know the exact day of the new moon.

From the context, we see that R. Yose must be R. Yose bar *Hanina*, R. Yoḥanan's important pupil and colleague. The exact significance of this passage has never been examined in detail. R. Yose is probably a member of the Academy of Tiberias, and on the thirtieth day of each month, he

and security about the fast of Yom Kippur, because Elul was always defective. But in the new situation, there were three to five cases related in the Talmud, in which there was a difference of one day between Palestine and Babylonia. This leads to the conclusion that the Babylonian Amoraim, contrary to the assertion of Ulla, did not know the reason behind the new decision. Otherwise, they would have adapted to the new situation to take advantage of it. It appears that they were not able to decide when they should make Elul full.

⁵² *B. Rosh Hashanah* 21a: מכריז רבי יוחנן כל היכא דמטו שלוחי ניסן ולא מטו שלוחי תשרי ליעבדו תרי יומי גזירה ניסן אטו תשרי.

⁵³ Stern (2001) p. 164 translates מן ד as “because.” According to Stern, R. Yose never prayed *Mussaf*, which seems odd and incorrect. How could he not know the fixing of the month in his capacity as an important member of the Academy of Tiberias and a very close pupil of R. Yoḥanan? Furthermore, Stern's understanding is contrary to the two classic commentaries *Korban ha-Eidab* and *Pnei Moshe*.

did not pray *Mussaf* before the proclamation, in case the neomenia would be postponed until the next day. This decision seems to be the only acceptable behavior for someone living in Tiberias. But why did R. Yose take exception more than anyone else?

I believe that the original meaning of this passage is that R. Yose did not want to pray *Mussaf* if *Rosh Hodesh* had not been fixed on the proper day of the first sighting of the lunar crescent. His decision must have been a reaction against increasingly numerous cases of manipulation of the calendar, and its significance was forgotten over time.

III.B.6 Levi

Levi in *B. Rosh Hashanah* 21a states:

לוי איקלע לבבל בהדסר בתשרי, אמר בסים תבשילא דבבלאי ביומא רבה
דמערבא, אמרי ליה אסהיד, אמר להו לא שמעתי מפי ב"ד מקודש.
Levi happened to be in Babylonia on Tishrei 11, and he said to the
people: How appetizing is the meal of the Babylonians on the day of
the great fast of the Palestinians.

Levi ben Sisi was one of the closest pupils of Rabbi, later a disciple of R. Ḥanina bar Ḥama, and finally a friend of the father of Samuel in Babylonia. Some commentators believed that he arrived on this very day⁵⁴ in Babylonia, or more precisely that he entered the *tehum Shabbat* of this Jewish settlement before the night of Tishrei 11, which represented the day of Yom Kippur in Palestine. He had left Israel on Elul 30⁵⁵ before he could have heard that the 31st had been declared Tishrei 1, but he was certain that the month of Elul would be a full month of 30 days. Therefore, he could not play the role of a messenger communicating the calendar and obliging them to fast for a second day. However, this understanding seems impossible. We know already that the messenger could not arrive in Babylonia before Tishrei 15 and Nissan 15. Furthermore, Levi was lame.⁵⁶ The only acceptable explanation is that Levi left in the beginning of Elul, but he already knew about the new rule that Rosh Hashanah cannot fall on *DU*, and thus knew that the month would be made full and lengthened to 30 days. R. Zeraḥiah ha-Levi is the only commentator to give a very similar explanation. This event would have occurred around 220 C.E. when Levi left definitively to Babylonia at the very beginning of

⁵⁴ They understand that he happened to come on this day, Tishrei 11.

⁵⁵ Novellae of Ritva. The novellae of Rabbenu Nissim records Elul 31, but before he could hear the proclamation.

⁵⁶ *B. Ketubot* 103b.

the ascension of R. Yoḥanan and this new rule would have been enacted under the leadership of R. Ḥanina. However, this seems unlikely, because Rabbi proclaimed that Elul is always defective,⁵⁷ and similarly Rav still proclaimed that Elul is always defective.⁵⁸ Further the rule *Lo Du Rosb* seems to be a later enactment during the leadership of R. Yoḥanan. Therefore, the second interpretation—of R. Ḥananel—reading that Levi happened to be in Babylonia on the Babylonian Marḥeshvan 10, which was in fact the Palestinian Tishrei 10. Because of political reasons prevailing at that time, the Babylonians had not been informed that the year had been intercalated. But if so, this event could also have occurred much earlier in Levi's youth, when he used to travel and was not yet lame.⁵⁹

III.B.7 Samuel

Samuel in *B. Rosb Hasbanah* 20b states:

יכילנא לתיקוני לכולה גולה.

Samuel said, I can fix the calendar for the entire Diaspora by calculation and without witnesses.

The situation of incertitude and the resulting obligation to keep two festival days weighed heavily on them and it was difficult to bear. The solution imagined by Samuel consisted in the calculation of a precalculated calendar which would emulate the movement of the moon and respect the movement of the sun, in fact a Jewish calendar before its final stage, one hundred years in advance. This solution imagined by Samuel would have released the Babylonians from this constraint of two consecutive festival days. The Talmud in *B. Hulin* 95b tells us that Samuel had concretized his project and sent to R. Yoḥanan a calendar calculated for sixty years. The Palestinian Rabbis viewed Samuel's achievements with a very negative eye and considered them an attempt to evade their authority. They saw it as a continuation of the activity of R. Ḥananiah, R. Joshua's nephew.⁶⁰ They imputed the misfortunes of Samuel's daughters to the sin of their father (see *Y. Ketubot* Chap 2, 6).

⁵⁷ *B. Rosb Hasbanah* 19b and *Y. Sanhedrin* I, 2, 18d.

⁵⁸ *Y. Sanhedrin* 1:2, 18d.

⁵⁹ *B. Kiddushin* 72a; *B. Shabbat* 130a.

⁶⁰ After the repression of Hadrian in about 135 C.E.

III.B.8 R. Abahu, *Y. Erwin* III, 9, 21c.

רבי אבהו אזל לאלכסנדריאה ואטעיגון לולבין בשבתא. שמע רבי מימר מן מי
יכול להון רבי אבהו בכל שתא.

R. Abahu went to Alexandria, and he let them take the Palms (*lulavim*) on the Sabbath. R. Ami heard and said: who will bring them R. Abahu each year?

Apparently, R. Abahu did not travel each year to Alexandria or perhaps it was exceptional that R. Abahu succeeded to reach Alexandria in time before the festival because the day of Rosh Hashanah fell on Shabbat, allowing him an extra day for traveling. The objection of Rabbi Yoḥanan was dictated by the fact that generally, in Alexandria, they don't know the exact day of the festival and therefore they don't take the Palms on Shabbat and they keep two festival days. It appears that in Israel, even after the destruction of the Temple, they were taking the Palms on the first day of the festival falling on Shabbat. Indeed, from this quotation in *Talmud Yerushalmi* we can conclude that at the time of R. Abahu, they were taking the Four Species on the first day of Sukkot falling on Shabbat in Palestine. Now R. Abahu exceptionally reached Alexandria before the beginning of Sukkot, and he allowed them to behave as if they knew the fixing of the month. In such circumstances, he allowed them to take the Four Species on the first day of Sukkot, falling on Shabbat, even outside Palestine.⁶¹ R. Yoḥanan disapproved this ruling.

III.B.9 Rav Naḥman (bar Yakov): *B. Rosh Hashanah* 21a reports:

רב נחמן יתיב בתעניתא כוליה יומי דכיפורי, לאורתא אתא ההוא גברא א"ל למהר
יומא רבה במערבא.

Rav Naḥman fasted the day of Yom Kippur, but in the evening, a Palestinian told him that in Palestine the great fast was a day later.

This seems to happen in the second half of the third century. We must again understand that this Palestinian was a traveler who left Israel in the beginning of Elul but was aware that Elul would be made full to avoid that Rosh Hashanah the 30th day of Elul falls on DU.

⁶¹ It is likely that he also allowed them to keep only one festival day, but this problem was not raised in the text. It is interesting to note that in *B. Sukkah* 43a, it says that after the destruction of the Temple, they took the Four Species in Palestine on the first day of Sukkot falling on Shabbat. By contrast, in *B. Sukkah* 44a it states that they did not. *Tosafot* on p. 43a write that the conclusion of p. 43a was not accepted. In fact, this is in contradiction with the narrative of the stay of Rabbi Abahu in Alexandria.

III.C From ca. 300 until 323

III.C.1 Rabbah

Rabbah in *B. Rosh Hashanah* 21a states:

רבא הוה רגיל דהוה יתיב בתעניתא תרי יומי, זימנא חדא אשתכח כוותיה.
Rava was accustomed to fast two days. Once it was proved correct.

We know that Rava lived until 352, and according to Hyman,⁶² he was born around 279 C.E. We will see below that after 325 when Abayé was promoted to head the Academy of Pumbedita, the Babylonian Rabbis already knew the fixing the month.⁶³ We will see below that in about 305⁶⁴ the Court of intercalation had not recourse any more to lengthening the month of Elul by an additional leap day, and two days of fasting no longer proved justified. It also seems unlikely that the Talmud would have recorded the details of the conduct of Rava before 305, when he was still a pupil under Rav Ḥisda. Therefore, the reading of R. Hananel seems to be correct: He reads Rabbah instead of Rava.⁶⁵ Rabbah was promoted to the head of the Academy of Pumbedita in 298 and remained in that position until his death in 320.⁶⁶ In 305, he was already 7 years in function, and the quotation seems to fit much better; it must correspond to the conduct of Rabbah during the first years of his reign, before 305.⁶⁷

⁶² Hyman, *Toledot* p. 1040 b.

⁶³ An interesting quotation from *Ta'anit* 21b proves that Rava had no doubt about the day of *Kippur*: לרבא כל מעלי יומא דכיפורי. Rava was greeted on each eve of *Kippur* by the Celestial Academy. The context proves that Abayé was still alive. Probably from 325 onward, he knew the date of Tishrei 1 in advance and had no doubt about the day of *Kippur*.

⁶⁴ This date of 305, which will still be used later in the paper, was chosen arbitrarily during the reign of Rav Ḥisda.

⁶⁵ However, in a responsum of R. Hai Gaon, the reading is Rava. *Otsar ha-Geonim, Rosh ha-Shanah* chapter 46.

This responsum is reproduced in *Torah Sheleimah*, part 13, chap. 3, p. 26.

⁶⁶ *B. Rosh Hashanah* 18a states that Rabbah lived forty years. Hyman (*Toledot* p. 1063a) has already emended the text and replaced forty with sixty. Rabbah would then have been born in 260 and would have been 19 at the death of R. Yoḥanan. The invitation to Rabbah to join the academy of Rabbi Yoḥanan (*B. Ketubot* 111b) would have occurred before Rabbah was 19. This is likely, and it is unnecessary to postpone Rabbi Yoḥanan's death by 9 years, as Hyman does in his commentary ad locum on *Igeret Sherira Gaon* and in *Toledot*, p. 671.

⁶⁷ Rambam writes in H.K.H. V: 3 that the empirical calendar of observation was still applied until the time of Abayé and Rava. Necessarily, he must have accepted the reading "Rava," and this had profound repercussions on his thought

III.C.2 Rabbi Simon:

Rabbi Simon in *Y. Sukkah* IV, 5 states:

רבי סימון מפקד לאילין דמחשבין, הבון דעתכון דלא תעבדון לא תקיעתא בשבתא
ולא ערבתא בשבתא...⁶⁸

R. Simon ordered those in charge of the calculations (“*demechasvin*”): Pay attention and do not place either Rosh Hashanah on Sabbath or Hoshana Rabbah on Sabbath. But if you are squeezed, then place Rosh Hashanah on Sabbath, but do not place Hoshana Rabbah on Sabbath.

R. Simon (also known as R. Simon ben Pazi) was a Palestinian Amora of the second half of the third century C.E. He was the pupil of R. Joshua ben Levi; the latter was himself the pupil of Bar Kapara, the younger pupil and colleague of Rabbi. He was a friend and contemporary of R. Abahu from Caesarea and he may have lived until about 310 C.E. The word *demechasvin* shows that calculation, rather than empirical observation, was increasingly taking place in fixing the neomenia, even if the formalism was probably still organized as if the sanctification of the neomenia depended on observation. R. Simon may have been the supervisor of those calculators.

III.C.3 Rav Ḥisda.

R. Ḥisda was the head of the Academy of Sura for ten years from 300 until 309; he lived 92 years.⁶⁸ *Y. Rosh Hashanah*⁶⁹ and *Ḥallah*⁷⁰ say:

and legislation. Rambam was certainly not aware of the slow evolution of the calendar, and he thought, as it was always universally admitted until the beginning of the 20th century and the discovery of the documents of the Cairo *Geniza*, that the transition from an empirical observation calendar to a fixed precalculated calendar was clear-cut. He considered that Abayé and Rava still belonged to the period of the observation calendar. Therefore, he considered the statement of Rava in *B. Beitzab* 17a, that a man can lay down his *Eruv Tavshelim* from one festival day to the other, was said when they did not know the fixing of the month. But now, he says, when we know the fixing of the moon, this is no longer a subject of doubt and therefore this is no longer possible. See *Hilkebot Eruvin* VIII: 14b and 15 and *Hilkebot Yom Tov* VI: 11 and 12. Other Rabbis like Ramban, Meiri, and Ritva considered that Abayé and Rava already knew the fixing of the moon and they wrote that Abayé and Rava already belonged to the new period of the fixed calendar. Therefore, they objected to Rambam’s ruling.

⁶⁸ *B. Moed Kattan* 28a.

⁶⁹ *Y. Rosh Hashanah* I, 4, 57b (at the end of halakhah 4), (8b in the Vilna edition).

⁷⁰ *Y. Ḥallah* I, 1, 57c (4a in the Vilna edition).

תמן חשין לצומא רבא תרין יומין, אמר לון רב חסדא למה אתם מכניסין עצמכם למספק הזה המרובה חזקה שאין בית דין מתעצלין.

There, in Babylonia, they are worried about the true day of the fast of Kippur (and some Rabbis fast two days). Rav Ḥisda said to them: “Why are you putting yourself in this big doubt? There is a strong presumption that the Court is not neglectful.”

This quotation of Rav Ḥisda must be from the very beginning of the fourth century, in about 305 as adopted above. The classical commentary *Korban ha-Eidab* claims that the Court sends the messengers immediately, without any delay. This explanation is untenable, because we know that the messengers could never reach Babylonia in time to inform them about the true day of *Kippur*. I think the correct explanation of this quotation is the following: Until this period, the Babylonian rabbis did not know when the Court decided that Elul would be a full month of 30 days, and therefore they lived in great doubt, especially about Yom Kippur. Rav Ḥisda seemed to know that the Court of Palestine had changed its conduct; Elul is again a defective month of 29 days in all the cases. If it was necessary to avoid an instance of Rosh Hashanah falling on Wednesday or Friday, the Court would move the neomenia of Elul or even of Av by one day, to obtain the correct result without making Elul a *leap* month. “The Court is not neglectful” would then mean that it reacts in time, enough in advance, and does not any more wait for the last moment. Of course, this new attitude implies that it was necessary to consider calculation more than observation. With this new situation, the doubt of the Babylonians could be considered again as a doubt of rabbinic order, the first festival day being statistically the true festival day.

III.C.4 Rav Safra

Rav Safra, *B. Pesahim* 51b, states:

אמר ליה רב ספרא לרבי אבא כגון אנא דידענא בקביעא דירחא ביישוב לא אבדינא מפני שינוי המחלוקת, במדבר מאי אמר לי, הכי אמר רב אממי, ביישוב אסור במדבר מותר.

Rav Safra said to Rabbi Abba: for example, in my situation, when I know the fixing of the month, in a Jewish settlement I do not perform [any work on the second festival day] to avoid any dispute, but in the desert [when I am alone] how should I behave? Rabbi Abba answered: This was the ruling of R. Ammi: Among Jews it is forbidden, but in the desert, it is allowed.

Rav Safra was a Babylonian Amora who spent much time in Palestine at the occasion of his frequent commercial journeys between Babylonia

and Palestine during the leadership of Rabbah⁷¹ and Rav Joseph.⁷² Later he retired in Babylonia where he became friendly with Abayé⁷³ and Rava.⁷⁴ He died in Babylonia under the leadership of Abayé.⁷⁵ Almost all of the different commentaries of this Talmudic passage about Rav Safra depart from a false hypothesis: they all assume that the calendar was still empirical, based completely on the observation of the new moon. Under such conditions, Rav Safra could not have had any advance knowledge of the fixing of the moon with respect to the calendar envoys.⁷⁶

It may be assumed that this dictum of Rav Safra belongs to the first quarter of the fourth century, when he was frequently visiting in Palestine and the Babylonian communities were not yet aware of the fixing of the month. I propose the following explanation: the council of intercalation was working more and more based on calculation. The calendar committee was still announcing the fixing of each month monthly, as in the past. Therefore, the Babylonian and even the Palestinian population did not know the day of the neomenia before the committee's monthly proclamation and the Babylonian population was holding two days for the festivals "out of doubt." However, the committee was already calculating the calendar in advance, and the members of the academy of Tiberias and the scholars, like Rav Safra, who were close to it, were aware of the committee's calculations before their monthly announcements and before the messengers left. Therefore, in a time when the Babylonians did not yet know the fixing of the month (before 320–323) and therefore kept two festival days out of doubt, Rav Safra knew unofficially and even secretly, well in advance the *keniyah* of the coming year when he was traveling to Babylonia.

⁷¹ From 298 until 320.

⁷² From 321 until 323, for 2.5 years.

⁷³ *B. Hulin* 110b, *B. Erubin* 45b and *B. Beitzab* 38b.

⁷⁴ *B. Batra* 144a and *B. Zevahim* 116b.

⁷⁵ *B. Moed Katan* 25a.

⁷⁶ Stern (2001) pp. 249-250 had also examined the problem. He also considers that Rav Safra was still in the period of the sighting calendar, and he supposes that Rav Safra was using a fixed calendar scheme of his own. This supposition seems impossible for many reasons. First, such a calendar could not guarantee that he will be in concordance with the fixing of Palestine. Second, if his supposition were the actual meaning of Rav Safra's knowledge of the moon's fixing, Rabbi Abba would have rebuked him, because Palestinian academies never accepted calendrical activities in Babylonia. Third when Samuel intended to use a fixed calendar (see *B. Rosh Hashanah* 21b), it was intended for the population of Babylonia. Here Rav Safra would use this calendar only for himself!

III.C.5 Era of Rabbah and Rav Joseph.

B. *Sukkah* 43b states:

אנן לא ידעינן בקיבוע דירחא, אינהו דידיעי בקיבוע דירחא...
 We [the Babylonians] do not know the fixing of the moon; they [the
 Palestinians], who know the fixing of the moon...

As can be seen from the context, this passage is from the time of Rabbah and Rav Joseph, before 323 C.E. (Rav Joseph died in 323 C.E.). At that time, in Babylonia, the Jewish people were not yet aware of the fixing of the moon. In other words, the Babylonians did not know the exact day of the neomenia before the fifteenth of each month,⁷⁷ while people living in Palestine did know that exact day before the fifteenth.⁷⁸

III.D Ca. 320–323 C.E.

III.D.1 Rav Joseph, B. *Pesahim* 52a:

רב נתן בר אסיא אזל מבי רב לפומבדיתא ביום טוב שני של עצרת. שמתיה רב יוסף. אמר ליה אביי: ולנגדיה מר נגדי, אמר ליה: עדיפא עבדי ליה דבמערבא מימנו אנגידא דבר ביה רב ולא מימנו אשמתא. איכא דאמרי, נגדיה רב יוסף. אמר ליה אביי: נשמתניה מר, דרב ושמואל דאמרי תרוייהו: מנדין על שני ימים טובים של גלויות. אמר ליה: הני מילי איניש דאלמא, הכא צורבא מדרבנן הוא, דטבא ליה עבדי, דבמערבא מימנו אנגדתא דבר בי רב ולא מימנו אשמתא.

Rav Natan bar Assia went from the Yeshivah of Rav to Pumbedita on the second festival day of Shavuot. Rav Joseph put him in *herem* (excommunication) because he walked out of the *tehum* (Shabbat). Said to him Abayé: why did your honor not lash him? He answered: I did punish him more severely because in Palestine they had voted to lash a Talmudic scholar who had sinned, but they did not vote to excommunicate him. [Therefore, we can assume that excommunication is more severe than lashes.] Some say that Rav Joseph ordered to lash him. Said Abayé: why did your honor not excommunicate him. Indeed, Rav and Samuel, both agree that we excommunicate for the transgression of the second festival day. He answered: this was said for normal people, but here in the case of a Talmudic scholar, it is better for him that we lash him, because in Palestine they vote to lash a Talmudic scholar, but they don't vote to excommunicate him.

⁷⁷ Therefore, they still held two days for the festivals “out of doubt.” Nevertheless, if my interpretation is correct, since 305 the most rigorous people no longer fasted for two days on Yom Kippur, because Tishrei was again defective without exceptions.

⁷⁸ Y. *Sanhedrin* V, 3 (Mishnah and beginning of Gemara).

We have an additional proof that the second festival day of Shavuot was kept without any discussion, in the time of Rav and Samuel, and they punished the transgressor by excommunication.

III.E Ca. 323–325.

III.E.1 Bar Hedyā, in *B. Sukkah* 43b, we find:

כי אתא בר הדיא, אמר לא איקלא.

When Bar Hedyā came back to Babylonia, he said that Hoshana Rabbah does not occur on Sabbath.⁷⁹

We know that Bar Hedyā came back to Babylonia when Rav Joseph was still alive,⁸⁰ in 323 C.E. or slightly earlier.

III.E.2 Ravin, *B. Sukkah* 43b provides:

כי אתא רבין וכל נחותי, אמרי, איקלא ולא דחי.

When Ravin and all the travelers came back to Babylonia, they said that Hoshana Rabbah may occur on Sabbath.⁸¹

As discussed above, Rabin returned to Babylonia around 325 C.E. It appears that the problem of Rosh Hashanah occurring on Sunday was a subject of discussion and that the council was hesitant to find a solution. At first, the council decided not to accept Rosh Hashanah on a Sunday, as told by Bar Hedyā, but it later reversed its decision and decided to abandon this additional constraint. Indeed, there is evidence that during the reign of Abayé, Rosh Hashanah could still occur on Sunday, and in *B. Ta'anit* 29b, we see that the ninth of Av could occur on Friday.⁸²

⁷⁹ And therefore, Rosh Hashanah does not occur on Sunday.

⁸⁰ *B. Berakhot* 56b.

⁸¹ Therefore, Rosh Hashanah can occur on Sunday.

⁸² It is very likely that this passage corresponds to the reign of Abayé, after 325 C.E. It is also very likely that the number of days between Passover and Rosh Hashanah was already fixed, so that the ninth of Av (Tishah be-Av) occurred on the same day as Passover, and the next Rosh Hashanah occurred two days later.

There is later evidence that during the reign of Rav Yemar (428-432 C.E.), Rosh Hashanah could still occur on Sunday. See *B. Niddah* 67b; Ajdler, *Hilkehot Kiddush ha-Hodesh* (Sifriati, 1996), p. 670. Later evidence confirms that in 507 C.E., Rosh Hashanah still occurred on Sunday and Pesah and Tishah be-Av on Friday. See *Epistle of Rav Sherira Gaon* 3: 4 (Hyman edition, p. 85); 4 Adar 4267 was a Sunday.

III.F After 325 C.E.**III.F.1 Rav Zeira II**

Rav Zeira II in *B. Beitzah* 4b states:

אמר רב זירא, כוותיה דרבי אסי מסתברא, דהאידינא ידעינן קביעא דירחא וקא
עבדינן תרי יומי

Rav Zeira II said: things seem logical according to the advice of R. Assi, because today, we know the fixing of the moon and nonetheless, we observe two festival days.

Note that Rav Zeira II must not be confused, as often occurs, with his more famous predecessor, R. Zeira I, the Palestinian Amora of the former generation and elder colleague of R. Abba. R. Zeira I lived in the second half of the third century and probably the first years of the fourth century and lived a long life (*B. Megillah* 28a).

Rav Zeira II was a Babylonian Amora, who spent some time in Palestine. He must have come back to Babylonia around 323 C.E., because he was then the colleague of both Abayé and Rava and a candidate for the direction of the Academy of Pumbedita together with Abayé (who had not yet been appointed), Rava, and Rabbah bar Matna.⁸³

Apparently, after 325 C.E., the Babylonian academies began receiving advance information about the year's calendar and thus began to know the fixing of the moon. But the meaning of this knowledge, as expressed in this passage about the position of Rav Zeira II, is different: Here, the academies know the length of each month and consequently the date of each neomenia for a relatively longer period, probably one year in advance.

The contradiction between this passage and the passage in *B. Sukkah* 43b, mentioned above, has embarrassed commentators such as *Tosafot*. R. Solomon ben Aderet,⁸⁴ in his novellae on *B. Sukkah* 43b, is probably the first to give a correct explanation of this apparent contradiction. He writes that this Talmudic passage dates from after “the institution of the calendar by Hillel, the last Patriarch, the son of R. Yehudah the Patriarch.⁸⁵” He was persuaded that the introduction of a precalculated calendar coincided with the creation of our modern calendar. He could not imagine the

⁸³ *B. Horayot* (at the end).

⁸⁴ Rashba (c. 1235-1310 C.E.).

⁸⁵ R. Judah II *Nessiah*. He forgets two generations, R. Judah III (also called *Nessiah* II) and R. Gamaliel V. Therefore, the exact sequence is the following: R. Judah I the Saint c. (135–210), R. Gamaliel III c. (210–219), R. Judah II *Nessiah* I c. (220–270), R. Gamaliel IV c. (270–300), R. Judah III (*Nessiah* II) c. (300–330), and finally R. Hillel II c. (330–365).

longer process and the slow transition from a calendar emulating the vision of the new moon toward a calculated calendar based on mean conjunctions and mean lunation.

III.F.2 Rava

Rava in *B. Sanhedrin* 12a says:

והא שלחו ליה לרבא, זוג בא מרקת ותפשו נשר ובידם דברים הנעשה בלזו ומאי
ניהו תכלת בזכות הרחמים ובזכותם יצאו בשלום ועמוסי יריכי נחשון בקשו לקבוע
נציב אחד ולא הניחו אדומי הלז אבל בעלי אסופות נאספו וקבעו לו נציב אחד
בירח שמת בו אהרן הכהן...
...

They sent a message to Rava: A couple [of people] was coming from Raqat,⁸⁶ but an eagle⁸⁷ captured it. In their hand were things made in Luz—and what are these? Purple.⁸⁸ Through the merit of the Merciful and through their own merit, they got out safely. And the offspring of Nahshon's loins⁸⁹ wished to establish a *netziv*,⁹⁰ but that Edomite⁹¹ did not allow them. However, the members of assemblies assembled and established one *netziv* in the month⁹² in which Aaron the Priest died.⁹³

This quotation looks like a coded message. It gives the impression that there were some communications problems between Palestine and Babylonia which could be connected to the war situation between the Roman Empire and Persia. It seems, furthermore, according to the Talmudic interpretation of the message, that the Romans objected to the intercalation of the Jewish calendar and its communication by the messengers; but the reason is not explained.

According to modern historians,⁹⁴ there is no external evidence of any Roman Imperial interference with the Jewish calendar during the fourth and fifth centuries and therefore the reason for this Roman hostile attitude remains inexplicable.

⁸⁶ Tiberias.

⁸⁷ The Romans.

⁸⁸ The special purple required for the manufacture of the fringes. One fringe of the *tzitzit* must be *tekelet*.

⁸⁹ The *Nasi*, the Patriarchate.

⁹⁰ A thirteenth month to intercalate the year.

⁹¹ The Romans.

⁹² The month of Av. Thus, exceptionally they had a second Av.

⁹³ Literal translation according to Stern (2001), p. 217.

⁹⁴ Stern (2001), pp. 215-218.

However, there are some indications⁹⁵ in the Talmud of persecutions—perhaps short-lived crises—at this period, confirmed by the Epistle of R. Sherira Gaon.

III.F.3 Rava

Rava in *B. Hullin* 101b states:

אלא אמר רבא, שמדא הוה ושלחו מתם דיומא דכיפורי דהא שתא שבתא הוא. וכן
כי אתא רבין וכל נחותי, אמרוה כרבא.

[After a discussion without a convincing conclusion between Abayé and Rava,] Rava concluded that there was a persecution in Palestine and they [the Sanhedrin in Palestine] sent from there [a coded message] that Yom Kippur of this year will occur on Sabbath. Later, when Rabin and all the travelers came back to Babylonia, they confirmed [the interpretation] of Rava.

The Epistle of R. Sherira Gaon⁹⁶ mentions that after Rabbah and Rav Joseph (predecessors of Abayé and Rava as heads of the Academy of Pumbedita), there was an important persecution in Palestine. For that reason, the level of the teaching diminished drastically in Palestine and those Babylonian Rabbis in Palestine, such as Rabin and Rav Dimi, returned to Babylonia. Rav Joseph died in 323 C.E., and Abayé was appointed in 325 C.E. This event (the sending of the coded message) seems to occur after the death of Rav Joseph and before the return of Rabin, around 325 C.E.

I had been struck by the coincidence between the date of the return of Rabin and the other travelers in about 325 and the council of Nicaea and I had proposed an explanation like the suggestion of Lieberman.⁹⁷ Indeed, he suggests that the persecutions which led to the institution of a fixed Jewish calendar were the result of decrees by the Christian Imperial authorities against the Jewish calendar in order to prevent the dissident Churches of the East, after the council of Nicaea, from observing Easter at the same time as the Jews observed Passover. Therefore, the Christian Emperors prohibited the Patriarch to dispatch messengers to the Jewish

⁹⁵ See the previous and next quotations. Note the coming back to Babylonia of Bar Hedyā, Rabin, R. Dimi and the travelers, *B. Sukkah* 43b. See also *B. Beitzah* 4b mentioning a possible future persecution. See finally at the end of *Horayot* about the coming back to Babylonia, before 325, of Rabbi Zeira II. See also next note. The Council of Nicaea, at the same time, is perhaps not foreign to the situation.

⁹⁶ Part II, chap. 3, p. 54 in the edition of Aaron Hyman.

⁹⁷ Lieberman, 1946, "Palestine in the 3rd and 4th Centuries," *JQR*, n° 36: 329-370. See pp. 330-334.

Diaspora in Syria and Babylonia. This would give the natural explanation of our Talmudic quotation and of the former one.

Stern (2001),⁹⁸ however, rejects this theory and considers it completely unsubstantiated. He writes, “the absence of any external evidence in either Christian or Roman legal sources, of any imperial prohibition against Patriarchal calendar reckoning, casts considerable doubt on its historical validity.”

We have already mentioned that there are some indications⁹⁹ in the Talmud of persecutions—perhaps short-lived crises—at this period, confirmed by the Epistle of R. Sherira Gaon. This Talmudic quotation, as the former, must correspond to such a situation.

It appears that Rava, unlike Abayé, understood in advance that Yom Kippur would occur on Shabbat. It was perhaps the first time that the council of Palestine was sending such information so early. The council of the calendar had already decided long before, that Yom Kippur would occur on Shabbat. Probably from this time onwards, Rava knew the exact date of the festivals, and they began to hold two days because of a *takanah*, the enactment sent by the Palestinians, but no longer out of doubt.¹⁰⁰

This situation also provides additional evidence that the council of Tiberias calculated the calendar in advance. This evidence records one of the first instances of communicating advance calendar information to the Babylonian academies.¹⁰¹

III.F.4 *B. Arakhin* 9b.

This passage in *B. Arakhin* states:

אמר לי רב אדא בר אהבה לרבא, אחרים מנינא אתא לעשמועינן, הא קא משמע לן דלא בעינן מצווה לקדש על פי ראייה.

Rav Adda bar Ahavah said to Rava: Does Aḥerim [generally R. Meir] intend to let us know a count [of the new month]? No, he wants to teach us that it is not an obligation to sanctify months by observation.

This passage seems connected to the decision to switch from empirical observation emulating a calendar based on the vision of the new moon

⁹⁸ Stern (2001), p. 217.

⁹⁹ See previous and next quotations. See the coming back to Palestine of Rabin, R. Dimi and the travelers, *B. Sukkah* 43b. See also *B. Beitzah* 4b mentioning a possible persecution.

¹⁰⁰ See Rabbi Yose *infra*.

¹⁰¹ Perhaps it was not the first time, and therefore, Rava was able to understand the coded message, but it could have been the first time and it explains why Abayé could not understand the coded message.

to the calculation of a precalculated calendar based on mean conjunctions and provides a theoretical solution to the practical problem raised by the situation described in the previous paragraph. Although Rava was Babylonian and was completely outside the calendar committee, he was consulted on the subject.

III.F.5 R. Yose in *Y. Erwin*.

The end of chapter 3 of *Y. Erwin* states:

רבי יוסי משלח כתב להון, אף על פי שכתבנו לכם סדר מועדות, על תשנו מנהג אבותיכם נוחי נפש.

R. Yose¹⁰² sent them [the people of Alexandria] a letter: Although I sent you the order [i.e., the details] of the festivals, do not change the custom of your late ancestors.

The last passage seems to refer to the beginning of R. Yose's leadership, around 325-330 C.E. There is a parallel passage in *B. Beitzab* 4b:

והשתא דידעינן בקביעא דירחא מאי טעמא עבדינן תרי יומי, דשלחו מתם, הזהרו במנהג אבותיכם בידכם, זמנין דגזרו המלכות גזירה ואתי לאקלקולי.

And now, when we know the fixing of the moon, why are we observing two festival days? Because they sent from Palestine the following instruction, be careful to maintain the practice of your late parents.¹⁰³ It could once happen that the authority enacts [unfair] laws [against the Jews] and they could be wrong if they observe only one day.¹⁰⁴

¹⁰² Rabbi Yose was the head of the Academy of Tiberias. Apparently, he was the first who sent the *keviyah* of the coming year, to Babylonia. It was also under his halakhic direction that the calendar became officially a precalculated calendar. In the Jerusalem Talmud, he is usually named Rabbi Youssa.

¹⁰³ The Babylonians were not happy with the situation of uncertainty obliging them to keep two festival days (see above Samuel and his calendar for 60 years). Once the Babylonian communities began to receive the *keviyah* in advance, they could hope to be released from this obligation to keep two festival days.

¹⁰⁴ Thus, Rabbi Yose wrote to them: keep your head! Keep cool! We are not out of danger yet. Because of the war between Rome and the Persians and because of the hostility of the Christians in the Roman Empire, the situation remained precarious. At any moment the communication of the *keviyah* could be disrupted. Continue to hold the tradition of your ancestors and keep two festival days and so you will be sure to not transgress the festival day. From this quotation, it can be deduced, that without the danger of communication breakdown of the *keviyah*, the Babylonians would, already at this stage, in about 325, have been released from the obligation of keeping two festival days. Additionally, the message indicates, that once the situation is stabilized, when it calms down and any

This passage is clearer than the first one in explaining the reason for this decision. It is a later interpolation, from the time of the redaction, in the time of Rav Ashi and his son. This passage was not correctly understood¹⁰⁵ as long as people believed that the institution of a fixed calendar in 358/359 allowed the Diaspora to calculate the calendar in full independence. Under such conditions, the maintenance of two festival days is not easy to justify, because a fixed calendar gives complete independence to all communities.

Rabbi Yose imposed upon the Diaspora the observance of the second festival days on the ground that new persecutions could disrupt the connections between Palestine and the Diaspora, and place them, once more, in the situation of not knowing the fixing of the moon.¹⁰⁶ This passage provides evidence that those in the Diaspora were not able to calculate the calendar by themselves. Each year, the Palestinians transmitted to the communities in the Diaspora, the data about the calendar for the next year. This indicates the fragility of the Jewish calendar. The only, but significant, practical improvement upon the empirical calendar was that the envoys came only once a year. In the case of crises or persecutions, envoys could even cut back their visits to once every few years. More importantly, the envoys could travel at the beginning of the year, well before the month of Elul. This new method of communication, in the case of a possible persecution or communication problem, would then confuse the authorities and the Jews' enemies, who were accustomed to look for the envoys around the month of Elul.

When the Babylonians began to calculate the calendar by themselves in the ninth century, they could have argued that the reason for observing two festival days disappeared. However, the observation of the two festival days was already so entrenched in their tradition that it was too late to

danger of breakdown of communication disappears, the Babylonians will be released from keeping two festival days.

¹⁰⁵ Therefore, Rashi felt obliged to explain that the Babylonians must observe two days as their ancestors, because if a bad kingdom would emerge and forbid the study of the Torah, they could forget the rules of the Jewish calendar and be mistaken. This quite far-fetched explanation was never questioned. The truth is that the Babylonian communities did not know the rules of the calendar before the ninth century and still received the information from the Land of Israel. In fact, the fear was that a bad kingdom would prevent the messengers from bringing the information, the *keniyah* of next year, to Babylonia in time. They would then be in the same situation of ignorance as before about 320–325, when they didn't know the fixing of the month.

¹⁰⁶ The expression “second festival days of the Diaspora” was created by R. Yose in *Y. Megillah* IV, 5.

consider removing it, and the Babylonians did not seriously consider doing so.¹⁰⁷ Moreover, the Geonim were engaged in a decisive showdown with the Karaites and the second festival day was an important point of contention between both communities.

III.F.6 Abayé in *B. Ta'anit* 29b:

ואם לא כבס בחמישי בשבת מותר לכבס בערב שבת מן המנחה ולמעלה, לייט עליה אביי...

And if he didn't do the washing on Thursday (and has no cloth for Sabbath) he is allowed to make the washing on Friday afternoon, day of Tishah be-Av, from Minḥah onwards; Abayé cursed those who let themselves carry to such extremes.

After 325, during the reign of Abayé, the Babylonian communities already received communication of the *keviyah*¹⁰⁸ of the year and they “knew the fixation of the month.” The number of days between Passover and the next Rosh Hashanah was already fixed, so that the ninth of Av occurred on the same day as Passover and the next Rosh Hashanah occurred two days later. As we know, Rosh Hashanah could still fall on Sunday, and therefore Passover and Tishah be-Av could occur on Friday.¹⁰⁹

III.F.7 Rava in *B. Taanit* 21b:

אבא אומנא הוה אתי ליה שלמא ממתבתא דרקיע כל יומא, ולאביי כל מעלי יומא דשבתא, לרבא כל מעלי יומא דכיפורי.

Abba the bonesetter received the greetings of the Celestial Academy each day, Abayé received them each eve of Sabbath and Rava each eve of Kippur.

¹⁰⁷ Apparently during the Geonic period, the weight of the second festival day was not felt anymore with the same sharpness in the Jewish community. A possible reason for this new situation is that the problem of the second festival day was now the subject of a major dispute between the Rabbis and the Karaites. Because of this contention, Saadiah Gaon (and later Hai Gaon) had developed new arguments to strengthen the rabbinic position and counter the arguments of the Karaites.

¹⁰⁸ The *keviyah* is the indication of the characteristic of the beginning Jewish year, i.e., the day of Rosh Hashanah, the day of the following Pesah and an indication whether the year is defective, regular, or abundant, 353, 354, or 355 days in a normal year, 383, 384, or 385 days in a leap year.

¹⁰⁹ It is interesting to note that the Talmud mentions one case of Tishah be-Av occurring on Friday in the time of R. Akiba, when Rosh Hashanah could still fall on any day: *B. Erwin* 41a.

Apparently Rava had no more doubt about the day of *Kippur*. After 325, they received the *keviyah* of the next year in advance and had no more doubts about the festivals; the two festival days were held because of the *takanah* sent from Israel and no longer due to doubt. But this passage could also relate to a period earlier than 325, perhaps after about 305, when the council of intercalation decided, according to the testimony of Rav Hisda, that Elul would be again defective, so that *Kippur* would be Elul 39. The attribution of the passage to a period after 325 seems more likely, because only after that year Abayé and Rava appeared as outstanding and prominent personalities.

III.F.8 Abayé and Rava in *B. Shabbat* 23a:

אמר אביי ודאי דדבריהם בעי ברכה, ספק דדבריהם לא בעי ברכה. והא יום טוב
שני דספק דבריהם¹¹⁰ הוא ובעי ברכה, התם כי הכי דלא לזילולי בה. רבא אמר,
רוב עמי הארץ מעשרין הן.

¹¹⁰ Thus, Abayé considered that the second festival day is a *ספק דדבריהם*, a rabbinic enactment introduced because of the doubt according to the instruction sent from Palestine, or in other words, transgressing it represents the transgression of a *ספק דרבנן*. However, the rabbis from the period of the Geonim onwards did not understand the situation correctly and thought the message of R. Yose to Babylonia coincided with the introduction of a definitive calendar, identical to our modern calendar. Therefore, they must understand that the second festival day was henceforth a weekday which, because of the fear of discriminatory and repressive measures against the Jews, should be kept as an indisputable rabbinic festival day. This would correspond to *ודאי דדבריהם* or *תקנת ודאי*, thus, to keep a weekday, beyond all doubt, as a festival day. And indeed, Rambam in *Hilkehot Kiddush Ha-Hodesh* V:6 writes that the second festival day is a *takanah*. In *Hilkehot Yom Tov* VI:14 he probably adopts the same position, and writes that the second festival day is a *מנהג* but he probably means *תקנת ודאי* (דרך) *מנהג* (I am borrowing an expression from Meiri in *Beit ha-Behirah* on *B. Sukkah* 43a). Thus, he means a *minhag* constituted by the rabbinic obligation to keep an additional festival day. However, all the rulers contradicted Rambam and ruled that the second festival day must still be considered as a rabbinic doubt. Their argument is that the second festival day cannot become stricter than before, after the introduction of a precalculated calendar (see traditional commentaries on Rambam, *Yom Tov* VI, 14). In fact, Maimonides adopted contradictory positions. In *Yom Tov* I:21 he wrote that it is a *minhag*. In *Megillah* 3:5 he wrote that it is a *תקנת ספק*; in H.K.H. V, 6 he wrote that it is a *takanah*, a rabbinical enactment; and finally in *Talmud Torah* VI, 14 (11) he wrote that it is a *minhag*.

Abayé said: an obligation which has the status of certainty by rabbinical enactment¹¹¹ requires a benediction but an obligation which has a status of uncertainty by rabbinical enactment¹¹² does not require a benediction. But the second festival day has the status of uncertainty by rabbinical decree¹¹³ and it nevertheless requires a benediction¹¹⁴. This is only in order that one should not despise the second festival day. Rava said: most of the peasants deduct the tithe.¹¹⁵

When from about 325 onwards Abayé and Rava knew the *keviyah* in advance, they knew that the first festival day is the true festival day while the second festival day is in fact a working day.

However, they received from Palestine the instruction to go on keeping the second festival days as before under the status that the second festival day could still be the true festival day. Thus, by rabbinical enactment, this second day remained a day of uncertainty. The rabbis feared that in case of political crisis or war, the diaspora could remain without information about the calendar coming from Palestine. They considered that keeping two festival days would increase the probability that they would keep the true festival day. This corresponds well to the expression: ספק דדבריהם. The uncertain character of this day is the tenor of the rabbinical enactment. This represents a considerable evolution with regard to the situation existing before, when both the first and the second day could be the true festival day and therefore the doubt was complete.¹¹⁶

¹¹¹ The obligation of lighting the Hanukkah candles does not suffer any uncertainty and is a rabbinical obligation, thus ודאי דדבריהם.

¹¹² *Demai* is the peasant's crops; by rabbinical enactment it is considered uncertain whether the peasant deducted the tithe and therefore, to avoid this state of uncertainty the rabbis prescribed that one should deduct תרומת מעשר. *Demai* is thus ספק דדבריהם.

¹¹³ The second festival day should now be a working day, but the rabbinical enactment sent by the Palestinians instructs to continue keeping the second festival day and to consider it as the possible true festival day.

¹¹⁴ The introductory *Kiddush*.

¹¹⁵ According to Rashi and Rabad, Rava says that in the case of *Demai*, the probability that the peasant did not deduct the tithe is very low and we cannot speak of a doubt. The deduction of תרומת מעשר is intended only to remove any fear but we cannot speak of a case of uncertainty and therefore no benediction is required. But in other cases of uncertainty by rabbinical enactment like *yom tov sheni*, a benediction is required without the necessity to have recourse to Abayé's argument.

¹¹⁶ The following quotation from *Yerushalmi* is related to this former period: דאיפלגון, שני ימים טובים של גליות, רבי יוחנן אמר מקבלין התרייה על ספק, רבי שמעון בן לקיש אמר אין מקבלין התרייה על ספק.

III.F.9 Rabbi Yose in *Y. Megillah* I, 2, 70b says:

אמר רבי יוסא, לית כאן חל להיות בשני ולית כאן להיות בשבת. חל להיות בשני,
צומא רבא בחד בשובא, חל להיות בשבת, צומא רבא בערובתא.
Rabbi Yose said: Purim may not occur on Monday or on Sabbath. If
it occurs on Monday, then the great fast [Yom Kippur] occurs on
Sunday, and if it occurs on Sabbath, then the great fast will occur on
Friday.

Based on this passage, we can conclude that the number of days between Purim and Yom Kippur is now clearly fixed.¹¹⁷ From Purim until the day after Yom Kippur, there are exactly twenty-nine weeks. Consequently, the number of days between Passover and Rosh Hashanah also becomes fixed. It is impossible to ascertain whether this passage is from the beginning of Rabbi Yose's reign, around 325–330 C.E., or if it belongs to a later period, when the calendar had already evolved from a semi-empirical stage to a fixed calendar, probably around 358 C.E.¹¹⁸ It is likely

See *Y. Pesahim* V, 4, 32c; *Y. Nazir* VIII, 1, 57a, and *Y. Yevamot* XI, 7, 12b.

They disagreed about the second festival day: R. Yoḥanan said that it is possible to receive a warning about a doubt, i.e., that it is possible to receive a valid warning about a transgression of the festival day although we don't know for sure when the true festival day occurs, while Resh Lakish says that it is not possible to receive a warning about a doubt.

On the other hand, the following quotations of statements by Rava belong also to the new period when he knew the *keviyah* in advance.

1. *B. Beitzab* 6a, אמר רבא מת ביום ראשון יתעסקו בו עממין, מת ביום שני יתעסקו בו ישראל.
2. *B. Beitzab* 5b, רבא אמר אף מתקנת רבן יוחנן בן זכאי ואילך ביצה אסורה.
3. *B. Beitzab* 17a, אמר רבא, מניח אדם עירובי תבשילין מיום טוב לחבירו ומתנה.

However, Maimonides wrote in H.K.H. V: 3 that the period of the empirical calendar by observation lasted until the time of Abayé and Rava, apparently Abayé and Rava included. This is consistent with his ruling in *Hilkebot Yom Tov* VI: 11, 12 and 14, according to which the dictum 3 of Rava belongs to the first period of the empirical calendar. R. Zerahiah ha-Levi on the *Rif Beitzab* (p. 3a of the Rif, top) has a similar position about the dictum 2. By contrast, Meiri in *Beit ha-Behirah* on *B. Sanbedrin* 13b writes that Abayé and Rava already belong to the period of the fixed calendar. Ramban and *Ran* on *Rif Beitzab* (p. 9b top of the Rif) also write that Rava knew the fixing of the moon.

¹¹⁷ Before this period, even when the *deḥiyah lo DU Rosh* was already in use, Pesah could still occur on any day because the number of days between Pesah and Rosh Hashanah was not yet fixed; this was of course also the case before the institution of the rule *lo DU Rosh*, see *Mishnah Pesahim* VII: 9.

¹¹⁸ For the Babylonians, it made no difference. It is even likely that the Babylonians did not note any difference as they did not know the rules governing the new calculated calendar.

that the decision to have a fixed number of days between Passover and Rosh Hashanah was made very early, because it responded to the motivation to inform the Diaspora easily. In any case, we see that the occurrence of Rosh Hashanah on Sunday was not a great concern.¹¹⁹ Rosh Hashanah could still fall on Sunday and the rule *lo DU Rosb* implies now *lo BD Pesah* and *Tishah be-Av*, and *lo BZ Purim*.¹²⁰ *Pesah* and *Tishah be-Av* could still fall on Friday and Purim on Wednesday.¹²¹

III.F.10 Rabbi Yose

Rabbi Yose in *Y. Megillah* IV, 1, 75a. states:

הוא התקין שתהא אשה חופפת וסורקת קודם טהרתה ג' ימים, רבי יוסה בשם רבי ינאי, רבי בא בר כהן בשם רבי חיניא כדי לשבת ולשני ימים טובים של גליות. He (Ezra) decided that a woman should wash her head and comb out her hair not more than three days before her purification. Rabbi Yose in the name of Rabbi Yanay and...: to allow her to wash before Sabbath and to purify herself on Monday evening after the two festivals days of the Diaspora.

If we compare this text with the parallel text, relating to about more than seventy years before,¹²² in *B. Niddah* 67b,

אמר רב הונא...אשה חופפת באחד בשבת וטובלת בחמישי בשבת שכן אישה חופפת בערב שבת וטובלת במוצאי שני ימים טובים של ראש השנה שחל להיות אחר השבת.

we see that the situation had completely changed. Rav Huna had chosen an example common to both communities, but after the establishment of the fixed calendar, Israel never experienced two consecutive festival days, even in the case of Rosh Hashanah. In other words, Rosh Hashanah had only one day in Israel after the fixed calendar was established. We have

¹¹⁹ In his capacity as head of the Academy of Tiberias, R. Yose seems to have played a major role, whereas the role of the Patriarch Hillel was probably formal and honorary.

¹²⁰ DU: Wednesday and Friday. BD: Monday and Wednesday. BZ: Monday and Saturday.

¹²¹ *Tosafot Rid* (R. Isaiah ben Mali Di Trani, c. 1200–c. 1260) on *B. Megillah* 4b, used this passage in *Y. Megillah* to prove that the *dehiyah* A was introduced much later than the two *dehiyot* DU. *Maharsha* on *B. Pesahim* 71a and *Arukh le-Ner* on *B. Sukkah* 43a accept also that the *dehiyah* A was a late decision.

¹²² If we consider that Rav Huna died in 297 C.E. and R. Yose lived until about 367 C.E.

also here the first mention of the Hebrew expression שני ימים טובים של גלויות designating the two festival days of the Diaspora.

To understand these contradictory elements, I suppose that Rabbi Yose's enactment, after the transition to a fixed precalculated calendar, included two parts. First the well-known part destined to the Babylonians and the Diaspora, to continue keeping two festival days outside the boundaries of Israel. Second, as already mentioned by Rabbi Zeraḥiah ha-Levi, to consider that the whole country of Palestine (Israel) should from now on be considered as the Court's courtyard so that they should keep only one day for Rosh Hashanah and all the festivals.¹²³

This enactment is so important in Rabbi Yose's eyes that he accepts a maximum delay of three days between the washing and the purification in the Diaspora and even in Israel to consider the case of Shabbat followed by two festival days, although this case does not even occur in Israel but only in the Diaspora. Still, the festivals of Tishrei and Rosh Hashanah could fall on Sunday.¹²⁴

III.F.11 Rav Huna bar Abin.

Rav Huna bar Abin in *B. Rosh Hashanah* 21a states:

שלח לי רב הונא בר אבין לרבא, כד חזית דמשכה תקופת טבת עד שיתסר בניסן,
עברה לההיא שתא ולא תחוש לה.

Rav Huna bar Abin¹²⁵ sent to Rava: when you see that the winter season is prolonging itself until the sixteenth of Nissan, intercalate that year and do not worry [about contradictory opinions, according

¹²³ This part of the enactment was unknown to the Babylonians who, therefore, didn't understand why the Palestinians keep only one day of Rosh Hashanah. The Geonim expressed their objection and *Rif*, R. Isaac Alfassi, wrote explicitly that the Palestinians must keep two days Rosh Hashanah. This contradiction began with Rava and continued during the Geonic period and later until finally in the twelfth century, when Provençal rabbis imposed upon the small Palestinian community to keep two festival days of Rosh Hashanah. See J.J. Ajdler, "Rosh Hashanah in Palestine at the Inception of the Jewish Calendar: One Day or Two?" *B.D.D.* (Bar Ilan) 33, March 2018, pp. 19–42.

¹²⁴ The ruling of R. Yose is contrary to that of Rav Yemar, who ruled that this delay of three days is excessive; according to him, the woman should wash and purify herself the night after the festival days.

¹²⁵ This Babylonian Amora spent a long time in Palestine and played an important role in Palestine. He was a member of the council of intercalation, or he was very close to it. But according to Hyman, he is not mentioned in Talmud Yerushalmi.

to Rashi, or about the two other signs of maturity, according to the *Tosafot*].

An essential condition necessary to create a fixed luni-solar calendar is to define an intercalation rule to determine regular and leap years constituted from twelve or thirteen lunar months. This is not the only passage to address this subject, but the personal qualities of Rav Huna bar Abin and Rava gives a special importance to it. As for Rava, we already know that he, despite being the head of Babylonian Jewry, was closely involved with the institution of a fixed Jewish calendar, and that he was apparently consulted or informed about all important items. Rav Huna bar Abin is a Palestinian Amora of the fourth century of Babylonian origin. He studied with Rav Joseph¹²⁶ in Babylonia and later went to Palestine, where he was the pupil of R. Jeremiah in Tiberias. He was a friend of Rabbi Yose and Rabbi Yonah. He remained in Palestine, even at the worst period during the repression of Gallus and Ursicinus in 351-352 C.E., when he had to hide himself in a cave.¹²⁷ He lived from around 300 until 365-370 C.E., and he seems to have played an active role in the creation of the fixed calendar together with Rabbi Yose.¹²⁸ Indeed, it is of special importance that he was a member of the council of the sanctification of the month,¹²⁹ and it explains the passage above. Because of Rav Huna bar Abin's special position we can consider that his rule was the practical rule in use, while other concurrent rules¹³⁰ were merely suggestions.

Rashi's interpretation—that the object of worry is about contradictory opinions—seems to be the true meaning. Concerning the significance of this message, I do not think it was intended to obtain Rava's opinion in response, but was instead the message, sent probably during the repression of Gallus, of someone fearing the worst for the future of the Jewish calendar and of the intercalation council sending a practical rule to his Babylonian colleagues in case communication became impossible. The existence of such an intercalation rule implies that the Metonic nineteen-year cycle of intercalation (a stable cycle of seven leap years in 19 years), was not yet instituted in Hillel's calendar.

¹²⁶ Y. *Sukkah* III, 4 and Y. *Yoma* VII, 2.

¹²⁷ Y. *Pesahim* I, 5.

¹²⁸ Y. *Sukkah* IV, 3.

¹²⁹ Y. *Sukkah* II, 5.

¹³⁰ B. *Sanhedrin* 13a.

The exact significance of this passage has often been discussed. Rabbinical Rishonim discussed the meaning of “until the sixteenth of Nissan.” According to Rashi¹³¹ and Maimonides,¹³² we intercalate only if the equinox occurs on the sixteenth of Nissan; according to others, such as *Tosafot*,¹³³ Rabbi Abraham bar Hiya,¹³⁴ and Rabbenu Hananel,¹³⁵ we intercalate only if the equinox occurs on the seventeenth of *Nissan*.

To fully understand this rule of *Shitsar*, we must address a last question. About which *tekuḥab* was R. Huna bar Abin speaking? The true equinox or the mean equinox? A true equinox is the passage at the vernal or autumnal point of the true sun while a mean equinox is the passage at the vernal or autumnal point of the mean sun. True vernal equinox occurs two days before the mean vernal equinox and the true autumnal equinox occurs two days after the mean autumnal equinox. In *B. Sanbedrin* 13b, the Talmud seems concerned with two problems, the position of Sukkot, that the occurrence of the twenty-first of Tishrei should be in the autumn and the position of Pesah, that the occurrence of the sixteenth of Nissan should be in the spring. This double occurrence can be reached only by applying the intercalation rule to the mean equinox. Indeed, if we apply the intercalation rule to the true spring equinox, then the rule concerning the position of Sukkot with respect to the true autumnal equinox cannot be respected.

All the *meabrim* shared this opinion, that the rule of *Shitsar* is about the mean equinoxes. Especially the fourteenth-century Jewish astronomer Isaac Israeli writes in his famous book *Seder Olam*, that it is the mean vernal equinox that is considered for the fixing of Passover.¹³⁶

¹³¹ *B. Rosḥ Hashbanah* 21a in Rashi.

¹³² *Hilḥbot Kiddush ha-Ḥodesh* 4:2.

¹³³ *B. Rosḥ Hashbanah* 21a: *Tosafot* “*ki haḥit.*”

¹³⁴ *Sefer ha-Ibbur*, book 3, chap. 5.

¹³⁵ *B. Rosḥ Hashbanah* 21a.

¹³⁶ *Yessod Olam*, ed. Baer Goldberg, Berlin, 1848, book 4, chap. 2, p. 3, column 2. The rule of intercalation of *Shitsar* was probably in use until the eighth century (according to Bornstein and Joffe). During the eighth century it was replaced by a stable intercalation cycle of 7 leap years in each cycle of 19 years. See J.J. Ajdler, “The Gregorian Revolution of the Jewish Calendar,” *B.D.D.* (Bar Ilan) 27, March 2013 pp. 17–76, especially pp. 17–27.

III.F.12 Ravina

Ravina in *B. Arakhin* 9b states:

מתקיף לה רבינא, והאיכא יומא דשעי, ויומא דתלתין שני .

Ravina objected: But there exists one day [made up] of hours and one day [completed] in thirty years.

Ravina, a companion of R. Ashi,¹³⁷ was a Babylonian Amora of the fourth and beginning of the fifth century. He studied with Rava,¹³⁸ which indicates that he was born about 330 C.E. According to two sources, less reliable than the Epistle of Sherira Gaon, he died in 422 C.E., six years before R. Ashi's death.¹³⁹ In his position as pupil of Rava, he probably learned calendrical data from him. This passage could inform us that the length of the synodical lunation used in the calendar of Hillel was 29d 12h 44m,¹⁴⁰ which differs from the lunation of our modern calendar. This value could have been reached in two stages. In the first stage, the lunation lasted only 29d 12h 40 m. In one year of twelve lunar months, these minutes¹⁴¹ amount to eight hours, and after three years, they amount to one day, which was called the “day of the hours,” or alternatively as the “day of three years.”

In a second stage, they added 4 m or 72 *halakim*. After thirty years of twelve lunar months, the calculators of the calendar get $360 \times 4 = 1440$ m. This additional day could have been named “day of *halakim*,” but they called it, probably later, the “day of thirty years.”¹⁴²

III.F.13 B. Pesahim 58b.

חל להיות בשבת כחל להיות בשני בשבת דברי רבי ישמעאל...

The *Baraita* was probably written in a world where Pesah could occur on any day and Rashi is then correct when he writes: ולא מילתא היא שהרי על פי הראייה היו מקדשין... But later at the time of Abayé and Rava, the world had changed, and Pesah could no longer occur on BD. Therefore, they likely understood the text according to this new meaning and understood that it records בשבת בשני because it cannot be בראשון בשבת.

¹³⁷ He considered himself, modestly, as his pupil and colleague. *B. Erwin* 63b.

¹³⁸ *B. Bava Batra* 16b.

¹³⁹ *Sefer ha-Keritot*, R. Samson ben Isaac (Chinon, France) and *Seder Tannaim ve-Amoraim* in *Maḥzor Vitry*, Nuremberg, 1923, p. 483.

¹⁴⁰ Thus 29 – 12 – 792 instead of 29 – 12 – 793 adopted later.

¹⁴¹ The 40 minutes.

¹⁴² *B. Rosh Hashanah* 20a.

III.F.14 Rav Yemar in *B. Niddab* 67b.

ורב יימר אמר אפילו שכן אמרינן לבר מאישה חופפת באחד בשבת וטובלת בחמישי בשבת, דלמוצאי שני ימים טובים של ראש השנה שלאחר השבת ליתא¹⁴³ דאפשר דחופפת בלילה וטובלת בלילה. דרש מרימר הלכה כרב חסדא וכדמפרש רב יימר.

Rav Yemar said: we may even draw the inference of “since” (considered above)¹⁴⁴ except in the case where a woman is permitted to wash and comb her head on Sunday and undergo immersion on Wednesday evening (beginning of Thursday) because the similar (model) case (of washing one’s head on Friday and) undergoing immersion on the night after the two festival days following Sabbath,¹⁴⁵ does not hold (and is not acceptable because it represents a too long gap between washing and immersion) since it is possible for the woman to wash her head and undergo immersion in the same night (after the end of the festival). Meremar said in his discourse: the law agrees with Rav Hisda but it is in accordance with the interpretation of Rav Yemar.

We see that in about 432 C.E.,¹⁴⁶ seventy-four years after the introduction of the fixed calendar by Hillel the Patriarch, by testimony of the Talmud, Rosh Hashanah could still fall on Sunday. According to The Epistle of Rav Sherira Gaon, Rosh Hashanah was still on Sunday in 4268

¹⁴³ This word means that Rav Yemar did not accept the case of Sabbath followed by the two days of Rosh Hashanah as an acceptable interval between washing and immersion, because it is too long. One cannot interpret it as meaning this case does not occur, because then Rav Yemar should also have considered the case of the two days of Rosh Hashanah preceding Sabbath, which still occurs today.

¹⁴⁴ Above (see main text III, F, 10) Rav Huna considered that a gap of three days between the washing and combing of the woman’s hair and her immersion after the end of Rosh Hashanah following Sabbath (or after Sabbath following Rosh Hashanah) is acceptable and moreover he drew the inference that “since” it is accepted for religious reason after these festival days, when the washing and combing is forbidden on the festival days, it is also acceptable, during a normal week, for her own convenience. Rav Hisda accepted the religious cases but rejected the inference generalizing the religious motives as convenience. On this Rav Yemar intervenes and rejects the possibility of a gap of three days in any case, for religious motives and a fortiori for convenience. The statement of Rav Yemar must be understood as follows: I accept the inference “since” except in the case presenting a gap of three days for convenience because I do not even accept a gap of three days for religious motives.

¹⁴⁵ Thus, Rosh Hashanah is on Sunday and Monday.

¹⁴⁶ Death of Rav Yemar. ESG (*Epistle of Rav Sherira Gaon*), part III, chap 4.

A.M. or in 507 C.E.¹⁴⁷ According to the *She'illot* of Rabbi Aḥai of Shabha¹⁴⁸ (written in Palestine in the period 750 – 760 C.E.), the postponement A was already ancient.¹⁴⁹ In the Palestinian rabbinic composition *Sefer ha-Ma'asim*¹⁵⁰ of about the mid-seventh century, reference is made to Rosh Hashanah still occurring on Sunday.¹⁵¹ This postponement seems thus to have been introduced in about the beginning of the second half of the seventh century. This fact, i.e., the late introduction of this postponement, was already known by Rabbi Isaiah ben Mali of Trani (c. 1180 – c. 1250 C.E.).¹⁵²

IV. The Institution of a Fixed Calendar

According to a responsum of R. Hai Gaon, written in 992 C.E. and mentioned by Rabbi Abraham bar Ḥiya,¹⁵³ the fixed calendar was instituted in 670 S.E. (358/359 C.E.),¹⁵⁴ by Hillel II, the Patriarch. Maimonides does not mention Hillel II, but he writes in *Hilkhot Kiddush ha-Hodesh* (Laws of the Sanctification of the New Moon) V, 3, that the empirical calendar based on the observation of the new moon remained in use until the days of Abayé and Rava.¹⁵⁵ By contrast, his contemporary, R. Zeraḥiah ha-

¹⁴⁷ See above, note 81.

¹⁴⁸ Leading scholar during the period of the Geonim and Talmudist of renown. The first rabbinical author known after the completion of the Talmud. It is also the first reference of the effective postponement A (Rosh Hashanah cannot fall on Sunday and *Aravah* on Sabbath). Indeed, we saw that the subject was already discussed in the Talmud, but it had not been the subject of an effective decision in Hillel's calendar.

¹⁴⁹ See *She'illot* Vilnius 1861, vol. 1, *Beresbit* and *Sbemos*, pp. 217-218 or *She'illot*, Jerusalem 1960, Mossad ha-Rav Kook, Volume *Sbemos*, p. 224. Joffe writes in his book *Yessodei Heshbon ha-Ibbur* (1931), p. 30 (table of contents) and pp. 51–53, that this postponement could have been introduced in about 640 C.E., but that is just a guess and could also be 660 or 670 C.E. See also Stern (2001), *Calendar and Community*, pp. 187–188.

¹⁵⁰ *Ha-Ma'asim livnei Eretz Yisrael, Halakhab and history in Byzantine Palestine*, Hillel I. Newman (Jerusalem, 2011) [Hebrew].

¹⁵¹ See Stern (2001), *Calendar and Community* (Oxford 2001), pp. 184-185.

¹⁵² See *Tosafot Rid on B. Megillah* 4b (Lvov, 1868 and re-edition Jerusalem, 1931), p. 44a, col 1 bottom and col 2 top. See also R. Menahem Kasher: *Torah Shelemah*, vol. 13 (New York, 1954), pp. 88-89.

¹⁵³ *Sefer ha-Ibbur*, book 3, chap 7.

¹⁵⁴ This is the only source, although it is second hand.

¹⁵⁵ At the time of Abayé and Rava, they were no longer fixing the calendar based on observation, as championed in this paper.

Levi,¹⁵⁶ mentions the tradition relative to Hillel, the Patriarch.¹⁵⁷ R. Menaḥem Meiri¹⁵⁸ writes (*B. Sanhedrin* 13) that the sanctification was abolished in the time of Abayé and Rava. Nahmanides¹⁵⁹ also raises the issue several times. In *Sefer ha-Zekhut* on *B. Gittin* 43b, he recorded that Hillel the Patriarch established the Jewish calendar according to the calculations that are still in use today. He wrote the same opinion in his commentary on *Sefer ha-Mitzvot*, positive Mitzvah 153. In his commentary on the Rif (R. Isaac ben Jacob Alfassi)¹⁶⁰ on *B. Beitzah*, Nahmanides recorded that the fixed calendar was established during the life of Rava.¹⁶¹ Additionally, R. Solomon ben Aderet,¹⁶² in his novellae on *B. Sukkah* 43b, wrote that the Jewish people knew the fixing of the moon when Hillel, the last Patriarch, established the calculation that is still used today. He considers that Hillel is the son of R. Judah *Nessia*, the grandson of R. Judah the Saint. These authors are quite imprecise about the genealogy of Hillel the Patriarch, whom they situate correctly at the same time as Abayé and Rava. The difference of about thirty-four years between the beginning of the calculation of a predictable, and probably still semi-empirical, calendar in 325 C.E, and the institution of the fixed calendar in 358/359 C.E., escapes them. This article has shown that a calculated and predictable calendar was communicated to Babylonia from about 325 C.E.

What then does the date of 358/359 C.E. represent? Considering the different passages mentioned above related to the evolution of the calendar between the years 325 C.E. and 350-358 C.E., it seems very likely that the calendar calculated around 325 C.E. was still a semi-empirical calendar, calculated each year. It was probably still a flexible calendar like the empirical one, and it is very likely that the neomenia were still intended to coincide with the first observation of the new moon. In fact, the transition to a fixed calendar required the choice of a *Molad* (mean conjunction), the length of a synodical month, and an intercalation rule (to respect the luni-

¹⁵⁶ On Rif *Beitzah* p. 3a of the Rif.

¹⁵⁷ There is great imprecision among all these authors about the genealogy of Hillel II.

¹⁵⁸ Second half of the thirteenth and beginning of the fourteenth century.

¹⁵⁹ Thirteenth century.

¹⁶⁰ Eleventh century.

¹⁶¹ There is certainly confusion because of the Talmudic elements showing that Rava received from Palestine the information about the calendar, and knew the fixing of the moon. As the Rishonim believed that the calendar had reached its definitive structure and rules during the fourth century, they connected the two elements and concluded that the fixed calendar was introduced during Rava's life.

¹⁶² Second half of the thirteenth and beginning of the fourteenth century.

solar character of the Jewish calendar). It also required a shift backward of about two days of the neomenia to shift the neomenia from the day of first visibility of the moon to the day of the mean conjunction.¹⁶³ It is likely that defining all these elements took about thirty-four years, during which time the calendar evolved from the former semi-empirical calendar to a fixed calendar. Before the knowledge of the Letter of the *Resh Galuta* (835/836 C.E.),¹⁶⁴ it had always been admitted that the Jewish calendar had been completely and definitively fixed in 358/359 C.E. Rare contrary evidence, such as a date in the Epistle of Sherira Gaon implying Rosh Hashanah's occurrence on Sunday, was mostly set aside as a copying error. From this letter of the *Resh Galuta*, we know that the Babylonians were not aware of the complete rules of the calendar, and to know the *keniyah*, they had to receive the information sent from Palestine.¹⁶⁵

In conclusion, the name of Hillel II, in connection with the institution of the Jewish calendar, is known through one unique and very late rabbinic source, a responsum of R. Hai Gaon mentioned by R. Abraham bar Hiya. As we have demonstrated in this paper, the evolution from an empirical to a fixed calendar was progressive and slow and began as soon as the end of the third and not later than the beginning of the fourth century. The "official institution" of the Jewish calendar would represent the final process of the shift of the neomenia from the theoretical day of the first visibility of the new lunar crescent to the day of the mean conjunction (*Molad*). The exact role of Hillel II in the institution of the fixed calendar is not clear. It could have been very limited and reduce itself to the simple fact that he was the Patriarch at the epoch of the institution.¹⁶⁶

¹⁶³ Nevertheless, the day of Tishrei 1 must be postponed by one or even two days depending on the restrictions imposed on the admissible days of the week for Tishrei 1 and on the goals pursued as to the number of days of the different years. This postponement influences the beginning of the following months.

¹⁶⁴ The Letter of the *Resh Galuta*, see Stern, *Calendar and Community*, p. 277 for a transcription, a translation, and a perfect photocopy. See also Jaffe, p. 98, and Sar Shalom, p. 27.

¹⁶⁵ From the Letter of the *Resh Galuta* it appears furthermore that the *keniyah* of the years 835/836 was different than that in our modern calendar.

¹⁶⁶ The main—or, at least, one of the main—craftsmen of the Jewish calendar and its rules was certainly R. Yose (Yousa in the Jerusalem Talmud), the colleague of R. Yonah.

Indicative Chronological Table

All dates are in the Julian calendar format. The table is based upon the *Epistle of Rav Sherira Gaon*.

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