Science in Qumran Aramaic Texts

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Ancient Cultures of Sciences and Knowledge
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Foreword

The idea to approach the Qumran Aramaic texts from an *emic* perspective of sciences, understanding them as components of the knowledge system of a given society comes from years of dialogue with Markham J. Geller. He lectured several times at the Faculty of Humanities at Pázmány Péter Catholic University Budapest on Mesopotamian magical healing, always presenting the subject in the context of the ancient knowledge system, from a perspective of the history of knowledge (*Wissensgeschichte*), for which he served as a Visiting Professor for several years at Freie Universität Berlin. His works – together with those of other contributors to this volume – are widely cited in the studies of this volume.

The relationship with the other contributors to this volume has also been a continuous one. We often discussed issues of the Qumran Aramaic texts at conferences, invited lectures, and in personal meetings. During these conversations, the issue of knowledge and science was always at the center. Jonathan Ben-Dov is the co-editor of a volume on ancient Jewish sciences and the history of knowledge in Second Temple literature. His topics cover astronomy and calendars in Qumran, ancient reading practices and cryptic-script in Qumran, as well as relations between Babylonia and the Levant. Henryk Drawnel is the editor of the fragments of the Astronomical Book of Aramaic Enoch and author of related studies. He dealt comprehensively with the relationship between the narrative parts of Aramaic Enoch and Late Mesopotamian culture, and with questions of scribal culture and knowledge transmission in the Aramaic wisdom texts from Qumran. Helen R. Jacobus is a researcher of zodiac calendars in the Ancient Near East and the Dead Sea Scrolls, and of astronomy and astrology in non-astronomical texts. Siam Bhayro is one of the editors of the Aramaic magic bowls, and author of several publications on magic bowl texts, the Watchers tradition, and on Galen's medical texts in Syriac. Anne Burberry has recently contributed to the edition of magic bowls. Andrew B. Perrin's research area is the Aramaic Dead Sea Scrolls, scribal transmission, dream-visions as revelations and their literary connections. Amar Annus' fields are Mesopotamian cuneiform wisdom tradition and the Aramaic tradition of the Watchers. Tupá Guerra wrote her dissertation on apotropaic magic in the Dead Sea Scrolls. Of course, I have been continuously in touch with the Hungarian contributors to this

volume. Nóra Dávid was my doctoral student, with the theme of Jewish burial customs in the Second Temple Period. Since then she has been publishing on spatial theory and the Dead Sea Scrolls, geography, and Jewish presence in Roman Pannonia. Réka Esztári wrote her dissertation on cuneiform scholarly interpretations, the structure and system of interpretation in the omen series *Šumma izbu*. Ádám Vér is a specialist of the Neo-Assyrian empire. The two of them have presented a number of independent and joint publications in the field of Mesopotamian religious history.

The corpus of Qumran Aramaic texts has a distinctive profile. Several Aramaic scrolls are dated early, and the Pre-Maccabean origin of the majority of Qumran Aramaic texts seems certain. Much of the texts reflect themes and traditions ultimately derived from Mesopotamia. They evidently were not produced by the Qumran community. However, the ideas expressed in the Aramaic texts appear in many Hebrew texts composed before and after the establishment of the Qumran settlement (mid-2nd century BCE), and they play an important role in shaping the specifically Qumranic worldview. So far, research on Qumran Aramaic texts focused on the rich literary aspects of the corpus, mainly approaching the topic from the perspective of traditional, theologically motivated topics, namely apocalypticism, eschatology, and messianism.

Science, understood as the written tradition reflecting the knowledge of a human community about the world, has not been a topic until now. The foundations of the cosmic worldview were formulated in Aramaic Enoch, which we know from Qumran, while the approach to history was based in the Aramaic texts of Daniel, also well-known in Qumran. We felt it necessary to begin to explore the worldview reflected in these texts and the forms in which it was expressed. This volume contains only a few cases, but we hope this endeavor will continue on a larger scale.

Budapest, 6 October 2022 Ida Fröhlich

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List of Abbreviations

AB	The Anchor Bible
ABRL	Anchor Bible Reference Library
AbrN	*Abr-Nahrain*
AbrNSup	Abr-Nahrain Supplements
ADD	Claude Hermann Walter Johns, *Assyrian Deeds and Documents*. 4 parts. Cambridge; London: Bell and Co., 1898–1923.
AfO	*Archiv für Orientforschung*
AfOB	Archiv für Orientforschung. Beiheft
ALD	Aramaic Levi Document
AMD	Ancient Magic and Divination
AnBib	Analecta Biblica
ANESSup	Ancient Near Eastern Studies Supplement Series
AnOr	Analecta Orientalia
AnSt	*Anatolian Studies*
AO.SS	Anecdota Oxoniensia. Semitic Series
AOAT	Alter Orient und Altes Testament
AOBib	Altorientalische Bibliothek
AOS	American Oriental Series
AS	*Aramaic Studies*
AS	Assyriological Studies
BAM	Die babylonisch-assyrische Medizin in Texten und Untersuchungen
BASOR	*Bulletin of the American Schools of Oriental Research*
BETL	Bibliotheca Ephemeridum Theologicarum Lovaniensium
BibAn	*The Biblical Annals*
BibOr	Biblica et orientalia
BIWA	Rykle Borger, *Beiträge zum Inschriftenwerk Assurbanipals*. Wiesbaden: Harrassowitz, 1996
BJS	Brown Judaic Studies
BMes	Bibliotheca Mesopotamica
BRM	Babylonian Records in the Library of J. Pierpont Morgan
CAD	*The Assyrian Dictionary of the Oriental Institute of the University of Chicago*. Chicago: The Oriental Institute of the University of Chicago, 1956–2006
CBET	Contributions to Biblical Exegesis and Theology
CBQ	*Catholic Biblical Quarterly*
CBQMS	Catholic Biblical Association Monograph Series
CdE	*Chronique d'Égypte*
CEJL	Commentaries on Early Jewish Literature

CHANE	Culture and History of the Ancient Near East
CM	Cuneiform Monographs
CP	*Classical Philology*
CRAI	Comptes rendus des séances de l'Académie des Inscriptions et Belles Lettres
CUSAS	Cornell University Studies in Assyriology and Sumerology
DJD	Discoveries in the Judaean Desert (of Jordan)
DÖAW.PH	Denkschriften: Österreichische Akademie der Wissenschaften, Philosophisch-historische Klasse
DSD	*Dead Sea Discoveries*
DSSSE	*The Dead Sea Scrolls Study Edition*
EdF	Erträge der Forschung
EJL	Early Judaism and Its Literature
EPRO	Études préliminaires aux religions orientales dans l'empire romain
ExpTim	*Expository Times*
FAT	Forschungen zum Alten Testament
FB	Forschung zur Bibel
FO	*Folia Orientalia*
GMTR	Guides to the Mesopotamian Textual Record
HANEM	History of the Ancient Near East Monographs
HBAI	*Hebrew Bible and Ancient Israel*
HdO	Handbuch der Orientalistik
HDR	Harvard Dissertations in Religion
HSM	Harvard Semitic Monographs
HTR	*Harvard Theological Review*
HUCA	*Hebrew Union College Annual*
HUCM	Monographs of the Hebrew Union College
ICC	International Critical Commentary
IEJ	*Israel Exploration Journal*
JA	*Journal asiatique*
JAJSup	Journal of Ancient Judaism Supplements
JANER	*Journal of Ancient Near Eastern Religions*
JAOS	*Journal of the American Oriental Society*
JBL	*Journal of Biblical Literature*
JCS	*Journal of Cuneiform Studies*
JJS	*Journal of Jewish Studies*
JNES	*Journal of Near Eastern Studies*
JSHRZ	Jüdische Schriften aus hellenistisch-römischer Zeit
JSJSup	Journal of Ancient Judaism Supplements
JSOTSup	Journal for the Study of the Old Testament Supplement Series
JSP	*Journal for the Study of the Pseudepigrapha*
LBAT	*Late Babylonian Astronomical and Related Texts.* Edited by Abraham Joseph Sachs. Providence, RI: Brown University Press, 1955
LNTS	Library of New Testament Studies
LSTS	The Library of Second Temple Studies
MC	Mesopotamian Civilizations
MRLA	Magical and religious literature of Late Antiquity

MSL	Materialien zum sumerischen Lexikon/Materials for the Sumerian Lexicon. 17 vols. Rome: Pontifical Biblical Institute, 1937–2004
NEA	*Near Eastern Archaeology*
ÖAW.PH	Sitzungsberichte. Österreichische Akademie der Wissenschaften, Philosophisch-historische Klasse
OeO	Oriens et Occidens
OIS	Oriental Institute Seminars
OLA	Orientalia Lovaniensia Analecta
Or	*Orientalia* (NS)
ORA	Orientalische Religionen in der Antike
OTL	Old Testament Library
PASP	*Publications of the Astronomical Society of the Pacific*
PBS	University of Pennsylvania, Publications of the Babylonian Section
PSI	Pubblicazioni della Società italiana per la ricerca dei papiri greci e latini in Egitto
RB	*Revue biblique*
ResOr	Res orientales
RevQ	*Revue de Qumrân*
RGRW	Religions in the Graeco-Roman World
RHR	*Revue de l'histoire des religions*
RlA	*Reallexikon der Assyriologie*. Edited by Erich Ebeling et al. Berlin: De Gruyter, 1928–
SAA	State Archives of Assyria
SAAB	*State Archives of Assyria Bulletin*
SAACT	State Archives of Assyria Cuneiform Texts
SAAS	State Archives of Assyria Studies
SAPERE	Scripta Antiquitatis Posterioris ad Ethicam Religionemque pertinentia
SBLMS	Society of Biblical Literature Monograph Series
SD	Studies and Documents
SHANE	Studies in the History of the Ancient Near East
SHJSH	Schriften der Hochschule für Jüdische Studien Heidelberg
SpTU	Spätbabylonische Texte aus Uruk
SSS	Semitic Study Series. New Series
STDJ	Studies on the Texts of the Desert of Judah
STMAC	Science, Technology, and Medicine in Ancient Cultures
STT	Oliver Robert Gurney, Jacob J. Finkelstein, and Peter Hulin. *The Sultantepe Tablets*. 2 vols. London: British Institute of Archaeology at Ankara, 1957–1964
SVTP	Studia in veteris testamenti pseudepigrapha
TAD	Bezalel Porten and Ada Yardeni. *Textbook of Aramaic Documents from Ancient Egypt*. 4 vols. Jerusalem: Hebrew University, 1986–99
TAPS	Transactions of the American Philosophical Society
TDOT	*Theological Dictionary of the Old Testament.* Edited by G. Johannes Botterweck and Helmer Ringgren. Translated by John T. Willis et al. 8 vols. Grand Rapids: Eerdmans, 1974–2006

TSAJ	Texts and Studies in Ancient Judaism/Texte und Studien zum Antiken Judentum
UL	Markham J. Geller, *Evil Demons: Canonical Utukkū Lemnūtu Incantations. Introduction, Cuneiform Text, and Transliteration with a Translation and Glossary*. SAACT 5. Helsinki: The Neo-Assyrian Text Corpus Project, 2007
VT	*Vetus Testamentum*
VTSup	Supplements to Vetus Testamentum
WAW	Writings from the Ancient World
WMANT	Wissenschaftliche Monographien zum Alten und Neuen Testament
WO	*Welt des Orients*
WUNT	Wissenschaftliche Untersuchungen zum Neuen Testament
WZKM	*Wiener Zeitschrift für die Kunde des Morgenlandes*
YNER	Yale Near Eastern Researches
ZA	*Zeitschrift für Assyriologie*
ZAW	*Zeitschrift für die alttestamentliche Wissenschaft*

Introduction: Science in Qumran Aramaic Texts

Ida Fröhlich

The history of science usually considers only science which is consistent with modern scientific systems, or anticipates their results. This is why astrology and magical healing, so popular in the cultures of the ancient Near East, are not classified as sciences. Reviews of the history of sciences usually begin with the Greeks.[1] However, the natural environment and reality surrounding man have not changed significantly since that age. The starry sky, the relation and functioning of the celestial bodies are the same as before. The order of the seasons is still the same (even if their operation is whimsical today). The flora and fauna of the different regions may have changed, but their basic habitats may not have. Similarly, the human body and its functions have not changed, and man has remained as mortal as before. Yet, based on similar observed reality, cultures that are not far apart in age and space created different systems. Science draws conclusions about the invisible from the observation of visible things. Yet, observing the same things or phenomena can result in different systems. The reason is that perception does not exist without prior theory. Behind every observation is a pre-existing system of thought. Observers observe the same thing but develop different attitudes based on different assumptions.[2]

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[1] E.g., George Sarton, *Introduction to the History of Science*, 3 vols., Carnegie Institution of Washington Publications 376 (Baltimore: Williams & Wilkins, 1962), 1:52 writes: "It is not yet possible to give a continuous account of early Babylonian, Egyptian and Chinese knowledge, and therefore it has seemed more expedient to begin our own survey with Homer." However, newer adaptations will also include areas that are not considered science today, see *The Oxford Handbook of Science and Medicine in the Classical World*, ed. Paul Turquand Keyser and John Scarborough (Oxford: Oxford University Press, 2018), chapters written by Glen M. Cooper, "Astrology: The Science of the Signs in the Heavens," 381–408; and Mariska Leunissen, "Physiognomy," 743–64. See also Jonathan Ben-Dov, "Scientific Writings in Aramaic and Hebrew at Qumran: Translation and Concealment," in *Aramaica Qumranica: Proceedings of the Conference on the Aramaic Texts from Qumran in Aix-en-Provence 30 June–2 July 2008*, ed. Katell Berthelot and Daniel Stökl Ben Ezra, STDJ 94 (Leiden; Boston: Brill, 2010), 379–402.

[2] Paul U. Unschuld, *Was ist Medizin? Westliche und östliche Wege der Heilkunst* (*Munich*: Beck, 2003), 11–13.

The set-up of attitudinal systems is shaped by three factors: fantasy, deductive logic, and observation.[3] Fantasy or imagination is the same as the preexisting system above, the system of ideas about the environment, the world, based on things not directly experienced. In the ancient Near East this background of thought was the idea that heaven and earth were not separated, and together they formed the cosmos. A well-documented Mesopotamian idea was that the celestial phenomena were controlled by the gods, and they contained messages for earthly man. To understand the movement of celestial bodies is to decipher the will and message of the gods. The sky was considered a stone surface on which the gods engraved messages.[4] The messages were about the human world, all its aspects – natural disasters, political and social events, health and disease. The diseases were caused by angry gods and mediated by evil demons. Trouble could also be caused by human hostile activity like offensive magic. The means of overcoming trouble was magic. The second factor, deductive logic and analytical thinking, explores the causal relationships between events. A phenomenon or event and the subsequent phenomenon or event may be causally related, but are not necessarily. In judging this, one often follows the principle of *post hoc ergo propter hoc* – that is, an earlier event in time is the reason for the later one. Ancient systems established causal relationships between astronomical phenomena, dreams, and natural events, and misdemeanors and diseases occurring later. Celestial phenomena and natural events served as omens. Influencing earthly events was possible by magic. The third factor, observation, means, among other things, the observation of the regularity of events and phenomena. Observation of celestial events yields the most obvious results. Based on observations of the regular functioning of celestial bodies, a series was created on the basis of which (e.g., a solar eclipse) realistic predictions about future events were supposed to be given. The need for categorization and serialization was also extended to natural environmental and terrestrial events. Human relations have been standardized by categories of the legal system. The recording and formalization of historical deeds and their consequences created historical thinking, according to which history is not a series of random events but a process influenced by the moral behavior of the characters. Therefore, natural sciences (called "science" in English), and knowledge related to the human

[3] Mark J. Geller, "Die theoretische Grundlage der babylonischen Heilkunde," in *Babylon: Wissenskultur in Orient und Okzident*, ed. Eva Cancik-Kirschbaum, Margarete van Ess, and Joachim Marzahn, Topoi: Berlin Studies of the Ancient World 1 (Berlin: De Gruyter, 2011), 153–57.

[4] Francesca Rochberg, *The Heavenly Writing: Divination, Horoscopy, and Astronomy in Mesopotamian Culture* (Cambridge: Cambridge University Press, 2004) presents brilliantly this system, with the aim of drawing attention to include cuneiform astronomical texts in the history of science.

world (called "humanities" and "social sciences"), were measured against the same rules and both can be called science.

Astrology and magical medicine are the areas where magical thinking predominates, and that is why these are the most common examples of "pseudo-sciences." However, the precise observations of Babylonian astronomy, collected for the purpose of magical interpretations, served as the basis for Greek astronomy and world interpretation, which set up a system completely different from that of the Babylonians. The observations on which the Greeks based their science came from Babylonian astronomy, to which the Greeks added nothing.[5] The radical turn was that the Greeks excluded the gods from their system and assumed a law behind all operations of the celestial bodies, and the rules of their operation were researched. That is why Greek astronomy is considered a science today. It was the attitude of the Greeks that changed compared to the system of observations, and eliminated the epistemological obstacle posed by the Babylonian system of science.[6] In Babylon, however, the old practice continued, based on the old theory. Astronomical observations continued to include astrological interpretations, and it was still believed that the operation of the cosmological system was based on the operation of gods and supernatural beings. A similar process took place in the 5th century BCE in medicine where the Greeks disassociated illness from its connection to the gods and their wrath against man. However, the new Hippocratic system of the humoral theory that attributed illness to an imbalance of the four humors in the human body is no more rational than that which attributed the disease to the divine. Humoral theory, on the other hand, is a law-based approach and, as such, is seen as the beginning of medicine. However, the Greeks still believed in their gods, and in the effectiveness of prayer. Moreover, the practice of magical healing also survived in the Greek world.

Scientific thinking is universal and covers all areas of the natural and human world. Ancient thinking systematized the constituents of space, time, and nature alike. This is evidenced by documents and literary works of the ancient Near Eastern cultures, including biblical literature. Geography as a science dealing with human space fitted into a cosmological system where heaven and earth were not separated. Categories of plants, animals, physical materials (metals, stones, etc.) were located in the same system, itemized on

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[5] Francesca Rochberg, "The Babylonian Contribution to Greco-Roman Astronomy," in *Hellenistic Astronomy: The Science in Its Contexts*, ed. Alan C. Bowen and eadem, Brill's Companions in Classical Studies (Leiden; Boston: Brill, 2020), 147–59.

[6] Gaston Bachelard, *La formation de l'esprit scientifique* (Paris: J. Vrin, 1938) = *The Formation of the Scientific Mind: A Contribution to a Psychoanalysis of Objective Knowledge* (Manchester: Clinamen Press, 2002), 24–32, demonstrated how the progress of science could be blocked by certain types of mental patterns, creating the concept of *obstacle épistémologique* ("epistemological obstacle").

long lists (*Listenwissenschaft*), representing special forms of the natural sciences, botany, zoology, and chemistry. Memory of human history was also systematized. History was not an incoherent chain of random events for them. Historical reviews present the past as a chain of events reflecting a system on the basis of which conclusions could be drawn for the future. Thus "science" and the learning relating to man and human time, that is, the humanities, formed a single system that included all the regular knowledge needed to understand the world. It was created by "a strong interest in understanding how the physical world works, together with an assumption that the world is regular."[7] Knowledge collected and systematized on the "working of the world" relates the functioning of the cosmic spheres, and that of the world of the humans, their natural environment, the living world, and man himself. All this knowledge was acquired through systematic inquiry, used in practice, and handed down through writing and teaching.

Science is created by human communities, and is a system of tried and tested ideas and methods accepted by a larger community. Science is described, traditionalized, taught, expanded, and renewed. These processes are also reflected in the documentation that can be linked to the ancient "sciences." Data on this have survived primarily from the literacy of the great river valley cultures, Egypt and Mesopotamia. The observations and results were recorded and analyzed by professionals, usually priests of local temples. Systematic lists of observations, omen interpretations, and diagnoses were kept in the libraries of the shrines as well as in private libraries. Different interpretations and results have survived. The accumulated knowledge was applied in education. The material in the temple libraries was copied by generations of students, thus gaining a degree in the sciences. Not only was it known locally, it was true international science.[8]

Only material written on durable media has survived. Documents written on skin or other perishable material disappeared. Mesopotamian documents were written on clay tablets for thousands of years, with cuneiform writing. Therefore, the traditionalization of knowledge can be tracked in a systematic way. The presence of libraries and archives is documented since the Old Babylonian period. Beginning with the Assyrian era, cuneiform libraries and archives have also been found in Syria. Most of the libraries and archives have been found in private houses. These were private schools where, in addition to the reference works, school texts also survived. The majority of the

[7] Philip S. Alexander, "Enoch and the Beginnings of Jewish Interest in Natural Science," in *Ancient Jewish Sciences and the History of Knowledge in Second Temple Literature*, ed. Jonathan Ben-Dov and Seth Sanders (New York: New York University Press; Institute for the Study of the Ancient World, 2014), 25–49, esp. 37.

[8] See Eleanor Robson, *Ancient Knowledge Networks: A Social Geography of Cuneiform Scholarship in First-Millennium Assyria and Babylonia* (London: UCL Press, 2019).

stock was scientific material: interpretations of various kinds of *omina*, lists of various plants, animals, and materials, healing texts and incantations. The vast majority of the material in Assurbanipal's library, the largest collection known today, contained scientific works (lexical, mathematical, historical astronomical texts, interpretations of various *omina*, medical texts, divinations, incantations), making up only a negligible portion of literary texts. It is to be noted that the original library documents would have included leather scrolls, wax boards, and possibly papyri, which were not written in Akkadian.[9] However, being written on perishable material, they did not survive. Much of the destroyed documents could have been written in Aramaic.

By the time of Assurbanipal, Mesopotamia had become bilingual. Aramaeans from the North infiltrated the Babylonian territories, and their language slowly became dominant. Aramaic, the vernacular of Mesopotamia became the *lingua franca*, the mediating language also for those who settled in the country. Aramaic also acted as a mediating language in the field of science and it conveyed the millennial knowledge accumulated by Mesopotamian science to the groups that spoke this language, in Mesopotamia and abroad. It soon became an intermediary between the written cultures of East and West, and also a vehicle of the spread of scholarly and literary traditions in these countries. Former inhabitants of the kingdom of Judah who were resettled in Babylonia following the fall of their kingdom (586 BCE), soon became acquainted with Aramaic (if they had not been so before). They soon adapted Mesopotamian scholarly and literary tradition which they assimilated to their home culture.

The common problem of displaced groups and diaspora communities is the processing of the cultural influences that affect them, and the formation of a new self-definition, the creation of a new knowledge corpus. Works of Jewish exilic literature – the earliest pieces of the Aramaic Danielic collection (Daniel 2, 4, 5) – reflect a familiarity with the Mesopotamian methods of the interpretation of *omina*. However, this method was used in a different way, declared as an inspired method, revealed by the unique God of the exiles, and superior to the methods of the Babylonian sages (Dan 2:17–23). Foreign science was incorporated into a new knowledge system.

In Mesopotamia, there may have been considerable Aramaic writing and literature, of which, however, almost nothing survived. Aramaic documents were found in the archives of the Jewish community of Elephantine in Egypt, as well as a copy of a wisdom work, the Aramaic novel *Ahiqar*, from the end of the 5th century BCE. Another group of Aramaic documents was preserved in the library of the community of Qumran that existed in the vicinity of the Dead Sea, between about 150 BCE and 68 CE. The texts they owned are from different ages and origins, and represent different languages. Most of the

[9] Simo Parpola, "Assyrian Library Records," *JNES* 42 (1983): 1–29.

texts are in Hebrew – biblical manuscripts, works known elsewhere, and compositions not known elsewhere. Much of the latter group was written in the community, forming their own literary tradition. There is a significant number of Aramaic texts – surviving, unfortunately, in a very fragmentary state. Based on the age of the manuscripts, their writing, and scribal habits, it can be assumed that these works were not written locally. Qumran Aramaic texts include fragments of the biblical book of Daniel, and originals of apocryphal and pseudepigraphic compositions already known from translations. Such are the book of Tobit and an Aramaic Enochic collection, the earliest and most significant group of Qumran Aramaic texts. In addition, a number of Aramaic texts were found that were not known elsewhere. Qumran Aramaic texts are somehow related to biblical tradition, either containing biblical quotations and references, or related in content to some biblical tradition, such as the Genesis Apocryphon, the 4QBirth of Noah text (4Q534–536), the Aramaic Levi document, the New Jerusalem texts, or the group of the "Danielic" compositions (the most famous of which is 4Q242, the Prayer of Nabonidus). Together with para-biblical literature and apocalyptic, incantation texts, lists, and other compositions were found in Aramaic. It can be assumed that the Aramaic texts of Qumran originate from a Jewish diaspora milieu familiar with the general themes and the traditions that fostered biblical books.

The most significant group of Aramaic texts is represented by an Enochic collection, largely but not exactly identical with the Ethiopic Book of Enoch. Earliest copies representing the Book of Watchers were written in the 3rd century BCE, probably in the Eastern Jewish diaspora. The book reveals great astronomical interest and includes a 364-day calendar of Mesopotamian origin. Peculiar elements in the narrative part show a familarity with Mesopotamian literary and religious tradition.

The rest of the Qumran Aramaic texts are also characterized by a strong interest in science, and the themes of knowledge.[10] Astronomical science appears not only as a separate genre in the Astronomical Book of the Enochic collection, presented as a divine revelation transmitted to an elect person by celestial beings. Parts of two astrological lists are preserved in 4Q318, a Selenodromion (tracing the position of the moon in the zodiacal signs throughout the 360-day year) and a Brontologion (weather omens related with astrology). References to science and scientific material can be included in both literary works and texts written with practical intent. Genesis Apocryphon, a paraphrase of various pericopae of the Genesis claims that Abraham teaches wisdom to the Egyptian sages from "the words of Enoch" (1QApGen ar = 1Q20 XIX, 25). The same composition includes a long geographical description on the boundaries of the land promised by God to Abraham

[10] On this see Alexander, "Enoch and the Beginnings of Jewish Interest in Natural Science," 34–36.

(1QApGen ar = 1Q20 XXI, 15–19). The description of Enoch's celestial and earthly journeys in the Aramaic Enochic collection contains cosmological and geographical material (1En. 17–36). The Aramaic Levi Document (group b) representing a teaching genre, contains a substantial section on metrology. Qumran Physiognomy (4Q561) is a fragmentary work containing physiognomical description. 4Q560, an incantation was written with practical purpose, against infantile fever. Genesis Apocryphon reports that Abraham delivers Pharaoh and his household from an evil spirit that causes general impotence and infertility in Pharaoh's court (1QApGen ar = 1Q20 XX, 16–31). The Lamech narrative, in the same work, brings to mind different theories of embryogenesis (the theory of the "double semen," and a physiognomic approach).[11] The List of false prophets (4Q339) recalls from historical tradition prophets who misled their contemporaries with their false prophecies. The apocalyptic predictions that appear in the pseudo-Danielic literature are based on the view that present and future can be built on the lessons of history. The texts describing Heavenly Jerusalem (2Q24, 4Q554, 5Q15, 11Q18) provide a spatial description of the apocalyptic future. The regularities that are supposed to be discovered in the changes of history and in the future are treated in works like 4Q180–181 and the Pesher on the Apocalypse of Weeks (4Q247). Literary testaments like the Testament of Qahat (4Q542) tell moral teachings in farewell discourses, based on biblical exegesis.

Aramaic learning (where the context is known) is esoteric knowledge, transmitted by angels to, and practiced by, worthy persons such as Enoch, Noah, or the patriarchs. The content of texts related to science and knowledge has a strong Mesopotamian effect, which is in line with what we know about the role of Aramaic language and literacy as a Mesopotamian mediator.[12] Aramaic served as a mediator of Mesopotamian knowledge and methods into postexilic Jewish culture. However, this was not simply an acceptance. There was an interaction between Akkadian and Aramaic knowledge. There are examples when colophons of cuneiform tablets indicate that the text was copied from a *magallatu*, that is from a scroll, which might be taken as evidence for Aramaic writing. Aramaic ostraca found in Maresha of the Hellenistic period contain divinatory and astrological terminology in Aramaic. This material seems to have parallels not only in cuneiform literature, but also in the Aramaic Enoch fragments.[13] In light of the above, the conviction emerges that

[11] Ida Fröhlich, "Medicine and Magic in Genesis Apocryphon: Ideas on Human Conception and its Hindrances," *RevQ* 25/98 (2011): 177–98.

[12] Stephen A. Kaufman, *The Akkadian Influences on Aramaic*, AS 19 (Chicago; London: The University of Chicago Press, 1974).

[13] Esther Eshel, "Aramaic Texts from Qumran in Light of New Epigraphic Finds," in *The Dead Sea Scrolls in Context: Integrating the Dead Sea Scrolls in the Study of Ancient Texts, Languages, and Cultures*, ed. Armin Lange, Emanuel Tov, and Matthias Weigold; in

a body of scientific literature existed in Aramaic already in the Persian and early Hellenistic periods, and that this corpus continued some of the notions of traditional Mesopotamian science and divination. Particular terms in the vocabulary of some Qumran texts (*dwq*, *molad*, *malwaš*) are attested in Syriac and Mandaic, as traces of an astronomical terminology of Aramaic origin, preserved centuries later.[14] Qumran Aramaic writings reflect the emergence of a new scientific worldview and a self-definition for the post-exilic Jewish communities that were familiar with it.

The first study, *Markham J. Geller*'s "'Secular' Science in Mesopotamia" is introductory and general in nature. It discusses an area that defines the worldview and the whole system of knowledge: cosmology and astronomy. How man imagines the universe around him largely determines his knowledge of others, the human environment, and man himself, his relationship to other living beings. The Mesopotamian worldview provides a general model of the system of things that works in the world. It examines how science is defined by the religious worldview, how knowledge and transcendence are related. The Mesopotamian astronomers and scholars who studied the heavens firmly believed the mechanism of the heaven and stars was created by the gods. Consequently, the stars were considered as functioning as a "heavenly writing." The whole world was interpreted according to the principle of "as above, so below." By observing and recording the movements of stars, they looked for similar patterns on earth, which could also be predicted. An astronomical approach defined all the knowledge that man considered important, and this influenced all other knowledge. Their methods were determined by the approach mentioned above. There are two major areas that do not count as science in today's system, but in the old days they did: one is astrology, which, precisely because of the approach mentioned above, was not separated from astronomy. The other is magic, which was based on the same approach to medicine. The causes of the diseases were not sought in biological factors, but in the violation of the interdependent system, in violation of moral laws, or in human harm, in witchcraft. The direct causes of the disease are usually demonic beings that must be cast out. Magic thus rises to the level of science, its methods becoming scientific methods. The maintenance and tradition of magical healing is the same as the fields that can be considered science in the modern sense: diseases are described, systematized, preserved, discussed, enriched, and taught.

The author follows the path of medicine in a section that gives a characteristic picture of this approach and practice. By the middle of the 5th century BCE, a new discipline had arisen in Mesopotamia, namely, astral

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association with Bennie H. Reynolds III, VTSup 140 (Leiden; Boston: Brill, 2011), 177–97.

[14] Ben-Dov, "Scientific Writings in Aramaic and Hebrew at Qumran."

medicine, which combined medicine and astrology. At the same time, a different approach developed in Greek medicine. The Hippocratic collection firmly separated medicine from magic, excluding its practitioners from medical practice. However, the disappearance of a system does not mean that it has been surpassed forever: Later, indeed, with Galen and Aelius Aristides, magical medicine reappears in Greek science.

The next five studies deal with questions of Mesopotamian and other influences in Qumran Aramaic literature. *Réka Esztári* and *Ádám Vér*, "'The Script of God' – Dan 5:25 in the Light of Mesopotamian Omen Literature" reveals an interpretive process in which a Babylonian interpretation read in Aramaic gives a new meaning to the text interpreted. The subject is the famous scene of the "writing on the wall," and prophecy related, in which a term is used that was virtually nonexistent before the Exile: the interpretation (*pešer*) of a written text – originating from God. The four enigmatic words (*menē' menē' teqēl ûparsîn*, according to the Masoretic Text) were deciphered by the protagonist with the aid of paronomasia, a popular exegetic tool applied already by the Mesopotamian commentaries of the 1st millennium BCE, by means of which the Aramaic text gains a new shade of meaning. The text reflects direct connections, or at least an in-depth proficiency of the Aramaic author in Mesopotamian cuneiform writing, which cannot be excluded. The essay, upon applying further Mesopotamian exegetical tools, which are based on, and dependent upon, the essential characteristics of the cuneiform writing system, offers a new possible solution to this age-old riddle.

Andrew B. Perrin, "Symptoms and Symbols, Prayers and Portents: Diagnostic Physiognomy and the Diviner in the Aramaic Prayer of Nabonidus (4Q242)" examines how we understand the role of the "diviner" (גזר) in the Aramaic Prayer of Nabonidus (4Q242). Nabonidus encounters him while he suffered a "severe inflammation" for seven years before his sins were remitted. While the text states this unnamed figure is a "Judaean," we know next to nothing of his divinatory profile, proficiencies, or performances. The paper explores a larger cultural and historical context for ascertaining the potential functions of this diviner by considering biblical backgrounds, perspectives from the larger anthology of Aramaic Dead Sea Scrolls, and Babylonian divinatory and medicinal manuals relating to physiognomy and omen divination. In this way, the paper draws on a larger background of Babylonian scientific observations and omen prognostication as a way of rethinking both the persona of the "diviner" and the plot of the Aramaic Prayer of Nabonidus.

The figures of two sages, the Mesopotamian Adapa and Enoch, known from the Aramaic tradition, are reflected in *Amar Annus*, "The Heavenly Counterparts of Adapa and Enoch in Babylonia and Israel." The author argues that the Mesopotamian image of the "son of Adapa" who sits on the throne of heaven should be understood as the heavenly counterpart of Adapa. During

heavenly ascent, the mythical sage Adapa became identified with his celestial double. This primordial event served as the mythical background for the cultic activities of Babylonian exorcist priests and their identity. The ideological connection between certain priests and the flood hero is also found in the Jewish pseudepigraphic accounts, where Enoch and Noah are described in similar terms or having similar functions. Some Jewish writings give account of the heavenly counterparts of authorities, whose appearances are described as young or youthful personalities, resembling the "son" of Adapa in the Babylonian material. The seeing of one's double during heavenly ascent can be explained as "autoscopic experience" from the neuroscientific point of view.

Helen R. Jacobus, "How 4QAstronomical Enoch$^{a–b}$ (4Q208–209) Transformed Elements of Late Babylonian Magical Hemerological Texts into a Synchronistic Calendar," compares 4QAstronomical Enoch$^{a–b}$ (4Q208–209), an early text belonging to the Enoch Astronomical Book, to Late Babylonian magical lists that use the zodiac. It is shown that this text, and the Late Babylonian hemerological magical text BRM IV, 19 and related texts, are probably descended from common sources. 4Q208–209 dispensed with the textual elements relating to spells and rituals, retained other key elements, and introduced other components, such as the lunar fractions for the synchronistic calendar.

Knowledge transfer is mapped in *Jonathan Ben-Dov*, "Jewish Aramaic Science and Mythology: Babylonian or Levantine Heritage?" that deals with the Mesopotamian elements of the Qumran Aramaic writings, which appear in scientific and mythological texts, like Enochic astronomy, and the narrative about the Watchers and Giants. It is not known whether the Jewish authors knew the Babylonian scholarly establishment. It can be assumed that Babylonian knowledge reached the Jewish scribes not via a direct Babylonian contact but rather as part of a general Levantine koine. That koine contained Babylonian elements alongside other, Hellenistic, as well as local elements.

Themes of knowledge transfer are continued in the next five papers, together with questions of tradition and innovation, and the role of personal observation in creating scientific texts, as well as how knowledge of foreign origin was embraced and authorized with the help of a core tradition of the community.

Tupá Guerra, "Writing Science, Writing Magic: Possible Functions for the Act of Writing. Scientific Knowledge Reflected in 4Q560" discusses the importance of the act of writing in connection with an apotropaic healing incantation, 4Q560. The act of writing is an essential part of scientific activity that has the primary functions of recording and transmitting information. Writing scientific knowledge in antiquity, particularly scientific knowledge related to healing, can have many other symbolical and practical uses. The paper considers magical healing from an emic perspective as science, as

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