"Who believed in a second industrial revolution? 'the age of computers and automation' in popular media in NL and elsewhere"

Dick van Lente

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Intro

This paper is about a new project I have just started. So far, I have mainly worked with Dutch sources, but this is such an international subject that I'd like to broaden the project, preferably in some kind of collaboration. So the whole setup is up for discussion; and if you are interested in cooperation or know of others who are doing similar work, I'd be very interested.

Research question, concepts

After World War II, many politicians, intellectuals and journalists in Europe and the US believed that society was entering a new era. They spoke of a second industrial revolution, driven forward by electronic computers (some added nuclear power – we will leave that out here for the sake of brevity). This kind of rhetoric is well-known since the early nineteenth century: the idea that a new society was emerging that differed fundamentally from the past[1]; and technology as a driving force: think of Saint-Simon's "industrial society", and Carlyle's "Mechanical Age" (later: 'railroad age', 'electrical age', etc). They were attempts to catch the essence of the new situation: rough simplifications, but put forward by very smart people: Saint-Simon, Carlyle, and for the second industrial revolution we could quote luminaries like Norbert Wiener, J.D. Bernal, CP Snow and many others. Such terms lend themselves very well for popularization, because they give people a quick interpretation of the bewildering changes they are going through. And the men that coin them could be called opinion leaders.

Another term that I find useful is the German word *Leitbild* (guiding image). Historian Hans-Luidger Dienel defines it as: a positive image of the future that is more practical than a vision or a dream, because it refers to what can be created; it provides people with a common

[1] Koselleck's basic insight. Also Hoelscher, *Entdeckung der Zukunft*.

understanding and a common goal for action.[2] As examples he mentions rationalization in business or sustainable development. The opposite are '*Schreckbilder*': images of a future we all wish to avoid, such as inflation, or, depending where you stand, communism. The coming of the automation age could be a *Leitbild*, OR a *Schreckbild*.

I am interested in the way such images, which are usually developed by intellectuals, enter the public sphere.

Therefore my research question: How common was this idea of a second industrial revolution, driven forward by computers and automation? What exactly was the content of this idea and what were the forces that shaped it?

Sources, method

I want to approach this as an international subject:

● computers and automation spread very quickly during the fifties and sixties, and one may expect that they raised similar questions in different countries, although answers might differ per country

● the source I use as a starting point are weekly illustrated magazines, such as *Life* in the US, *Paris Match* in France, or *Asahigrafu* in Japan. What I like about these magazines as a source[3]:

● These magazines were very popular: you can be sure they reached a large part of the population.

● much competition between them so you may assume that they were well attuned to the preferences of their readers

● They allow you to follow the development of your theme week by week.

● They were very similar in different countries, because they imitated each other, and often used the same or similar pictures and stories. So you can ask questions like: was "the age of automation" conceived in similar ways in different countries? Was there convergence or divergence over time? How important were national peculiarities?

[2] H.-L. Dienel, "Bilder und Leitbilder der Technik" ms 2004 (I have not seen a published version of this. Should ask him).

[3] Spelled out in van Lente (ed), *The nuclear age in popular media* (Palgrave 2012).

[Together with six colleagues, I have done a similar study on nuclear technologies in 8 countries: appeared last year at Palgrave: *The nuclear age in popular media*]

Historiography

Recently several studies have appeared about the international diffusion of computers – usually written by economic or business historians, but several of them have taken account of cultural factors. What can we learn from them?[4]

[4] Based on: P. Paju, H. Durnova, 'Computing close to the Iron Curtain. Inter/national computing practices in Czechoslovakia and Finland, 1945-1970', *Comparative technology transfer and society* 7/3 (dec 2009), 303-322.
P. Paju, 'National projects and international users: Finland and early European computerization', *IEEE Annals of the history of computing* (okt-dec 2008), 77-91.
G. Alberts, 'Appropriating America: Americanization in the history of European computing', *IEEE Annals of the history of computing* april-june 2010, 4-7.
W. Aspray, 'International diffusion of computer technology, 1945-1955', *Annals of the history of computing* 8/4 (1986) 351-360.
A.van den Bogaard, H. Lintsen, F. Veraart, O. de Wit (red), *De eeuw van de computer. De geschiedenis van de informatietechnologie in Nederland* (Stichting Historie der Techniek, Deventer: Kluwer 2008).
J.W. Cortada, 'Patterns and practices in how information technology spread around the world', *IEEE Annals of the Hist of Computing* (Oct-Dec 2008), 4-25.
P. Edwards, *The closed world. Computers and the politics of discourse in Cold War America* (Cambridge, Mass: MIT Press 1997).
F. Dittmann, 'Microelectronics under socialism', *Icon* 8 (2002), 43-54.
T. Friedman, *Electric dreams: Computers in American Culture* (New York: New York University Press, 2005).
S. Gerowitsch, 'Kyberkratie oder Kyberbürokratie in der Sowjetunion', In B. Greiner (Hg), *Geist und Macht im Kalten Krieg* (Hamburg: Hamburger Edition 2011), 376-395.
David P. Julyk, "*The Trouble With Machines Is People." The Computer as Icon in Post-War America: 1946-1970* (PhD thesis University of Michigan, 2008. Typoscript).
Arthe van Laer, 'Developing an EC computer policy, 1965-1974', *IEEE Annals Hist of Computing* 32/1 (2010), 44-59.
E. Medina, *Cybernetic revolutionaries. Technology and politics in Allende's Chile* (Cambridge, Mass: MIT Press 2011).
D. Mindell, J. Segal, S Gerovitch, 'From communications engineering to communications science. Cybernetics and information theory in the United States, France, and the Soviet Union', in M. Walker (ed), *Science and ideology. A comparative history* (London: Routledge 2003), 66-96.
R. Kline, 'Cybernetics, management science, and technology policy. The emergence of "Information Technology" as a keyword, 1948-1985', *Techn & Cult* 47/. (juli 2006), 513-.
C. Schlombs, 'Engineering international expansion: IBM and Remington Rand in European computer markets', *IEEE Annals Hist of Computing* (oct-dec 2008), 42-58.

● There was a lot of talk about an imminent 'full automation of the economy', but in fact, automation was a very complicated process, with many failures. Therefore: don't take stories about computers and automation in the popular press as reflections of what was really going on.
● This has to do with the fact that, strange as it may seem, the themes of automation and thinking machines was not new at all. Statues of humans that move as if they are alive go back to antiquity. The question if thought might be a mechanism like the body has been on the agenda since Descartes. And feedback control mechanisms were used already in windmills and steam engines. Therefore, much of the postwar debate was a continuation of much older *Leitbilder* and *Schreckbilder*.[5]
● It may be more fruitful therefore to inquire which individuals and groups served as 'opinion leaders', what their interests and motives were, and how such ideas entered popular culture. For example:
● The American firm IBM was very active and successful in promoting its products in Europe. Did its marketing efforts influence the public image of computers?
● How is this related with the image of 'the American way of life', which included American management styles, rationalization and automation? Was this a *Leitbild* or a *Schreckbild*?
● On the other hand, some countries emphasized their unique national character. France is the most obvious example: it tried to develop its own nuclear reactor as well as its own type of computers, claimed that cybernetics was really a French invention, and so on. All to distinguish itself from the US and show its grandeur.[6] Finland is another interesting case: it developed its technological prowess in order to be independent of its big neighbors Germany and Russia. Images from the national epic *Kalevala* were used to drive the message home.[7]

C. Caetano, E. Pauer (Hg), *Roboter als Zukunftsboten – Aspekte einer Kulturgeschichte der Roboter in Japan* special issue *Technikgeschichte* 77/4 (2010).

[5] See Wikipedia, 'List of fictional robots and androids' and 'List of fictional computers'. D. Bourg, 'Les robots, les dieux, les animaux et nous' in *Et l'homme créa le robot* (Paris: Musée des arts et métiers, 2012), 85; R. Sims, *Der mechanische Mensch* (Zürich: ,).

[6] Mindell o.c.

[7] Paju o.c.

Summarizing:

● I am interested in *Leitbilder* and *Schreckbilder* of automation, computers and robots (three terms that are often combined in the popular media).

● which dominated: the positive or the negative?

● how did they relate to the past: did they emphasize *continuity* with old images of mechanization and thinking machines? Or did they speak of a *revolution*, the beginning of a new era?

● was the future imagined as a kind of idealized, or despised America? Or was a national future imagined? Or perhaps a generalized modernism towards which all mankind would converge?

● who were the opinion leaders? What were their motives? How did their ideas filter through in the popular press?

The Dutch case

Let me begin with opinion leaders. For the sake of brevity, I will focus upon only one: Fred Polak (1907-1985), a high ranking official and government adviser; former student of Tinbergen, the great mathematical economist.[8] In 1949 he became part-time professor of sociology in Rotterdam. The theme of his inauguration speech was the social impact of automation and computers, which he called, like Norbert Wiener, a second industrial revolution. Two core developments: Industry, he believed, was on its way to 'full automation'. And the new science of cybernetics was the leading direction in the social sciences. The goal of this new science was a fully numerically controlled society, and the means to achieve this were mathematical modeling of everything, from machines to human beings to society ('sociometrics' similar to his teacher Tinbergen's 'econometrics').

Polak was not a man for details. He said that mass media would enhance the mechanical character of culture, without explaining what exactly he meant. However, this was common talk at the time: famous psychiatrist Erich Fromm wrote about 'automaton conformity' in western

[8] F.L. Polak, *De wentelgang der wetenschap en de maatschappij van morgen* (2e uitgebreide druk, Stenfert Kroese, Leiden [1950]; idem, *Prognostica*; idem, with H.F. van Loon, *Gesprek met morgen*. Also in general intellectual journals such as the leading one, *De Gids* (e.g. 1952, p. 58-64: Polak was one of the 'prominent Dutchmen' who were asked to comment upon 'our times') and newspapers such as *NRC*. His work was commented on by other prominent intellectuals in the same and similar media.

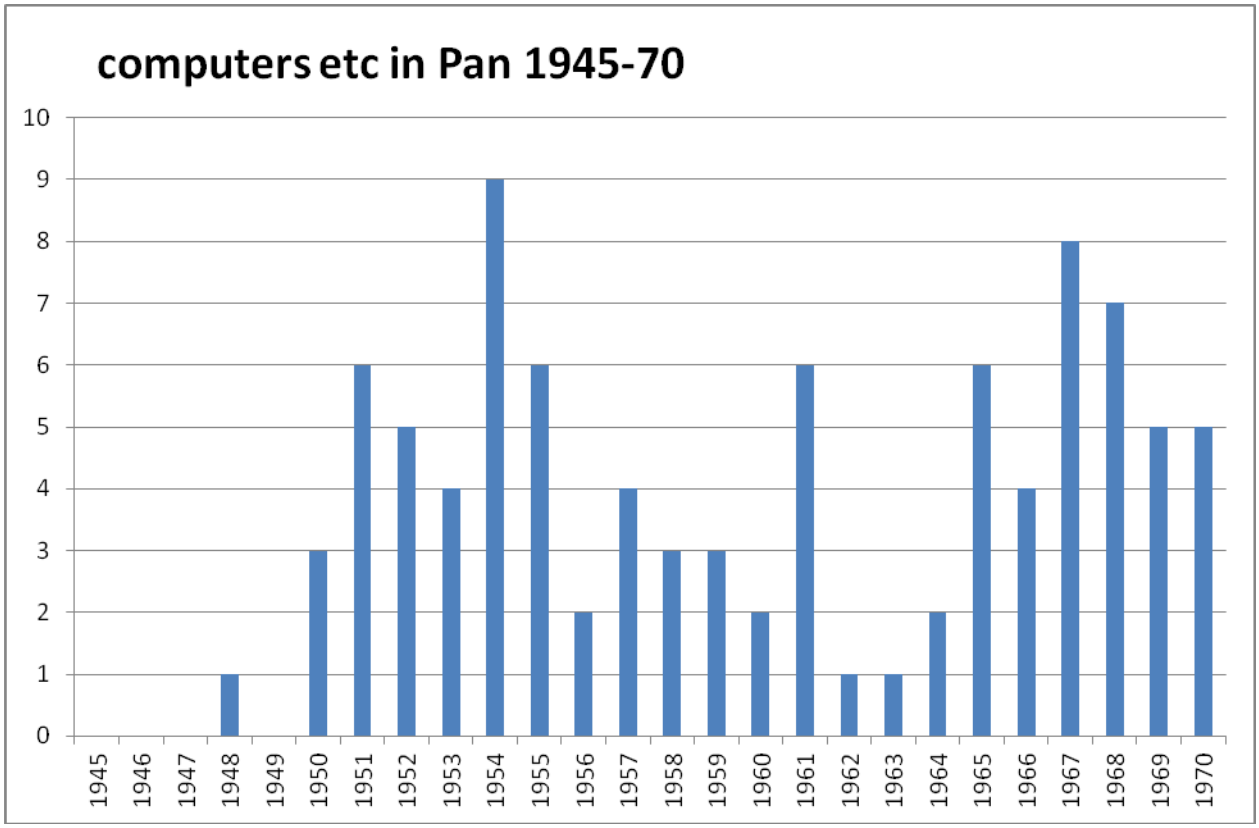
societies, and a little later Charles Wright Mills spoke of the typical western citizen as a 'cheerful robot' – and several Dutch writers spoke in similar terms.[9]

For Polak, the fully-automated society was a *Schreckbild*, and America was going that way. A counter-force should be created by social scientists like himself, and their work should be amply funded by the government. He did not present an alternative, a more attractive *Leitbild*, and certainly not a specifically Dutch perspective, like the French and the Fins. In his later publications, he spoke of a European rather than a Dutch future society.

Panorama

Panorama was the most popular of Dutch illustrated magazines for a general public (only women's magazines were even more popular). It was more widely read than any newspaper, and marketing research shows that it reached all kinds of people in terms of age, sex and social class. I have gone through all the weekly issues and collected articles, photo's with captions, cartoons and readers' letters on the themes of automation, computers and robots. Here are some simple statistics:

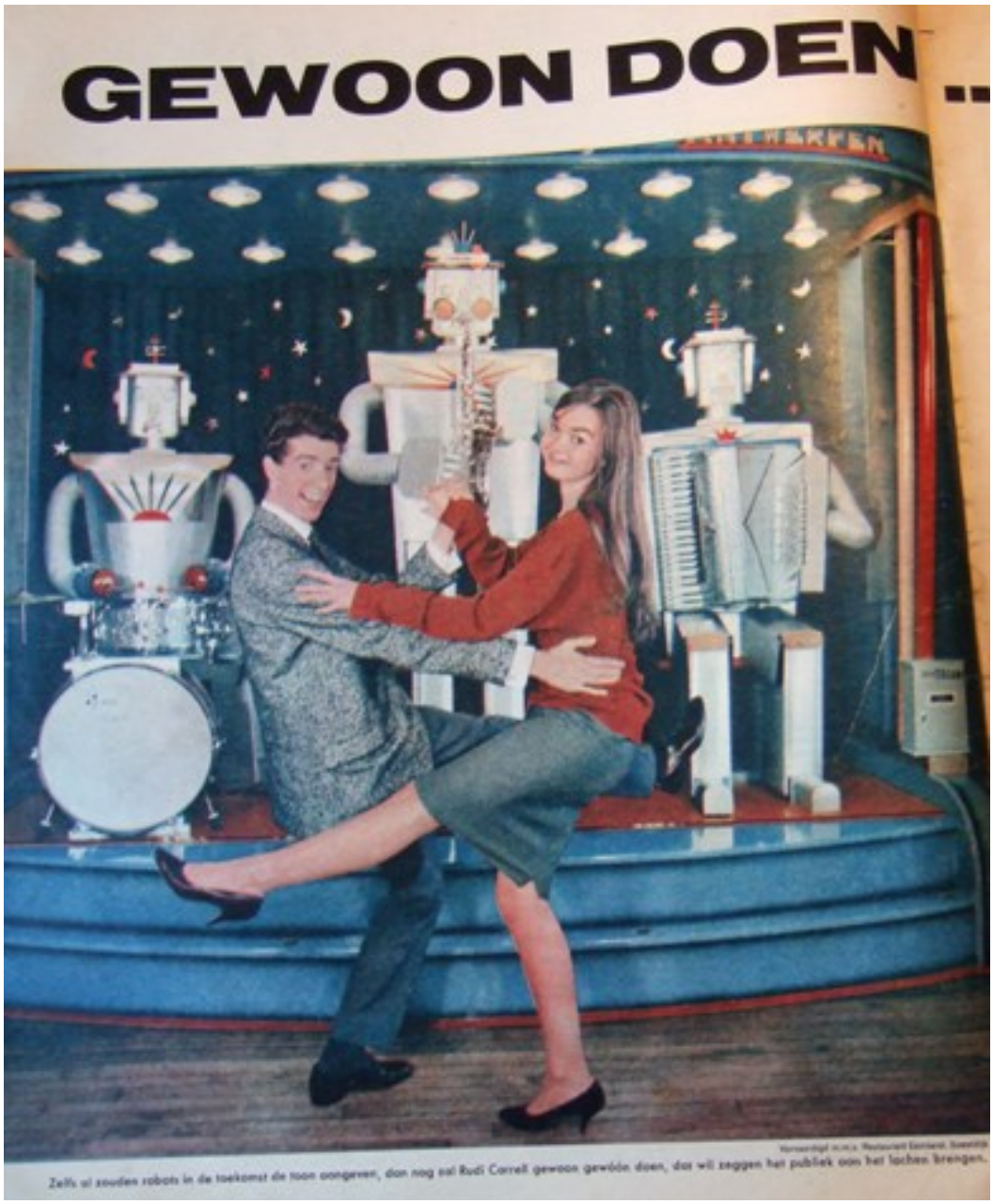
[9] Beets en Tolhoek in W&S.



- Two peaks in interest: the early fifties and the late sixties. The more serious articles clustered slightly later in the fifties and, also, late sixties.

- Robots were the most popular subject, throughout, but esp in the 50s.

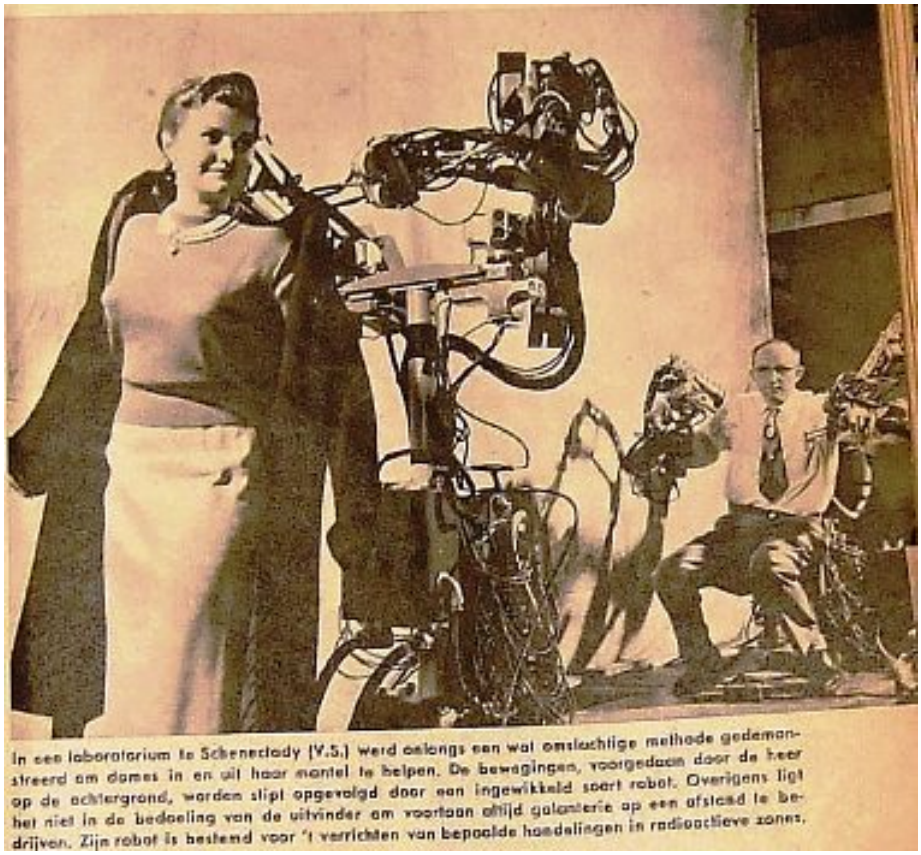
So let's start with them. Everyone talks about robots these days, said *Panorama* in 1952. Robots, usually made by amateur technicians, appeared at markets and exhibitions. Robot orchestras were popular – here in a kind of puppet show for children in Japan, and a dancing orchestra in a bar in Antwerp, Belgium.



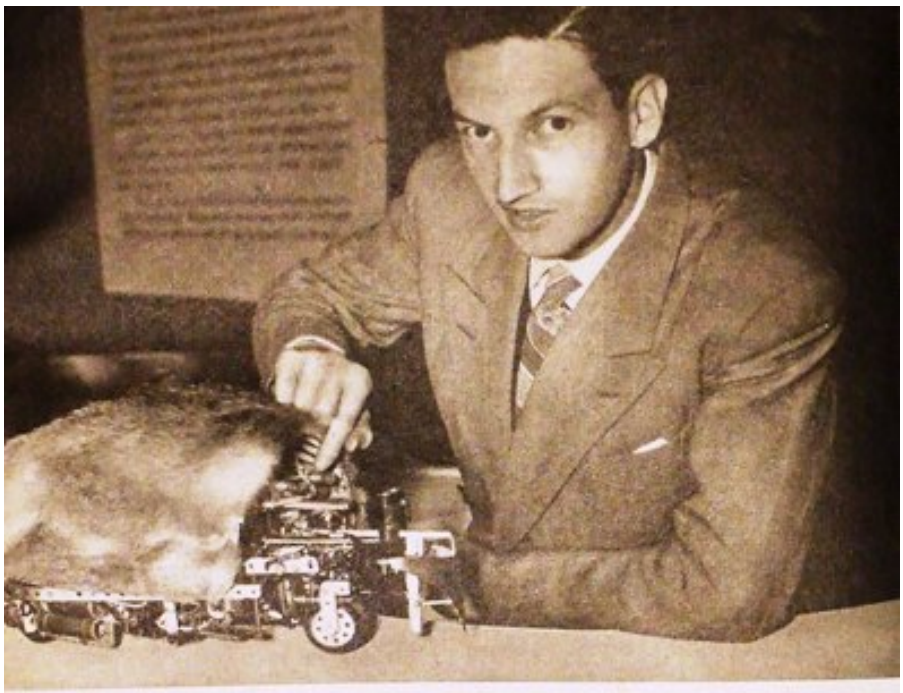
The word ‘robot’ was used for all kinds of automatic machinery, whether or not it looked like a human being – e.g. a ‘robot elevator’ (elevator without a boy to operate it). Computers were also sometimes called robots.

Words like automaton, automatic, automation were also very popular. Instead of many examples just one cartoon (28 okt 67), in which a woman has just bought a new item and tells her husband: ‘I don’t know what it is, but it is automatic and we don’t have it yet’.

There were serious articles about robots too, e.g. machines with remote control, developed for use in, for example, nuclear reactors; and also on the first robots with feedback controls, e.g. by Grey Walter in Britain and Albert Ducrocq in France. In most of these articles, there was no sense of threat, as in Polak's publications, but rather of amazement at the ingenuity, and helpfulness of these new machines and gadgets.



In een laboratorium te Schenectady (V.S.) werd onlangs een wat omslachtige methode gedemonstreerd om dames in en uit haar mantel te helpen. De bewegingen, voorgedaan door de heer op de achtergrond, werden stipt opgevolgd door een ingewikkeld soort robot. Overigens ligt het niet in de bedoeling van de uitvinder om voortaan altijd galanterie op een afstand te bedrijven. Zijn robot is bestemd voor 't verrichten van bepaalde handelingen in radioactieve zones.



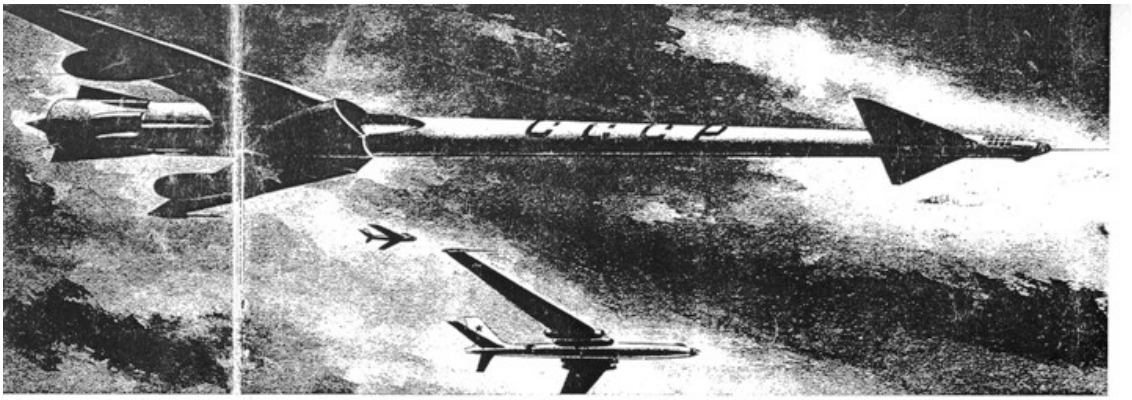
▲De tweeëndertigjarige Franse ingenieur Albert Ducrocq, schrijver van 't boek „l'Ere

Were robots and automation presented as bringing about a revolution? Usually, no, even the contrary. Esp during the 50s, *Panorama* made a point of showing that 'robots are nothing new'. For example, the famous mechanical dolls by Droz in Switzerland, that 'still cause amazement in this century of technology', linked present-day robots to this tradition that I mentioned.

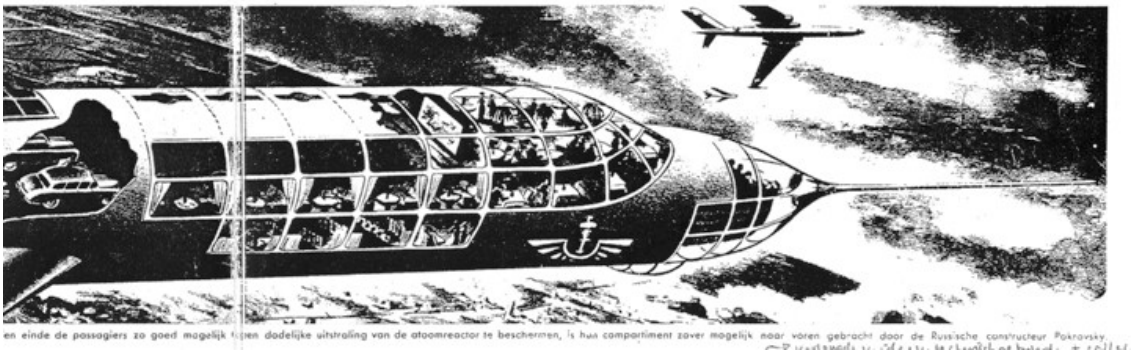
So was there really nothing new? A few articles pointed out that what distinguished recent robots from the older mechanical dolls was that they could 'think', that is, react to the environment, take decisions, and learn from experience. Some articles discussed the phenomenon of 'emergent behavior' that had been studied by Grey Walter and others. The most frightening article was about a new American guided missile, Nike, which could find, follow and destroy a fast maneuvering airplane. This article ended with speculating about the prospect of a 'push-button war' in which 'mechanical brains will fight each other': automation ending in mass destruction.

Panorama was much more optimistic about another great issue in the fifties: technological unemployment caused by automation. It said that certainly jobs would be lost, but the process would be gradual, new and more interesting jobs would be created, and there would be more leisure time.

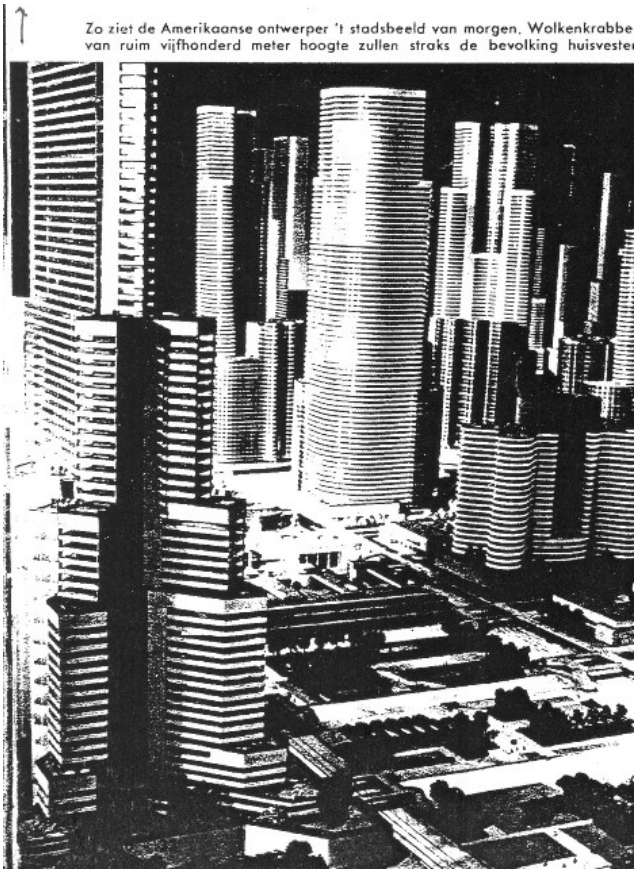
Overall, during the fifties we find no coherent *Leitbild* as in the work of the intellectuals, but we do note significant differences with the intellectual discourse. Panorama never wrote about the prospect of men becoming robots or society a machine. It quoted experts from the United States, but also from other countries. In most articles the future looked like a technological paradise, not specifically an American paradise or a recognizably Dutch one, but a kind of generalized, even ecumenical modernism, as in this article, that pictured, side by side, Russian passenger planes and American skyscrapers.



ussische ingenieurs zien het vliegtuig van c toekomst zo. De atoomcentrale is in het verbrede staartstuk gemonteerd. De totale lengte van de romp, waarin ook een enorm vrachtruim, meet tweehonderd meter.



en einde de passagiers zo goed mogelijk t[illegible]en dodelijke uitstraling van de atoomreactor te beschermen, is hun compartiment zover mogelijk naar voren gebracht door de Russische constructeur Pokrovsky.



Zo ziet de Amerikaanse ontwerper 't stadsbeeld van morgen. Wolkenkrabbe
van ruim vijfhonderd meter hoogte zullen straks de bevolking huisveste

At the end of the fifties there was a slackening of interest, but a new wave followed soon. For example, the director of a large publishing firm that specialized in popular science and technology said: 'we are at the beginning of a computer era.'[10] Computers, he believed, would enter the home (he was thinking of terminals of large mainframes located in some central location). Therefore, together with Philips, the electronics form, he produced a series of cheap books on computers, to help build up a market.

In Panorama, two longer articles appeared at the end of the sixties which offered radically opposite perspectives:

One ('67) described, with great enthusiasm, the grand visions of American experts on Artificial Intelligence (it talked about the prospect of a 'world brain' which integrated human and machine intelligence). The other article, written by the famous Italian journalist Oriana Fallaci, was a portrait of the three American astronauts who accomplished the first landing on the moon (july 69). It was entirely negative. It portrayed the astronauts as cold, technology-obsessed 'robots'. Spaceflight served as a metonym for the a future world that would be dominated by technology, and boring people like Neil Armstrong. In fact, this was the, by that time, well-worn image of a 'brave new world', 'filled in' with the story of space flight.

[10] KDC, Nijmegen, archives of Spectrum, nrs 873, 2481, 3087.

figuren in plaats van met ruimte-
experts.

Robot

Neil Armstrong, maanman nummer 1, is 39 jaar oud. Zijn familienaam, die iets van boerse kracht en goedmoedigheid oproept, past hem niet, zeker niet wat betreft zijn gezicht met de enigszins pinnige wipneus en de dunne, sarcastische mond. Zijn wangen zijn

Conclusions

Tentative, because my sample of articles is still so small:

● Contrary to what is often said (e.g. Ceruzzi, *Hist of modern comp*, p. 3), it was not the popular press but leading intellectuals who made the most dramatic predictions for the future – the idea of a second industrial revolution as the greatest upheaval in history and so on. Why? In the case of Polak, his need for funds to get his prognostics project under way was certainly a factor (Wiener, although well established, also tried to launch a new super-science, cybernetics). Panorama, on the other hand, emphasized continuity, at *least during the fifties*. It did sometimes point out the newness of electronic feedback control, but it refrained from talk about men as robots and society as a machine. This seems to have changed in the late sixties: then the tone

became more dramatic, both on the positive and on the negative side. Explanation? One might speculate that it wanted to put people at ease, but in the case of nuclear technologies, the magazine often painted a very disturbing picture of the future.

● Again, during the 1950s, America was usually neither a real *Leitbild* nor a *Schreckbild* (although we have met some exceptions). It was a major source of examples and expertise, but experts from several other countries, including the NL, were quoted as well. The future looked 'modern', not particularly American, but not Dutch either, and the problem of national identity was never raised, as it was in France and Finland.

● Overall, the prospects of automation were much less pessimistic than those of nuclear technology – the other cluster of innovations that were believed to shape the future. Compared to the intense fears of nuclear war and of radiation, worries about unemployment were slight, and prospects of robots taking control, or of a world-wide brain probably sounded more like science fiction than as a real threat or promise.

● In the sixties: turn towards more dramatic prospects both + and -.