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### ***Published in:***

*European Association for Jewish Studies*

*Newsletter 6 (1999) 27-31.*

Publisher: <http://www.ejjs.uni-halle.de/>

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# Essay

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## The Babylonian Background to Talmudic Science

The *Wissenschaft des Judentums* school of German Jewish scholarship made great strides in establishing the study of Jewish texts on a firm academic footing. Nevertheless, there was a hidden agenda which is noticeable in all of the research of that period, which has influenced twentieth century scholarship as well. The unconscious aim was to de-orientalize Judaism by seeking comparisons between Classical Jewish texts and Greek science and philosophy. Julius Preuss, for instance, sought Greek parallels to talmudic medical practice and looked for Greek etymologies wherever possible, and S. Kraus produced a monumental two-volume dictionary of Greek and Latin loanwords in rabbinic literature. Comparisons were later proposed between Jewish and Roman Law by Boaz Cohen, and Saul Lieberman's work on *Hellenism in Jewish Palestine* laid the groundwork for future studies of this kind. Nevertheless, two main factors which characterised these works force us to re-evaluate many of their conclusions.

(1) The vastly different social contexts of the Jerusalem and Babylonian Talmuds were usually ignored in these studies. The differences between the Graeco-Roman world of Palestine and the Parthian world of Babylonia were enormous. For one thing, Babylonian rabbis knew no Greek. The very few Greek words, such as *sanegor* and *kategor*, which find their way into the Babylonian Talmud were introduced as Greek loanwords from mishnaic Hebrew or Palestinian Aramaic, although it is abundantly clear that Greek was no longer spoken in third century CE Babylonia, and there is no evidence for the penetration of Greek thought into Parthia, the arch-enemy of the Roman Empire. Moreover, no Babylonian Amora can be demonstrated to have been influenced by Greek writers, and in fact, words such as *apikoros* for 'apostate' is a misuse of the Greek term 'Epicurean'.

The methodology of dealing with talmudic sources is therefore often muddled, since the primary question must always be when a statement is likely to be made and by whom, and whether such a statement originates in Babylonia or Palestine. In terms of ancient science, such a distinction is likely to be crucial, since Babylonia itself had a long tradition of science and school curricula which predate the Talmud by almost two millennia, and in fact pre-dates Greek science as well.

The Babylonian tradition of science functioned entirely independently of Western science, with major differences, some of which will be discussed below.

(2) Cuneiform writing existed for a much longer period than has previously been realized, possibly as late as the third century CE, which has important ramifications for talmudic science. Rabbis such as Mar Samuel, who were interested in astronomy and medicine, were still living during a period in which they could consult with Babylonian priests who presumably had access to information from cuneiform tablets. This means that the considerable legacy of Babylonian scribal schools and extensive learning was still available to both priests and rabbis. Babylonians, for instance, had a long tradition of astronomical observations, and possessed a huge pharmacopoeia for medical recipes. Babylonian learning and scientific lore was robust and widely taught in scribal schools, and thrived without contact with Greek science.

This bifurcation of cultural influences in the talmudic period is quite complex, since rabbinic academies were repositories of contemporary knowledge and philosophy which were influenced by respective intellectual environments. Much of this bifurcation, however, is not evident from the final editing of both Talmuds, since the Saboraim who redacted the Talmuds did not intend to produce textbooks of ancient science. In both cases, science was mentioned en passant in cases where it was deemed to have been relevant to Halakhah. Astronomy, therefore was relevant to calendars and timing of festivals, medicine was relevant to grounds for divorce, or menstruation, and mathematics was relevant to the dimensions of a *sukkah* or tabernacle. In no case can one demonstrate that rabbis invented scientific thinking, but were utilising science for purposes of determining correct procedures in Halakhah.

## Medicine

One basic question regarding medicine which arises is how much either rabbis or Babylonians knew about internal anatomy. It seems that neither rabbis nor Babylonian medics knew much about internal anatomy, since they had rather vague ideas about where organs were and their functions. The brain was called in both Akkadian and Aramaic by the same word which means 'marrow', nor did anyone in Babylonia seem to know that it was related to cognition; both Babylonians and rabbis considered the heart to be the seat of intellect, and the kidneys to be the seat of emotions. The word *libbu/lb'* for heart probably referred to almost any organ



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of the belly, nor did anyone know about circulation of the blood. The main reason for such vague knowledge of internal anatomy was that no one performed autopsies, presumably because of taboos against cutting open the human body. What is important here is that the rabbis shared the general level of knowledge of medicine which had been prevalent in Babylonia throughout the period when cuneiform was being read, and possessed no other knowledge from elsewhere that can be attested, such as from Greek medicine. Moreover, one should assume that a Babylonian Jewish doctor in the period would have studied the same medicine with the same curriculum as any other local doctor, and that there was no such thing as Jewish medicine.

There is an important discrepancy between Babylonian and Greek medicine, since it was Greek medicine which developed the use of venesection or bloodletting, while there is no evidence for this medical procedure in cuneiform medical literature from Babylonia. Nevertheless, there are references to bloodletting in the Babylonian Talmud, which may indicate that the practice was introduced from Palestine into the Babylonian Jewish community, but the attitude towards venesection is ambivalent. There were days which were said to have been either lucky or unlucky for bloodletting, but other traditions from the Babylonian Talmud discourage the practice.

Tractate Gittin 68a–70b of the Babylonian Talmud contains several pages of medical recipes, organised from head to foot, which is typical of medical textbooks of the period. Exceptionally, the lengthy text is not ascribed to any rabbinic authority, which suggests that the entire passage has been quoted from a contemporary medical text, and surprisingly, the *Gittin* passage contains many Akkadian loanwords which have not been recognised as such by standard dictionaries. The layout of the recipes and descriptions of the symptoms is reminiscent of Babylonian medical texts, and the complete lack of Greek loanwords further suggests that the medical traditions recorded there originated in Babylonia. Like cuneiform medicine, there is no reference to surgery (or even venesection), and occasionally recipes are mixed with magical incantations, as was done in cuneiform medicine. Finally, the text includes references to *Dreckapotheke* such as types of animal dung which are prescribed in treatment, but the Talmud warns against using such ingredients since they could prove harmful. The redactors, who probably added the warnings about *Dreckapotheke*, had not known that originally in cuneiform medicine such references to animal dung were secret names for ordinary plants or minerals, and

the secret names were designed to prevent laymen from trying to follow these recipes without the aid of medical advice.

Other passages in the Babylonian Talmud appear to be translations of Akkadian recipes, such as the following:

**Aramaic:** It is permitted to treat a runny eye with antimony on the Sabbath. What is (the reason)?

Because the sinews of the eye are attached to the projections of the “heart” (internal anatomy). What (is it)?

Rab Judah said, “for example: a discharge, a squeezing, blood, tears, and heat”. At the beginning of the pain ...

**Akkadian:** If a man’s eyes are diseased and filled with blood, were constantly bloodshot with blood and mucus [lit. resin], tears came out from the middle of his eyes, and film has encircled the pupil of his eye, and blurring has turned to shadow ...

**Aramaic:** For daytime blindness, let the healer take seven red (pieces) from the belly of animals, and let him roast them in a craftsman’s vessel. Let (the healer) say to (the patient), “Blind one, give that I may eat”. Let (the patient) say to him, “Open-eyed one there, take and eat”.

**Akkadian:** The incantation priest will raise seven loaves and the patient with the sick eyes will raise seven loaves, and [the priest] will say to the sick man, “receive, O bright of eye”. The sick man will say to the incantation priest, “Receive, one with staring eye”.

### Magic

Magic is another area of ancient science which predominates in the Babylonian Talmud and is almost entirely lacking in the Palestinian Talmud. We are in the fortunate position of having a large number of Jewish Aramaic incantations from many sites in Babylonia, inscribed on ceramic bowls, which can now be compared with magic in the Babylonian Talmud. Although one might expect the magic to be similar or identical, the results of comparisons are disappointing. Some talmudic rabbis appear as authorities in magic bowls, such as Joshua bar Perahia, particularly when a divorce writ or *get* is being issued against the demon Lilith. Rabbi Joshua bar Perahia, however, is not known in the Talmud as an authority on magic, but rather as the

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teacher of Jesus. Certain demons, most notably Lilith, occur both in the Talmud and in Aramaic magic bowls, and the generic Aramaic term for demon, namely *sheda*, occurs in both literatures; both of these terms go back to Akkadian. The magic bowls, on the other hand, frequently refer to the use of a divorce writ against Lilith or any female demon, a magic practice which is not referred to specifically in the Talmud, nor is the use of a ceramic bowl for incantations recorded in talmudic magic; this is unexpected, considering the large numbers of incantations which have been found in many sites in Iraq and Iran.

Furthermore, talmudic magic shows some similarities with Akkadian magical texts, such as *Maqlû*, although such parallels with cuneiform sources are mostly lacking in magic bowls. One exception is the following:

- Aramaic: The “sorceries should be reversed upon those who invoke them”.
- Akkadian: Whatever (the witch) has bewitched and hexed, “may it return and seize you” (*Maqlû* VII 158–160).

One prominent misconception is that the Talmud, like the Bible, was opposed to magic. What is being opposed in all systems of magic was witchcraft and black arts, which were considered odious in biblical, talmudic, and Akkadian systems of magic. Witchcraft, however, is only one form of magic, with the bulk of magic being protective and therapeutic, and hence beneficial. The systems of magic have much in common, namely that illness and misfortune was conveyed by demons on sufferers, who may have been liable to demonic attack in some instances by transgressing some taboo or custom. Other agents of magic, such as the evil mouth and evil tongue, are commonly cited in both Akkadian and Jewish magic. The evil eye denotes a fear of envy, and the evil tongue refers to gossip and slander, both of which feature in magic as manifestations of black magic and witchcraft, in which the patient feels himself to be victimised by another person, and against whom an incantation was thought to be effective.

### Omens

In addition to magic or healing arts, which were considered as a ‘science’ in antiquity, the recording and interpretation of omens was another aspect of inquiry requiring observation and recording of phenomena, an early form of scientific thinking. Akkadian omens were based upon a somewhat complicated system of right and left indicating either a good or bad omen, but an omen associated with the left (unlucky) side, referring to an

enemy, could result in being a favourable omen. This system can be found in the Babylonian Talmud, although the parallels have not yet been fully explained or studied, namely in the system of ‘pairs’ which are considered to be lucky or unlucky in the Talmud. According to this system, any pair is unlucky, with the result, therefore, that one is advised to drink either one or three glasses of wine, but not two or four, because of the ‘pairs’. The logic beyond this system goes back to Akkadian notions of right and left, in which the left hand, for instance, is unlucky. If one begins counting with the right hand, the left hand will always be number two, and hence ‘pairs’ are unlucky. Although not expressed in the same way, the logic of pairs in talmudic lore appears to derive from Akkadian omens.

The Talmud also records many types of omens, many of which go back to the extensive Akkadian omen literature. One well-known aspect of talmudic omens in Tractate *Berakhot*, for instance, consists of dream-reports, comprised in the Talmud into a type of dream-book similar to other ancient compendia of dream omens from Babylonia, Egypt, and Greece. There are some general comparisons between all systems of dream-report records, and even similarities between dream-books themselves, although these comparisons usually miss an important point. Only the protasis of the omen is comparable between one language or society and its neighbour, since the apodosis or interpretation of the dream is usually culture-specific, and is influenced by local factors and ideas. What is significant, therefore, was the process of recording dreams and grouping them according to types, which was the objective of dream books. Whether any specific dream was a good or bad omen is irrelevant to these comparisons, since the apodoses are likely to differ. When one looks, therefore, at the protases of talmudic dream omens, the parallels between talmudic and Akkadian dream omens are striking. The subject has never properly been researched, however, and requires much more basic philological work, but the following examples from Tractate *Berakhot* in the Babylonian Talmud will suffice to indicate the nature of the comparisons:

- Aramaic: (If one dreams) that he enters a city, his desires will be fulfilled.
- Akkadian: If (one dreams) that he goes to Nippur, sorrow (or) well being for one year. If (one dreams) that he goes to Babylon, ...
- Aramaic: (If) in a dream he had intercourse with his mother ... (If) in a dream he had intercourse with his sister ...
- Akkadian: In my dream I had intercourse with my mother who bore me, or my dead mother, or my sister.



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Aramaic: (If) in a dream he is standing naked, if in  
Babylon he will be without sin, if in  
Palestine ...  
Akkadian: If in his dreams he walks around naked ..

Akkadian tablets contain a large number of terrestrial omens, known as *Shumma Alu*, which are concerned with everyday occurrences, and similar types of omens can be found in the Babylonian Talmud, as in Tractate *Sanhedrin*:

"His bread fell from his mouth"  
"His staff fell from his hand"  
"His son called to him from behind"  
"A raven calls to him"  
"A deer has crossed his path"  
"A snake is on his right and a fox is on his left"

Other omens are hemerological omens which are common to both Akkadian and talmudic sources, defining lucky and unlucky days in a month. The Talmud makes reference to various days of the month or year which are lucky or unlucky for medical procedures, or for blood-letting, or even mentions foods which should or should not be eaten on certain days of the month. These notices probably go back to Akkadian hemerologies which specified days of the month in which certain foods could not be eaten, or when one could be seen by a doctor, as well as other patterns of behaviour which were deemed to be appropriate on some days and not on others. These hemerologies were based upon a complex system of astral magic which presumed that the movement of stars affected human events, and it is not surprising to find such notions in the Talmud as well, or even a reaction against such ideas in the form of a statement that 'Israel has no constellation'; the word for 'constellation', *mzl*, is a pun on the word for 'good fortune'. Such statements usually refer to celestial omens, of which a large number are known from Akkadian compendia known as *Enūma Anu Enlil*, but examples of celestial omens have also been found in Jewish contexts in the Cairo Geniza, which probably go back to rabbinic prototypes. Examples are as follows:

Aramaic: If when (the moon) rises, its horns are equal, the world is poised for danger.  
Akkadian: If both of the moon's horns are of equal length, the land will be secure.

- Omens appear in unexpected places within the contexts of talmudic discourse. One important theme of halakhic inquiry in Tractate *Niddah* concerned the unborn foetus, and what shape the foetus might take as a miscarriage, to determine whether a discharge represented an actual miscarriage of a foetus or not. The discharge was thus described in great detail as to its

shape, being likened, for instance, to the shape of an animal or an animal with two heads, etc. The method of describing these lists of discharges is probably based upon the same methodology of collecting Babylonian omens. One such interesting Akkadian omen series, known as *Shumma Izbu*, records abnormal births, describing such births as having the shape of animals or animals with two heads, much in the same terms as the talmudic discussion of discharges.

Other types of omens were useful to both Jews and Babylonians. Physiognomic omens were known in Qumran in Aramaic and Hebrew, but with close Babylonian parallels. A person's features were analysed to determine what his future might bring, the distinction being that the features of a well person might reveal what will happen to him, just as the features of a sick person might reveal whether he will live or die; the latter type of omen occurs in the form of symptoms of illness. Animal anatomy was also the subject of omens, and especially the sheep's liver was used in extispicy in Babylonia to predict the future. The system did not entirely escape rabbinic usage, since the process of rigorous examining of the slaughtered animal's organs as a basis for declaring it fit to eat probably goes back to Babylonian practices of looking at internal organs.

### Scribal Curriculum

One crucial aspect reflecting the transmission of culture is the curriculum, which provides information regarding connections between Akkadian and talmudic texts. There were no doubt many subjects, such as mathematics, astronomy, or magic, which would have been part of the ancient Babylonian scribal training, in which all students in formal education would have been expected to learn to read and copy such texts. The question is whether rabbinic training incorporated similar approaches or methods of study, or even similar subjects. One text genre which appears to offer clues to similar curricula in both Babylonian and rabbinic training is a type of text which catalogues aspects of what we might call urban. Within the Babylonian curriculum students had to learn lists of the names of the streets and the locations of temples and shrines in the city of Babylon; students also had to learn the exact measurements of the dimensions of major temples, all recorded in a text known as *TINTIR*, the Sumerian name of the city of Babylonian. There were probably several good pedagogic reasons for learning this text, such as mathematical exercises of area, and analyses of temple names which could be explained through *notariqon*, i.e. dividing a name into component parts and etymologizing each part of the name separately. The text was probably studied long after the layout of Babylon had changed in

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late periods, but the text was concerned with the structure of Babylon at its zenith, as an intellectual exercise. A similar exercise can be found in the Mishnah Tractate *Middot*, in which every aspect of the Jerusalem temple, including gates and exact measurements of rooms, etc., is specified. The text was copied and studied long after the destruction of the Jerusalem temple, and similar texts were preserved in the Apocrypha as descriptions of the 'heavenly Jerusalem'.

The use of *notariqon* and even *gematria* in rabbinic analysis of biblical texts was not invented by rabbis; these methods of text criticism, as noted above, were already used in Babylonian scribal schools long before rabbinic academies are attested. The use of numerical equivalents for names, which could be used instead of the name itself, is well known in Akkadian texts, and the use of *notariqon* often relied upon puns and word-plays between Akkadian and Sumerian. There is little doubt that these methods employed in Babylonian scribal schools were precursors of rabbinic exegesis, which developed into the typical types of exegesis known in Midrashim. What we do not know is the exact means whereby these ideas were transmitted from one school to another, or one curriculum to another, or exactly when these ideas proliferated to the extent that they influenced study methods within rabbinic academies.

### Conclusion

One rich area of future research in Jewish studies, and particularly in Talmud studies, will need to focus on cultural and literary background of the Babylonian Talmud, which preserved considerable amounts of information drawn from local sources. Up to now the majority of studies concerned with the historical and social context of rabbinic texts have relied upon Greek (and occasionally Latin) sources to provide the proper *Sitz im Leben* for rabbinic thought. In reality, however, many of the most authoritative and best documented rabbinic texts originated in Babylonia, far from any Greek cultural milieu or even influence. The challenge, therefore, is to reconstruct the proper intellectual and social environment in which Babylonian Amoraim operated and flourished, and from which there was considerable influence on rabbinic thought. Particularly in the fields of ancient science, such as astronomy, magic, medicine, and recording of omens, rabbis in Babylonia derived most of their knowledge from the millennia-long tradition which surrounded them in Babylonia.

In many ways Babylonian science was quite advanced. For instance, although not as precise as Greek

mathematics, the Babylonian mathematicians used a value of '3' for 'pi', which was adopted by rabbis in Babylonia and continued to be used long after a more exact value for 'pi' had become known. Babylonians developed a theory of numbers which was more advanced than that of the Egyptians, even though not as sophisticated as that which Greek mathematicians were able to develop. One reason for these differences, perhaps, is that by the end of the first millennium BCE Babylonia had established a tradition of observation and reckoning which had been used for nearly two millennia within the scribal curriculum. Babylonian culture by the late first millennium was on the wane, as Akkadian began giving way to Aramaic and eventually Greek (to a limited extent), under Seleucid rule. Greece, on the other hand, was just beginning to develop by 500 BCE, and although having learned much from Babylonian astronomy and even medicine, began to develop new systems of analysis and scientific thought. Although Greek influence managed to penetrate into Palestine by the first centuries BCE, Parthian rule in Babylonia virtually excluded the possibility of any flowering of Greek culture in the fertile crescent, but reacted in favour of traditional learning and science which had developed in Babylonia for millennia and was still being copied in scribal schools.

There is little reason, therefore, to assume that Babylonian rabbis had much to learn from the Greeks, or that they were impervious to intellectual norms which surrounded them. Everyone is aware that the so-called Jewish calendar, for instance, is based upon the Babylonian calendar, which had been in use since the early second millennium BCE. What is less clearly understood is how much the Jewish calendar reflects the Babylonian calendar, even aside from the names of the months. Most striking is the fact that the Babylonian New Year festival was held in the seventh month (Teshritu), although the regnal year was reckoned from the first month (Nisanu), and that the day in Babylonia begins with sundown (or moonrise) rather than with sunrise. Although these features are usually considered to be integral to Jewish law, they in fact reflect local Babylonian practice which influence Jewish law and custom.

The future student of Talmud, therefore, may get a shock: he may have to learn some Akkadian. Connections between the Bible and Babylonia (*Bibel und Babel*) have become well-established over the past century, but the realization of the intimate connections between the Babylonian Talmud and Babylon (i.e. *Bavli und Babel*) remain to be studied and integrated into the field of Jewish Studies. ■