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This is an old book I recall from my parents library. A very boring title, but after fifty or sixty years my imagination is sufficiently aroused to dip into it. It turns out that my father got it as a prize for diligence and achievements in his studies, and he has even graced it with a painted exlibris of his own making. Further in the book there is a bookmark, a slip of a postal receipt from the fall of 1945, which no doubt has rested there undisturbed for over seventy years, in spite of a succession of moves. The postal delivery of which it is a record, as well as an unintended record of an aborted reading, consisted in a shipment of clothes to the sanatorium in Eksjö, southern Sweden, where my father stayed recuperating from TBC, acquired being drafted into the army during the war. The prolonged presence of the slip has left a mark, a dark shading of the paper of the type to jaundice with age.

I check the author on the web. He turns out to have been a very successful Austrian journalist who wrote on topics such as trade, finance and industry, topical, if not always engaging, subjects at any time. He also had good relations with the Nazi regime, in fact becoming a member after the book was written. This does not necessarily mean too much, apart from an act of pragmatism, being concerned with the sale of his books on which he depended. Many German writers at the period, showed similar concerns, and unless they for obvious reasons were barred, often chose some kind of accommodation in the interest of normalcy and realism. Zischka was criticized after the war for having acted as a propagandist for the regime by presenting it as normal. To a large extent it was normal, otherwise it would have hardly survived, and what broke its power was its military adventurism, without which it may very well have been viable, maybe more so then many communist regimes. Furthermore the publishing company 'Dagens Böcker' (Books of Today), under whose imprint it appeared, folded after the war. It was accused of being friendly to the Nazi regime, in fact of having been controlled by it, as well as with its association with a Swedish-German friendship organization. As to having been a puppet, such radical accusations tend not to be solid but easily falsified; but certainly its aim was to present 'the other side' in the ostensible interest of allowing a wide spectrum of views to be available, protected by the right of speech and publication. Such ambitions are in principle laudable, and only become regrettable in retrospect. A disinterested inspection no doubt would find that the great majority of the publications would not be overtly propagandistic (that would undercut their purpose) but rather neutral, not to say reasonable, and most people unaware of their progeny, no doubt would find nothing remarkable nor controversial, let alone politically offensive, but would be more than willing to agree with most of the homilies presented. Who would oppose the slogan 'Gegen Hunger und Verzweiflung' actually used in an election campaign for Hitler. The book as such is thus an interesting document from the late 30s. A list of other publications at the end is interesting. One find authors such as Fredrik Böök and Sven Hedin (the famous explorer) who have been castigated as friendly to the Germans during the War. More interestingly though is a book by a certain

Paul Schmitz with the provoking title 'Islam - morgondagens stormakt? (Islam - world power of the Future?) To return to the book proper.

Science and technology did not really have an impact on quotidian life until the 19th century, and along with the exploitation of electricity, which provides a versatile way of distributing energy, the main advances were done by predominantly German chemists. It is remarkable that agriculture, the most basic industry of them all providing our most basic needs, was so wastefully pursued during most of human history. One only needs to look at the degradation of the environment which took place in the cradle of civilization, the Mid-East including Persia and the Eastern Mediterranean. As long as the population pressure was low and there was plenty of untouched wilderness there was not really much of a problem, you only needed to move on. Still there was a problem in principle as Malthus pointed out, the exponential (geometrical) growth of the population and the linear (arithmetical) growth of arable lands, could not be reconciled indefinitely. The great untouched prairies of North America provided endless possibilities and a postponement of the problem beyond the concern of the immediate future which occupies most people and hence politicians. And Malthus was rejected as a cynical pessimist (but did have a profound influence on the thinking of Darwin, whose concerns were of a different order). However, the plight showed itself first in densely populated Europe, and the need to feed its own populations and not to be dependent on that of foreign powers, led to improvements. The first hero we encounter is Justus Liebig (1803-1873) who was the first who systematically studied the demands on the soil for plant growth and the need for fertilizers. True fertilization had been used before, but then more accidentally, and for the first time its ingredients were identified, and the important principle that it was the minimum that set the limits for growth. Thus a shortage of some crucial nutrient could not be compensated by an overabundance of a different one. What was needed was nitrogen, and naturally occurring fertilizers such as saltpeter KNO_3 were to be found only at certain places which hence enjoyed a monopoly[1]. The theme of the book is to show how the unfair distribution of raw materials tend to lead to monopolies, and thus unchecked greed and all its concomitant exploitation and consequent miseries. What breaks monopolies is human ingenuity in the form of scientific inventions, more or less exclusively chemical ones, providing surrogates, not seldom superior to the natural material. Thus ways of producing fertilizers from commonly available material effected a revolution especially in Europe. It may be symptomatic that as a young teenager Liebig lived through the year without a summer in 1816, when a volcanic eruption reduced sunshine and temperatures leading to world-wide famines, hitting especially Europe and Germany hard. Since the 19th century famines have been the exception rather than the norm in at least Europe, testifying to a great improvement of well-fare that industrialization and globalization brought during that century. Furthermore Liebig was also instrumental in breaking another monopoly, namely that of sugar, whose production was confined to the tropics through sugar canes. Much of 18th century economy was based on sugar, and along with cotton providing the economy of the American South and the concomitant slave trade. Through successive improvement

[1] one thinks about guano the waste of marie birds on the western coast of South America, but also to be mined in deserts of the same area, leading to internal wars, with Chile acquiring crucial territories at the expense of Bolivia

of the sugar beet, its sugar content was gradually increased until it became commercially viable. There are of course antecedents to this process, maize and cereals are of course fruits of prehistoric cultivations, but only in the 19th century could such improvements be done 'scientifically' and rapidly.

The author presents a variety of cases, of how hard-to-find and rare raw-materials can be supplemented by industrial production of substitutes based on commonly available substances due to scientific advances, and how those productions can become more and more effective, producing less and less waste, by exploiting the very waste itself. Wood and coal are always wasted when burned, and that also goes for oil, when they can be the source of so much more valuable entities. Sugar, which is a form of ready energy for humans (along with most other organisms) can be extracted from wood, and thus providing more crucial energy, than when wasted for heating. On the other hand heating and other energy sources for machines is unavoidable. What we are looking at is a mostly unsung aspect of life, at least by the poet and the intellectual, namely that of comfort and material well-being, based on human goal-directed invention, not disinterested inquiry driven by curiosity inspired search for knowledge for its own sake as a testimony to the beauty of creation. This kind of scientific progress is done on an industrial scale by armies of researchers systematically leaving no proverbial stone unturned. Disdained by the poet and the intellectual purist, it is nevertheless the kind of scientific activity that is understood and appreciated by the public, and supported by the politicians, and underwritten by powerful commercial interests, resulting in industrial production and the creation of jobs, which in a subtle and not very well understood cycle, leads to a spiral where production stimulates consumption which in its turn leads to wealth and increased production. The vision of a modern technological society in which knowledge is pursued and reaped systematically, and put to the use of subjugating nature, conceived as the natural enemy of human life and endeavor, goes of course back to Francis Bacon (1561-1626). To the purist the whole spectacle looks pretty vulgar, a view which in later years has been corroborated by perceiving it as a deadly threat to the environment and biological diversity, (what was initially thought of hostile nature) rendering a less interesting and poorer world to be passed on to our grand-children. A world in fact which eventually would make the ostensible goal to all that frenzied activity, namely human well-fare and material comfort impossible. This all very much looks like an argument by contradiction in mathematics, and it might very well be.

In his final chapter the author does not dwell on environmental degradation, except on a local scale, as visible waste has always been viewed as offensive. Such matters were not that important at the time, although local environmental concerns have a long history, and Nazi Germany did distinguish itself by addressing environmental issues and passed commendable legislation to that effect as well as instigating laudable initiatives. But of course large scale warfare necessarily puts concerns about the environment in second place (at best). What the author is concerned with is human co-operation, i.e. peace and trade, although he does express disdain for a dominating world of finance which he associates with monopolies as the natural goal of any profit-seeking enterprise[2]. His account is one of

[2] and here of course one may see this as a case of incipient anti-semitism taking the background of the author into account, with its conspiracy theories, whether this is fair or not, is a question we will leave aside

heroes and the blessing of science, how it has worked for a leveling of material resources, making what formerly was only a privilege for the very rich, affordable to the masses. Now general homelies, which no one can oppose, as well as general philosophical reflections, are of limited interest. It is in the details, the Devil dwells, and the main interest is to be found in the case stories.

In addition to sugar beets, the author also discusses the cases of natural rubber (kautschuk), cotton and silk. The atrocities following in the wake of rubber are nowadays well-known, but already quite familiar to the author leavening his account with appropriate doses of moral indignation. Those success stories are of course uncontroversial, as most piecemeal technological advances, where the palpable advantages outweigh any abstract and distant concerns. Then there are of course many examples where human surrogates are far superior to naturally occurring materials, he lists soap and glass, with a long history, mortar not to mention plastic as more recent. The name plastic does not occur, but I guess that 'konsthartser' refer to it, as well as the importance of long molecular chains constituted mainly of carbon and hydrogen, to its manufacture. More problematic is the scarcity of some metals such as tin and lead, which he fears are up for immediate repletion, for which it is very hard to find substitutes (in fact this is very much true today when certain rare metals are needed for crucial components in electronic gadgets). And then of course the energy problem, it being a shame to burn coal, although it does provide the major energy source at the time. Oil being a curiosity in the mid 19th century did with the advent of the automobile become one of the most important commodities in modern economy, and he regrets the absence of oil in Germany (and its profusion in the States, which at the time provided most of the oil consumed). With mechanized warfare that characterized the Second World War, the need for oil became paramount, and Germany, which was defeated not so much by virtue of moral superiority as by material, particularly because of a shortage of oil to drive their machines. At the end there is a discussion of how to reap solar power directly, which may derive some interest for being written in the late thirties.

Now as to real technical information there is a dearth. There is a fair amount of statistical data presented but not digested nor made to serve some purpose beyond that of illustration. He also seems not to distinguish properly between energy and power, the later energy per time, although in view of the non-technical presentation its does not really matter. As noted he was a very successful popularizer, knowing that the patience of the regular reader is very limited when it comes to technical details, which may strain his thinking power and knowledge, instead preferring the anecdotal approach, the historical overview and the philosophical reflection. The book is written in the happy attitude of optimism, which were prevalent up to the 60's in popular science, when there was still talk about the peaceful exploitation of nuclear energy, a topic he does not mention at all, let alone dwell on.

Zischka born in 1904, was eventually rehabilitated after the war and resumed his career as a writer of popularization. As late as 1988 he wrote a book on Chernobyl, and lived on until 1997.

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