

## SURVEY OF RECENT HALAKHIC PERIODICAL LITERATURE

### BIRKAT HA-HAMMAH: AN ALTERNATE DATE?

Each twenty-eighth year becomes the occasion for the publication of monographs and articles dealing with a blessing recited only once in twenty-eight years—*Birkat ha-Hammah*, or the Blessing of the Sun. Immediately thereafter the topic recedes from memory to be recalled only when the dawn of the next twenty-eight year cycle appears on the horizon.

The year 5741, which marks the beginning of the 206th twenty-eight year solar cycle, has already seen the publication of several works, including republication of R. Yechiel Michal Tucatzinsky's informative and authoritative *Tekufat ha-Hammah u-Birkhatah*. This booklet first appeared 56 years ago, was republished with additions twenty-eight years ago, and now has been published by the author's son with the addition of a number of valuable notes. Also republished is R. Pinchas Zelig Schwartz' *Yizrah Or* which may be familiar to many as a result of its wide circulation in this country in 1953. A number of items have also appeared in English, including this writer's *Seder Bircas ha-Chammah* and an extremely interesting article by a mathematician, Charles Elkins, which appears in the current volume of the *Proceedings of the Associations of Orthodox Jewish Scientists*. Elkins presents much intriguing information regarding the Jewish calendar in general and the astronomical premises which form the basis of *Birkat ha-Hammah*.

*Birkat ha-Hammah* is a blessing praising God, "who makes the work of creation" and is recited on the occasion of the return of the sun to the position in the heavens which it occupied at the moment of its original creation when that event occurs on the day of the week and at the hour of the day which correspond

to the day and hour of the creation of the sun. Genesis 1:14-19 records that the sun was created on the fourth day of the week. According to rabbinic tradition the sun was created at the very beginning of the day and was affixed in the sky in the position occupied at *Tekufat Nisan*, i.e., the vernal equinox. Thus *Birkat ha-Hammah* is recited whenever the vernal equinox occurs at the beginning of the fourth day of the week. At the time of the equinox day and night are equal in duration, each being twelve hours in length. Since in the Jewish calendar each day begins with nightfall the beginning of the fourth day is 6:00 P.M. Tuesday evening.

According to the dictum of Samuel, *Eruvin* 56b, the solar year is reckoned as exactly 365 days and 6 hours in length. Given the premise that the sun was created on Tuesday evening at 6:00 P.M. and that this event also marked the first vernal equinox, it may be determined by means of simple arithmetic calculation that the vernal equinox will recur at 6:00 P.M. on a Tuesday evening only once in twenty-eight years. Hence the recitation of *Birkat ha-Hammah* at twenty-eight year intervals.

The reader may readily associate the 365 and a quarter day year of Samuel with the identical basis of the Julian calendar and may recall that the Julian calendar was replaced by the Gregorian calendar in 1582 because the solar year is simply not 365 and a quarter days long. It has been determined astronomically that the earth completes its orbit around the sun in 365 days, 5 hours, 48 minutes and 46 seconds. Thus the date assumed for the *tekufah*, or equinox, advances steadily to a date later and later than the true solar equinox.

According to our calendar *Tekufat*

*Nisan* occurs on April 8 throughout this century. Yet the astronomical phenomenon marking the vernal equinox occurs on March 21, some eighteen days earlier. How then can *Birkat ha-Hammah*, which ostensibly marks the vernal equinox, be recited on a day which in fact does not coincide with this phenomenon? Indeed, it is readily demonstrable that the true astronomical equinox has never recurred on Tuesday evening at 6:00 P.M.

A number of proposals have been advanced suggesting alternate dates for *Birkat ha-Hammah* which would be in close conformity with astronomical phenomena. Various dates are suggested by J.D. Eisenstein in his *Otsar Yisra'el* X, 189; in an article contributed by him to the *Jewish Encyclopedia*, XI, 591; and in *Ha-Do'ar*, August 8, 1952. His various proposals are, however, contradictory and not consistent with any calendrical theory. Moreover, Eisenstein fails to recognize that *Birkat ha-Hammah* is recited pursuant to a rabbinic edict and any modification thereof must perforce be promulgated in accordance with procedures governing rabbinic legislation.

A much more carefully formulated proposal was advanced by Dr. Arthur Spier in an article which appeared in *Jewish Life*, January-February 1953. Spier forthrightly states that no change can be made in the regulations governing *Birkat ha-Hammah* other than by a properly constituted rabbinic synod. Accordingly, his proposal is presented in the form of a suggestion "addressed to a future Sanhedrin for possible consideration." Spier, the author of a meticulous work, *The Comprehensive Hebrew Calendar* (New York, 1952), suggests that March 20, the date on which the astronomical spring equinox frequently occurs, be selected as the date for *Birkat ha-Hammah*. The blessing would be recited at roughly twenty-eight year intervals beginning in 1885. During the course of the next several hundred years March 20 occurs on a Wednesday each twenty-eighth year, except in transition from the twenty-first to the twenty-second and the twenty-second to the twenty-third centuries. In those instances Spier recommends a twenty-nine year interval.

Spier states quite candidly that on those dates the astronomical *tekufah* will not occur "at six o'clock Jerusalem time, the beginning of Wednesday, because the Tekufoth do not

follow such a periodic rule" and that his proposal does not constitute "a perfect solution."

In point of fact, this suggestion probably would not be entertained by a future Sanhedrin because of one crucial consideration. It must be recognized that the occurrence of the *tekufah* on a Wednesday (even if the astronomical equinox were always to occur on March 20, which it does not) is not, in itself, sufficient reason to occasion *Birkat ha-Hammah*. Indeed, were this so, the original *tekufah* would have provided for *Birkat ha-Hammah* five times in each twenty-eight year cycle since, according to the reckoning of Samuel, *Tekufat Nisan* occurs on a Wednesday with the frequency of five times in twenty-eight years. *Birkat ha-Hammah* was, however, ordained only once in every twenty-eight year cycle because it is only once in twenty-eight years that the *tekufah* occurs on the eve of Wednesday at 6:00 P.M. This time is described by the Gemara, *Berakhot* 59b, as the hour at which Saturn is in the ascendancy and, according to rabbinic tradition, is the hour at which the sun was created. The statement of the Gemara that the blessing is pronounced only when the *tekufah* occurs on the evening of the third day going into the fourth when Saturn is in the ascendancy is a detailed exposition of the configuration of events which occasions the blessing. It is evident that only recurrence of the *tekufah* at a time which coincides with both the day and hour of the original creation of the sun is sufficient cause to warrant the blessing. Furthermore, were Spier's suggestion accepted and the hour of the *tekufah* to be ignored, there would no longer be any reason to limit recitation of *Birkat ha-Hammah* to once every twenty-eight years. Following Spier's recommendation, it would be logical to ordain *Birkat ha-Hammah* in every year in which the vernal equinox falls on a Wednesday. This occurs with a much greater frequency than once in twenty-eight years. Hence, adoption of the dates recommended by Spier would appear to be precluded.

Yet there remains an obvious discrepancy between the rationale underlying recitation of *Birkat ha-Hammah* and the astronomical facts. In order to understand the nature of *Birkat ha-Hammah* it is necessary to draw attention to what appears to be an anomaly in the calendar itself. The Jewish calendar is lunisolar, i.e., the months are calculated according to the moon, while the years are

reckoned according to the sun. The length of each lunar month approximates the period of time which it takes the moon to complete its rotation around the earth. Twelve lunar months equal approximately 354 days, or approximately 11 days less than the length of a solar year. Thus, in a lunar calendar the months would retrograde through the four seasons, i.e., each year every lunar month would occur about 11 days earlier in the solar year than it occurred in the previous solar year. Hence, the various Holy Days would, over the course of years, occur in each of the four seasons. However, the Torah declares, "Preserve the month of Aviv and observe Passover to the Lord your God" (Deuteronomy 16:1). The commandment requires that Passover occur in the month of Aviv, i.e., in the spring. This is accomplished by periodic intercalation of an additional month in order to assure that Passover will occur after the vernal equinox. The Jewish calendar provides for the addition of seven such months in each cycle of 19 years. This method of reconciling lunar months and solar years is known as the "*tekufah* of Rav Adda." Rav Adda calculated that 19 solar years are exactly equal to 19 times 12 lunar months plus seven additional, intercalated months. Rav Adda's solar year is equal to 365 days, 55 minutes and  $25 \frac{27}{57}$  seconds. Rav Adda's calculation is much closer to the length of the solar year than the 365 and a quarter day solar year assumed by Samuel.

This presents somewhat of a paradox. The essence of the calendar promulgated by Hillel II and in use by us assumes a solar year of 365 days, 5 hours, 55 minutes and  $25 \frac{27}{57}$  seconds in length as postulated by Rav Adda. Yet for purposes of commencement of the *tal u-matar* prayer in the Diaspora as well as for recitation of *Birkat ha-Hammah* the length of the year is reckoned in accordance with the somewhat lengthier calculations of Samuel.

This paradox was noted by many early authorities, including Ibn Ezra, *Sefer ha-Ibbur*, p. 8, R. Isaac Israeli, *Yesod Olam*, Fourth Treatise, chapter 15, and R. Ovadiah ben David in his commentary on Rambam, *Mishneh Torah*, *Hilkhot Kiddush ha-Hodesh* 10:1. In explaining the reason for this discrepancy a number of scholars points out that the calendrical calculations were determined by the members of the *Bet Din* which was responsible for proclaiming the New Moon. These individuals were quite capable

of making the mathematical calculations necessary to reconcile the lunar and solar years in accordance with the formula of Rav Adda. Such calculations are, however, too cumbersome for persons lacking proficiency in mathematics. Since every individual is required to pray for rain some relatively simple way had to be found to enable the common man to determine the approximate date marking the beginning of the rainy season. Samuel's reckoning of the solar year as being 365 and a quarter days in length makes it possible to calculate each of the four seasons without resorting to complicated formulae. Hence Samuel's calculations were widely disseminated and the discrepancy between that reckoning and the solar year was ignored by most people.

The comments of *Hazon Ish*, *Orah Hayyim* 138:4, are helpful in elucidating this point. *Hazon Ish* is renowned for his independent investigations in establishing precise *shi'urim* (measurements and sizes) for halakhic purposes and is known to have stressed the necessity for meticulousness in such matters. Nevertheless, he recognized that in some areas of Halakhah the Sages did not ordain measurements and calculations in precise terms. In discussing the lack of precision in Samuel's calculations, *Hazon Ish* points to the fact that some of the mathematical formulae employed in rabbinic writings are simply approximations. He notes that, at times, "the Halakhah was designed on the basis of approximate calculation, for the *mitsvot* were given solely to purify people and [that they] be meticulous in [fulfilling] His commands, may He be blessed in acceptance of His kingship. . . . For all of these purposes nothing is lost if the limits delineated be approximate so that even those of imperfect wisdom be capable of fulfilling performative commandments." These comments may also cast light upon the role of Samuel's calculations in establishing *Birkat ha-Hammah*.

The blessing "who makes the work of creation" is clearly a *birkat hoda'ah*, a blessing of thanksgiving. It is recited not only on the occasion of *Birkat ha-Hammah* but also upon beholding various wondrous phenomena. However, it would appear to this writer that as recited on the occasion of *Birkat ha-Hammah* this blessing is different in nature from the identical blessing as recited upon beholding the wonders of creation. On

the latter occasions the blessing is an emotional response expressing thanksgiving for the marvels of nature. However, nothing spectacular is perceived on the occasion of the return of the sun to its original position in the heavens. Indeed, were empirical observation its sole means of discovery, this event would unquestionably pass without notice.

The blessing on the occasion of *Birkat ha-Hammah*, it would appear, is not responsive but rather evocative in nature. It is designed to reinforce belief in the doctrine of continuous creation. In his discussion of the first of his Thirteen Principles of Faith, Rambam affirms that God did not simply create the universe by means of a single act for all of eternity but that He constantly recreates the universe. The Sages sought a means of emphasizing this teaching. The return of the sun to its original position and the beginning of a new solar cycle symbolize the continuous and ongoing recreation of the universe. Accordingly, in ordaining *Birkat ha-Hammah*, the Sages seized upon the 365 and a quarter day year of Samuel which had gained popular currency. Whether or not this assumption was astronomically correct was not a matter of significance to them. Important was the instrumental validity of Samuel's calculations which had been accepted for purposes of recitation of *tal u-matar*. Acceptance of Samuel's calculations results in a pattern of solar years which repeats itself in twenty-eight year cycles. In such solar cycles *Tekufat Nisan* unfailingly recurs at the beginning of a Wednesday every twenty-eight years. Regardless of its empirical accuracy, this perceived verity serves to dramatize a cosmological and theological truth of independent validity, namely, the doctrine of continuous creation. The Sages ordained the blessing of *Birkat ha-Hammah* in order to cause people to reflect upon this fundamental teaching.

Whatever the theory or theories which may be advanced every twenty-eight years when the difficulties associated with *Birkat ha-Hammah* become a matter of concern in current halakhic periodical literature, the very attempt to determine the accuracy of the calculations may, in and of itself, constitute

the fulfillment of a *mitsvah*. The *mitsvah* of *Kiddush ha-Hodesh* (which, according to Rambam, includes the obligation to add an intercalary month when necessary) requires that the *Bet Din* be proficient in both the halakhic and astronomical considerations governing the establishment of twenty-nine or thirty day months and leap years. Thus the study of astronomy was certainly obligatory upon members of the *Bet Din*. At least one authority maintains that such study and the mathematical determination of the calendrical system is, in our day, mandatory for every individual.

R. Zevi Elimelech Schapiro of Dynow, *Derekh Pekudehka*, no. 4, sec. 10, presents the remarkable view that, with the lapse of monthly sanctification of the New Moon by the *Bet Din*, proficiency in calendrical calculations became the responsibility of each individual. Each person must himself determine which months are "full," i.e., thirty days in length, and which are "deficient," i.e., twenty-nine days in length, as well as which years are leap years and which are common years. Although a fixed calendar has been promulgated and is not subject to change, *Derekh Pekudekha* maintains that every individual is obliged personally to calculate the length of months and years.

Although he does not state this thesis explicitly, *Derekh Pekudekha* presumably maintained that the *Bet Din* did not exercise jurisdiction in these matters as a judicial body but as the agents of all individual Jews. Since at present, there is no longer a *Bet Din* to serve as agent, the obligation becomes an individual one and hence the antecedent calculations are also a personal obligation. In order to fulfill the minimal requirement, declares *Derekh Pekudekha*, an individual must know the time of the *molad* (appearance of the nascent moon) and personally calculate the time of the next *molad*. Furthermore, one must know the precise order of leap and common years in the nineteen year cycle as well as the position in the cycle of the year which is current. An individual will thus have at least a minimal awareness of the reason why a given year is a common or a leap year.