

קונטרס אור זרוע KUNTRES OHR ZARUA

A SIMPLIFIED STUDY OF THE JEWISH CALENDAR



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Preface

It all started with a question.

It was December 1978, and I had come to his home to meet my future wife, Naomi, for the first time. While I was sitting at his table, talking in learning, a deceptively simple question was tossed at me by my future father-in-law, Reb Shmuel Hakohen Roth z”l, a *talmid chacham* of towering intellect — the personification of *Torah u’gedulah b’makom echad*.

“Why do we begin saying ‘*v’sein tal u’matar livrachah*’ on December 5th?”

Of course, he knew the answer. However, at the time, I did not. December 5th? A solar date? What connection could it possibly have to the lunar-based structure that governs the Jewish calendar?

My initial inclination was to turn to the Gemara (*Taanis* 10a) where the subject of *She’eilah*, the requirement to insert the words ‘*v’sein tal u’matar livrachah*’ into the ninth *berachah* of *Shemoneh Esrei*, is discussed. However, I could not find there a definitive connection between the requirement of *She’eilah* and the civil date of December 5th. Nevertheless, the gauntlet had been thrown down and the challenge presented.

The question sent me down a rabbit hole of astronomical computations, halachic requirements, and mathematical formulas — a deep dive into the extraordinary design of the Jewish calendar we use

today. As I delved into its structure, I was astounded by the ingenuity of its architect, Hillel II, who constructed the fixed Jewish calendar in the year 359 CE. I came to learn that the Jewish calendar is more than just a system for marking time; it is an astonishing framework that seamlessly weaves lunar months with solar years and astronomical seasons in a way that facilitates and ensures the continuity of Jewish life.

I pored over texts, deciphered calculations, and untangled the complexities of intercalations, *molad* determinations, and calendrical postponements. My research resulted in a somewhat rudimentary book, crafted painstakingly on a typewriter, page by page, in an era before desktop computers and word processing existed. My work never went to press. I did, however, share copies with friends and family by having it photocopied and bound at my local Staples store.

Then, earlier this year, I saw an ad by an Israeli company offering to digitize old manuscripts. I sent them my crude, Staples-bound book, and what I received in return was a digital file and the rekindling of a passion. With the ability to edit what I had written decades earlier, I set to work revising, clarifying, and enhancing my original texts. What emerged is what you hold in your hand today — a reshaping of my work into something new and improved, meticulously emended, elucidated and ready for publication.

Last year, I was *zocheh* to author and publish a *sefer*, an in-depth study of *Sefer Devarim* that I named אז נדברו, with the word “אז” being the *roshei teivos* of my name, אלכסנדר זיסקינד. In a similar vein, I have titled this work קונטרס אור זרע, which not only alludes to the luminaries of the sun and the moon, but also, once again, is comprised of the *roshei teivos* “אז”.

This book is a testament as to how a simple question can inspire a perennial pursuit. And it is for this reason that I dedicate *Kuntres Ohr Zarua* to the memory of my *shver*, **Reb Shmuel ben Reb Moshe Hakohen Roth ע"ה**.

With this *kuntres*, I hope, *b'ezras Hashem*, to systematically unravel

and lucidly articulate the secrets of Hillel's calendar system. We will journey through the mathematical principles underpinning its design: from *molad* calculations to the 19-year *machzor katan* cycle, to the 28-year *machzor gadol* cycle, from the role of intercalation to the significance of *tekufos*. Each chapter will *iy"H* clarify Hillel's meticulous thought process, which transformed a system of unpredictable time-keeping into ordered certainty.

And, yes — we will answer the question: *Why do we begin saying 'v'sein tal u'matar livrachah' on December 5th?*

Alexander Ziskind Scharf

Bein Keseh L'Asar 5786

Chapter 1

The Lunisolar Calendar

THE SUN AND THE MOON

The Torah tells us that on the fourth day of Creation, Hashem proclaimed: יהי מאורות ברקיע השמים להבדיל בין היום ובין הלילה והיו לאתת ולמועדים ולימים ושנים — *Let there be lights [i.e., the sun and the moon] in the firmament of the heaven to divide between the day and the night, and let them be signs for the seasons, and for the days and years.* (Bereishis 1:14)

Rashi explains this passage as follows: ולמועדים: על שם העתיד שעתידים יהיו — *In the future, Yisrael will be commanded to establish the festivals according to the birth of the moon.*

Rashi continues: ולימים ושנים: לסוף שש"ה ימים גמרו מהלכתם ב"ב מזלות — *At the end of 365 days, they [the sun and the moon] complete their passage through the 12 constellations of the zodiac, and that constitutes a year.*

According to Rashi, these *pesukim* teach us that Hashem intended that the duration of the months and years of the Jewish calendar be measured by the cycles of both the moon and the sun. The length of

the month is determined by the time it takes the moon to make one orbit around the earth, while the year is measured by the time it takes the earth to make one orbit around the sun.

THE LUNAR MONTH

We see that the moon is critical in establishing our months by the fact that the Torah uses the word חודש — derived from the word חדש, which means “new” or “to renew” — to refer to “month.” This indicates that there must be a sign of renewal to signal the commencement of a new month. During the course of the moon’s orbit around the earth, the moon visibly increases in size and then decreases until it disappears from view. Approximately 24 hours later, the moon reappears. The reappearance of the moon is the sign of renewal we are looking for to indicate the beginning of a new month. The amount of time it takes the moon to orbit around the earth, what is referred to as the lunar month, is approximately 29½ days.

THE SOLAR YEAR

In contrast to the moon, the sun maintains the same appearance daily, neither waning nor waxing, and thus never renewing. Nevertheless, the length of the solar year can be measured by the passage of the four seasons the earth experiences during its orbit around the sun. The Hebrew word for “season” is *tekufah*. In Chapter 12 we will address the *tekufos* and their vital role in the Jewish calendar. However, for now, all we need to know is that the four *tekufos* begin on specific dates that are defined by specific astronomical events. Those four dates are:

- ❖ **March 21: Vernal Equinox, *Tekufas Nissan*.** This date is the beginning of spring, when the hours of daylight and darkness are equal.
- ❖ **June 21: Summer Solstice, *Tekufas Tammuz*.** This date marks the

beginning of summer, when the day is at its longest and the night at its shortest.

- ❖ **September 23: Autumnal Equinox, *Tekufas Tishrei*.** This date is the beginning of autumn, when the hours of daylight and darkness are once again equal.
- ❖ **December 22: Winter Solstice, *Tekufas Teves*.** This date marks the beginning of winter, when the night is at its longest and the day at its shortest.

The solar year is measured by the length of time that elapses between one Vernal Equinox and the next, which is approximately 365¼ days.

THE LUNISOLAR CALENDAR

As mentioned above, Rashi explained that the Jewish year, which is made up of lunar months, must also take into account the solar year, as the *pasuk* in *Parashas Re'eh* says (*Devarim* 16:1), שמור את חדש האביב (*Devarim* 16:1), ועשית פסח לה' — *Observe the month of aviv [spring] and keep Pesach unto Hashem*. This *pasuk* tells us that Pesach must fall during the season of spring, which commences with *Tekufas Nissan* — a segment of the solar year. (Whether all or just part of Pesach must fall during *Tekufas Nissan* is a question we will address at the end of Chapter 13.)

What emerges is that the Jewish calendar is lunisolar in nature. It requires that the solar year of 365 days be comprised of lunar months. However, this presents a logistical problem, because the solar year of 365¼ days is approximately 11 days longer than 12 lunar months. Accordingly, were we not to make any adjustments, Pesach would eventually fall in the winter. Therefore, we must periodically add an additional lunar month to the year. The process of adding a thirteenth month to the Jewish year is known as “intercalation.” Intercalation creates what is referred to as a *shanah me'uberes*, a leap year — a year