

Creating Golems: Uses of Golem Stories in the Ethics of Technologies

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Abstract People tell stories. In stories, the narrator and the receiver can perceive meanings. These meanings can be analyzed again through larger interpretative framings. In this article, different ethical uses of the golem story are analyzed by making use of some of Jörn Rüsen’s ideas concerning historical thinking and narration and with a focus on the uses of the golem myth in studies and discussions on new and emerging science and technology.

Keywords History culture · Myths · Ethics · The golem story

Introduction

Caplan [16] highlights that understanding is a historical task and phenomenon. In Christian Medieval theology, it was customary to interpret the scriptures (and the world) on four different levels: the *sensus historicus*, the *sensus tropologicus*, the *sensus allegoricus*, and the *sensus anagogicus*—or literal, moral, allegorical, and anagogical—where the first sense is the referential, the second distinguishes vice from virtue, the third sense constitutes an example through a simile, while the fourth refers to the secrets of the afterlife. On this basis, Eco

[32] sees the text as open to the reader; as a place where a reader can “hunt for and find a multiplicity of meanings”. This does not infer that anything goes, but rather that there are what Eco calls “a range of rigidly pre-established and ordained interpretative solutions” ([32], 51). The current paper will address the question of how to understand the use of stories when trying to come to terms with social representations and ethics of technologies. My point of departure will be the story of the golem.

What Is (the) Golem?

One of the basic premises for this paper is that a golem is the creature created through the contextualization of the golem story. The production of meaning about technologies from stories depends on the actualization of the stories and the contextual conditions. The framing and the application of different modes of uses of history cannot be prescribed in advance since the mode for orientation in time is an existential and situated task [44]. Gelbin [38] documents the changes in meaning in the different golem stories depending on their actualization in different social settings: from Grimm’s 1808 presentation of the Jew’s lack of creative faculties over a Jewish nationalist use and a Jewish Enlightenment application of the story, to Meyrink [59] (1915) and Wegener’s [77] *mis-en-scène* of the Jew as a parable for modernist aesthetics, and to the uses of the golem story in explaining cybernetics and technological society in general inaugurated by Wiener [80]. The uses of

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stories and the analysis of their possible meanings cannot be found in the stories themselves, but in their relations to the social settings in which they exist or are found.

However, it is possible to give a brief and non-controversial account of some elements of the golem stories without making excessively strong metaphysical claims: The golem is a man-made living entity. “Golem” is a Hebrew word, and it occurs only once in the Bible ([67]; [47], 36). Judaism has a large body of extra-biblical literature, and it is in these, the Talmud and the Midrash, that the word and phenomenon “golem” mainly occurs in historic Judaism. It is in this literature that the golem has been associated with the creation of life [47].

Very often, the stories connected to golems emphasize their creation through technical means. These technical means can range from holy words to genetic modification. The traditional golem stories had discussions on the societal status of the golem. A letter exists dating from 1674 which describes the golem as being the creation of a Polish rabbi. From being a theme of discussion and a mythical figure over the whole of Jewish Europe, the golem moved to Prague. Jakob Grimm’s 1808 golem story is not located anywhere, and a range of towns in Europe had golem stories ([5], 22). With Leopold Weisel’s “*Der Golem*” (1847), the golem was established in Prague, its creator had become Rabbi Loew (1512/1525–1609), the golem was used for different chores and practical work, and it was necessary to control it [26]. Rosenberg [62] published, in 1909, a Hebrew version of the golem stories and Rabbi Loew that later became copied and distributed in several versions and languages [5]. One central issue in Rosenberg’s stories is Rabbi Loew’s battle against the blood libel against the Jews, or the accusations of ritual murder of Christian children, and the golem’s role in protecting the Jews from this accusation. Wiesel [81] also presented a golem as a protector of the Jews.

The notorious task of placing the enunciations on the golem myth in their correct context demands concerted effort. One such example is Jon Turney who wrote the following: “In a satire directed against the Cartesian world picture, Spinoza wrote that the golem ‘has as much life as any human being, if one accepts that the relation between body and mind is so loose that it can in a moment be lifted and replaced’”

([74], 15). Turney’s source here is John Cohen’s *Human robots in myth and science* [19]. Cohen writes

In a satire which he directed against Descartes, Spinoza (1632–1677) wrote that the golem “has as much life as any human being, if one accepts the new viewpoint that the relation between body and mind is so loose that it can in a moment be lifted and replaced”. Ironically, as Coleridge remarks (in his *Biographica Literaria*), Spinoza was not above taking a hint or two from Descartes’ animal machines, and he in turn constituted a source for Leibnitz’s conception of the pre-established harmony ([19], 74).

However, this quote is from a different Spinoza than the Dutch Jewish philosopher. The quote comes from the fictional character Spinoza in Berthold Auerbach’s novel *Spinoza*. Cohen’s great chain of ideas’ transmission lacks justification as well as real historical continuity. This novel is one of the earliest in which the golem occurs (1837). Here, the full quote in Auerbach’s *Spinoza* is the end of a long line from the character Spinoza:

The great Rabbi Löw certainly never thought of Descartes, and yet his Golem had as much life as any man, if we are to accept the new view, that the union between soul and body is so slight that at any moment it can be disjoined, and again reunited ([4], 217).

The pedantic reader would also react to the improbable fact that Rabbi Loew (1512/1525–1609) had read the work of Descartes (1596–1650) in Auerbach’s text. Searches through Spinoza’s (1632–1677) works, and the historical résumé of the golem stories made by Moshe Idel [47] indicates that Spinoza did not write on the golem story. Christoph Lüthy also contributes to the construction of a golem myth when he writes “In Gustav Meyrink’s [*sic!*] novel *Der Golem*, the clay man flees his rabbi’s rule and becomes something of an immortal symbol of the wandering Jew” ([57], 20). Lüthy here mixes Meyrink’s version of the golem story with the tradition of attributing the golem creation to a rabbi—most often Loew.

The stories of the golem can also be used as an example of my argument that stories get their meaning through use, since the different meanings of all the golem stories vary from being anti-Semitic to

being a celebration of Jewish-Czech identity [6, 38]. Baer explains this phenomenon by writing that with the multitude of golem texts and legends, “no one text is the ‘true’ text and that all golem legends continue to exist and to serve as both sources and intertexts” ([5], 22). It is also interesting to note that the first movie adaptations of the golem story (1915–1920) can be interpreted as a meta-project whereby the story of giving life to a creature (the golem) is being duplicated through the technical mis-en-scène of humans. When looking at Paul Wegener’s movie *Der Golem—wie er in die Welt kam* [77], it is difficult for this author not to think of Sigfried Giedion’s [39] presentations of how nineteenth century mechanization created new aesthetic ideals, forms, and movements. Wegener’s golem, played by himself, moves like a mechanic doll—very similar to Frankenstein’s monster in the adaptation to film from 1931. In this version, Boris Karloff’s movements were inspired by Wegener’s golem [27]. In Wegener’s movie, the creature was benevolent, but later movies on artificial life express a type of mechanophobia that remains a paradigm until the problem becomes artificial life’s similarity to humans as portrayed in *Blade Runner* (1982). Here, the production of genetically engineered *replicants*, humanoids with designed qualities, is the basis for the colonization of outer space. In *Blade Runner*, the uncanny element exists rather in the impossibility of knowing who is human and who is not human—and if it really matters in existential and ethical terms.

History Writing and Technologies—Theoretical Understanding

Writing and telling history as aiming toward a goal—or holding the view that society is moving from a beginning and toward an end, Sigfried Giedion refers to as rationalistic:

Rationalism, whether retaining belief in God or not, reaches its ideological peak in thinkers of the latter half of the eighteenth century. Rationalism goes hand in hand with the idea of progress. The eighteenth century all but identified the advance of science with social progress and the perfectibility of man.

In the nineteenth century the creed of progress was raised into a dogma, a dogma given

various interpretations in the course of the century ([39], 30).

Debates over science and its social position have to some extent been historiographical debates. If one believes in stories of origins, one such story could be the rise of the Strong Programme, that later became an important dimension of science and technology studies, based on readings of Thomas Kuhn’s [51] views on the historiography of scientific discoveries. In a now classic defense and illustration of the Strong Programme, David Bloor [7] wrote a full chapter on the differences between the Popperian and the Kuhnian approach to (the history of) science. Kuhnian history of science represented a welcome break with the perspective of continuity in history and the underlying panglossian and whiggish insistence that the world of today was the goal of all of yesterday’s efforts [30, 53]. In Voltaire’s *Candide*, Pangloss is a philosopher who insists that “we live in the best of all possible worlds” even though *Candide*’s and his company’s travels are filled with miseries [75]. The notion of “whiggish” is connected to a specific way of perceiving the past only in its relation to the present—and not by its own merit:

It is part and parcel of the whig interpretation of history that it studies the past with reference to the present; and though there may be a sense in which this is unobjectionable if its implications are carefully considered, and there may be a sense in which it is inescapable, it has often been an obstruction to historical understanding because it has been taken to mean the study of the past with direct and perpetual reference to the present ([12], 11).

Butterfield’s position here is then an idea of analyzing the distinct social forces at play in different places in the past. He developed this position further and applied it to the rise of modern science. In his *The origins of modern science: 1300–1800*, Butterfield holds that “change is brought about, not by new observations or additional evidence in the first instance, but by transpositions that were taking place inside the minds of the scientists themselves” ([13], 1). Kuhn refers to Butterfield’s introductory remarks as “a classic case of a science’s reorientation by paradigm change” ([51], 85) and thus aligns himself with Butterfield.

How Can We Use History?

“What can we learn from the past?” That is one of the big issues that this article addresses. Connected to that big issue is another huge question: “What is history?” The golem story is at once both a past artefact and a contemporary attempt at societal orientation. As Jürgen Habermas [45] has argued, we should not reject out of hand possible insights into common value-based discussions just because some such insights cannot be justified outside of a faith-based sphere. In a similar vein, Klas-Göran Karlsson concludes that “uses of history that in themselves or in their consequences violate established principles of human rights, by humiliating, wounding or in other ways inflicting suffering on individuals or collectives, are abuses of history” ([48], 141). From such considerations, it seems clear that golem uses are not illegitimate to the extent that they investigate the possible ethical implications of a story without inflicting suffering.

In *The Well Wrought Urn*, a seminal book in the trend of literature studies now labeled New Criticism, Cleanth Brooks writes:

We can very properly use paraphrases as pointers and as short-hand references provided that we know what we are doing. But it is highly important that we know what we are doing and that we see plainly that the paraphrase is not the real core of meaning which constitutes the essence of the poem ([9], 180).

Brooks here points to a view that holds that the meaning and the message of a well-composed and forceful piece of art—or in his case a poem—cannot be fragmented into a set of particulars that are themselves providers of the poem’s meaning. Brooks attacks the “heresy of paraphrase.”

Most of the distempers of criticism come about from yielding to the temptation to take certain remarks which we make about the poem – statements about what it says or about what truth it gives or about what formulations it illustrates – for the essential core of the poem itself ([9], 182).

Brooks is critical of making generalist abstractions of a poem that are supposed to make up the inner core of the poem or what the poem really says. He suggests that we see the poem as a drama—as the unfolding of a series of words and events. He sees the poems as

expressing paradoxes, ironies, and incompatibilities. Brooks would agree that a change in structure or any sort of editing or paraphrasing creates something new. Maybe this new item qualifies as literature or art—and maybe not. Anyway, Brooks’ point could be understood as highlighting that any use of a story is a change of the story. There is a large middle ground between Karlsson and Brooks. Karlsson’s position can be used to justify all use of history that does not cause suffering, while Brooks does not allow for any interference with the original at all.

A central concern in this paper is that the use of meaningful material should be theoretically justified. However, even in cases where there are several competing theories of interpretation, it might be that none (or all) can be applied. In one of Smith’s [71] works on the theories of myth, he tells us the story of the Bororo people in Brazil. They have posed a significant challenge to ethnologists and anthropologists of the nineteenth and twentieth century because they, according to the ethnographic traditions, claim to be parakeets, while it is obvious to every observer that the Bororo are humans. Smith argues that none of the theories of myth from James George Frazer and Lucien Lévy-Bruhl to Edward Evan Evans-Pritchard and Claude Lévi-Strauss has managed to reconcile the position that “myth is true” with the veracity of the Bororo statement that they are (metaphysically) parakeets. Theoretically informed readings should of course be put to the test just as Smith proposes. Smith shows us the underlying theoretical blind spots and the difficulties in making coherent sense of mythological material but argues for the necessity of theoretically informed approaches to the study of myth.

As Appiah [3] reminds us, people tell stories, and these stories constitute communities. This narrative function even has an evolutionary benefit, and its neurological and physiological basis needs to be further understood, according to Le Hunte and Golembiewski [54]. Jay Clayton writes that “The interest of SF [science fiction] does not lie in its ‘take-home lessons’ [...] Rather the interest for policy lies in what the genre shows about the historical contexts that produced it and in the cultural attitudes the genre reveals” ([18], 319). What I propose is to use insights on uses of historical storytelling, philosophy of history, and theories on myth to discuss the different uses of myth to emerging sciences and technologies. Central to this will be Jörn Rüsen’s insights on uses of historical storytelling. Rüsen has created a typology of uses of history.

This typology has been used to analyze and establish how narrators of stories put themselves as moral and cognitive agents within the limits of their experiences and what they perceive as legitimate future choices. By showing how the different uses can be explained theoretically by Rösen's model, I will use it to explore further uses of cultural stories as a possible source of insight into new and emerging technologies.

Theories of Historical Consciousness

I will suggest that the logic that Jörn Rösen finds in ethnocentricity is isomorphic to the problem of reaching out beyond one's own identity narrative, which is inherent in narrative ethics. This is because self-narratives are created in resonance with an individual's cultural surroundings and must have compatibilities with these surroundings [10]. According to Rösen, there are three characteristics in ethnocentric thinking:

1. Concerning its guiding value system, ethnocentric historical thinking is based on an unbalanced relationship between good and evil. As I have already pointed out, positive values shape the historical image of oneself, and negative ones the image of others ([66], 122).
2. Teleological continuity is the dominant concept of time that rules the idea of history in master narratives. Traditionally, historical development from the origins of one's own life-form through the changes of time to the present-day situation and its outlook into the future is a temporally extended version of all those elements of this special life-form, which constitute the mental togetherness of the people ([66], 122).
3. The spatial equivalent to this temporal perspective is a monocentric world. One's own people live in the center of the world, and otherness is situated and placed at the margins. The longer the distance from the center, the more negative is the image of otherness ([66], 124).

There are then the notion of good and evil, a notion of temporal continuity and a notion of center and distance from the center. Jörn Rösen suggests that it is easy to find a way out of the dichotomy of good and evil in history culture. He writes that

the identity-forming value system must include *the principle of equality* going across the difference between self and others. Then the difference itself loses its normatively dividing force ([66], 125).

However, Rösen is quick to point out that an abstraction of "equality" seldom or never forms a part of a person's identity. In order to reach a notion of recognition, Rösen argues that it is necessary to introduce negative historical experiences into the culture's master narrative. In this way, it is possible to reach mutual recognition which opens up for equality. In order to avoid the temporal continuity, Rösen suggests looking at the temporal chain as conditions of possibility rather than of opportunity, and to change the perspective from the archaic origin to present-day. In this way, an individual can learn to look at choices and opportunities made and lost instead of approaching the world as planned and teleological. Rösen does not really come up with a good solution (other than to use *multiperspectivity* and to try to make a story of humankind) to the problem of the center. It might be that in narrative studies, narrative ethics, and narrative historiography that it is impossible to enlarge the narrator.

In an earlier article, Rösen gives examples of four different types of historical narration which he explains first in general:

narration has the general function of serving to orient practical life within time. It mobilizes the memory of temporal experience, developing the notion of an embracing temporal whole, and bestows on practical life an external and internal temporal perspective ([65], 43).

This narration which creates what Rösen calls historical consciousness can be further divided into six factors, of which the last two, this form of consciousness' relation to moral values and moral reasoning, will be of interest here:

1. its content—i.e., the dominant *experience of time*, drawn from the past; 2. the *patterns of historical significance*, or the forms of temporal wholes; 3. the mode of *external orientation*, especially in respect to the communicative forms of social life; 4. the mode of *internal orientation*, particularly in respect to historical identity as the core of historicity in human self-awareness and

self-understanding; 5. the *relation of historical orientation to moral values*; and 6. its relation to *moral reasoning* ([65], 44).

The four different types of historical consciousness are, according to Rösen, the traditional, the exemplary, the critical, and the genetic type—and all take a narrative form.

The traditional type of historical consciousness is characterized by a connection to origins and a notion of obligations being transmitted through traditions; past occurrences give us our values and serve as a basis for the validity of these values. “Traditional historical orientation defines morality as tradition. [...] In respect to moral reasoning, traditions are reasons upholding and underpinning the moral obligation of values” ([65], 45).

The exemplary type of historical consciousness consists mainly in the articulation and following of rules. The past contains examples of certain canonical events that serve as a basis for extracting abstract rules. Morality here has a timeless validity and is proven and understood by just such a timeless validity: “history teaches moral argument by means of the application of principles to specific and concrete situations” ([65], 46).

The critical type of historical consciousness appears in the ability to take a critical stand toward the validity of the past as an obligation to act in certain ways. This can be done by showing that there are other grounds for acting, which is to produce a counter-narrative, which questions the validity of comparing a situation in the past to present-day circumstances.

Its contribution to moral values lies in its critique of values. It challenges morality by presenting its contrary. [...] It calls morality into question by pointing to cultural relativity in values contrasted with a presumed and specious universality, by uncovering temporal conditioning factors as contrasted with a bogus “timeless” validity ([65], 48).

Rösen’s fourth type is the genetic type of historical consciousness which he explains as a situation where change itself is the essence of a story. It furthers the changing circumstances and contexts that are necessary to provide stories with meaning. Our behavior must differ from past patterns, since repetitions would serve to estrange ourselves from the difference between present and past.

Moral values become temporalized, morality shedding its static nature. Development and change belong to the morality of values conceptualized in terms of a pluralism of viewpoints [...] moral reasoning relies here essentially on the argument of temporal change as necessary or decisive for establishing the validity of moral values ([65], 50).

Inherent in Rösen’s view, we can perceive a notion of possibilities for developing historical identities, narratives, and ethics. Rösen also states that his model is inspired by Kohlberg’s [49] model of moral development. The important point here is that all these types are narrative types: they are stories told by someone to someone else (or oneself) to make sense of the world.

One possible weakness of this model is that it does not establish a fixed point of reference and is thus relativistic. Another weakness is that it can be seen to be isomorphic with the development of history writing in European academia (Table 1).

However, by applying the model developed by Rösen, and sketched out here, I believe that we can develop a tool for talking about and discussing narratives with informants and lay people, on the one hand, and for analyzing such narratives on the other hand.

As Rösen and others would point out, it is possible to apply other interpretational frames to stories about the past (history). It could be possible to deny any identity through continuity and rules and point to other stories or experiences that oppose, threaten, undermine, deny, or counter the proposed interpretation of the suggested narrative. Such an approach would be a critical narrative. The best-known examples of such approaches are feminist, minority, and neocolonial readings of history.

The Golem and Uses of History

Norbert Wiener’s Golem

In *The Pentagon of Power*, Lewis Mumford addresses the golem. Here, the context is the two guiding magical aims he claims underlie the tradition after Francis Bacon:

First: he who creates a perfect automaton is in fact creating life, since, according to mechanistic doctrine, there is no essential difference between

Table 1 Typology of historical narration

	Memory of	Continuity as	Identity by	Sense of time
Traditional narrative	Origins constituting present forms of life	Åermanence of originally constituted forms of life	Affirming pre-given cultural patterns of self-understanding	Time gains the sense of eternity
Exemplary narrative	Cases demonstrating applications of general rules of conduct	Validity of rules covering temporally different systems of life	Generalizing experiences of time to rules of conduct	Time gains the sense of spatial extension
Critical narrative	Deviations problematizing present forms of life	Alteration of given ideas of continuity	Denying given patterns of identity	Time gains the sense of being an object of judgment
Genetical narrative	Transformations of alien forms of life into proper ones	Development in which forms of life change in order to establish their permanence dynamically	Mediating permanence and change to a process of self-definition	Time gains the sense of temporalization

Source: [64], 91

living organisms and machines, provided they work. Even such a percipient and sensitive mind as that of Norbert Wiener came increasingly to endow his Golem with the ultimate properties of life. But, second, beneath this magic was a more insidiously flattering idea: *he who creates life is a God*. Hence the very idea of a creative deity, which science from the sixteenth century on had regarded as a superfluous hypothesis in analysing matter and motion, came back with redoubled force in the collective persona of organized science ([60], 125).

The reliance on a specific version of the golem myth where life is opposed to inanimate matter is here clear. This dichotomy is also present in Norbert Wiener’s usage where he writes

In our desire to glorify God with respect to man and Man with respect to matter, it is thus natural to assume that machines cannot make other machines in their own image; that this is something associated with a sharp dichotomy of systems into living and non-living; and that it is moreover associated with the other dichotomy between creator and creature ([80], 12).

The golem myth in earlier forms evolved around the impossibility of creating a man with a soul—not a living being in itself [68]. Mumford [60] argues that Johannes Kepler and Galileo Galilei had removed the soul from scientific considerations in the sixteenth century—and that only mass and motion mattered in their worldviews. Wiener’s position here with four sets of dichotomies:

God/man; man/matter; living/non-living; creator/creature—combined with the capital letters—is a powerful rhetorical device. He says that they are associated and that it is “natural to assume” these connections. Of course, Wiener goes on in the text to show that machines can make other machines (theoretically) through means of machine learning and cybernetics. Wiener explicitly identifies the learning and new machines with Rabbi Loew’s golem. In Wiener’s framing story, he establishes the golem as the entity between God, man, and machine. Wiener’s reluctance to be specific in what he exactly means by a golem in his book renders the analysis of his approach to myth and history difficult. His subtitle “*A Comment on Certain Points Where Cybernetics Impinges on Religion*” suggests with the word “impinge” that there is a conflictual relationship. Wiener is somewhat more concrete when he seems to advocate that the relationship between science and religion should be assessed based on knowledge, and by this, it is fair to assume that he means scientific knowledge:

Knowledge is inextricably intertwined with communication, power with control, and the evaluation of human purposes with ethics and the whole normative side of religion. It is hence germane to a revised study of the relations between science and religion that we should re-examine our ideas of these matters in terms of the latest developments of theory and practical technique ([80], 3).

It is difficult to conclude otherwise than that Wiener sees his science of cybernetics as being able to provide a more robust foundation for normative human behavior.

This sensation is strengthened by his play with Matthew 22:21: “Render unto man the things which are man’s and unto the computer the things which are the computer’s” ([80], 73). The golem in Wiener’s parlance seems to become the self-learning machine which “will continually transform itself into a different machine, in accordance with the history of the actual play” ([80], 18). Wiener says that such a machine will be able to outplay its creator or programmer. Through Wiener’s rhetoric, the golem is no longer a being of the past but becomes an ideal for the future. Wiener does not have any revolutionary views, like the ones found in Bostrom [8] where he suggests that the future posthumans will discover new norms and values. It is difficult to say whether Bostrom should be seen as a genetic or exemplary user of history. His emphasis on transformations points toward a genetic use of history, while his theory of the foundation of norms and values rests on twentieth century sociologists seems to make him exemplary. However, I would see him as an exemplary user of history because of his evolutionist and rationalist leanings. Wiener, on his side, explicitly addresses a situation where machines might become out of control with reference to another story, “The Sorcerer’s Apprentice.” Wiener concludes that “we had better be quite sure that the purpose put into the machine is the purpose which we really desire and not merely a colourful imitation of it” ([79], 1358). Wiener’s conception of the golem should be seen as in dialog with Scholem [67] presentation of the golem as a Kabbalistic figure. Scholem writes “obviously a man who creates a golem is in some sense competing with God’s creation of Adam” ([67], 159). Mumford’s suggestion that Wiener puts himself in the creator’s place seems justified.

Wiener’s emphasis on origins as crucial in how entities become responsible agents places him in a traditional use of history. However, his view that science will replace religion as a foundation for norms—and which again opens up for future changes—places his use of history in the genetic tradition. His focus on law-like norms for controlling human behavior seems to make him an exemplary narrator of history. It seems most reasonable to categorize Wiener as an exemplary user of history because he is not interested in ruptures, but wants to “re-examine our ideas of these matters in terms of the latest developments of theory and practical technique” as if this development is a continuous evolution which constitutes a basic human condition.

The Golem in Collins and Pinch

Everyone who has published a book knows that the editor wants a title that attracts attention. This seems to be the case with Wiener’s book, and I hope it is the case with the trilogy of the golem and science, technology, and medicine by Harry Collins and Trevor Pinch. As a reader, one is left with the impression that they do not even try to use their overarching mythological framing in their analyses.

The use of myths or stories as explanatory devices for understanding science and technology suggests a specific point of view and a particular understanding of the content and function of a myth. To begin with the latter, I will suggest that myth usage by Collins and Pinch is mainly seen as constructing a framework that creates meaning between the different items and agents in the story. This usage bears great similarities to the view that Victorian anthropologists Spencer, Tylor, and Frazer had on myth: myth is a story that primitive people tell themselves in order to understand their surroundings and rituals are carried out on the basis of such myths in order to control nature and society through magic [20, 78]. There is one central difference between this Victorian usage and much of the Collins and Pinch usage: the Victorian anthropologists collected the stories among the primitives while Collins and Pinch [21–23] set up the golem myth as the main background for the public in general to understand the rituals carried out in labs and in mediatised science performances. According to Collins and Pinch, the golem story is as follows:

A golem is a creature of Jewish mythology. It is a humanoid made by man from clay and water, with incantations and spells. It is powerful. It grows a little more powerful every day. It will follow orders, do your work, and protect you from the ever threatening enemy. But it is clumsy and dangerous. Without control a golem may destroy its masters with its flailing vigour; it is a lumbering fool who knows neither his own strength nor the extent of his clumsiness and ignorance ([21], 1).

However, Collins and Pinch’s position seems to have similarities with the use of metamythical structures as proposed by, among others, James George Frazer’s understanding of all mythology as being centered around the theme of dying and resurrecting gods. According to Frazer, all mythology could be compared and understood under this formula [78]. In their golem trilogy, Collins and Pinch write “What,

then, is science? Science is a golem” ([21], 1; [22], 1; [23], vii). Translated into Frazerian anthropology, this would read “What then is myth? Myth is the story of dying and resurrecting gods.” This metamythical method of comparison is based on a “rationalist confidence in ‘covering laws’ of human development” ([78], 93), and as such, it fits rightly into Rüsén’s category of exemplary use of history. Collins and Pinch belong to the tradition of sociology of knowledge after Mannheim [24]. He wrote about the sociology of knowledge that it sets itself “the task of solving the problem of the social conditioning of knowledge by boldly recognizing these relations and drawing them into the horizon of science itself and using them as checks on the conclusions of our research.” ([58], 237). The articles in the Collins and Pinch golem trilogy all carry the hallmark of a critical sociology of knowledge where they deconstruct stories from science and technology into social factors conditioning large-scale science systems. In this manner, their popular framework for explaining modern science, technology, and medicine based on their own retelling of the golem myth is removed from their critical endeavor.

Another important trait of the golem in Collins and Pinch is that the “golem, powerful as it is, is the creature of our art and craft” ([21], 2). In the first chapter in the first golem book, the authors investigate the theories and trials of memory transfer between individual worms, rats, or mice. This, as Collin and Pinch show, was a field of research that petered out without any final word and “the gaze of the golem turned elsewhere” ([21], 25). Except for the discussion on Pasteur’s germs, there is nothing concerning creation of life in their books: the “life” that is created is “science,” “technology,” and “medicine.” If Collins and Pinch were to be corrected in their assertion that “without control, a golem may destroy its masters with its flailing vigour” ([21], 1), one would expect larger catastrophes than the exploding space vessel Challenger [21], and I do not understand which masters are being killed when children are exposed to unnecessary tonsillectomy [23], but I recognize that unnecessary surgical procedures should be abolished. However, in both these cases, it is technology or medicine that gave the answer to the explosion and to the injuries.

Collins and Pinch introduce a new layer of meaning to the golem story, that the story is somehow about the justifications behind science, technology, and medicine,

but this interpretation seems to be in contrast to their initial view of golems as destructive and daft. In their chapter “Crash!: nuclear fuel flasks and anti-misting kerosene on trial,” Collins and Pinch [22], 57–75) address the issue of demonstration vs. experiment in a historically informed manner.

Terrence Deacon also approaches a specific type of golem. His golem is a product of “Jewish folklore of the late Middle Ages” and it is “formed from clay to look like a man and is animated by a powerful rabbi using magical incantations” ([25], 91). Deacon contrasts and compares the golem to robots, homunculi, and zombies. Deacon clearly uses the golem as a form of taxonomic principle but hides the meaning rather well in the text. He explains that he understands a “golem as the avatar of [...] apparently mindlike processes that are nonetheless devoid of their own ententional properties (91). By the term “ententional” Deacon means “those attributes that are characteristic of living things that are not found in inanimate matter and include such things as a sense of self, self-maintenance, self-preservation, purpose, goal-orientedness, end-directedness, function, reproduction, evolution, adaptiveness, subjectivity, value, and meaning or semiosis” ([56], 292). It is uncertain if Deacon’s use of the word “avatar” refers to the Hindu theological notion of a God assuming different shapes and thereby also different qualities [28], or to the online practice of providing a fantasy graphic portrait of oneself. The story of the golem in Deacon’s text becomes an exemplary story according to Rüsén’s taxonomy. The golem is seen as an expression of a systemic function that plays out identically in all contexts. Deacon uses myth in an exemplary manner. He also has a peculiar reading of the golem where he sees truth, the word some legends say is written on the golem’s forehead, as “heartless and mechanical, and by itself it cannot be trusted to lead only to the good” ([25], 93). Deacon seems here to assume that entities that only follow instructions and take these as truths, like the golem in Deacon’s system, sooner or later will lead to a disaster. Deacon’s use of the golem is somewhat similar to the golem in Collins and Pinch since there is an understanding of a certain stupidity inherent in the golem. However, they seem to differ in that Deacon’s golem leads automatically to a disaster while Collins and Pinch’s golem just creates chaos and is the opposite of systematization.

However, bearing in mind the etymological meaning of the monster as something to be shown and displayed (often with a moral undercurrent as an abomination), the

view of the golem as a monster seems to be commonplace in much of the literature on the golem myth—and especially its connection to new technologies [40, 42, 43, 50, 63]. Reading the Collins and Pinch golem trilogy as a demonstration of science as an abominable and monstrous societal practice since it is unclean could be done with reference to Mary Douglas [29] who studied the eating restrictions in the Hebrew Bible based upon a structuralist understanding of myth and ritual: through deciding what societal practices that can be framed as being in place—or not out of place—some practices are forbidden and others made mandatory. Their portrayal of science, medicine, and technology as monstrous places these disciplines and practices in a taboo-category that are at once holy and forbidden in Douglas' categorical schemes. The content of the stories Collins and Pinch tell indicate that medicine, science, and technology are mundane matters that should be discussed openly and freely as issues that affect different people in different manners, but this, alas, is not the content of myths.

The Golem in Grinbaum and Groves

Grinbaum [40] explicitly addresses “The nanotechnological golem”. He explains “it helps to compare oneself with, say, Daedalus, and see if questions arise that are common to the situation of moral choice with respect to contemporary technology and the situation in which Daedalus found himself according to myth” ([40], 192). Grinbaum tells a medieval golem story from the Rhine area. The golem creator, Jeremiah, destroys his golem because it was not possible to tell the difference between a human and the golem. For Grinbaum, the moral of the story is clear:

Various similarities as well as differences exist between Jeremiah and the modern scientist. Like Jeremiah, the scientist only considers true the knowledge that he can transform into know-how and apply practically. One could imagine that the scientist would be merely satisfied with being aware that he possesses some knowledge, without necessarily transforming it into a technology to be applied in the real world. But, like for Jeremiah, this option is untenable for the technoscientist. Practical implementation of knowledge in the form of technological know-how has become the ultimate criterion of true knowledge for a

representative of this crossbreed between an old-style scholar and an engineer ([40], 193).

Grinbaum tells us that “the technoscientist” cannot hold truths other than the ones he can transform into some technological piece that is devoid of societal concerns. There is, for Grinbaum, a continuity through the ages between Jeremiah and “the scientist.”

Both alone and together with Chris Groves, Grinbaum is more explicit in a later article on how the golem story can “cast new light on modern science and technology” and that “[i]n reflecting on such stories, we may learn more about the complexities of moral judgment” ([42], 137). They claim this time that there are points of comparison between the Prague golem legend and modern technology in the creator of technoscience/golems. These points of comparison are as follows: purposefulness, reversibility, machine-like obedience, and responsibility. Grinbaum and Groves then continue to analyze the Frankenstein story as a parable for technology and responsibility.

According to the framework for typologies for historical consciousness developed by Jörn Rüsen, the uses of stories by Grinbaum have evolved from the 2010 paper to the 2013 paper. Grinbaum's application of the golem story is done in the traditional mode in the first paper [40] and in the exemplary mode in the second paper [41]. In the first paper, the patterns are pre-given, while in the second, he and Chris Groves address some historical rules. In the first paper, Grinbaum takes the identity of Jeremiah and the technoscientist for granted, while in the second, this identity is expressed through the four general points of purposefulness, reversibility, machine-like obedience, and responsibility.

Two types of use of history then remain unused, the critical and the genetic. One striking issue with the uses of history and myth by Grinbaum Groves and others is that the narrators know the outcome of the golem stories while they cannot know the outcomes of the technology stories since these outcomes are located in the future.

The Golem's Alphabet

Rabbi Byron Sherwin [68] has a different understanding of the golem than that of many other writers. For him, the golem is the righteous quest for technological goods. He contrasts this to the Frankenstein science which he sees as human vanity and exploitation. Sherwin [69] tells us that the golem story has proved highly versatile

and has become, among other uses, a parable for human technological inventions. In a very succinct passage, he addresses the issue of new meanings in new contexts. When it comes to the creation of golems—or life—he writes

If the adept could discern the proper primordial order of the letters of the Torah, the letters of God's long name, he could work wonders. He could crack the code of creation. With the sequencing of the human genome, these abstruse medieval notions have taken on a new meaning and relevance. Like the Torah, the genome, sometimes called the Book of Life, consists of sequences of letters comprising a very long text. Decoding this book enables us to discover many of the secrets of life. If we could master the art of combining the letters that comprise this book, we could work wonders ([68], 48).

As I have identified, the use of a story might emphasize change, development, and transformations in what Rügen called the genetical narrative. The varying circumstances confer meaning to a story or make the story different. Sherwin's use is in this manner an instance of such use. The new event is the discovery of DNA with its four nucleotide bases guanine, adenine, thymine, and cytosine. The annotation of these bases are G, A, T, and C. Many humanists would suggest that there is a big difference between the letters GATC and the letters in the Torah. Craig Venter also sees the genome as a written text (or as information that can be translated into writing): "At Synthetic Genomics, Inc. (SGI), we can feed the digital DNA code into a software program that automatically works out how to resynthesize the sequence in the laboratory" (Venter [76], 156). In Sherwin's description of the relation between the letters, the sounds, and meanings of the Hebrew language, it is predominantly important that rabbis took for granted that God spoke in Hebrew. The letters codifying God's original message held creative power, and the combination of letters in different sequences could perform transformations such as that from inert to alive [33, 68]. Sherwin writes about a Talmudic golem account: "a golem is animated by the recitation of certain combinations of consonants and vowels" ([68], 13). The act of animating the golem through words is also present in several other versions of the story sometimes as a piece of parchment or paper and sometimes as writing on the forehead. This view would nowadays qualify as magical.

Sherwin's golem is nevertheless a creature for which its owner should care. Sherwin tells us how Rabbi Loew dressed, fed, and housed the golem. He used the golem for his or the local Jewish community's purposes, and when he had no more use for its service, he put the golem to rest. According to Sherwin, there is a large difference between Judaism and Christian thinking on the creation of life. This is seen as an abomination in Christianity, while Judaism holds this opportunity open. Bioethicist Paul Wolpe shares Sherwin's view in that the golem is profoundly different from the losing of control over technology:

There is no safety mechanism built into [Frankenstein's] monster. And ultimately Frankenstein must pursue his creation and he dies trying, unsuccessfully, to end the monster's life. While the golem always remains under control of its creator. Rabbi Loew builds a safety valve into the golem and when he gets out of control, he simply has to remove one letter from its forehead and it turns back into clay. And it's heartening to see the leaders of synbio have taken that idea of the safety valve seriously and built it into their products [73].

In the revisions of *I and Thou*, Buber [11] writes "But the severed It of institutions is a golem and the severed I of feelings is a fluttering soul-bird". And in a later note, Buber has explained the golem as "an animated clod without a soul". The golem in Buber's elliptic presentation can be interpreted to be a poorly functioning "It," and not a helper in any way. Likewise, Moshe Idel shows us the manifold interpretations of the golem in both ethical and theological discussions in Judaism [47]. James Redfield deconstructs the notion of "relevance" of the golem to modern biotechnology by pointing out that "in Judaism's classical literature, 'life' is inseparable from other *logoi*, especially theology and anthropology. Hence it is anachronistic to try to make the golem relevant to 'biology'" ([61], 64).

The Exemplarity of Science Stories

David Bloor sees history writing as a central issue for the understanding of the relations between science and society. One is struck by the one-dimensional view on the relation between society and historiography,

however. He sees not paradigmatic ideas such as Enlightenment or Romantic worldviews as the major influence on historiography, but rather “whether the underlying social image is that of a threatened society or a stable, confident and enduring one; whether society, or some section of it, is felt to be in decline or in the ascendancy” ([7], 78). Bloor calls this thesis a “law” that consists in

those who are defending a society or a sub-section of society from a perceived threat will tend to mystify its values and standards, including its knowledge. Those who are either complacently unthreatened, or those who are on the ascendancy and attacking established institutions will be happy, for quite different reasons, to treat values and standards as more accessible, as this-worldly rather than as transcendent ([7], 78).

In retrospect, it is not difficult to see the paradox of relativism that haunts Bloor’s approach. His certainty—the mystification of values and standards—should then be the product of “perceived threats.” However, it might also be argued that Bloor does not see himself as “defending a society or a sub-section of society,” and thus treats “values and standards as more accessible, as this-worldly rather than as transcendent.”

Bloor’s “law” is based on a view of history—and of the writing of history—as governed by specific general structures similar to what Carl Hempel [46] called “General Laws.” The Strong Programme’s endorsement of Kuhnian history of science can be fully justifiable without resorting to General Laws, however.

Referring to Rösen’s framework, we can argue that Bloor finds patterns of identity in history that govern people’s actions. He writes a form of exemplary history where instances are given validity and meaning through their incorporation in the general laws.

Concluding Remarks

In analyzing a story, Rösen shows how its potential moral implications depend upon what can be called “framing” in the parlance of assessment traditions, and that “factors [...] are generally considered external to analysis and are excluded from explicit reflection” ([72], 275). As in Rösen’s theoretical presentation, the framing conditions are not part of the story told, but

necessary for understanding the social setting of a given technology appraisal. Stirling relates such framing conditions to exercising power through science and lists the following concerns as being part of the framing conditions that are external to the analysis, but have “determining influence”:

Choosing policy questions, bounding institutional remits, prioritizing research, including disciplines, accrediting expertise, recruiting committees, setting agendas, structuring inquiry, forming hypotheses, choosing between methodologies, defining metrics, characterizing decision options, prioritizing criteria, interpreting uncertainties, setting baselines, exploring sensitivities, conducting peer review, and constituting proof ([72], 275).

These are factors influencing the production of expert knowledge. Wynne ([83], 282) sees “the social relationships, networks and identities” as “the best explanatory concepts for understanding public responses to scientific knowledge.” According to the theoretical framework developed by Rösen ([65], 43), “narration has the general function of serving to orient practical life within time”. The structuring, reception, and interpretation of—among other things—scientific knowledge are then dependent on the socially existent epistemological modes of historical consciousness. The production of understanding of technologies among non-experts is equally dependent on “framing issues” as it is for the experts, but in the case of laypeople, these issues are rather “social solidarity and dependency—of social identification with material kinship, friendship, and community networks” ([83], 299).

In the critical mode, one will typically deny obligations with references to past events, but this denial will need justification. When approaching the critical type of historical consciousness, one important feature is to establish a counter-narrative. Counter-narratives are critical in the sense that they serve to highlight “deviations which render problematic present value-systems” ([65], 47). Where Grinbaum and Sherwin—and to some extent Wiener—found identities and continuities, and Bloor, Collins and Pinch, and Grinbaum and Groves discovered rules, in the critical mode the timeless and static nature of stories are challenged and different stories or voices are looked into. A given agent involved in technological developments confronted with a golem story could point to the fact that before 1840, the golem

“was essentially a story about rabbinic mastery of the holy word” ([26], 251). The central part of the story was then the piece of writing placed in the golem’s mouth and removed again to bring it to rest. In such an understanding, the essential point is the mastery over writing rather than the mastery over matter. Hence, the philosopher, the poet, or the rhetorician constitutes the danger because they control the words we use in relation to matter. What remains similar between the critical version and the two other versions is that with mastery comes responsibility, but the tools for mastery are different. It seems reasonable to assume that Collins and Pinch and Grinbaum and Groves suggest counter-narratives to what Felt and Wynne suggest are the dominant narratives in “modern technoscientific societies,” namely “narratives that blame ignorance and privilege scientific knowledge have become sufficiently entrenched to be regarded as master narratives” ([34], 74). Nevertheless, Grinbaum and Groves seem to be trapped within a “dynamic of negation” which, according to Rösen ([64], 92), “is not sufficient; it only replaces one pattern with another.”

Moving to Rösen’s genetic mode of historical consciousness where “moral values become temporalized, morality shedding its static nature” ([65], 50). Here, change is of the essence. If an agent is to keep up his or her relation to society, it is vital that he or she changes with society. Neither a narrative nor its negation can serve to provide a final point of view, but change and difference become the main historical continuity. This continuity should be understood as pointing toward a future—a future that is different from the present—and it will be this different future that we need to acknowledge when making a moral choice. Since society and societal norms and values are at play when reaching a decision, the golem plot has to be located to a concrete societal situation; there is no abstract right or wrong. Jeremiah or the rabbi must be endowed with future expectations and the task to be accomplished with the golem must be rendered explicit. Even the translation from the golem to technoscience needs to be justified and relativized as translation and not identity piece by piece, item by item, social issue by social issue. One example of such genetic moral orientation can be found in an article by Winickoff et al. [82] examining differences in risk assessment regimes in Europe and USA. Here, they suggest that “risk assessment always incorporates policy and value judgments” and that “public participation has an important role to play in generating

reliable and conclusive risk assessments, especially in novel and contested risk situations” (93). Furthermore, an important issue to stress is that all risk assessment depends on certain “framing” conditions, which are conditions for selecting, weighing up, and presenting the most important dangers. All phases of a risk assessment involve social and political choices and decisions; so, all claims in favor of a value-free and neutral risk assessment should be rejected. Winickoff et al. emphasize change in a similar way as Rösen’s genetic mode since they underscore how societies and challenging societal situations are dependent on each other.

Singer [70] uses the term “golem” to signify “artificiality” in general. Singer sees “golems” as being the stories told about golems, the creature, and artists.

The artist must love the matter which he forms. He must believe in it, grant it life, bewitch it and be bewitched by it. There hasn't yet lived anyone who could improve upon the “Song of Songs,” Homer's Iliad, Dostoyevsky's “Crime and Punishment,” or Michelangelo's “Moses.” The golem-makers were actually the fiction masters of their time. In a way they were lying to themselves and to others, but their lies precursed the truths of the future: men's attempt to endow mechanisms with qualities that God has given to the human brain [70].

Singer writes that the world-view of the Kabbalah where man is free to pursue his God-like intentions is preferable to the mechanistic world-view presented by evolutionary science and astrophysics. He obviously means that the containment of the golem in Jewish Kabbalah is a quality modern science lacks. Modern science is not able to switch off their golems. Singer here sees creativity as the issue at stake. To some extent, he conflates the zeitgeist with the producers and the outcome. However, Singer sets up contrasts between creativity in periods; he sees extra-creative conditions as influential on the product and on the producers. Singer thus addresses the golem in line with Rösen’s genetic mode.

As mentioned above, Karlsson argues that “uses of history that in themselves or in their consequences violate established principles of human rights, by humiliating, wounding or in other ways inflicting suffering on individuals or collectives, are abuses of history” ([48], 141). Rabbi Byron Sherwin expresses a Jewish understanding of the golem similar to the one that Courtney

Campbell et al. describe when they argue that “[t]he world is not fallen, as in Christian tradition, but instead elicits from human innovation, knowledge, and technical skill to achieve completeness” ([15], 224).

Fraser and Honneth [36] argue that injustice can be understood both as lack of recognition and lack of redistribution inside or between societies. Ahonen [1] shows how history writing lacking recognition aspects can suppress groups and prolong conflicts. The recasting of the golem as a savior against the background of the Holocaust suggests a novel affinity between the golem story and Jewish identity [5, 14, 17]. This change of contextual settings for the golem serves as an illustration of how difficult it is to universalize specific moralities from singular myths or stories and adds material to Appiah’s [3] dictum that stories create communities—and even deepens the insight since the different versions of stories are indicative of different communities.

The golem story qualifies as what Eco [32] called “an open text.” What emerges from the analysis is a view of the writers on science and technology as an “interpretive community”:

Interpretive communities are made up of those who share interpretative strategies not for reading (in the conventional sense) but for writing texts, for constituting properties and assigning their intentions. In other words, these strategies exist prior to the act of reading and therefore determine the shape of what is read rather than, as is usually assumed, the other way around ([35], 171).

Stanley Fish sees readers as co-creating the meaning in the texts they encounter, and argues that there are unwritten rules as to how an interpretive community can create acceptable readings of a text. The rules for reading and re-writing the golem myth, in the literature on novel technologies seem to mainly consist in the notion that “history is life’s teacher”, in a more straightforward manner than other theoretical reflections indicate.

Questions of how to provide meaning to the past and how to draw this meaning back again into the present are also central in debates on science and technology. Academics and other thinkers often, for example, identify a technology that in their view indicates the future path for societal developments at large: Anders [2] and the atomic bomb, Lenin [55] and electricity, Fukuyama [37] and biotechnology, and Kurzweil [52] and artificial

intelligence, to name but a few. Such authors provide us with apocalyptic or utopian visions of our near future based on their understandings of the power of technology [see also 31].

Elizabeth Baer points out that “the golem himself is a kind of text—created through a ritual of words and having letters inscribed on his forehead in several versions of the tale” ([5], 15). The cultural framings of stories and the contexts for the stories decide the possible meanings that stories can have for a reader. The golem story is no exception, but in order to deduce ethical or normative meanings from a story, the interpreter needs to be wary and explicit about what kind of framing s/he chooses. Ethical deductions are used in accordance with critical and genetic ways of approaching history—not only in the traditional and the exemplary way—and these deductions are accepted in the wider academic milieu as equally valid deductions as the traditional and exemplary ones.

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