The Cosmology of Lists in Ancient and Contemporary Societies

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Introduction

Omen compendia, lists of gods, lists of the names of one god, catalogues of saints, lists of canonical books, lists of angels, catalogues of things that are forbidden and things that are allowed, lists of heresies… Religions would have looked very different without the aid of lists. And where had science been without taxonomies, registers, lexicons, catalogues, statistics and scientific bibliographies?

What is a list? It is a reeling off of objects, which have some characteristic features in common – one is that they appear on the list. The other characteristic features are often implicit and not spelled out (cf. Neusner 1990: 317). Making lists is a universal human technology, which implies taking power over something and someone and controlling the world. In lists things that are seen as belonging together are kept together, and things which are regarded as different are kept apart. A list encompasses each and every element it includes as well as the sum of its parts (Belknap 2004: 15). Lists are usually built on older lists, they are combined with each other and frequently contribute to the generation of new lists. While all lists collect and transmit knowledge, a religious list frequently connects human existence directly or indirectly to postulated superhuman beings. All types of lists have the potential to become research material for science, but not all lists have the potential to become scientific tools.

The theme of this article is the interplay between a specific technology, the making of lists, and the systematic gathering of knowledge connected to different types of institutions as palaces, temples, churches, monasteries and universities on the one hand, and religion, as institutionalized communication with postulated superhuman beings, on the other. The examples are from three periods and areas: Mesopotamia, the Roman Empire and contemporary Norway.

What do lists tell us about the conception of the world? What sort of cosmologies do lists reflect and create in ancient and contemporary societies? What are the similarities and the differences between lists used in religions and lists used in science? What does the long historical perspective applied in this chapter add to the discussion about the relationship between religion,

science and technology?

Religion, science and technology

The concepts "religion", "science" and "technology" are relatively new.[1] Science and religion in the strict sense – modern sense – are intimately connected with the differentiation of function systems in the modern world, described by Niklas Luhmann and by Peter Beyer, who points out that each of these systems are characterized by a specific type of communication (Beyer 2006). Religion and science are terms that describe two differentiated function systems in the present world. The question is if the same terms can be used in a historical survey or if they are anachronistic. Nick Jardine, for instance, speaks about "conceptual anachronism, the application of our categories to the works and deeds of those who lacked such categories" (Jardine 2003:127, cf. Jardine 2000).

In the case of "religion", it has proved fruitful to use the term for institutions and processes in cultures that did not themselves have the term. In the academic study of religion this is considered acceptable. A minimum definition of religion, inspired by Edward B. Taylor, is: "Religion is communication with culturally postulated superhuman beings". Melford E. Spiro adds the institutional dimension and sees religion as "an institution consisting of culturally patterned interaction with culturally postulated super-human beings" (Spiro 1966). Religion is further a modern designation for "boundary-conscious and knowledge-based religious groups" (Rüpke 2010: 197, cf. also Beyer 2006). Terms always have different levels of references: As an *emic* term, religion is connected to and dependent on specific historical processes in the Western world in the last centuries. As an *etic* term religion is a global and comparative category. In this paper, religion is used as an etic category, and includes an institutional dimension in line with Spiro's definition.

It is not so easy to apply the term science in the same way. Even if it is possible to launch science as an etic term in line with how religion is used, it is not necessarily fruitful to do so. This is not a matter of nominal purism, but more a realization that there are more difficulties connected with speaking of science in earlier times than there are with speaking about religion.

[1] "Science" is a concept that was coined by William Whewell in 1833; "technology" has been used from the 19th century, but with changing content/references; "religion" started to develop as a universal term in the 19th century.

Science as a general category is, according to Peter Dear, "a very prestigious label that we apply to those bodies of knowledge reckoned to be most solidly grounded in evidence, critical experimentation and observation, and rigorous reasoning" (Dear 2006:1).[2] In the strict sense, science emerged in the nineteenth century (Harrison 2006) and is an activity that takes place in an institutional and social context, connected to specific types of institutions, especially to modern universities.[3] Consequently, science *sensu stricto* is not a human universal and does not have a continuous history (Jardine 2000: 258-9).

On the other side, even if science is not a human universal, there were definitely systematic attempts at pursuing knowledge in institutional settings in earlier periods of human history. Some of these attempts are used as examples in this chapter. They have some aspects in common with science and might be compared to science, but are not here labelled science. What did exist in earlier centuries were attempts at understanding the universe and the place of humans in it by means of the study of nature and history. The institutions that harboured these attempts were not universities, but palaces, temples, and later monasteries. However, it must also be pointed out that the ancient examples presented in this chapter stand in one way or another in a historical continuity with what happened later and finally with what could be called a scientific stage in human history.

Technology is the use of scientific knowledge to solve practical problems in industry and commerce, but technology can also be defined in a broader way to describe the specific methods, materials, and devices used to solve practical problems more generally. This is how the concept is defined in this article where the specific technology in focus is the making of lists. The relationship between science and technology is disputed. To take control over fire and to invent the wheel were, for instance, two early technologies with far-reaching consequences, invented without any help from science in the strict sense.[4]

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[2] Peter Dear describes "science as a practical human enterprise that has grown up over the past few centuries by developing an intimate relationship between, not two opposed philosophies, but two distinct practical endeavours: natural philosophy, the goal of which is to make sense of the world, and instrumentality, which aims at creating means of material control." (Dear 2006: 191).

[3] The philosophical and scientific theories of the Greeks are sometimes counted as science (for instance McCauley 2000: 69; 2011: 97-8; 272).

[4] According to Robert N. McCauley: "Science and technology are not the same thing – not because science is independent of technology but because technology can be and once was wholly independent of science." (McCauley 2000: 68; cf. also McCauley 2011: 88-100). However, science can also be seen more like the explanatory by-product of technology. According to Barbara Herrnstein Smith, the division between scientific thinking and orientation towards technology in a more practical way is "arbitrary and artificial" (Smith 2012: 107; Smith 2009: 135-38).

Technologies are usually combined with other technologies: Lists are put into writing and get added value by means of counting. A numerical saying at the beginning of a list predicts the number of items on it and sometimes enumerates each and every item (Roth 1965: 1). In contemporary societies statistics and computer technology create new possibilities for making comprehensive lists and for combining lists in complex ways.

Mesopotamia

Writing was invented as a technology for preserving and passing on knowledge. At the same time it offered possibilities for creating new knowledge. In the ancient Middle Eastern societies, writing was among other things used for creating lists.[5] The combination of the two technologies – writing and making lists – proved to be powerful, indeed. Lists as a privileged format for recording knowledge clearly fuelled the encyclopaedic drive of humans. The study of lists has only been done sporadically, and there is no shared theoretical background for this study (cf. Dolezalová 2009: 2). According to James Goody lists connected to the technology of writing represented a significant change in the "modes of thought" in terms of the formal, cognitive and linguistic operations, which this new technology of the intellect opened up (Goody 1978: 81). This view is contested (cf. for instance Baines 1983), but it is reasonable to think that a list of gods carved in stone reflects power to a higher degree than a list of gods memorized by priests. It is also reasonable to think that more items might be stored on written lists that on those kept in memory and further that it became easier to combine lists in dynamic ways when they were expressed in writing.

The Assyrologist Wolfgang von Soden thought that the Mesopotamian lists were a primitive science, and he applied the word *Listenwissenschaft* (1936) to them.[6] According to Niek Veldhuis, "lists are used to explain writing, Sumerian vocabulary, grammar, and mathematics. List-like texts are used to record laws, medicine, and omens. The list becomes the privileged

[5] Mesopotamian list making had its parallel in Egypt, for instance in the so-called *onomastica* and in the king lists. According to the historian Ian S. Moyer, Egyptian king lists include theory in an implicit form, which means that theory, "resides in the juxtapositions and interstices of the list as a generic form" (Moyer 2011: 129). Moyer compares the use of Egyptian lists with "what has been called *Listenwissenschaft* in the study of Mesopotamian texts: a learned social habit in which the creation of lists or catalogues (of animals, plants, places, events, omens etc.), elaborates a body of knowledge by referring particular items to each other, to a category, classification, or paradigm, or (in the case of historical events) to paradigmatic precedents. At times such lists are expanded through the inclusion of exegetical comments on particular items." (Moyer 2011: 130).

[6] Von Soden´s teacher, the famous Assyrologist Benno Landsberger, was probably the one who coined the concept (Scolnic 1995: 8, note 50).

format for recording knowledge." (Veldhuis 2006:493). There are lexical lists, which produce words and names in thematic order while other lists order them syllabically (van der Toorn 2007: 119). Many lists are bilingual with words in Sumerian and Babylonian. These lists are examples of a strong encyclopaedic drive where almost everything in the world was potentially an object for being put on a list. According to Amar Annus:

> When every single phenomenon in the world could be considered a possible object for recording in the spirit of examination and divinatory deduction, one can see in this attitude an early example of the encyclopaedic curiosity, which is the basis for all scientific endeavour.
>
> (Annus 2010: 2)

The amount of knowledge in the Mesopotamian lists is impressive, but there is a reluctance to label this knowledge scientific. Leo Oppenheim states that it

> cannot and should not be claimed, of course, that the word lists containing, for example, the names of plants, animals, or stones constitute the beginnings of botany, zoology, or mineralogy in Mesopotamia. They are not scientific (not even a pre-scientific) achievement; rather they result from a peculiar interaction of a genuine interest in philology (or, at any rate, lexicography) and a traditional Near Eastern concern for giving names to all things surrounding the scribe, thus linking nature to man.
>
> (Oppenheim 1979)

These lists were used in the Mesopotamian education system. They are expressions of philological interests, and do not refer to natural phenomena.

However, there were other types of lists as well in the Mesopotamian societies. Some of them were based on observations, for instance on astronomic configurations. These lists were used for taking omens. The astronomic omen compendia were the fruits of systematic observations of celestial phenomena, and in this regard comparable to a scientific approach. From the mid-sixth century astronomical and atmospheric phenomena were recorded monthly and annually (cf. Rochberg 2007: 147-153). Based on the growing number of data and the creation of mathematical models, it became possible to predict astronomical and atmospheric phenomena on the basis of the lists.

In a typical astronomic text there is first a description of a celestial phenomenon (*protasis*) and second, a description of what the celestial phenomenon will lead to in the terrestrial world (*apodosis*), in other words, if P then Q. In line with a polytheistic worldview, the interpretive context includes a rich abundance of superhuman beings. These lists are not encyclopaedic, but rather strategic and had a specific area of application.

A special category called "scribe" or "literatus" was employed to observe the astronomical phenomena and predict the lunar eclipses (Rochberg 2011: 15). These specialists studied omen compendia to decode the messages that the eclipses conveyed and informed their clients about them (Oppenheim 1979). Their interpretations were built on observed and calculated data. The systematic observations made it possible to predict astronomical phenomena, but these observations were also used to predict what would happen on earth, especially related to agriculture and politics,[7] later also in individual horoscopes. In other words the predictions based on astronomical observations were made in a divinatory context and took place within the institutional framework of the great temples of Babylon and Uruk (Rochberg 2007: 28).

The Mesopotamian lists reflect a conception of the world where things above and things below were entangled in each other, but by means of systematic observations they were made tidy and eventually presented as cause-effect relationships. It is reasonable to presume that the experts on astronomy, omens and the making of lists were funded because their astronomical observations were applied in the form of omens and not because of the observations *per se*.

Seen through our anachronistic glasses these astronomical omen compendia present a mixture of science and religion, a fact that was, perhaps, reflected in the title of a seminar at the Oriental Institute of the University of Chicago in 2009: "Science and Superstition: Interpretation of Signs in the Ancient World". When the papers from the seminar were published, the publication got the neutral title: *Divination and Interpretation of Signs in the Ancient World* (Annus 2010). The anachronistic dichotomy in the original title refers to an interpretation of Babylonian astronomy as a muddling of systematic observations and faulty inferences and predictions based on these observations (cf. also Rochberg 2007: 29). The title of the seminar and the title of the publication reflect two different views of ancient cultures, raising the question whether

[7] Especially the *Enuma anu enlil* from the 7th century AD is important.

Babylonian astronomy deserves the label "science" or not.

Francesca Rochberg, a leading scholar in the field of Assyrology, argues that the divinatory astrological and astronomical texts rightfully belong to the history of science (Rochberg 2007: 12; 237-286). She sees Babylonia in particular as "the most important locus of scientific activity before the classical period of ancient Greece" (Rochberg 2011: 9), because observations and investigations of the Babylonians were "related to what we would recognize as scientific astronomy." (Rochberg 2011: 10). The Babylonian achievements in mathematical astronomy were later on an important influence on the development of astronomy in Greece. Rochberg regards accordingly the Mesopotamian approach to astronomy as a scientific enterprise and as part of the history of science: Rochberg points out that Babylonian astronomy has been conceived of "as stuck between the too mundane and practical on the one side and the too religious and metaphysical on the other" (Rochberg 2007: 29).

Whether Babylonian astronomy should be called science or not is accordingly a point of definition and dispute. The point here is that Babylonian mathematical astronomy was advanced and influential, as Rochberg has convincingly pointed out (Rochberg 2007; 2011). The systematic use of lists was an important instrument in this development.

The Roman Empire

Listing the natural world

Making lists was a preferred genre for storing and transmitting knowledge in the empires of Mesopotamia and Egypt. In the Roman Empire, as well, the encyclopaedic drive was strong. The most famous author in natural history was the polymath Pliny the elder (ca. 24-79 A.D.), in his youth a cavalry officer, later a procurator, prefect and an admiral of the fleet. In his famous and long-lived *Natural History* in thirty-seven volumes, the list is one of his most important tools. His *oeuvre* was enormously influential and regarded as a prototype of encyclopaedic lists of the facts of nature right up until the sixteenth century (Doody 2010: 31).

Some of Pliny's information is obtained from primary sources, but most of it is derived from secondary sources (Healy 1999: 42-62). Usually Pliny is satisfied when he has listed several names, starting with the most special within a class, for instance the biggest animals, the most

expensive jewels, or the most exotic trees. The ideal is to know everything and render the world as correctly as possible by means of lists. The connection between the object and the name is close, and Pliny does not necessarily describe the object that the name refers to. This type of knowledge is connected, according to the classicist Aude Doody (2010: 26 f.), to a learned as well as an imperialistic tradition where hierarchy, complete knowledge and defining the most special specimen are ideals (Doody 2010). Pliny is a source for the study of religion and magic, which he calls *scientia*, a kind of knowledge (30.2.7.8). While his universe is divine (cf. 2.1), most of his lists are not about religion but about names of things in the natural world – they are secular lists of things that are useful for people to know about (cf. Healy 1999: 78). As for the institutional context of Pliny's work, the "great learning of the day was now happening in the cultural context of the huge and incredibly diverse Roman Empire." (Lehoux 2011: 40). In his case, making lists was part of the imperial project and the business of running an empire, "Pliny's lists of names expressed an ideal of total knowledge and total order that is both scholarly and imperial in intent" (Doody 2010: 74). So, in relation to the Roman Empire, the chief example of encyclopaedic lists, which are those of Pliny in his *Natural History*, served strategic purposes as well as being encyclopaedic.

Listing heresies

The two examples of making lists considered so far have in the main been connected to *natural history*. In the Mesopotamian example observations of and genuine knowledge about celestial phenomena were part of a religious world-view and applied to legitimating politics and the governing of the country. In Pliny's case lists were used in the imperial project as part of an intellectual strategy for ruling the Empire.

Epiphanius, bishop of Salamis in Cyprus in the late fourth century CE, made lists of religions, sects and religious groups that he called *hairesis*.[8] Epiphanius had several aims. One was to create a comprehensive and global history of true beliefs and practices versus false beliefs and practices. Another aim was to carve out a model for orthodox Christianity in opposition to all competing religious and philosophical movements. One of the strategies Epiphanius applied to make everything hang together – historically and theologically, cognitively and emotionally –

[8] Epiphanius applies the concept *haireses* to describe sects and groups. The concept means "way of thinking" or "thought system" and was originally a neutral concept. For the theme of *hairesis* and its development, see Iricinschi and Zelletin 2008: 3-5 and Thomassen 2008. Among Christians, who did not like thought systems in the plural, it came to be used about people whose beliefs deviated from those of the church.

was to develop key models and metaphors and use them in a consistent way.

Epiphanius reckons with eighty heresies and introduces them in the form of lists in the beginning of his work. The number eighty is linked to the Song of Songs and the eighty concubines mentioned in this text (2, 8; 6, 8; 21, 1). The concubines are contrasted with the one true bride, who is likened to a dove (6:9) (*De fide* 35, 3, 5).

In his huge taxonomy of heresy, Epiphanius took over a genealogical model from Irenaeus. This model includes two "family trees", one of heresies and heretics and one of legitimate succession, which is the family line of the Church and its rightful sons. In addition to the genealogical model, Epiphanius developed a model of his own, according to which all inventors of heresies were compared to different species of harmful animals. This means that Epiphanius' list of heresies was combined with knowledge taken from contemporary lists of animals, the harms they caused and the remedies against them. The model animal was the serpent, and the knowledge about snakes came from one of many handbooks about treatments for bites of poisonous animals (*Proem* II, 3,1-5, cf. Dummer 1973:299). In this way models and lists from natural history were used to give credibility, scholarly value, and emotional impetus to a theological system. Epiphanius' catalogue of heresies had a huge influence. *Panarion* became paradigmatic for later works to such a degree that from Epiphanius' time, the late fourth century, to the nineteenth century all religions, except one's own branch of Christianity, were considered to be heresies of different kinds. In the words of Averil Cameron, "Baroque in its variations and its ornaments, Christian heresiology did not of course begin in late antiquity with the extraordinarily inventive, even fictive, catalogues contained in the *Panarion*, or 'Medicine-Chest,' of Epiphanius of Salamis in the 370s, but from that moment on it never looked back." (Cameron 2005: 193).

Epiphanius' approach has in many ways been normative for Church History. A common strategy in this discipline has been to see schismatic groups and movements as lapses from a norm presumed to be present from the beginning and embodied in the Church.

Listing demons[9]

Lists presuppose lists. The *Secret Book of John*, a treatise that exists in three versions in the

[9] A longer version of the analysis of lists in the *Secret Book of John* is included in Gilhus 2013.

Coptic-Gnostic library from Nag Hammadi and in one version outside it, includes various lists. The frame of the text is Jesus who reveals to John how the world has been created and what the relationship is between the pneumatic world and the material world below. A special focus is on the creation of human beings.

Contexts for the lists in the *Secret Book of John* are astronomy, medicine/therapy and knowledge about the body on the one hand, in other words topics in natural history, and superhuman powers on the other.[10] There are lists of angels, demons and rulers of the planets, the members of the human body, the passions, the year, the week etc. The lists interact with the narrative they are part of. The lists of the angels that created the body of Adam is a litany of seventy-two small creation myths:

> The first one began to create the head. Eteraphaope-Abron created his head; Meniggesstroeth created the brain; Asterechme (created) the right eye; Thaspomocha, the left eye; Yeronumos, the right ear; Bissoum, the left ear; Akioreim, the nose; Banen-Ephroum, the lips; Amen, the teeth; Ibikan, the molars; Basiliademe, the tonsils; Achcha, the uvula; Adaban, the neck; Chaaman, the vertebrae; Dearcho, the throat; Tebar, the right shoulder; [...], the left shoulder; Mniarcon, the right elbow; [...], the left elbow; Abitrion, the right underarm; Evanthen, the left underarm; Krys, the right hand; Beluai, the left hand; Treneu, the fingers of the right hand; Balbel, the fingers of the left hand; Kriman, the nails of the hands.
>
> (II, 1 15:29-16:12 in Waldstein and Wisse 1995: 95-97)

When this list is finished the text presents a new list of the powers that are active in the different parts of the body:

> And those who were appointed over all of these are seven: Athoth, Armas, Kalila, Jabel, (Sabaoth, Cain, Abel). And those who are particularly active in the limbs (are) the head Diolimodraza, the neck Yammeax, the right shoulder Yakoubib, the left shoulder Verton, the right hand Oudidi, the left one Arbao, the fingers of the right hand Lampno,

[10] *The Secret Book of John* is the first text in Nag Hammadi codices II, III and IV and the second in BG 8502, 2. The main differences between the four versions are that the long version (II and IV) includes an enumeration of the demons connected to the different body-parts of humans and ends with a hymn (the so-called Pronoia hymn). The text edition and translation used here is that of Michael Waldstein and Frederik Wisse (Waldstein and Wisse 1995).

> the fingers of the left hand Leekaphar…
>
> (II, 1 17:7-15 in Waldstein and Wisse 1995: 101-103)

The list goes on to the toes of the left foot with Abrana. After Abrana this list turns into a new list of the seven powers that are over the angels.

Jack Goody made a division between three types of lists – lexical lists (encyclopaedia), retrospective lists (king lists) and a third genre, which could be called a utilitarian, instrumental or strategic list (Goody 1978). If we analyze the lists in the *Secret Book of John* by means of this typology, they fit into several categories. They are retrospective lists because they tell what happened at the creation of Adam, they are lexical lists because they give a survey of body parts on the one hand and demons/angels on the other, and they are probably also instrumental or strategic lists because they have been used for some purpose (healing, getting power over angels/demons). The angels/demons are systematized in relation to a classification system, which in this case is the human body. To list superhuman beings is probably the oldest type of theology that exists, as genealogies and line of kings are the oldest versions of history writing (cf. Quack 2002).

Several lists were used to generate the lists in the *Secret Book of John*. Some of these lists were connected to celestial phenomena. Twenty of the names come from Egyptian lists of decans, that is powers connected to the zodiak. The number of the angels/demons is seventy-two. In Jewish tradition this number is connected to the illnesses that Adam was infected with at the creation (Izmirlieva 2008: 71 ff), which means that death is integrated in Adam's body in the form of these illnesses. The number seventy-two may have come from the duodecimal system that was originally used in Mesopotamia.

The lists of the *Secret Book of John* have their origin in older lists, with roots in Egypt, Mesopotamia and Greece, with references to astronomy, astrology, numerology and medicine. They contributed to lift these types of knowledge into a learned discourse, which Foucault has called "epistemologisation" (*Archaeology of Knowledge*, cf. Visi 2009: 14-15). These lists have most likely been the instruments for ancient scholars and for an elite.

What is the point of creating a list of seventy-two angels/demons and the powers that are active in the different parts of the body? The purpose could have been to describe a totality by means

of its parts, but the goal could also have been to present the human body as a fragmented entity, a collection of *disjecta membra*. Richard Gordon has stressed the last point (Gordon 1999). However, when one knows the names of the angels connected to the different parts of the human body, one confronts fragmentation with system and gives a survey of the situation, which might be helpful, because it is an instrument of control. The lists define human experience of what is antagonistic and dangerous and take control by means of names and numbers (cf. Frankfurter 2006:24). Such a list could even have been used to approach demons in a systematic attempt at healing the body (King 2006: 113).

Contemporary Norway

The ultimate goal of makers of lists is probably to create a list that covers everything. One trick to seemingly make this happen is to choose a specific number as the limit for the list – eighty, seventy-two, three hundred and sixty-five, which are numbers that were used by Epiphanius and by the *Secret Book of John*. Another approach is to try to count everything that exists, for instance in birth registers and census papers. Lists are then used to take strategic decisions based on data that encompass all known cases.

Human societies have continued to be based on lists, but today new technologies have been created and combined with making lists. Statistics is one example, because the list is the fundamental ingredient in statistical thinking. According to Gigerenzer in *The Empire of Chance*, statistical thinking has been "second to no other area of scientific endeavour" in its influence on "modern life and thought" (Gigerenzer et al. 1989, xiv-xv). Computerizing is another technology that has heavily influenced the art of making lists. Machines create longer lists than humans ever did and make it possible to combine lists in new ways.

One example of a research project based on statistics and computerized lists, is the Norwegian Nord-Trøndelag health study (HUNT), one of the largest health studies ever performed (1984-2008). The point of that type of health enquiry is to find the causes of diseases by looking at variations and common causes, for instance why some are ill, while others remain healthy, and by looking at differences in health between groups. The objective is that new information about causes of diseases makes it possible to prevent and treat them. In other words, the HUNT databases are of great social utility. The HUNT databases contain information about approximately 120 000 persons, which means that the percentage that answered the questions

has been very high. It is rare that a health study is so representative in relation to a population. So far, there have been three HUNT surveys, the first starting in 1984. That a project continues for so many years is also rare and adds value to the data. The questionnaires give restricted information about each person, but since it is possible to link these data to national health registers, it is possible to get a lot of information about each of the participants.

The third wave, HUNT 3, included questions about participation in cultural activities and religious beliefs. These were used to investigate the relationships between physical and mental health domains and religious and existential oriented parameters.[11] What are the connections between religious activity and life interpretation on the one side and public health, mastery and social belonging on the other? (Kjølsvik and Holm 2008: 261).

In HUNT 3, comprehensive lists with medical and religious data were combined to get scientific results about the relationship between health and religion. In a study published at the end of 2011 a clear relationship was found between time spent in church and lower blood pressure in both sexes (Sørensen et al. 2011). The more time spent in church the better. The conclusion was that those that were religiously active were healthier than those that were not religiously active. It was a cross-sectional study and accordingly not possible to say anything specific about causation. This type of research has been done in the USA since the 1980s and it is growing (Sørensen et al. 2011).

However, in *Science Daily* (23.12.11), the heading that presented this Norwegian Study was "Religious belief battles Hypertension", while the heading in the publication of the Norwegian Research Council (forskning.no, 2.01.2012) read: "Singing hymns lowers blood pressure". Peter Harrison has recently pointed out in an article about constructing the boundaries between religion and science that there is a general tendency to show that religion is good for you. He has also stressed that there are the occasional tendencies of religion "to surrender its epistemic autonomy to scientific experts" (Harrision 2006: 103). Since science is usually regarded as the strongest contemporary system of authority, this is not strange. In line with what Harrison has pointed out, in the dissemination of the results from the Norwegian study about religious attendance and blood pressure, a cause-effect relationship that was not originally present in the

[11] HUNT 3 contained five questions on religiousness and view of life, one of them was "How often in the last 6 months have you been in a church/prayer house?" (p. 3). 3,6 % had been to church more than 3 times a month. 74,5 % of those who had answered regarded themselves as Christians compared to Humanist, Atheist and Other. 37, 9 % sought God's help sometimes, 53,2 % answered never.

results of the study, was established: If P then Q.

Religion, science and the cosmology of lists

In this chapter, we have consulted three cultures, swept four thousand years and presented five examples. What do the lists of the Mesopotamian omen compendia, the *Natural History* of Pliny, the *Secret Book of John*, Epiphanius' *Panarion* and HUNT 3 have in common, and what are the differences? What does the historical perspective on lists add to the interpretation of the relationship between religion, science and technology?

Societies have different institutions that collect, store and transmit knowledge. The temple of Marduk in Babylon, Epiphanius' monastery, and the Norwegian University of Science and Technology in Trondheim, exist within different cosmological systems. One of the things these institutions have in common is that they use lists as a technology for storing and transmitting knowledge.

These lists are instruments for mapping the world and for understanding better how it works. Making lists contributes in all these cases to the continuous process of establishing and maintaining a meaningful human cosmos for those that are involved.

The lists are further used for specific strategic purposes. Based on the Mesopotamian omen compendia connections were made between what happens in heaven and what happens on earth, and this knowledge was applied in the government of the state and to cast horoscopes. Pliny's lists were part of the imperial project of describing, surveying, and maintaining an empire. Epiphanius' lists were used to map the religious landscape of his time and boost the power of the church. His text and the models he applied became a standard for writing church history. The lists in the *Secret Book of John* combine knowledge from astrology and medicine with knowledge about demons. One purpose is to describe and understand the position of humans in the world. In the example taken from HUNT 3, religious activity (church attendance) and bodily processes (blood pressure) were seen as interconnected and this implied that religion is a good thing. When things are connected by means of lists, it is possible to act on the basis of them. Lists give credibility, power and control – sometimes also an illusion of a complete mastery of a field, especially when everything within a group apparently has been counted and

put on the list.

While communicating with superhuman beings does not need to be a complex activity, institutionalized religion is usually developed into intricate systems. Lists are instruments that contribute to the development of complexity in religion as well as in science, not least because they have a tendency to expand, be combined with other lists and to generate new lists. It seems natural for humans to create systems of great complexity and institutional power as was done in Mesopotamia and Egypt and to rely heavily on lists for doing this – whether these systems are scientific or religious or a mixture of both.

This goes against what Robert N. McCauley has claimed in his recent book and its title, *Why religion is natural while science is not* (2011). In an earlier article, McCauley stressed the same point, that religion is a natural and science an unnatural activity. According to him, "the elaborate cultural institutions surrounding each play a far more integral role in the generation and persistence of science than they do in the case of religion." And second, "most of the cognitive activity underlying religion concerns cognitive processes that rely far less on particular cultural input, particular forms of cultural input, or even peculiar cultural input than is the case with science." (McCauley 2000: 64; cf. McCauley 2011). Perhaps the religion/science divide in McCauley's reading is not so much a question of natural/unnatural as of two entities that are not on the same level, scientists who are working in research institutions on the one hand, and children and ordinary (and unsophisticated) believers on the other. In a critical review of McCauley's thesis, Barbara Herrnstein Smith describes this comparison in a rather ironic way, "inasmuch as science requires literacy, complex social arrangements, educated elites and technical means for preserving and transmitting knowledge, it is fundamentally 'cultural' while, conversely, since religion requires nothing but basic cognitive abilities, it is 'natural'." (Smith 2012: 103).

The religious and the scientific impulse, and let us for practical reasons say that the religious impulse is to communicate with superhuman beings, and the scientific impulse, is to understand how things are connected and function, seem both to be natural in human beings. However, when these impulses are made part of institutions, including systematic use of the technology of list-making, these institutions sometimes become really complex. The Mesopotamian omen compendia as well as Epiphanius' mapping of heresies were dependent on elaborate religious institutions, which played an integral role in generating and upholding activities of that type.

Religion should rather be compared to science on this sophisticated level (cf. Smith 2012: 104).

Science is at present a complex global system, connected to almost every form of knowledge, from history to nuclear physics. In many disciplines and fields there is a demand for large-scale experiments and for inputs and know-how from a wide range of fields. The vast differentiation of disciplines and the need for complex management of these disciplines make the successful global system of science immensely complicated and apparently "unnatural". Science has even absorbed theology, which is made part of the extended scientific system. What is natural and what is unnatural? While it can be argued that it is characteristic, and therefore natural for human beings, to build complex systems, it is more difficult to argue that when these systems exceed a certain level of complexity they turn from being natural to becoming unnatural.

The differentiated function systems of Western societies imply that science and religion are distinct from each other. In ancient cultures, there was no clear division between institutionalized communication with superhuman beings and the study of the natural world or between a cosmos governed by god(s) and the description of nature. This is striking in the Mesopotamian omen lists, but the lack of division is also presupposed in the other ancient examples where knowledge of natural history is combined with theology in the lists of the *Secret Book of John* and in Epiphanius' *Panarion* – in the last case in a metaphorical way. But even when science and religion in modern societies exist as differentiated function systems and the boundaries between them are patrolled, these boundaries are easily blurred, as when the results from the religion/blood pressure study of HUNT 3, based on scientific questionnaires and computerized lists, were published in the media. This indicates that even if the limits of what counts as science are rather strict, seen from the point of view of scholars and scientific institutions, they are easily overstepped when scientific knowledge leaves the safe haven of universities and moves into the open sea of the general public and the media.

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