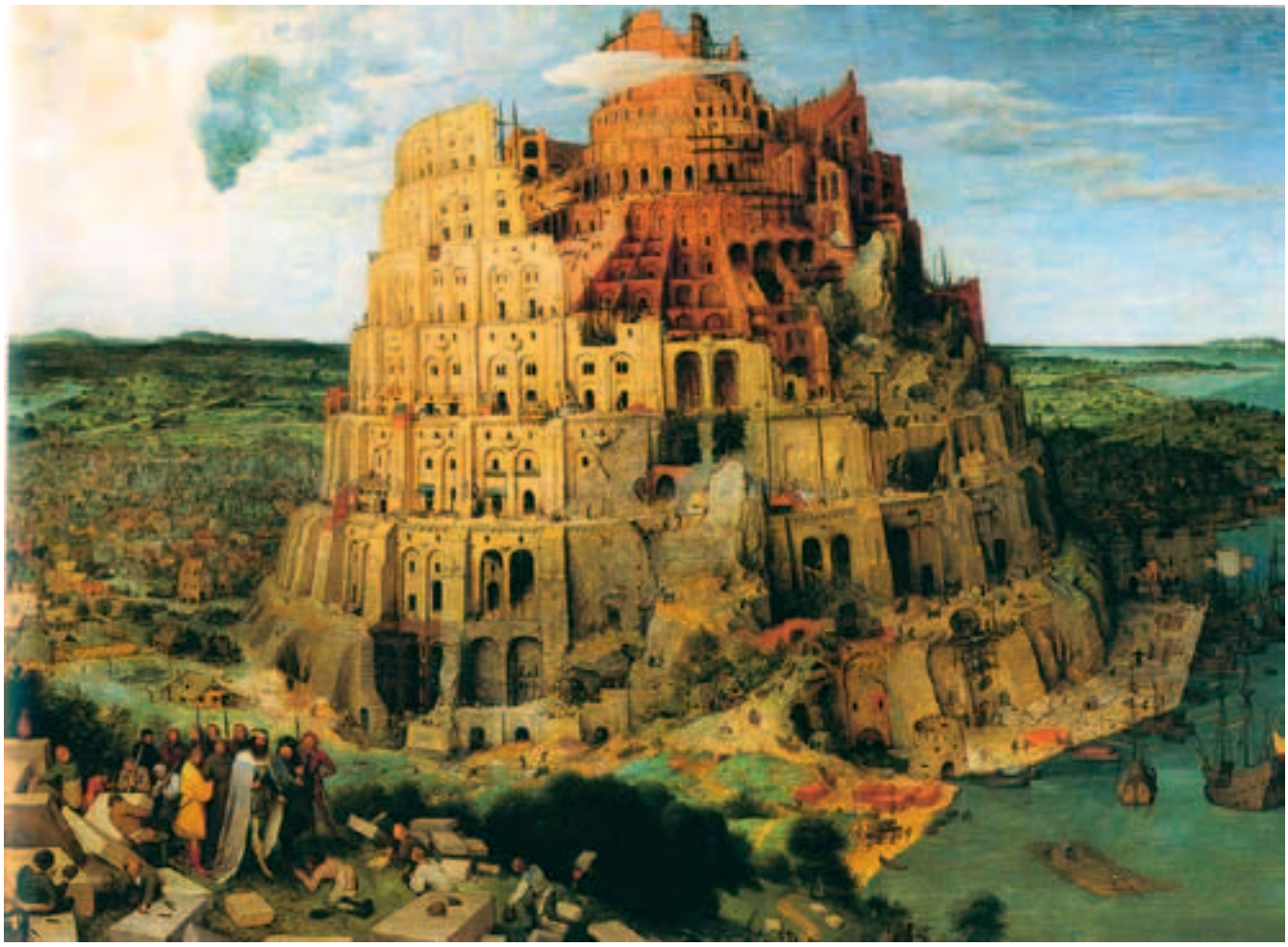

Towers of Modernism

The Tendency Towards Technological Mega-projects in the 20th Century

By Dirk van Laak

In recent history, there has never been a lack of good, impressive, and convincing ideas presented to solve the complex problems of mankind. In many cases the reality has been less successful. Even when, especially when, the plan was ambitious and technical. Often massive projects had massive consequences that hadn't been considered before. Therefore, it might be advisable to take a historically informed look back at the intellectual environment in which these technologically large-scale projects were conceived. Unquestionably attractive plans, like the "Solar Energy Partnership with Africa", may benefit from looking at examples from the past in order to avoid making the same mistakes in their future realisation.

One of the most obvious historic characteristics of the 20th century is the worldwide exploitation of space and energy resources. Both can be seen in the innumerable civil works of enormous size and in land use and landscape planning, which, in part took on continental dimensions. Hardly any society that had access to the corresponding technological means, withstood the temptation to take quantum leaps of development through technological mega-projects.

Foto: Yogho

Image 1: The ship lock system of the Three Gorge Dam during construction (November 2002).

A More 'Efficient' Environment

An entire epoch allowed itself to be fascinated by epical technology, in which ideas of a more efficient environment were reflected. Deserts were to be irrigated and brought to blossom. The formidable rivers of Siberia were to be diverted in order to make verdant the barren plains of central Asia instead of allowing them to flow uselessly into the Arctic Ocean. At Gibraltar and the Bering Strait dams were to be erected, railway lines were to circle the globe from Berlin to Cape Town and from Moscow to New York. Chad and parts of the Congo were to be flooded and turned into huge lakes as a way to milden central Africa's climate. With the help of surgical nuclear strikes canals could be created to run through isthmuses and peninsulas in mere minutes. Any shortage of energy could be overcome by having gigantic mirrors in space collect the sun's energy and shine it back to Earth.

In our ecologically sensitive frame of mind we react to these suggestions with a certain embarrassment. They seem like either the spawn of a naïve imagination or like a scurrilous exhibit in a technological cabinet of curiosity. But has this era of mega-projects ended? Currently, there are thousands of technological projects that cost more than a billion dollars being planned or constructed. They become macro-projects by definition. One need only think of the Three-Gorges Dam (Image 1) or the ever-new competitions to build the tallest building in the world. Historians usually have a hard time with technical and construction projects. When the projects have failed or required great sacrifices, they are generally ascribed to the prestige filled desires of politicians who have grown too big for their boots. However, these large-scale technological projects are symptomatic for a particular mental horizon typical in modernism – when they, or because they rarely delivered on what they had promised. Just like the Great Wall in China, the Seven Wonders of the World in antiquity or the medieval building of cathedrals, these modern large-scale projects served a transformed kind of divine service in addition to being a demonstration of power.

At the same time, they claimed a usefulness that went far beyond a technological function. It was meant to provide a means by which to rationally structure the chaotic existence of mankind. These technological total-works-of-art were perceived as being among the highest human cultural achievements, as they had been set out in the programme of the Enlightenment. That is, that rational planning and the execution of those plans were an expression of secular reason, perhaps even the salvation from the constraints of deprivation and the arbitrary power of Nature.

"Man the Maker" Intervenes

The increase in the number of these projects in the 20th century has its origins in the 19th century's realm of ex-

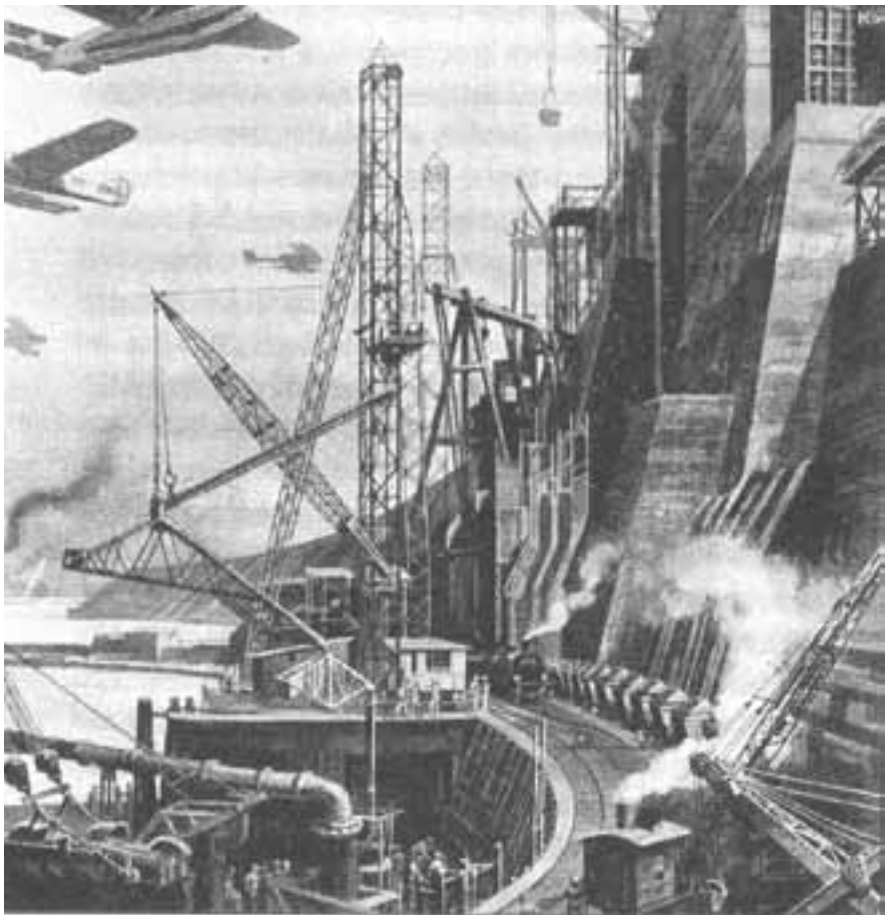

Image 2: The imagined Gibraltar dam construction site – in the 1930's a visionary icon of beginning.

perience. The enormous success of science and industry led Western Man to see himself as the 'active' part of history. The "Homo Faber or Man the Maker" had to work for his exalted position within evolution. A fundamental tenet of physics with its many consequences fit into this: the interaction between mechanical, thermal and electrical energy as well as the possible transformation of all materials and forces. From a techno-industrial viewpoint everything seemed to consist out of power, resources and work. Nature was perceived as stored energy, which could be released and used in the service of mankind. Productivity became a central, also moral imperative. Nothing was left unused, that could be subordinated to human control.

In the run up to the 20th century, the step from understanding to active intervention was taken in almost all academic disciplines. One need only think of the transition from biology to social Darwinism to eugenics. Plans took the place of projections, projects the place of prophecies. The sort of logic that had been shaped by the categories of 'manpower' and 'degree of efficiency' had been impregnated with the earlier experience of a 'synergistic revolution' that took place between 1870 and 1914. Almost all innovations that define our Age of Mobile Masses harken back to this epoch, all types of electrical equipment, motor vehicles, high-rises and other buildings that rest on steel frames. In addition, significant parts of city infrastructure, dynamite, aluminium, refrigerators, air conditioning, modern printing, the typewriter, the telephone, as well as photos, film and audio-recorders.

All of these promises of mass consumption clearly stand in uncomfortable contrast to the recognition of limited resources. This deep fear of exhausted natural energies is supported by the second law of thermodynamics of progressive entropy, and was largely focused on the social consequences of a threatening shortage of certain resources. The exhaustion of the coal reserves was already discussed in the 19th century. When the last white spots disappeared from the world maps in the 19th century this fear took on global proportions.

Population growth, consumption of resources, and energy requirements were in truth the dynamic elements of the 20th century. Their growth was exponential, their distribution was uneven, and the effects were in part catastrophic. Untold wars have since been fought also because of the budget of the Earth's resources. It was key (?) that branches of knowledge were presented in isolation from one another and created a need to act through the use of statistics, columns of numbers and dynamic card sketches.

Victory Over Nature

Large-scale settlement projects and the exploitation of space and energy resources were attempts to provide technical answers to an existing set of problems. To their contemporaries, the gigantomania was consistent with the size of their undertaking. Hadn't the Suez and the Panama Canal, or the trans-continental railway in the USA proven the enormous, economic, political and social effects of large-scale technical initiatives?

Already in the early 19th century the French sociologists Henri de Saint-Simon and Michel Chevalier had propagated the idea that technological development projects could re-integrate a fragmented society in a technical way.

The much-touted 'social question' seemed to reflect the development of productive and efficient machines. At the turn of the 20th century development projects and earth encircling forms of world transportation were hailed as the most politically significant links in service of mankind. Imperial branch lines like the French Trans-Saharan Railway, the British Cape-to-Cairo Railway, or the German Baghdad Railway were supposed to use their respective technological systems to push their tentacles deep into foreign territories and in doing so effectively take control of them.

In addition, for many technicians and engineers large-scale technical projects seemed to be the most effective alternative to war, that together with mass unemployment seemed like the very definition of waste. Border crossing networks, like the interconnected economy of energy supply, seemed by contrast to be a first-rate guarantee of peace because they enhanced the dependence of states on one another. Critical voices were frequently denounced as "Luddites" or "Enemies of Progress". By building of the towers of modernism one hoped to overcome the Babylonian confusion of mankind. Victories should be celebrated over the elements of nature instead of over men. Mankind's destiny would not be decided between power and powerlessness but rather between efficiency and waste.

In innumerable technological futuristic novels such seemingly sensible colossal projects were described in an exemplary way. The character of the ingenious inventor and construction engineer advanced to an icon of modernism. In 1919, the American sociologist Thorstein Veblen called for a," Sowjet of the Engineers". With this, he became a founding father of the Technocracy Movement that only achieved a moderate direct political influence. Its principles however – efficiency, rationality, the common-good, and planning – continue to function today as subconscious ideologemes of scientific, technical and administrative elites. In 1932, the visionary builder Herman Sörgel succinctly described the basic concepts of technocracy in the following way: "Technology creates economy and economy should make politics!" – "Instead of evaluating the technological heritage" Sörgel continues," Europe fragments itself in political feuding. Too much negative organization – too little positive production! Armies of the unemployed are living on the reserves of society."

Image 3: Also in the 1950s planning continued assiduously. The book title signals the confidence in the worldwide feasibility of an optimized cultural landscape.
Source: Karl Krüger: Ingenieure bauen die Welt, Berlin 1955, Cover Page

Massive projects, from which apparently everyone would derive some ben-

Image 4: Since the end of the 1920's, Herman Sörgel a master builder from Munich, pursued his plan to build an infrastructurally connected super-continent "Atlantropa", in which Europe and Africa would be connected by a partially dried Mediterranean basin as well as hydropower stations. Even the Sahara was to be made fertile again. Source: Wolfgang Voigt: Atlantropa. Weltbauten am Mittelmeer. Ein Architekturtraum der Moderne, Hamburg 1998.

efit, have been on-trend since the 1920's. The execution of these projects was supposed to be generous, and of a historic dimension. Where in the past traffic had been presented with previously impassable obstacles these were now circumvented, penetrated or simply blown out of the way. With modern bridge building and bulldozer technology any short cuts seemed possible. Thoughts then turned to earth tangential railways in a bid to provide the maximum in speed for traffic. Natural limitations were not accepted as such anymore. Starting in the 1920's, the Dutch had reclaimed a large part of their land from the sea using dikes, in particular in the Ijsselmeer. The subsequent cult of 'new-land' that developed out of this led German engineers to develop a plan in 1929 to dry out the North Sea entirely.

The Tennessee Valley Authority in the USA became an internationally envied model. In the 1930s this backward area was hooked-up to Modernism, in that it began to regulate the unpredictable Tennessee River and use it for power generation. In California, Australia and South Africa desert regions were turned into virtual 'Gardens of Eden' by using artificially moved watersheds and elaborate canal systems.

More ambitious still was the 'Great Stalinist Plan for the Transformation of Nature' from 1950 with many projects meant to 'optimise' the natural world. This may be seen especially in the subproject of the engineer Mitrofan M. Dawydow who wanted to divert Siberian Rivers into the southern steppe regions of the Caucasus. This plan was only realized in part, and in the course of several decades led to the extensive drying out of the Aral Sea.

In 1926, a Russian poet proclaimed the Credo of these large-scale plans in an exemplary way:

"May the brittle breast of Siberia be dressed in the armoured cement of cities, with the stony orifices of factory chimneys, chained with the lines of railways! Let the Taiga be drained, cleared of trees, let the Steppe be tram-

Image 5: Within the framework of the Atlantropa plan every part of the landscape was meant to be used productively, while the desert should again become inhabitable. Source: Botho und Hans von Roemer: Technische Wunder von heute und morgen, Minden i.W. 1935.

pled down. A Brotherhood of Mankind can only be erected on cement and iron." In the end effect it was in the Soviet Union especially that a great deal of fertile land was turned into lunar landscapes or contaminated regions lying in limbo.

Violent Interventions

The First World War and the Great Depression had a catalytic effect on the development of a mindset that saw no value in holding onto historic convention. This period has been described as the Age of 'Authoritarian High Modernism' (James C. Scott), because it urged the complete control of man's destiny but also of nature's laws. Especially in the massive projects of city planners there was a tangible intention to create a 'new man'. In the 1920's, the architect Le Corbusier had considered demolishing the entire city centre of Paris and replacing it with several colossal high rises. Frank Lloyd Wright was supposed to have had the same plan for New York up until the 1950's – a plan that, since September 11, 2001, is harder than ever to imagine.

The basic assumptions of this 'worldview of energy' as it is described here, were politically seductive and could be combined with almost any set of goals. On large constructions sites, contradictions of origin and interest could be generously melted down and instead the future could be focused on. However, the tradition of the duty to work 'in service of the common good' was maintained, but also those of slavery and forced manual labour were maintained right down to the present day. When, in systems like the Soviet Union, the various planned goals were not achieved, engineers were often branded as saboteurs and often paid for the failure of the project with their lives.

Because of their competence in matters of 'efficiency' these technical elites were ultimately needed in every system and could be used in the Cold War battles of prestige. Since the 1950's a renewed wave of planning euphoria could be noted, which promised to place the logic of inherent necessity in the place of political authority, guaranteeing that questions of social justice be settled through administrative pathways. The worldwide agreement with this highly modern approach can be particularly seen in the most ambitious large-scale projects of this time, namely the use of nuclear energy and space travel. Both projects promised to ultimately solve the question of resources and energy. The control of space and time was now completely limitless, and the oldest dreams of alchemy and the paradox of a perpetuum mobile finally promised to come true.

Since the 1970s a new sensitivity to the environment and ecology began to develop in Western countries, as well as a more differentiated treatment of the use of space and energy. We still live with the legacy of the high modernist period and its wasteful treatment of nature, the resources as well as an expectation of 'endless prosperity' (Burkhardt Lutz). The tendency to large-scale projects however in which 'quantum leaps of development' can be taken is still alive and well in developing and emerging countries. Here, the Western example of a lifestyle that lives in surplus is noticeable but also the legacy of Western attempts to lead the supposedly 'under-developed' areas onto the

path of economic growth. The colonial development of the inter-war years mutated after 1945 into a comprehensive and at first thoroughly optimistic development aid program in which the First and Second World tried to outdo one another with respect to the 'blessings' provided to the Third World. Several historical developmental steps were supposed to be skipped over through ambitious large-scale plans and long-term projects.

Egypt provides a good example of this development. During the planning of the Aswan Dam in the 1950's and 60's, this emerging country understood how to use political rivalries, and the so-called 'poker-dividends' of the Cold War for its own ends. However the Aswan Dam, which was completed in 1970, became the very image of the social and ecological consequences of such projects. Even despite its usefulness: These civil works were and are placed in landscapes that have lived for thousands of years in a flowing rhythm of regenerative energies, which have emerged and been inscribed in the hearts of the societies living there. The way in to a bright future was to be violently straightened-out, while in other places it had long ago started to meander again.

African Ambitions

In Africa alone, there is a long tradition of technical large-scale projects. The continuous motif of ultimate engineering-technological challenges can be found in the plan to 'make the Sahara green again'. As early as the 1870s, the French engineer François Elie Roudaire had proposed that, in the border region between Algeria and Tunisia, a 13, 000 km2 lake be recreated as it must have existed during the Roman Empire. Roudaire's plan included flooding three valleys that were under sea level, recreating the fertility of the region, as well as a positively changing the North African climate.

The plan of the master-builder Herman Sörgel from the late 1920's also proposed wide-reaching climatic changes in Africa. The Mediterranean was supposed to be cut off from the Atlantic and Black Sea through giant dams built in both Gibraltar and Gallipoli. The sea level of this inland sea would begin to drop by 100 m as more and more water evaporated. In this way, Sörgel wanted to gain additional land and, using hydroelectric power stations placed at the mouths of incoming rivers, secure the future energy requirements of Europe. Africa was to be developed, and using transportation technology becomes associated with Europe. According to Sörgel's calculations, elaborate dam and irrigation facilities would have made a large part of the Sahara fertile again and would have mildened the tropical climate of central Africa to the degree that Europeans could have settled in it. Sörgel wanted to christen this infrastructurally associated Eurafrican continent 'Atlantropa' (see pictures 4 and 5) that he saw it rivalling the size of the greater areas of America and Asia.

The plans of the French physicist Bernard Dubos were somewhat more modest in scope. In the 1930s he wanted to set up huge up-wind power stations in the Atlas and Hoggar mountains of Algeria and send energy to Europe by day and to Africa at night. At the same time, tall chimneys were to influence the weather – an idea that in the 1950s got tied in with the formidable forces unleashed by atoms. In newspaper reports of this time the irrigation of the Sahara was repeatedly mentioned except that in this case, passing monsoon clouds would be forced to shed their rain because of atom bomb blasts set off over mountain ranges. Concurrently, the philosopher Ernst Bloch gushed, 'a blue atmosphere of peace, out of the desert comes fertility, out of ice comes spring. A few hundred pounds of uranium and thorium would be enough to make the Sahara and Gobi deserts disappear, and turn

Prof. Dr. Dirk van Laak
Institute of History
Otto-Behaghel-Strasse 10C
35394 Giessen
Telephone: 0641 99 28131
Email: Dirk.van.Laak@geschichte.uni-giessen.de

Dirk van Laak, born in 1961 became a Professor of Contemporary History in 2007 at the Justus-Liebig-University Giessen. Academic stations include positions in Essen, Hagen, Jena, Chicago, Tübingen and Freiburg. Research focus: German and international history of the 19th and 20th century. History of Infrastructure, Technology and Planning, Colonialism and Imperialism. Publications include: 'Weiße Elefanten. Anspruch und Scheitern technischer Großprojekte im 20. Jahrhundert" (1999).

Siberia, North America, Greenland and the Antarctic into the Riviera.'

Many current projects still are redolent with this Blochian 'Utopian Spirit.' They all share the quality of being superficially extremely 'sensible', but at the same time use a Western and very limited measure of that 'sense'. Many of these projects have a 'romance of the drawing-board' quality that suggests that things have been efficiently considered. In more recent times, the resistance to the 'big is beautiful' style of thinking can be easily seen. Not just the environment and nature have rebelled against the continued ruthless exploitation. Indeed, many of the people affected by these plans are no longer willing to accept an acute curtailment of their quality of life in exchange for an abstract idea like 'progress.' They demand a consultation process during projects, which purport to support the common good. Planning for public spaces has now become a much more discursive and strongly legalised process in which small is often more beautiful. In a pluralistic society, no plan, no matter how sensible it is, can be decided on from above. More often, it must often be negotiated over a painfully long period.

After all of the sobering experiences in developmental aid, this applies particularly when attempts to export technical or cultural 'developments' into other cultures are made. After the experiences of the last century show, one must state the following: Large-scale technical projects are only successful in the case of extremely favourable accompanying circumstances or in that they remain open in their reaction to the unexpected. Too often, disagreeable factors have been violently excluded, like a scarcity of workers and international agreements, revolts of affected populations, or of the environment. This probably explains the tendency authoritarian systems have toward large-scale plans. Because they aspired to perfection, many large-scale projects became symbols of waste, not efficiency.

Keeping these insights in mind, and in an open and partnership-oriented process it is still not possible to be careful or conservative enough. There will be no progress by pointing out the necessity for action in apparently obvious situations. Much more to the point, it is important to pro-actively face the different kinds of inherent logic of all involved parties. The interdisciplinary conversation, as taking place in this project, 'Solar Energy Partnership with Africa,' at the University of Giessen is a first and necessary step in this direction. •