

All Ever Said About Technological Progress*

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Review of: J.H.J. van der Pot, *Die Bewertung des technischen Fortschritts. Eine systematische Übersicht der Theorien*, 2 vols (Assen: van Gorcum, 1985), 1429 pp.

Whatever there may be to say in between, both the first and the last thing to be expressed about these two huge tomes cannot but be one's profound respect for it. Respect for the author's courage in tackling such a wide-ranging subject by way of an individual effort; respect, too, for the immense amount of work that went into the collection of all the material assembled here; for the design of the superb arrangement assigning every element of the material its proper systematic place; for the care van der Pot bestowed upon the presentation of his book, rendering the material accessible to the reader by a wide variety of means.

It is possible, to be sure, to criticize quite severely the manner in which van der Pot has chosen to approach his subject. Briefly said, the book's principal drawback is that it is virtually unreadable. Some 80 to 90 percent of its content consists of quotations. True, these are held together by the author's own connecting text, and above all by their systematic order of presentation. But this does still not alter the fact that, if one tries to read it through from beginning to end, the entire collection turns out to be barely digestible. The reviewer does not wish to imply to have read every word of it. All I could do to acquire, and maintain, a grip on the book as a whole was to work my way into its system of classification, read all the connecting text, go through about half the quotations, but just peruse the remaining half, especially those in which German 'Kulturpessimisten' give extensive vent to their misotechnical broodings. Still, these two volumes and their densely printed pages have occupied me for days, and hardly as a passive consumer, either. For the content leaves one no peace of mind, so many unexpected vistas are opened up; so compelling a perspective upon technology does gradually unfold; so fundamental, in short, is the subject that van der Pot has tackled here in its hardly fathomable wholeness. For the variety of viewpoints on technological progress and what it means for us is almost endless.

By analogy with Descartes' remark in part 2 of the *Discours de la Méthode* that it is impossible to imagine anything, however strange or incredible, that has

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not already been advanced by one philosopher or another, so, too, we may sigh — having made our acquaintance with van der Pot's compilation of German, English, and French quotations on technological progress — that it seems impossible to take a stance on this highly controversial subject without its having been adopted already by someone. Let me illustrate by picking up one fundamental theme — the question of whether we can control technology in its seemingly remorseless advance, and, if so, what may persuade us that we can? This is the subject of van der Pot's fourth Hauptteil, 'Die Theorien über die Beherrschung des technischen Fortschritts'. Among answers to this question van der Pot distinguishes between the optimistic, the fatalist, and the activist outlook. He explains that the first two of these viewpoints have in common a denial that control over technological progress is necessary (or at least desirable), the difference being that in the second view technology is regarded as a kind of Moloch which cannot be stopped, whereas the supporters of the first view believe that technology itself automatically produces the correction of whatever damage it has caused. The fatalist conception is further subdivided by van der Pot according to whether one believes that technology progresses through regular, autonomous patterns, or whether one adheres to "die Auffassung des technischen Fortschritts als eines Teilgeschehens eines sich der menschlichen Lenkung entziehenden Prozesses" (title of ch. 188).

The first of these notions — of a law-like regularity in the pattern of technological advance — is elaborated in three successive chapters. In the first of these the theory of the autonomy of technological progress is described in greater detail as the idea that humanity has irrevocably lost its grip on technology: "Der technische Fortschritt, so wird hier gemeint, sei zu einem nicht mehr lenkbaren Geschehen, zu einem nur noch nach eigenen Gesetzmässigkeiten ablaufenden Prozess geworden; weder Kräfte ausserhalb dieses Prozesses, noch etwa der individuelle Forscher können irgendeinen Einfluss darauf ausüben" (pp. 735-736). Follow ten quotations from six authors who, with varying degrees of determination, urge upon us our helplessness in the face of technology. In the next chapter van der Pot offers an excursion, in which the question is examined of whether technical inventions depend upon the ingenuity of one specific individual, or whether another inventor would have taken up the work if the former had not. Seven quotations are invoked to shed light on the question from a variety of viewpoints. At the end van der Pot himself concludes that the idea of interchangeability between one thinker and another remains unprovable speculation in the field of general culture, but does hold for science and technology. The principal evidence for the assertion is taken from empirical material compiled by R.K. Merton concerning the frequent occurrence of multiple discovery in science. The chapter ends on the assertion that the idea of the replaceability of the individual inventor which van der Pot accepts (on

inadequate grounds, I still believe, but never mind) does not constitute sufficient reason for inferring a complete autonomy of technological progress.

In the next chapter, 'Zur Kritik an der Theorie der Eigengesetzlichkeit', twenty mostly quite lengthy quotations on seven pages disentangle carefully the various grounds for the theory, each being examined as to its plausibility. Most often it is the authors van der Pot quotes whose voices are heard here, rather than his own. One example: on p. 745 he quotes Friedrich Rapp, who begins by defining what is plausible about the thesis of the autonomy of technological progress:

Niemand wird bezweifeln, dass heute — unabhängig von der herrschenden Wirtschaftsordnung und dem politischen System — Lebensstil und Anschauungen immer mehr durch die Technik geprägt werden. Diese Entwicklung scheint ihrer eigenen Dynamik zu gehorchen: Wirtschaftlicher Konkurrenzkampf und das Verlangen nach höherem Lebensstandard führen dazu, dass man in jedem Fall die gegebenen technischen Möglichkeiten uneingeschränkt ausnutzt und dabei bestrebt ist, um jeden Preis möglichst hohe Zuwachsraten zu erreichen. Der dadurch in Gang gesetzte Prozess schafft sich selbst gleichsam ständig neue Nahrung und nimmt angesichts der komplexen Verflechtung von technischem Fortschritt, ökonomischem Wachstum und steigendem Lebensstandard den Charakter eines unentrinnbaren Geschehens an, bei dem es anscheinend nur noch darauf ankommt, die aus den technischen Effizienzforderungen resultierenden Sachzwänge möglichst adäquat zu erfüllen (pp. 745-746).

Later on in this quotation, and also in those that follow, it becomes clear that the viewpoint expressed here — that of the individual in confrontation with a process that appears to take place far over his head — fails to do justice to the dependency relations in which technology finds itself. Of these, social interests and the market of supply and demand come first. Beside this fundamental reason for rejecting the notion of complete and unredeemed autonomy van der Pot also pays much attention to its ethically undesirable consequences, because it leads to "Entmündigung des Menschen" (in the words of the historian of technology, Rürüp, quoted on p. 747).

In the immediate sequel the author recalls the idea of technology as a self-correcting system. He points out that supporters of this and the preceding notion share the determinist assumption that technological progress possesses its own dynamic, but that the optimists among them believe in automatic self-correction (curing the evils technology has called into being by means of more technology), whereas the pessimists hold that there can be no cure. Finally, he takes both parties to the debate to task in that their views "einer Leugnung oder einem Abschieben der sittlichen Verantwortung für die Folgen des technischen Fortschritts gleichkomme[n]" (p. 747). This idea is elaborated further and made more concrete in citations from five authors.

The one example given above occupies thirteen and a half pages in the book. Why pay so much attention to it? In the first place, the example serves to

illustrate a working method van der Pot maintains throughout, filling almost 1200 pages with it. What we find here is what we find everywhere — overarching ideas are broken down into their component parts; each of these parts, one after the other, is carefully and patiently reproduced by means of quotations; each is analyzed in its consequences — whether or not thought valid by the author — and connected with ideas advanced earlier; finally, the whole is focused by means of a personal point of view which is always present at the background and which comes increasingly to the fore as the book progresses. Van der Pot's viewpoint derives from his deep awe for what — slightly simplifying — one might call the 'Club of Rome', or the 'limits to growth' conception of humankind's present-day afflictions. He is profoundly perturbed by the amount of destruction the human race has wrought upon nature with the aid of technology. He appears convinced that modern technology, in what it entails in terms of the destruction of nature, of overpopulation, of the exhaustion of resources, and of inescapable energy shortages, has carried humankind to the brink of a crisis without precedent — a crisis from which we can escape only if we succeed very soon in controlling present-day technology and in reshaping both its scale and its overall nature. The author usually remains modestly at the background of the images evoked by his quotations, yet very occasionally he sets restraint aside and allows the reader a glance at his personal views. Two of his statements seem to me particularly indicative of his own conception:

... der wissenschaftlich-technische Fortschritt [hat] schwierigere Probleme ins Leben gerufen, als diejenigen, die er gelöst hat; für deren Lösung wird ... weiterer wissenschaftlicher und technischer Fortschritt allein nicht genügen, sondern vor allem ethische Besinnung und Weisheit notwendig sein (p. 638).

Die cartesianische Subjekt-Objekt-Trennung gehört zwar zu den Entstehungsbedingungen der Naturzerstörung. Als deren eigentliche (moralische und behebbare) Ursache wäre aber die konsumorientierte Lebensweise in den reichen Ländern zu nennen (p. 1119).

It is the view expressed in words such as these that renders the example given above of van der Pot's working method such a decisive passage in his book. Human control of the technology created by humanity itself is required, in van der Pot's view, for the survival of the human race. Such control presupposes an activist stance, hence it is foreclosed by a conception of technology as either a monster running wild or as a self-correcting system.

Therefore, in spite of the markedly objective tone that permeates the book, what we have here is, ultimately, a book with a moral. It does not occur to me to blame van der Pot for this. One cannot imagine anyone to spend twenty years in doggedly composing a book of such gigantic proportions without being driven by a powerful, personal involvement in the problem-area under discussion. Moreover, in the great majority of cases viewpoints are rendered in the book

towards which the author maintains a neutral stance. Where this is not the case, with partisan feelings clearly coming into play, van der Pot still aims for a fair representation of ideas he is far from sharing and which, on occasion, he takes to be perilous to the utmost. This is true even for the domain where van der Pot feels least impelled to stick to his customary restraint — that of the 'motorisierte Strassenverkehr' he loathes with a kind of objectified intensity, regarding it as the example *par excellence* of technological ingenuity run wild and turned against its own inventor.

Nor does the author's personal view provide the foremost — let alone the only — principle of organization underlying *Die Bewertung des technischen Fortschritts*. Primary is, rather, an ongoing striving for comprehensiveness and systematic arrangement of the material. As far as I can judge, van der Pot has attained these aims to the extent that this is humanly possible. Comprehensiveness goes so far as to lead the author to suggest theoretically possible positions which he has never found formulated anywhere. As for the system, this I consider to be the most enduringly valuable aspect of the book. His lucidly applied method, always sharply analytical in its distinctions and its classifications, turns him into the Linnaeus of technological progress. The most creative portion of this book, therefore, is its Table of Contents — nineteen pages filled with captions for the Hauptteile, Hauptabschnitte, Abschnitte, and separate Kapitel with their variety of sections and subsections of which the book consists. If a reader were to go through the table of contents very slowly and very patiently, allowing each single part to sink in and filling it with content, he might in a sense forgo reading the actual text of the book. But alas, this cannot be done — it is the content which fleshes out the bloodless skeleton of which a systematic classification must of necessity consist. The question which cannot fail to present itself is whether the skeleton really needs all 1178 pages of flesh to give it life. Is it not rather the case that the skeleton, loaded with so much citation flesh, collapses under its assembled weight?

However much I regret to say so, I fear that, for all the fascination the book exudes, the question cannot but be answered in the affirmative. Here if anywhere, less would have been more. True, almost every quotation reflects a somewhat differently shaded opinion about the specific problem treated in each consecutive chapter; still I do not believe that the elimination of, say, one half of the quotations would seriously have distorted the book's accumulated impact. At some point during the two decades van der Pot has been working on it his project ran away with him. Rigorous editing resulting in a compressed version of c. 500 pages might have rescued the work from the kind of unreadability that now, alas, is among its most striking features. In his Introduction van der Pot acknowledges, with amiable irony directed at himself, that books, too, are subject to 'limits to growth' which have been far exceeded here. Still, he has let

matters rest with the statement. In its present format the book will be most serviceable as a reference work — useful indeed as an inexhaustible storage room filled with often striking quotations, yet falling short of the job it was originally called upon to perform.

It must meanwhile be acknowledged that van der Pot did his utmost to render the book optimally accessible as a work of reference. 'Externals' are very well taken care of; quotations are reproduced with almost painful accuracy, and, most important of all, after the Table of Contents and the main text (including 91 pages filled with supplementary or last-minute quotations) one finds an extensive Bibliography (85 pages), an Index of Names (22 pages), and, finally, a well-organized Subject Index which — larded with cross-references — takes us in another 22 pages from 'Abnutzungseffekt' to the very 'Zweckneutralität, Zweckindifferenz der Technik' which, in van der Pot's view, constitutes so regrettable a pretext for allowing technology to forge ahead on its course, as if technology were an ethically neutral affair.

This, then, brings us back to what van der Pot hopes to achieve with his book. In his own words, as expressed in the 'Vorwort des Verfassers', it is

die Hoffnung des Autors, dass dieser Versuch zum Übersichtlichmachen des Denkens über den technischen Fortschritt einen kleinen Beitrag zur Erleichterung der Aufgabe seiner Beherrschung liefern wird. Denn daran kann kein Zweifel sein, dass nicht nur für die heutige Menschheit, sondern auch für die kommenden Generationen die Beherrschung des technischen Fortschritts ihre wichtigste Aufgabe sein wird, weil ohne ihre gemeinsame Anstrengung zur Meisterung dieser Aufgabe der Frieden nicht gesichert und die Bewohnbarkeit unseres Planeten nicht erhalten werden kann (p. 25).

Let me raise a few points, then, about this basic thesis of the author. The literature cited in the book goes up to 1982; ten years have meanwhile passed, and it is striking how dated the book already is, especially the last of the four Hauptteile, which deals with the control of technology. A problem-area which exerted such a strong grip on public debate in the 1970s was soon to give way to an equally one-sided glorification of technology. Large-scale unemployment did intervene, while the belief in the omnipotence of state intervention withered. With the return to the agenda of concerns about unchecked technology in recent years, the problem has come to be enclosed less in an atmosphere of imminent doom such as exuded, at the time, by the Club of Rome. One particular aspect of the message of Meadows *et al.* was a tendency to foreclose the future entirely — to ignore possible new, unexpected, and, by definition, unpredictable developments which may give quite a novel twist to a given situation. The 'technological fix', to be sure, has its limitations, yet it was put aside a little too easily in those days of yore. Critics who pointed out this *vitium originis* of the 'limits to growth' approach are cited by van der Pot with his customary fairness (pp. 881-885), still I think that he fails to do sufficient justice to their point of view. A narrowly

related shortcoming of van der Pot's book resides in its somewhat one-sided 'humanities' approach to technology. True, amidst all those thousands of quotations the engineer, the inventor, the technician is not wholly excluded from the floor. Still there is a marked predominance of armchair philosophers, of cultural critics with minimal experience of their own in the daily business of the technician. It is true that an ability to reflect critically upon the societal consequences of his own doings is rarely the strongest point of your average engineer, still a somewhat greater familiarity with the nuts and bolts of technology; a somewhat greater awareness of the sheer pleasure of invention might with profit have entered the many pages of *Die Bewertung des technischen Fortschritts*. More generally speaking, what one misses too much is a dimension of technology which certainly did not fail to find expression in the literature — that of technology as an adventure, as an immensely exciting journey of exploration into the unknown, as an ongoing challenge to human creativity. The third Hauptteil in particular, which is devoted to the meaning ('Sinn') of technological progress, suffers decisively at places from this very defect.

None of this detracts from the fact that the book has a great deal to offer to everyone with an interest in technology, the historian certainly not excluded. The place technology has occupied in society as a whole over the ages; the fundamental turn technology gave to social development at several key junctures in world history like the Industrial Revolution; the set of conditions which made possible a breakthrough in technology in the West that was not achieved spontaneously in any other civilization — all these and many similar fundamental themes from the history of technology-in-society make their appearance here, by means of often compellingly formulated quotations. What, if any, is the connection between the rise of modern technology and the economic ethic of Protestantism? May the passage in Genesis in which God appoints man to the stewardship over nature be held responsible for our present ecological crisis? How have periodizations of history — the topic to which, many years ago, van der Pot devoted his doctoral thesis — been influenced by historical breakthroughs in technology? Questions like these, and many from quite other domains, come up for discussion by means of quotations which have frequently served as eye-openers to the present reviewer. For years already I have in class been telling budding engineers that it makes sense to conceive of world history as divided in three principal periods, marked by the Neolithic and the Industrial Revolutions, respectively. Not until I came across van der Pot's 39th chapter, 'Gliederungen der Universalgeschichte', did it dawn upon me that this insight — which I took to be rather recent without ever wondering about its origins — has been among us for more than forty years already. It stems from the German school of 'philosophical anthropology', and was expressed for the first time by Arnold Gehlen in 1949. Since then, Freyer, Topitsch, Linton, and Roszak have adopted it, so that it

has meanwhile acquired the status of almost a cliché. In this manner one can enjoy much of the book, being struck again and again by passages from authors one may never have heard of, and in whose works one may wish to delve somewhat further.

All this intellectual excitement is to some extent counterbalanced by an effect that began to worry me more as I penetrated further in van der Pot's book. Too often, I think, opinions are confronted with other opinions, without any empirical material being adduced that might enable one to make a choice between one view and another on other grounds than just a sense of emotional recognition. Not always, yet much too often matters raised in this book are decided on grounds of general plausibility. It is here that the outstanding *qualité* of the author — his analytical acumen — lays him open to a certain *défaut*. This is that one would like to be presented with empirical material which might serve as a test, thus moving all those numerous opinions to a higher plane — that of theories in the veritable sense of the word. Too often we are facing just the conclusions of authors cited, whereas the value of those conclusions resides precisely in the cogency (or the lack thereof) of the empirical material upon which the conclusion ultimately rests.

It may seem as if, in voicing this complaint, I am asking for an even bulkier book than van der Pot's *Die Bewertung des Technischen Fortschritts* has turned into already. This, then, is not the case. In this review I have asked for a somewhat different — more in particular, for a more concise and therefore more accessible — book. But whether or not an 'abridged van der Pot' would be feasible is, in the end, neither here nor there. A full translation into English seems to be in the making, and I recommend it to everyone. For there is in any case very good reason to admire what van der Pot did accomplish. Few topics in the history of humanity have exerted quite so tangible an impact upon our lives as the progress of technology — no one who was not already convinced of this truth before he touched the book can still get around it upon laying it down. Any attempt whatsoever to introduce order into the enormous volume of literature on the subject, and to put that order to good service in hacking a path through the jungle of literature, thus rendering it vastly more accessible, deserves our profound respect. This is especially true when the effort is guided throughout by the sober objectivity, the fairness, the erudition, the coherent vision, and the analytical acumen displayed by van der Pot in *Die Bewertung des technischen Fortschritts*.

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