



ENGLISH ABSTRACTS

LOGICAL MODEL FOR TALMUDICAL HERMENEUTICS

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This paper offers a logical model for the Talmudical Hermeneutics, *Kal Vachomer*, and two versions of *Binyan Av*. It turns out that this is a general model for non-deductive reasoning. The model assumes that non-deductive reasoning in an application area relies on a system of parameters that determine the application. These parameters can be observations (in the scientific case) or Halakhic laws (in the Halakhic case). The known facts of the application are explained in the model in terms of these parameters, and additional unknown facts about the application can be non-deductively derived from the model. The model uses, among other means, topological properties of graphs.

We show complete correspondence between our model and a variety of talmudic debates (*sugiot*), and explain several questions and difficulties that appear in the intuitive perception of Talmudical Hermeneutics.

Among other things, we explain the meaning of the turning round of a *Kal Vachomer*, the distinction between *Kal Vachomer* and *Binyan Av*, as well as the relationship between three different versions of analogical generalizations (*Zad Shaveh*).

The model allows us to analyse complex non-deductive derivations, such as the composition of one analogy following another, etc.

We achieve a uniform platform for modeling all of the Logical Talmudical Hermeneutics, which allows for the general composition of one rule following another. We can even generate possible new rules according to this model. This is a distinct example in which 2000 year-old talmudic reasoning principles can be exported and applied to current scientific and Artificial Intelligence problems.

THE DISTRIBUTION ROUTE FROM ANCESTORS TO DESCENDANTS

Moshe Zakai, Baruch Fischer

This article studies the distribution of descendants of an individual as it propagates along generations from father or mother through their sons and daughters. We examine the ratio of the descendants to the total population, and construct a model for the route of distribution from ancestors to descendants. We find that within a certain number of generations everyone of the later generation, is a descendant of almost everyone from the first generation. For example, for a population of 10^6 at the first generation, the full descendant spreading time is 24 generations, and for 10^9 it is 34 generations. This result depends only on the population of the first generation, and is independent of the population growth factor even if it changes along the generations. We also discuss the extinction probability of a family that depends on the growth factor. As a running example we consider the offspring of King David. The conclusion is that practically every Israelite was a descendant of King David already in 400 BC, the beginning of the era of the Second Temple in Jerusalem, and that is surely valid for everyone today. We note that this work does not deal with any genetical aspects nor does it take into account any geo-social-demographic factors.

THE JEWISH CALENDAR

The Blessing of the Sun, Halakhic Derivatives and the Incense Mixture

Kopel Rabinovitch

The Jewish calendar consists of two fundamental principles. It is based on the lunar month, which is defined as the time duration of one cycle of the moon's rotation around the globe. The period of the moon cycle is the time duration between two successive new moons. The other principle is to set the holidays of the year according to the spring month. The spring and the other seasons of the year (summer, autumn and winter) are determined by the location of the Earth on its rotation trajectory around the sun during the year. The solar year is defined by the time duration necessary for the Earth to complete one rotation around the sun. Wednesday was the first season day of the year of the universe creation. On this day the sun

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and the moon hung in the sky. Shmuel's method was accepted for the season's calculations. According to his opinion, the universe was created in Nissan. Hence, the first day of the Nissan season of that year was Wednesday. From calculations it turns out that the Nissan season (spring) will occur on Wednesdays in cycles of 28 years. Accordingly, whenever it occurs we say the blessing of the sun.

Another law based solely on the solar calendar is the day when we begin to pray for rain in the Diaspora. In Israel we begin to ask for rain on Cheshvan 7, but in the Diaspora we begin 60 days after the Tishrei season. This date in the Jewish calendar varies from year to year.

The Jewish calendar principles require a combination and correspondence between duration of the lunar months and the duration of the solar years. During 19 solar years there are, with high precision, 235 lunar months. Hence, to preserve whole days and months it was determined that, in the period of 19 years, 7 years will consist of 13 lunar months each (leap years) and the remaining 12 years will consist of the 12 lunar months (simple years). Also, it was decided that some months of the year will have 30 days and some 29 days. The differences between the years in the period of 19 years, new moon sanctifying and a leap year setting process, which was initially sanctified by the Beit Din based on testimony of witnesses who saw the new moon, led to various halakhic discussions. A case where the halakhical ruling contradicted the natural reality, and a case that creates a paradox, are introduced and discussed.

Halakhic laws that are related to aspects of the solar year and the Jewish calendar are found in the incense mixture. The incense mixture procedure is reviewed and discussed in detail with regard to the Jewish calendar.

The conflict between the scholars of the Diaspora and Eretz-Israel on the authority of sanctifying the month by testimony of witnesses who saw the new moon, and the determination of a leap year, is also described.

THE EQUINOCTIAL CYCLE ATTRIBUTED
TO THE AMORA SAMUEL AS AN ANCIENT TRADITION
IMPLEMENTED DURING THE FIRST TEMPLE EXILE:
AN HYPOTHESIS

Zvi Weinberger

The spring equinoctial cycle based upon a 365.25 day Solar year is attributed to the Babylonian Amora Samuel. This approximate length of the Solar year was known in antiquity and its common use preceded its use by Samuel by several centuries. The astronomical equinoctial year is shorter than the approximate value by 11 minutes and 5 seconds. This difference has remained relatively constant for the past 2500 years. A difference of 11 minutes and 5 seconds accumulates to a day every 129.9 years. Presently, the calendar difference between the two equinoctial dates amounts to 18 days and four hours. A direct calculation reveals that the two equinoctial dates coincided 2360 years ago, i.e. in the year 3409 after creation. We learn from our traditional sources that the destruction of the First Temple occurred in 3338. Prophetically, the exile was to last seventy years – until the year 3408, i.e. a year before the coincidence of the two equinoctial cycles.

Because of the proximity of the termination of the exile and coincidence of the astronomical equinox and the equinox attributed to Samuel, we suggest that an annual equinoctial period based on the approximate 365.25 day solar year was implemented temporarily during the exile. The common folk remaining in Israel at the time the Sanhedrin were in exile, were provided with simple calculations based on a 365.25 spring equinoctial period in order to add an intercalary month when necessary.

The calculations ensured that Nissan would be in the spring and the Passover festival before the astronomical equinox. At the beginning of the exile, the approximate spring equinox preceded the true equinox by 13.5 hours. At the end of the exile the two coincided.

THE SIGNIFICANCE OF THE QUANTITY OF DOUGH
THAT REQUIRES SEPARATION OF *CHALLAH*

Michal Tikochinsky

This article discusses the disagreement among tannaic sources regarding the minimum quantity of dough required for the obligation to separate *Challah*. Analysis of the sources by various commentators indicates that the differences are based on mathematical formulas, each of which derives from a different point of view regarding the commandment of *Challah*. Each of the formulas seems to point to a larger and more general understanding of the concepts and principles governing the commandment of *Challah* as one of the commandments “dependent on the land.” These principles are consistent with other questions about *Challah* that are raised throughout *Masechet Challah*.

THE TORAH WAS NOT GIVEN TO CELESTIAL ANGELS:
ABSOLUTE DEFINITION IN HALAKHIC RULING

Shlomo E. Glicksberg

In a number of midrashim it is noted that the Torah was purposely given to man along with his limits, difficulties and faults, and does not expect man to reach the level of perfection that characterizes angels. This idea is the foundation of the general rule “the Torah was not given to celestial angels” that was formulated later and used many times in the Talmud and Jewish rulings.

The rule is first found in the writings of the fifth generation of Babylonian Amoraim. We find three different uses of this rule in the Talmud: The first is in offering a post-facto justification for man’s less than ideal fulfillment of God’s will. The second is in fixing halakhic standards in specific cases. The third and least frequent, is used to express the need for a more stringent legal position due to man’s limitations.

After the Talmudic era, during which the use of this rule was widespread, it continued to appear in later writings. We still see the different uses mentioned above but mainly the second use is found and almost always to explain a less strict ruling. In many cases, in the later halakhic writings, this rule is used only as a literary embellishment and not as part of the primary legal rationale for the ruling.



RESPONSA TO HALAKHIC-PSYCHOTHERAPY QUESTIONS

Seymour Hoffman

Several interesting and pertinent questions regarding the practice of psychotherapy are addressed by prominent contemporary rabbis. Also included in the article are the views of a well-known psychiatrist and several respected rabbis regarding psychological treatment.

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