

Cultural history and technology: theory, concepts, and examples from the Netherlands

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Core texts referred to:

J. Bruner, *Making stories. Law, literature, life* (Cambridge, Mass: Harvard UP 2002), chapter 1, 'The uses of story'.

J. Carey, *Communication as culture* (Boston: Unwin Hyman, 1989; revised: New York: Routledge, 2009, with introduction by H. Stuart Adam), chapter 1, 'A cultural approach'.

D. Nye, *Narratives and spaces: technology and the construction of American culture* (New York: Columbia UP, 1997), Introduction.

R. Williams, *The long revolution* (London: The Hogarth Press 1992), pp 38-39.

M. Hessler, *Kulturgeschichte der Technik* (Frankfurt am Main: Campus, 2012).

Intro: do we need a conceptual framework?

During the forty or so years that I have been studying history, my main interest has always been in cultural history. To me this means trying to comprehend changes in how people see the world and themselves, and how they communicate and discuss their thoughts and feelings. Within that huge field, I was most interested in how people reacted to, and interpreted new technologies, especially the big innovations, which many believed would change the world: steam, electricity, nuclear power, computers. Most of my work is about the nineteenth and twentieth centuries.

Reading cultural history has been fascinating and frustrating at the same time. Fascinating, because such great books and articles have been written about it, but frustrating as well, because when I tried to learn from them how to practice this type of history, most of these works offered only very vague suggestions. When imagining a conversation in which I put this question to my favourite authors, they seemed to reply: just read as much as you can about your subject, immerse yourself in the sources; when reflecting on your reading, you will start to see patterns; make these patterns the core of your article or book; illustrate your story with the most telling quotations and the best examples, episodes, etc. that you have found. I use the word 'story' on purpose here, because I see these colleagues as first of all storytellers – and some of them are really outstanding ones.

A typical example is Paul Boyer's book about early reactions to nuclear weapons in the US, *By the bomb's early light*. The book is based on a massive amount of sources,

especially popular media, and it is very well written. But nowhere does Boyer explain how he selected his sources, what method he used in analysing them, and he tells you little about possible different interpretations and why he has chosen one explanation rather than another. He essentially tells a story, based on a couple of theses and narrative lines, which he illustrates with a mass of good examples. You tend to believe him because of his enormous erudition as well as the charm of his style – but afterwards you might think, as I did: what if you use a different set of sources, or if you find some of Boyer’s sources more or less important than he does? When I am in a more grumpy mood, I find such books overwhelming in detail, and impressionistic, even arbitrary, in their interpretation. This kind of criticism is applicable to many great books in cultural history, not just about technology. I am thinking about Keith Thomas’ work on religion, for example, or Alain Corbin’s *The lure of the sea*. And for cultural history of technology I had a similar experience with Joseph Corn’s *The winged gospel*, the recent book by Ronald Kline on cybernetics, and even David Nye’s analysis of American technological narratives, although Nye’s work is more theoretically informed (I’ll come back to him). These authors hardly use the theories and methods developed in, for example, the sociology of science and technology, popularization theory, concepts of narrative analysis, cultural anthropological approaches, etc; we even don’t see much explicit old-fashioned historical source criticism here. And they typically make big statements about what ‘people,’ ‘most people,’ or ‘many people’ thought or felt, offering as evidence only a few quotations and a lot of references in the footnotes – which, to me, is more suggestive than persuasive.

Please note that I am not talking of minor works, but about books that are highly regarded in the history of technology community, and that I admire myself as well. I also hasten to add that several historians of technology *have* paid a lot of attention to theory, including cultural theory – the American Paul Edwards is a great example for me; so is the Swiss historian Sarasin; or the German historian Martina Hessler. Hessler, by the way, recently published a *Kulturgeschichte der Technik*: an overview that I highly recommend (don’t forget to read the historiographical overview she wrote as an additional chapter, and which is freely available on the internet).¹ In short: I am not saying that no one is bothering

¹ A few rather arbitrary examples from my own reading: P. Edwards, *The closed world. Computers and the politics of discourse in Cold War America* (Cambridge, Mass: MIT Press 1997); A.W. Daum, *Wissenschaftspopularisierung im 19. Jahrhundert. Bürgerliche Kultur, naturwissenschaftliche Bildung und die deutsche Öffentlichkeit 1848-1914* (München: Oldenbourg 2002, 2d ed.); Ph. Sarasin, *Geschichtswissenschaft und Diskursanalyse* (Frankfurt a/M; Suhrkamp 2003); Anne-Katrin Ebert, *Radelnde Nationen. Die Geschichte des Fahrrads in Deutschland und den Niederlanden* (Frankfurt: Campus 2010); M. Hard, A. Jamison, *Hubris and hybrids. A cultural history of technology and science* (NY, London: Routledge2005); M. Hessler, *Kulturgeschichte*

with theory in this field, but I am surprised that so many seem to be doing happily without, and without getting much criticism.

If so many good books are written with so little attention to theory, why would you take the trouble of constructing a theoretical and methodological framework? I think there are two main reasons. First, theory sharpens your perception: you will see connections that you otherwise might miss. And second, if you want to work with others, for example in a comparative or transnational project, you simply have to agree with your co-authors on what kinds of sources to use, which questions to ask, and what methods to employ, in order to build up a coherent interpretation together. And by explicitly stating your theoretical point of view and your methods, you invite discussion with your colleagues, which may lead to improvement of these methods.

In this lecture, I will explain the framework I have developed. It is only one of many possible approaches which you might consider to use in your own work. In the first part, I will set out the theoretical flagpoles, in the second, I will try to demonstrate their usefulness with some examples from my own research.

Symbol sphere

In the seventies, as a student, I eagerly read Charles Wright Mills' *The sociological imagination*. I was especially inspired by the final chapter, in which he explains his method. To get a better understanding of his approach, I then read the large theoretical work he had written earlier, together with the German sociologist Hans Gerth, *Character and social structure* (1954). This book provided a comprehensive conceptual framework for analyzing any society, in all its aspects, and in all phases of human history. It seemed to offer a key to a historian like me, who was interested in a structural approach to history. The book disappointed me, however – and probably others as well, for you will find few references to it (see Jstor, Muse, web of science, scopus, google scholar).

But, as happens sometimes, one phrase of Gerth and Mills had stuck in my head: “symbol spheres” (plural). This concept has not caught on either (see the same search engines), but to me it is very useful. In fact, it has become my working definition of culture. Let me explain.²

der Technik (Frankfurt am Main: Campus, 2012); Chr. Neumaier, *Dieselaautos in Deutschland und den USA. Zum Verhältnis von Technologie, Konsum und Politik, 1949-2005* (Stuttgart: Franz Steiner 2010).

² The literature on cultural analysis is, of course, huge, and it is part of several academic disciplines, each with its own conceptual toolbox and theoretical repertoire. Therefore, one can be grateful to those erudite and

First, symbols are forms of what semiologists call ‘signs,’ commonly understood means of designating objects and experiences, which can be combined in myriad ways to create messages, in the form of sentences, stories, images, songs. They are, in other words, vehicles of communication, which I consider to be the core of culture (more of that in a moment). Second, although Gerth and Mills speak mainly of language, ‘symbols’ can also refer to images and even to ‘body language,’ because these are all ‘signs,’ which are used to convey meaning. ‘Symbol sphere’ therefore invites a broad approach of culture, and the use of a wide range of sources. And finally, while Gerth and Mills emphasize cognitive and normative aspects, symbols also convey feelings, hunches, and intuitions, which are obviously very important in reactions to technologies.

The second part of Gerth and Mills’ term is ‘sphere.’ This suggests that culture is an environment. I think of culture as one of several aspects of the world that surrounds us, and which includes, besides symbols: nature, artefacts, social arrangements and institutions. This view of culture differs from the more common one, in which symbols are assumed to be expressions of ideas which reside inside our heads. In this view, culture is basically a psychological, or ‘inner’ phenomenon. This implies that we can study culture only indirectly, through the outward manifestations in which these ‘inner worlds’ of experience are expressed. James Carey is one of many thinkers who disagrees with that view. He insists that

‘Thought is predominantly public and social. It occurs primarily on blackboards, in dances, and in recited poems. The capacity of private thought is a derived and secondary talent, one that appears biographically later in the person and historically later in the species.’

And: ‘Our attempts to construct, maintain, repair, and transform reality are publicly observable activities that occur in historical time.’³

eloquent scholars who can guide us through all this work and help us choose the tools we need for our own research. I suggest just three books that I have found extremely helpful, as well as enjoyable; for more references, you can start with the bibliographies of these books. J. Fiske, *Introduction to communication studies* (London, NY: Routledge 1990 2nd ed. Oorspr 1982); U. Daniel, *Kompendium Kulturgeschichte. Theorien, Praxis, Schlüsselwörter* (Frankfurt 2004, 4^e verbesserte Auflage. 1st ed 2001); and Hessler’s overview, quoted above. More specific works are quoted elsewhere in this lecture.

³ Carey, ‘A cultural approach to communication’ in J.W. Carey, *Communication as culture* (New York: Routledge 2009, 2d revised edition, with foreword by H. Stuart Adam), 22, 25.

The cultural anthropologist Clifford Geertz, too, wrote that ‘human thought [is] a public, and not, or at least not fundamentally, a private activity.’ He spoke of an ‘extrinsic theory’ of thought. He argued that the cultural patterns we learn are so important, because humans are the least programmed creatures in the world. They learn because their instincts cannot sufficiently guide them. And this learning process, fortunately for us historians, leaves traces in the sources.⁴

Many other scholars agree. Just one more example. In 1972 the American philosopher Hubert Dreyfus wrote a withering critique of Artificial Intelligence research, because he believed that AI is based on a fundamental mistake: the idea that intelligence is located inside the brain – a human or an artificial one. Dreyfus argued that intelligence is *not only* located inside human minds, but also in the environment that men and women have created, and in their practices:

‘Intelligence is nothing other than the overall interactive and interdependent structure of meaningful behaviour and objects.’⁵

For the cultural historian this is, of course, a pleasant point of view, for we can only really study the visible or public part of culture. The thoughts and feelings inside our heads are not only invisible to others, they are also ephemeral, even inscrutable to ourselves, and they leave only very partial traces in the sources – as in a diary entry about a dream you had: the words capture only a distorted fragment of the dream’s rich colours, shapes and sounds, which are lost forever after you have woken up.

⁴ Clifford Geertz, ‘Religion as a cultural system’ and ‘Ideology as a cultural system,’ both in idem, *The interpretation of cultures* (New York: Basic Books, 1973) esp 95-96 and section V of the ideology essay (213ff). The philosopher Gilbert Ryle’s *The concept of mind* was an important reference for Geertz. Here are some more examples of this ‘external’ view of culture. Goethe says in his autobiography that when he is alone he imagines being in conversation with others; even solitary thought was a social process to him! (see Goethe’s *Dichtung und Wahrheit*, 13th book, where he explains how he came to write *Das leiden des jungen Werthers*; see the Insel-edition, volume II, pp 640-641). Neurologist Oliver Sacks says something very similar about another seemingly private phenomenon: personal memories (*New York Review of Books*, 21 febr 2013). Not all our gurus agree, however. The great linguist Noam Chomsky believes that in human evolution, language as an instrument of thought precedes its use for communication. See the fascinating review of his latest book with Robert Berwick in *New York Review of Books*, 18 August 2016, by Ian Tattersall (I look forward to reactions to this review, which will probably be published there later this year). I am entirely incompetent to judge between these positions. My choice for culture as a public phenomenon is a pragmatic one, although it is nice that some great thinkers will back it up with theory and evidence.

⁵ J. Haugeland, ‘Body and World: a review of H.L. Dreyfus, *What computers still can’t do: a critique of artificial reason* (Cambridge, MA: MIT Press 1992)’, *Artificial intelligence* 80 (1996), 119-128.

If culture is an environment that consists of symbols, it is a dynamic environment, a *process of communication* – because that is what symbols are for. James Carey liked to quote Kenneth Burke, who compared culture to an unending conversation, going on in a parlour. When you have become old enough to enter the parlour and begin to understand what the people around you are talking about, you join the conversation. You leave it when you die, but the discussion goes on and on.⁶ Historian of technology David Nye has extended this idea to technology – not just *discussions about* technology:

‘Overall, I take technology to be part of an ongoing conversation between generations and between social groups over their differing conceptions of what is desirable, possible, or even real.’

And: ‘Technologies are part of a dialogue between human beings about their different perceptions. This dialogue takes the form of narratives, different stories we tell each other to make sense of the transformations that accompany the adoption of new machines.’⁷

It is important to add that the conversation which is culture is not always a peaceful one, as the parlour metaphor suggests. Culture is also a theatre of conflict, of hegemonial ideas versus suppressed ones. Maybe we should think of ‘conversation’ as the more civilised part of culture, and recognise that there is another part where bitter conflicts are fought out – areas of violence. In any case, we need to take into account that culture is always enmeshed with relations of power. We cannot study culture apart from politics and the economy.⁸

This brings me to the question of how the symbol sphere is related to other aspects of our environment: to nature, artefacts and institutions. This relates, of course, to the long debate about materialism and idealism. Carey, for example, is clearly an idealist. He argues that, as the Gospel of John says, ‘in the beginning was the word’: we live in the world we create in a process of constant conversation. David Nye would probably agree. Postmodernist

⁶ See Stuart Adam’s introduction to the 2009 edition of *Communication as culture*. Burke’s famous ‘parlor metaphor’ is in his *The Philosophy of Literary Form: Studies in Symbolic Action*.

⁷ David E. Nye, *Narratives and spaces. Technology and the construction of American culture* (Exeter: University of Exeter Press), 3. The notion of culture as dialogue was developed in the early twentieth century by American thinkers such as C.H. Cooley. See D.J. Czitrom, *Media and the American mind* (Chapel Hill: University of North Carolina Press 1982), chapter 4, esp 96, 98.

⁸ I owe this important addition to a remark, in the discussion after my talk, by one of the tutors, Jaime Valentines-Alvarez, who said we needed a dose of Gramsci, in addition to Habermas.

thinkers have elaborated this idea excessively, in my opinion.⁹ But we need not go into that: most historians have more or less ignored the debate on postmodernism, because they are interested in more specific questions; or because, as we saw at the beginning of this lecture, they are not interested in theory at all. Thus we have, for example, marvellous studies about how certain ideals of modern living and gender relations inspired the design of the Frankfurter Kitchen during the 1920, which in turn became the model for most kitchens afterwards. The physical organization of these kitchens then influenced the daily lives of millions of women and their families. Historians and sociologists have used the term ‘script’ to describe this process: a word that nicely connects ideas (a script has to be ‘written’) and behaviour (a script prescribes action – although the human actor may deviate from it).¹⁰ Other studies show how different attitudes towards authorities that were dominant in countries such as France, Germany and Britain shaped the very different reactions to the Chernobyl disaster in 1986.¹¹ In this recent research, the subject matter of cultural history tends to become very broadly defined, more or less as social history was when I was a student in the 1970s. Raymond Williams is often quoted, who in the 1950s defined culture as ‘a whole way of life’ – that is: our work, daily habits, power relations, etc. – in all of those areas, of course, technology plays a role.

My own research focuses upon a narrower, perhaps more traditional aspect of culture: the way people come to see the world. *I try to understand the process of human understanding, as it manifests itself in an ongoing conversation.* My goal is not to understand the making and uses of technology. If you would tell me that therefore my research is not about history of technology at all, I would not complain (and that is why I did not call this talk ‘cultural history OF technology’). The making and using of technology are not what I attempt to understand. Yet, technology plays a central role in my research, because of its enormous presence in 20th century societies, not only in the economy, in daily life, and in military power, but also in people’s awareness of themselves and of the world, their fears and hopes

⁹ Carey, ‘Cultural approach’, 22. Ernest Gellner has answered the postmodernist core idea nicely and briefly: ‘concepts do constitute a social constraint; but not all social constraints are conceptual,’ in E. Gellner, *Plough, sword, and book. The structure of human history* (Chicago: University of Chicago Press 1989), 14-15. See also the excellent critical discussion in U. Daniel, *Kompendium Kulturgeschichte* o.c.

¹⁰ E.g. Martina Hessler, ‘The Frankfurt kitchen: the model of modernity and the “madness” of traditional users, 1926 to 1933’ in R. Oldenziel, K. Zachmann (eds), *Cold war kitchen. Americanization, technology, and European users* (Cambridge, Mass: MIT Press, 2009), 158-178. This is one example of a now very large literature on the ‘social construction of technology.’ See Hessler’s overview, o.c.

¹¹ Karena Kalmbach, *Meanings of a disaster: the contested ‘truth’ about Chernobyl. British and French Chernobyl debates and the transnationality of arguments and actors* (PhD thesis, European University, Florence, 2014).

and fantasies, and how they discussed these things among each other. That is what my work is about.

Stories

If culture consists of conversations, frequently with technology as a prominent topic, how can we analyse these conversations? David Nye and the psychologist Jerome Bruner say: by studying the stories people tell each other and themselves. Why stories? Bruner gives a very general answer. Stories, he says, are the most basic way we understand the world. As in much narrative theory¹², he uses a broad definition of story. It includes stories we tell and listen to in daily life: a student explaining why he is late in class, what you tell your partner about meeting your neighbour in the street, who told you of her recent visit to the hospital; or how a refugee tells you about crossing the sea in a leaking boat at night and being picked up by a coast guard. Fiction and non-fiction may blur in such stories of course, especially if they have the purpose of convincing an audience – say the teacher who listens to a student who comes in late, or the lonely neighbour who needs a listening ear, or the Syrian who tries to make the authorities give him a refugee status. These are all stories, because they contain action unfolding in time and in a certain setting, with actors having certain motives and goals.¹³ Even such daily storytelling may draw on literary genres, like the adventure story or the conflict of generations. And we model the stories we tell each other and ourselves on the ones we are familiar with: the fairy tales that were read to us when they were children, or the adventures of people in tv serials, which themselves follow ancient models.

The basic reason why stories are so powerful is that they give us a sense of order, and at the same time show us what may happen when this order is disturbed. The order is usually presented at the beginning of the story, where we enter its fictional world. It may be far away or long ago, or very close to home, as long as the listener or reader recognizes it as an ordered human situation. Then something unexpected happens, the order is disturbed, perhaps seriously deranged.¹⁴ That is the start of story.

¹² From, again, a flood of titles, I recommend Luc Herman, Bart Vervaeck, *Handbook of narrative analysis* (Lincoln, Nebraska: University of Nebraska Press, 2005); and the older but still very useful R. Wellek, A. Warren, *Theory of literature* (Penguin 1980, 1st ed 1949).

¹³ See Kenneth Burke's pentad, quoted in Bruner, *Making stories*, 34. Bruner demonstrates how psychologists' notions about self correspond very neatly with basic elements of a story: 70-72.

¹⁴ Bruner says that we are hard-wired that way: we seek the routine and the reassuring, but our nervous system is always alert to the unexpected, and part of us is always eager for adventure, danger.

Here are two examples. In Tobias Wolff's short story 'Say yes,' a husband and a wife are doing the dishes, a daily routine they have apparently shared for a very long time.¹⁵ They chat about this and that. Their conversation then turns to the question if black people should marry white people. The man says they shouldn't, the wife disagrees. Suddenly the conversation becomes very sharp, when the wife asks: if I had been black, would you not have married me? The situation turns into a small marital crisis, and at the end there is a glimpse, but no more, of reconciliation in the bedroom: the relationship has become as uncertain as it was when the couple had just met. Stories in popular media usually turn to more spectacular material than this domestic scene. The tv series Star Trek, for example, always starts in the high tech environment of the starship Enterprise with its crew, which become very familiar to the viewer after a few episodes. Then a stranger comes on board, the situation is disturbed, disaster threatens; during the next half hour, the adventure culminates in a restoration of order.



In a fundamental way, technology is a perfect case of 'the dialectic of the established and the possible.' Think of the Manhattan Project in World War II: a very goal-directed and well organized project, involving several *well-established* organizations, such as universities, large companies, and state-financed research institutes. All these people and organizations worked according to well-established practices of scientific discovery and technological invention. On

¹⁵ A film-version of this story is available on youtube. I found it disappointing: the couple are glamorous young actors instead of the older, homey couple that I think Wolff had in mind.

the other hand, they worked at the frontiers of the *possible* and created new things, with consequences that could mostly not be foreseen – in this case, nuclear power. This dialectic can well be represented in stories where something unforeseen happens in some everyday situation that we recognise as our own.

Let's expand this idea a little. The world we find ourselves in presupposes a lot of implicit trust: to fall asleep on an airplane, say, or to trust the pills your doctor prescribes to you. This trust is as routine as our daily use of high tech, it is part of the 'established order' in which we live. But trust is always accompanied by a subconscious undercurrent of doubt: the plane might crash, the doctor might make a mistake, *you never know*, it is always *possible*. And in our nightmares, the doctor may be an evil character who wants to kill us; or the plane might be manipulated by some sinister power. Disaster movies exploit these fears. And science fiction literature and movies are full of evil scientists who derange the established order – think of Frankenstein, Moreau, Strangelove.¹⁶

One corollary of Bruner's theory of stories is that, as he says, 'the sharing of common stories creates an interpretive community.'¹⁷ In other words, stories that are very popular are likely to shape ideas and intuitions about the world that most people in a society share – although there will certainly be variations depending on gender, social class, age and so on. That is why I am particularly interested in popular culture: it is likely to reflect common ideas, a common sense of the established order and common fears of disruption. There is another reason for that: popular magazines, comics and films are usually made for profit. The people who produce them do all they can to make them attractive for as many people as possible. 'The sharing of common stories' does not mean that many people read exactly the same comic books or see the same movies. The important thing is the deep structures in these stories: if many stories have the same basic structure, that structure will tend to shape a similar point of view in most of the readers or viewers.¹⁸

¹⁶ A. Giddens, *The consequences of modernity* (Cambridge: Polity 1990), 88-90; M. Berman, *All that is solid melts into air. The experience of modernity* (NY: Viking Penguin 1988; 1st ed 1982), 15. A beautiful book on trust is Geoffrey Hosking, *Trust. A history* (Oxford: Oxford University Press 2014), but he does not write about technology. On images of scientists: R. Haynes, *From Faust to Strangelove. Representations of the scientist in western literature* (Baltimore: Johns Hopkins 1994); Philip Sarasin, 'Das obszöne Geniessen der Wissenschaft. Über Popularwissenschaft und "mad scientists"', in Sarasin, *Geschichtswissenschaft*, o.c., 231-257; and many others.

¹⁷ Bruner, *Making stories*, 25.

¹⁸ Or *reflect* a common point of view? Perhaps impossible to distinguish the two; but Bruner's formulation, and that of Carey too, tends towards *shaping*. This is another classical, unresolved and probably unresolvable, dilemma.

So how do we find these structures? Well, another advantage of studying culture as storytelling is that we can use the large toolbox of narrative analysis, created by generations of literary scholars and anthropologists. One problem is that this toolbox is so big, so rich. You can spend your whole life studying it – but since you need to get on with your empirical work, you have to make some drastic choices. I myself have chosen to work with just a few tools from this big box:

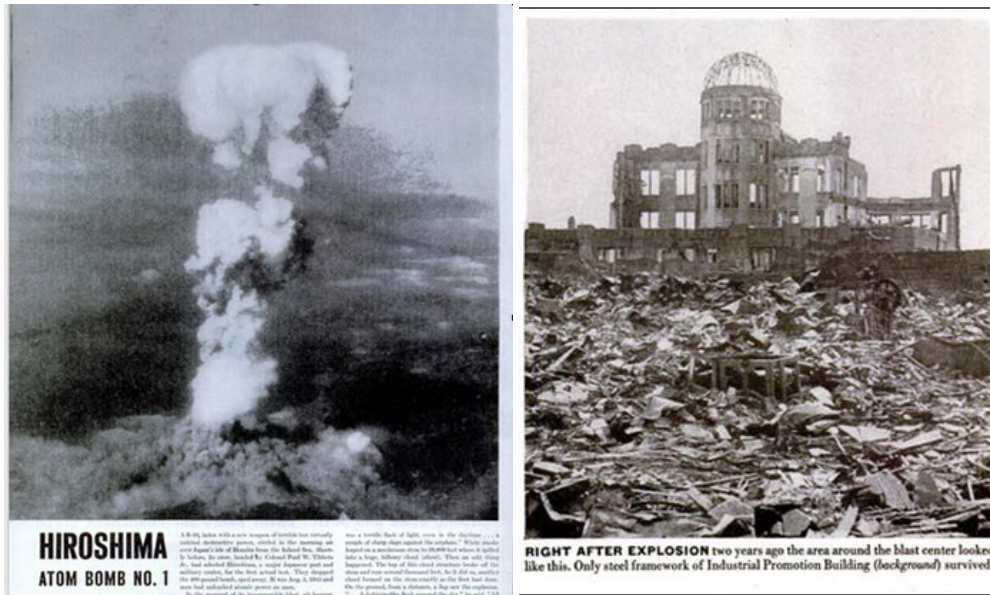
- Following Levi-Strauss, I am looking for the **oppositions** which form the basic structure of a story. For example: what exactly are the characteristics of the utopia or dystopia that await us as a consequence of new technologies? What are the characteristics of the good guys and the bad guys in a science fiction story? In my research, I was surprised to find how frequently the opposition between male and female occurred in stories about new technologies.
- I also look for recurring **metaphors**. In the debate about nuclear power in the late 1940s and early 1950s, for example, it was often said that mankind was ‘at the threshold’ of a new era, or ‘at a crossroads.’ Propagandists of nuclear power liked the image of swords being turned into ploughshares. Metaphors add emotional power, suggest attributes without mentioning them, and make the complicated seem more understandable. They are attempts to push your thoughts in a certain direction. The physicist Edward Teller’s use of the ploughshares image suggested that peaceful uses of nuclear power *replaced* weapons. This was obviously false, but it served his purposes. Another nice example is an article I found in the company newspaper of the Dutch Philips Electronics company, in the 1960s, about the work of a computer operator. The article was kind of advertisement for this new kind of work, which probably was rather boring. The article compared the operator to a master organ player; and in an interview with one operator, this guy compared the computer to an animal whose moods and whims one had get acquainted with in order to tame it. These images created a picture of a man in charge, and the artistic and organic metaphors tried to impart a counter-image to that of the ‘cog-in-the-machine’, of boredom and repetition that was common at the time.¹⁹ These examples show the importance of interests and power relations in communication, which I mentioned earlier.

¹⁹ Philips Koerier, 12 juni 1965.

- Finally, I search for **metonyms**, by which a complicated phenomenon is represented by a more easily graspable part of it. This is very common in news reporting and news photos. A dramatic example are news photo's of the destruction of Hiroshima and Nagasaki. From August 1945 *Life*, the American illustrated weekly magazine, showed the famous 'mushroom cloud,' which was later repeated after each nuclear test. It also showed images of the Japanese cities, reduced to rubble.²⁰ Only in 1952 did it publish pictures of the wounded and dead, taken right after the attack by a Japanese photographer. This happened after a Japanese magazine had first published these photo's.²¹ Illustrated magazines in other countries followed the same pattern.

²⁰ Peter Hales claims that the explosion only looked like a mushroom for a few seconds, and these were always selected for depiction. He also makes much of the fact the the photo's appeared in a context of American domestic luxury, depicted in advertisements. Thus the Americans became observers at a safe and comfortable distance. See P.B. Hales, 'Imagining the atomic age: *Life* and the atom', in E. Doss (ed), *Looking at Life magazine* (Washington: Smithsonian Institution, 2001) . Scott Zeman has demonstrated that the image of nuclear weapons was much grimmer, in his 'To see . . . things dangerous to come to' in D. van Lente (ed), *The nuclear age in popular media* (New York: Palgrave Macmillan 2012).

²¹ H. Utsumi in *Nuclear age*, o.c.



Metonymy is unavoidable in news reporting, esp in news photography. The nuclear attack was too complicated to picture in full: the Manhattan Project that had produced it, the science and the industrial corporations that were involved, the questionable military logic, and the immense suffering it caused. A magazine has to choose which image(s) it will use to represent this phenomenon, and it obviously makes a big difference which images it chooses. Like metaphor, metonymy pushes our thoughts about a large phenomenon in a certain direction – and this can be done in text as well as in images.

So, in summary, this is my theoretical framework:

- Culture is an environment consisting of symbols ('symbol sphere');
- These are used in conversations, which may be peaceful and civilised or more conflictuous;

- Conversations are largely made up of stories;
- Stories are structured, and their structures can be discovered by looking for oppositions, metaphors and metonyms; and by determining the order of the world the story describes, the way this order is disturbed, and how and to what extent order is restored;
- these structures indicate patterns of understanding; they indicate common patterns of understanding if they occur frequently in popular media.

Examples

Most of the following examples are taken from my research about the representation of nuclear technologies in popular media.²² Let us begin with Bruner's notion of 'the dialectic of the established and the possible.'

My first example is a comic story series, 'Blake and Mortimer', that was very popular in the Netherlands during the 1950s through the 1970s. It was created by the Belgian artist Edgar Jacobs (it is still in print, by the way). His stories always take place in real locations and the action always involved a topic that was much discussed at the time. When reading the first pages, you feel like watching a documentary film. Take *SOS Metéores* (1959).



We are in Paris, Place de l'Opéra, on very rainy day. The newspapers write about the extreme weather conditions, floods, and traffic problems, and there is much speculation about the causes. Scientists speak of sunspots, many people think it has to do with hydrogen bomb tests. In other words, we are in a familiar world that is deeply disturbed and scared. Reading the story, we will learn the real causes of the problems. We do this by following the heroes, both British: secret agent Blake and scientist Mortimer. This is already a statement, of course:

²² Dick van Lente (ed), *The nuclear age in popular media*, o.c.

Jacobs tells us that the puzzling and unsettling events we observe in the world are caused by things that are hidden from the public eye: international power struggles and secret applications of new technologies.

As the story unfolds, we learn that the weather is being manipulated by some power in the East (the Soviet Union is not mentioned explicitly), as a preparation for an attack. This evil state employs a brilliant scientist, who has invented a very advanced machinery for changing weather conditions. Of course, Blake and Mortimer prevent a victory of this eastern state at the last moment.

The main effect of the story, like all Jacobs' stories, is reassuring: it emphasizes order, in two ways. First, the basic nature of the conflict is the familiar struggle between good and evil. The complex structure of science and technology is reduced to two scientists, a good one and an evil one. The evil one is always the most intelligent, also in the other stories, but the less brilliant Mortimer has moral rectitude and the forces of order on his side, and these are victorious in the end.

Not all popular stories have this reassuring tendency, however. Here is another very popular comic, by the Dutch author Marten Toonder. Its two heroes are a gentleman bear, Bommel, and his friend, the clever cat Tom Poes.



The starting point of these stories is, as in Blake and Mortimer, a familiar world, this time a small town. The inhabitants are mostly animals, but the scenes are immediately familiar: there are houses and shops, there are a mayor and policemen, there are entrepreneurs and criminals. Trouble often comes with some kind of new technology, as here in *Kwetal de breinbaas* (1950). A strange machine flies over the town, and as in Jacobs' story, people speculate. Some talk of a traveller from Mars, others of a flying saucer, some even of a split atom. When the craft has landed in the street, the policeman tries to maintain order by refusing to

recognize the strangeness of the phenomenon. He tells the crowd to walk on and keep to the right and asks the dwarf who steps out of the craft for his driver's licence.



Het vreemde toestel van de dwerg was nu Rommeldam genaderd, maar door het verlies van de kachelpijp scheen het zijn stuur kwijt te zijn. Het daalde ten minste tamelijk snel en beschreef vreemde bochten in de lucht. Zonder remmen daverde het dwars door een toren heen en het valt te begrijpen, dat de burgers van de goede stad door dit voorval hevig schrokken.
 'Een vliegende schotel!' riep iemand. 'Marsbewoners!' riep een ander, en een derde brulde: 'Een gesplijste atoom!'
 De verkeersagent, die midden op het plein het verkeer regelde, was de

agent op straat.

'Het is alleen maar een potkachel!' zei de verkeersambtenaar, onzeker een pas achterwaarts doende. 'Kom er eens uit, meneer!'

De dwerg werd nu zichtbaar. Er was niet aan hem te zien, dat hij zich pijn had gedaan en misschien was dat ook wel niet zo. Hij glimlachte ten minste vriendelijk en schudde zijn hoofd.

'Ik vrees, dat de gigelgens niet zwaar genoeg was om de kracht van de gridogeen op te heffen!' sprak hij spijtig.

'Allemaal praatjes!' en wuifde de agent. 'Maak plaats voor de ...'

But the dwarf brings big trouble. He has invented a machine that can make things disappear to the fourth dimension. Dangerous events follow, but in the end, Tom Poes puts the dwarf and his invention under the ground again, from where they have come. Order is restored, and as in all Toonder's stories, there is a meal to celebrate the happy ending. There is a snag however. Just before the final meal, we see Tom Poes read an item in the newspaper to Bommel, about the new hydrogen bomb, which had just been announced by Truman, shortly before Toonder's story was serialized in the newspapers. Tom Poes tells his friend that the new weapon is very similar to the dwarf's machine that they have just put under the ground. The message is, of course, that in the real world, we cannot put dangerous inventions underground again. While order is restored in Tom Poes and Bommel's world, the real world is in big trouble, with no solution – no Tom Poes – in sight. Toonder was very pessimistic. In story after story he showed how power always corrupts, and that the immense power of modern technology is therefore a terrible danger.

This pattern of the reassuring established order versus the frightening possibilities of modern technology is also visible in non-fiction-texts. One often repeated story about nuclear power was that it was new, yes, and frightening as well, but so was fire when it was first invented, and so was electricity. Electricity was used for lighting as well as for killing (the electric chair), and so it would be with nuclear power. Disney in his magnificent propaganda film on nuclear power, 'Our friend the atom,' started with the famous story of the fisherman who unintentionally liberated a dangerous ghost from a bottle, but then succeeded in making the ghost serve him. Similar narratives were spun around automation and robots: robots are an

old story, some people said: there were moving statues in the ancient world, in the eighteenth century humanoid automatons were created, etc. The frighteningly new, these stories suggested, are not in fact so new, and will soon be domesticated, made part of the established order. Toonder exemplifies the approach taken by the more daring artists, who used their art to explore the possibility of disaster. Other examples of such unsettling work are the Swiss Dürrenmatt's wonderful play *Die Physiker* (1963), and Kurt Vonnegut's science fiction novel *Cat's cradle* (1963).

Next, consider the uses of **metonymy**.

Here is an example from a Dutch magazine I studied intensively, *Panorama*. It is a series of pictures with captions, which appeared in 1950 under the title 'Half a century of progress.'



We see six pairs of photographs, each time comparing a scene from 1900 with one from 1950. The topics are medicine, flight, the automobile, radio and tv, modern housing, and weapons. The difference between the two pictures in each pair is labelled 'progress.' It is striking that all examples are of technology. Progress is here not associated with social legislation, for example, or with the increasing level of and participation in education.

This is metonymy at work: twelve pictures of very specific objects represent a very general social process called progress. Not only is progress narrowed down to technologies, the technologies that are depicted also give a very specific idea of what technological progress is. The medical example, for example, shows the development from a powerless doctor at the

bedside of a sick patient to a patient enveloped in an iron lung, a machine that takes over the vital process of breathing: technology has really taken command here!



One could read some of these pairs of pictures as highly ironic, even sarcastic comments on the idea of progress. Look at the progress of flight: from the Wright brothers at Kitty Hawk in North Carolina (1903) to a modern B 36 Convair bomber plane, made for carrying nuclear bombs, or from the machine gun to the atomic bomb.



The reader might wonder: is this progress? However, was irony or sarcasm what the magazine intended? Did the editors want to depict progress as a mixed blessing, or even as a descent into destruction? There is no trace of irony in the captions, which only contain rather dry description. This is a problem we often encounter when studying pictures: interpretations may seem obvious, but are very difficult to prove. How should we deal with this?

Excursus: Interpreting pictures.

This is an important problem, for in the 20th century many messages went by image, not by text, or by a combination of the two. We need good instruments of analysis. But many

historians don't worry much about this. They offer interpretations exhibiting their learned associations and some virtuosity in writing, but no real empirical support.²³

In searching for answers, I was disappointed with much of the literature about analysing pictures. Two authorities, one in cultural history, the other in history of photography, may serve as examples. P. Burke's *Eyewitnessing. The uses of images as historical evidence* (London: Reaktion 2001) gives an overview of types of interpretation, questions to be considered, pitfalls to be avoided, and many wonderful examples. This is useful, but Burke does not provide the reader with very concrete guidelines or practical suggestions. According to a report of a conference where he spoke, his opinion is: 'There are no rules in general. Each historian dealing with pictures has to determine and follow his or her own set of rules.'²⁴ Something similar is the case with Jens Jäger, *Fotografie und Geschichte* (Frankfurt a.M. Campus 2009). He too gives an overview of approaches to the analysis of pictures and he discusses the obvious questions (about authenticity, context, conventions, the importance of captions, etc), but does not leave you with a readily applicable and convincing method.

I found some empirical sociological and historical studies much more useful and inspiring, for example Ibson's chapter in E. Doss (ed), *Looking at Life magazine* (Washington 2001), which demonstrates an amazing change of views about masculinity during World War II; C.A. Lutz and E.A. Collins' analysis of *National Geographic* (Chicago 1993), and a classic study by Erving Goffman, *Gender advertisements* (London 1979). The interpretive power of these works comes from their construction of long series of images around a certain theme, in Goffman's book, for example, pictures of women and men laughing, or of families; and in Lutz and Collins images of white and coloured people looking at each other. Such series will reveal patterns of behaviour, as well as remarkable exceptions to those patterns. They may suggest, for example, power relations between men, women and children (in Goffman's case), or between western and non-western people (in the Lutz/Collins book). They may also reveal recurrent oppositions, metaphors, and metonyms, as in my example of the Hiroshima pictures above (more examples soon). And such recurring patterns reflect, as we have learned from Bruner, patterns of thought and feeling. The patterns we find in series of images may lead us to formulate hypotheses, which we then can test against other evidence.

Remember that pictures do not always simply illustrate. Sometimes there is a tension between the message of the text and the content of the accompanying picture, as in the

²³ example: Hales in Doss (ed), *Looking at Life*, o.c..

²⁴ Tagungsbericht: The Pictorial Turn in History 04.04.2008-05.04.2008, London, report on the H-net.

example of progress and the bomber, above. Another example are medical applications of radiation, often cited during the 1950s as examples of peaceful uses of nuclear energy, counter-images to those of nuclear weapons. The pictures illustrating these articles could be rather frightening, demonstrating the deadly power of radiation and therefore suggesting fear rather than confidence.



On the other hand, such images were also used to show that doctors were waging ‘a war on cancer’, which explains why they sometimes looked like armed aliens. It is often impossible to establish which meaning was intended by the editors, let alone how it was understood by readers. But recurrence of grim images of ‘the war on cancer’ certainly indicates one common way of looking at radiation, and at illness. In any case, always be careful in your formulations. I have read too many authors who claim that pictures in a magazine showed that ‘most people’ (in general) were ‘overwhelmed’, ‘puzzled’, etc., even though they can only show pictures, which if you look closely can be explained in different ways. Show these different ways, offer possible interpretations, using other sources for comparison: that way, you won’t impress the hasty reader, but you will invite the serious reader to think and argue with you.

The pictures above also show that images may add a strong emotional content to the message. This is important, because so much in reactions to new technology is emotional rather than discursive. Historians tend to focus upon ideas, arguments, rational debate, ‘discourse’, but much of the response to nuclear power and other new technologies is not articulated in that way. Images sometimes can show affective responses more clearly than texts, for example by depicting *body language* – which is also part of the symbol sphere. Here

is an example from the Dutch highbrow magazine *Groene Amsterdammer* in the summer of 1957. It was a comment on an exhibition called 'The Atom' which was taking place at the time at Schiphol airport.



The exhibition was meant to convince the Dutch public of the great future nuclear energy would bring and to make it stop worrying too much about nuclear weapons. The newspaper's cartoonist depicted, we may hypothesize, the common reactions: not at all convinced, not overtly hostile either, but very suspicious, and women more so than men. This attitude would have been difficult to express in words, but in this picture it is crystal clear. If you read the picture in this way, and then look at reactions to the exhibition reported in newspapers, you will find this confirmed (it even looks a bit like the image of the citizens of Rommeldam in Toonder's story, above). I found one very nice confirmation in a newspaper report on a public hearing of the municipal council of a small town, where the first Dutch nuclear reactor would be built. The journalist carefully described the body language of the councillors, listening to the nuclear experts extolling the beauties of nuclear energy. He said, for example, that they were sitting 'dead silent and stiff.' The dominating feeling was one of insecurity and fear, especially with regard to radiation, as well as distrust of the scientists (many famous scientists, such as Einstein, issued sharp warnings about radiation at the time, which undermined the optimistic message that many authorities propagated).

Body language is part of our daily conversations-without-words – one could even say not hindered by words. It relies on instant, instinctive understanding. It leaves few traces in written sources, although there are exceptions, such as the newspaper report I just cited, and descriptions in novels. But it is omnipresent, of course, in news photo's, cartoons and comic stories. It expresses feelings and attitudes more than ideas. That is why these sources, difficult to explain as they are, are precious, and so are the serious attempts of scholars such as Lutz, Collins, Goffman and Ibson, cited above, to interpret them.

The cartoon above suggests that women were much more, or more openly, sceptical about nuclear energy than men. Other evidence supports this. For example, according to several scholars, women were disproportionately active in the antinuclear movement.²⁵ That brings me to the next picture, another example of metonymy.



This picture, from *Panorama*, 1961, illustrates, believe it or not, the early antinuclear movement in Britain. The caption says that this is Mrs Oliver, arrested in London for her protests against nuclear tests. She is quoted as saying: ‘For my children I have now washed (laundered?) seven thousand diapers. I want to do at least as many again. But a nuclear war would end the lives of myself and the children whom I love.’ This is metonymy, on several levels. Most obviously, Mrs Oliver represents the women in the peace movement and their

²⁵ S.R. Weart, *Nuclear fear. A history of images* (Cambridge, Mass: Harvard UP 1988), 367; L. Wittner, *The struggle against the bomb, vol 2, Resisting the bomb, 1954-1970* (Stanford: Stanford UP 1979), 464.

most quoted motives: concern about their children. But the picture has a lot of additional symbolic power. Mrs Oliver, the diapers and the garden stand for the protection and cultivation of life, as opposed to the death force of nuclear weapons. These weapons are not depicted, but they are implied in the picture, and explicitly mentioned in the caption. In other words, the picture gives us an *opposition* of which we see only one side (I'll come back to that). The image of life continuing is strong and comical here: while the garden grows, the babies will go on shitting, so the line of diapers will never end. The laundry line suggests continuity in time, but also fragility: it might all of a sudden be cut off. Thus, the picture tells a *story*, the familiar, reassuring one of birth and growth, and the possibility of sudden, massive death.

Finally, you might say that the picture and the caption show a connection between two female roles that was new at the time. One is the familiar one of doing the laundry: female drudgery, elevated here to a symbol of life. The other role is the relative new one of political activism – radicalism even, for this lady was arrested. This is shortly before the second wave of feminism, and some authors have suggested that the antinuclear movement was one kind of preparation for that. But we cannot decide exactly what message was conveyed here: 'here is a woman who has taken a strong political stand, but don't worry: she is still a good housewife and mother', or: 'look at this nice housewife – but beware: she is also a radical.'

Oppositions

The great anthropologist Claude Lévi-Strauss has made us aware that all stories are built up around oppositions. Hence, the main oppositions in a story reveal its structure. In the example I just gave, the ruling opposition is life against death, and these categories are connected with others: life is connected to babies and mothers, for example. The picture does not show the other side, death, but there is a strong suggestion that mothers, being closer to the basics of life, like babies and dirty diapers, have a better understanding of its value than men, who dominate science, technology, the military and so on.

When you look at other representations of nuclear power, you find this female-male opposition everywhere. Here, for example, is the poster that advertised the Atom exhibition in 1957 that I mentioned earlier. The text reads: 'a glimpse of the future.'



Here, the atomic age that looks at us from the future is a pretty, smiling girl. More commonly, the atomic future was depicted as in the pictures below, so why this choice of a female model?



The exhibition also featured a very modern kitchen, and in the article in *Panorama* about it, there were women in almost every picture.



Why was the atomic future feminized like this?

There is an obvious answer: to soften the image of nuclear power, to domesticate it, associate it with female care. Perhaps the makers of the exhibition knew that resistance to nuclear power was particularly strong among women; or maybe they wanted to associate nuclear power with coziness and homeliness in general. Such explanations sound plausible enough, but how could you substantiate them?

To me, the first step is to realize that each and every image, statement and gesture about nuclear power – or whatever issue you choose to study – is part of a conversation, a dialogue, as Carey has taught us. If people use strong language or powerful images, it is because they feel strong opposition to their views. If women figure very prominently in atomic propaganda, there must be a gender issue. But that is only a hypothesis, that we have to test against other evidence. Since there is so much material for this period – think of newspapers and illustrated magazines alone! – this is not too difficult, only a lot of work. What can we learn from them about the gender issue? Here are some examples.

One newspaper report on the exhibition was written from an explicitly female perspective, by a female journalist. She said that the exhibition was typically a men's product, and very unattractive to women: the scientific explanations were too complicated and the atmosphere was cold. If the organizers had tried to create or more woman-friendly atmosphere, they had failed miserably, according to this writer.

At the end of 1949, when the Cold War was heating up – the Russians had just tested their first nuclear weapon – a theatre play toured the Netherlands, which received a very enthusiastic response. It told the story of an accident in a nuclear research facility in the US,

which is funded by the armed forces. The core of the story is a conflict between the professor who directs the institute and his son, who also works at the plant as a scientist. The professor has discovered an explosive more powerful than plutonium. The son wants to keep the material out of the hands of the government, but the father says that the government has a right to the results for which it has paid. When the reactor malfunctions and is about to explode, the son saves the facility, but receives a lethal dose of radiation. As he lies dying, the professor changes his mind, and refuses hand over his report.

Gender is an important sub-theme here. The professor has a housemaid, and elderly woman, who has more or less taken the place of his deceased wife. She says that since the professor has started to work for the military, the mood in the house has changed: military bigwigs walk in and out, there is an atmosphere of secrecy and nervousness, and the professor has become short-tempered and sleepless. The accident, she says, is the result of this, and the whole project is a crime. Her voice is one of human feeling and common sense, against a world of men gone mad. It is striking that the antinuclear movement that started about eight years later had features that were similar to this play of 1949: a strong presence of youth and women, who turned against the military-academic-industrial establishment.

This theatre play was very helpful in my research, because it literally presented a conversation about nuclear power, although in fictional form. It summarized a wide range of arguments, connected with different social and generational attitudes and emotions.

While the play showed different sides of the dialogue, many sources exhibit only one side, as my final example shows. Leonard de Vries was the most popular popularizer of science and technology during the 1950s and 60s. He had written widely read books about electricity and radio, for an adolescent audience. For the atom exhibition, he wrote a book about nuclear power, and at the exhibition he gave public lectures. It would be an understatement to say that De Vries was a technology enthusiast – he was nothing less than a rhapsodist of technology, a lyrical lover. In his novels for young people he wrote about the almost ecstatic enjoyment of working together on technological projects.



At first, this seems puzzling, because the mood among most intellectuals in the Netherlands was pessimistic during the fifties. They spoke of a cultural crisis, and blamed technology for much of this crisis (there is no time to go into this here, but they were thinking of increasing materialism, the rise of a technocracy, the decline of religion and idealism and so on – Dekker’s play was a fictional expression of this type of criticism). So how does De Vries fit into this picture? For one thing, he was outside the circles of the intellectuals and spoke to a different group of people – such as the high school boys that were the main characters in his stories. He did not write in newspapers and intellectual journals. Yet, he was in dialogue with the pessimists, in two ways. First, you can read his works as a point-by-point refutation of the common pessimism: technology is the motor of industrial development and national wealth; it does not reduce people to cogs in machines and it does not create deadly routines, but invites participation in technological discovery and inspires enthusiasm in cooperative technical work. But what makes him especially interesting to me is not so much his arguments, which were advanced by others as well, but the *emotional* quality of his work: the sheer joy of technological creation that he described and, in view of his large audience, succeeded in conveying to his readers. His work demonstrates, again, that we must pay a lot of attention to feeling when we study reactions to technology.

Concluding remarks

The interpretive scheme suggested here is a simple one, certainly when compared to the very sophisticated analyses of semiologists and narrative analysis.²⁶ Those analyses often focus on one or a few sources. We historians cannot afford to do that: we usually study a large amount of very heterogeneous source material. We always have to balance depth and scope of analysis, and the scheme described here is my answer to that unsolvable problem.

Still, the amount of source material to be analysed for this type of research is huge. But it has its limits too, for the number of basic stories circulating in a society is limited. Of course there are endless variations. But basic oppositions, metaphors ('crossroads,' 'war on cancer') are repeated endlessly, and the point may come sooner than you think when you start seeing the same pattern of thinking again and again. The challenge then becomes: when does this pattern start to change? And why?

Implicit in my approach is the notion that ideas are not locked up in a social group or in a nation – not even in higher order units such as 'western culture.' They circulate, take on different forms in different media. For cultural analysis, therefore, I find it more fruitful to think in terms of society as a conversation than as a structure of classes, organizations and so on, each with its own set of ideas and attitudes. I think people participate in communication circuits of different kinds and ranges. For many people and for long periods of time these were rather narrow, and there was great intellectual authority in, say, the local priest. But in the period I am studying, the decades after World War II, people increasingly participated in several circuits – radio and television for example, in addition to their local community or church. Some people, such as modern architects, participated in international circuits like the CIAM, that were more important for the development of their ideas than national or local ones. This idea of communication circuits needs elaboration, of course. This lecture has focused on the basic structures in messages involving modern technology and how they interact in a continuous conversation.

²⁶ Nice examples in Fiske o.c. and in John Storey, *Cultural studies and the study of popular culture* (Edinburgh: Edinburgh University Press 2010, 3d ed).