

INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI

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Science, Technology and Society

By

Dr. Sambit Mallick

**Department of Humanities and Social Sciences
Indian Institute of Technology Guwahati**

You from here onward what kind of intended and unintended consequences of social action that we have so far as the relationship between technology and politics is concerned this is very important in controversies about technology and society there is no idea more provocative than the notion.

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That technical things that political quality at issue means to claim that the metal structures and systems of modern material culture can be accurately judged not only for their contributions of efficiency and productivity not merely for their positive and negative environmental side effects but also for the ways in which they can embody specific forms of power and authority it is very important okay then if I say that the manifest function of such machines structures and systems

of modern material culture can be accurately judged only in terms of their contributions of efficiency and productivity only in terms of the positive and negative environmental side effects then the latent functions of beamless in structures and systems of modern material cultures the way they embody specific forms of power.

And authority must be emphasized okay as you have already discussed now there is a subtle difference between power and authority authorities link legal whereas power is illegal in sociology but we are not going to discuss that much okay because our goal here the kind of instrumental rationality that we are engaged in okay does not allow us to move beyond our force because of certain and limitations because you have to complete this the lectures within with in a time frame and I am sure to anticipate must immensely benefit from this kind of engagement now if you look at this since ideas of such kind idea of such manifest.

And latent functions of muscle structures and systems of modern material culture okay then under manifest constants of material structure cell systems of modern material culture we are putting efficiency and productivity positive and negative environmental side effects and so on and latent functions we met where we are trying to emphasize on the fact that that the missing structures and systems of modern material culture embody this is specific forms of power and other since ideas of this kind of a persistent and troubling presence in discussions about the meaning of technology that deserves explicit attention writing in technology.

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□ Writing in technology and culture almost two decades ago, Lewis Mumford gave classic statement to one version of the theme, arguing that "from late neolithic times in the Near East, right down to our own day, two technologies have recurrently existed side by side: one authoritarian, the other democratic, the first system-centered, immensely powerful, but inherently unstable, the other man-centered, relatively weak, but resourceful and durable." This thesis stands at the heart of Mumford's studies of the city, architecture, and the history of technics, and mirrors concerns voiced earlier in the works of Peter Kropotkin, William Morris, and other nineteenth century critics of industrialism.

And culture almost a couple of I mean almost from extremes or so 1564 gave a classic statement to one version of the theme arguing that from late model nearly six times in the nearest right down to our own day two technologies have recurrently existed side by side one authority the others Democratic the first system Center immensely powerful but inherently unstable the other human centered relatively weak but resourceful and visible then two types of Technology Mumford was referring to one authoritarian to democratic authoritarian technology.

According to Martin is fiscal centered immensely powerful but inherently unstable because it is Democratic the other democratic technology which is human template relatively weak but resourceful and durable and hence sustainable you can look at many, many technologies in this context and such argument stands at the heart of Mumford's studies of the 50 architectures and the history of techniques and mirrors concerns voiced earlier in the works of cocoa tin merits and other 19th century critics of industry.

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- More recently, antinuclear and prosolar energy movements in Europe and America have adopted a similar notion as a centerpiece in their arguments. Thus environmentalist Denis Hayes concludes, "The increased deployment of nuclear power facilities must lead society toward authoritarianism. Indeed, safe reliance upon nuclear power as the principal source of energy may be possible only in a totalitarian state." Echoing the views of many proponents of appropriate technology and the soft energy path, Hayes contends that "dispersed solar sources are more compatible than centralized technologies with social equity, freedom and cultural pluralism."
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More recently you will find anti-nuclear in to solar energy movements in Europe and America has adopted a similar notion as a centerpiece in their album the environmentalist genesis conclude let me coach has here the increased deployment of nuclear power facilities must lead society towards authoritarianism minded self real self reliance upon nuclear power as the principal source of energy may be possible only in totalitarian state echoing the views of many proponents of appropriate technology and the soft energy boss has contains that dispersed solar sources are more compatible than centralized technologies with so the liquid is freedom and cultural diversity this is these are very important.

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□ Writing in technology and culture almost two decades ago, Lewis Mumford gave classic statement to one version of the theme, arguing that "from late neolithic times in the Near East, right down to our own day, two technologies have recurrently existed side by side: one authoritarian, the other democratic, the first system-centered, immensely powerful, but inherently unstable, the other man-centered, relatively weak, but resourceful and durable." This thesis stands at the heart of Mumford's studies of the city, architecture, and the history of technics, and mirrors concerns voiced earlier in the works of Peter Kropotkin, William Morris, and other nineteenth century critics of industrialism.

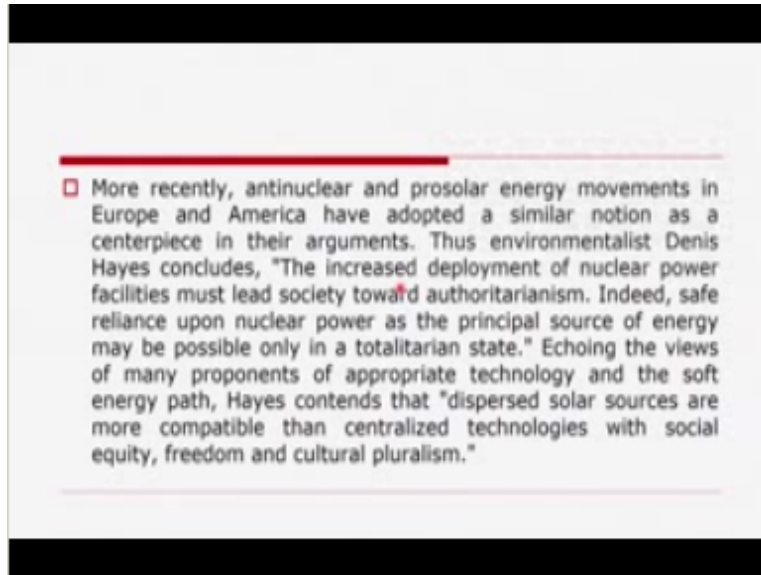
Then what we saw first let in the form of authoritarian and democratic technology okay or you suppose the kind of environmental movements that we see in the context of Narmada Bacau Angolan maybe in the context of in the Northeast that we see the construction of in the form of construction of subhan city Demand zone what we find that they have become a part of authoritarian technology they are immensely there they are immensely also their system centered that because they are supported by the state by the government by apolitical institution but inherently unstable okay.

And here what we find that the use of nuclear power nuclear energy that we see the use of nuclear weapons that we see okay it is bickering effect on civilization on our fifty our security on our existence of big on, on the essence of being on the reason of our existence on the reason of our being okay as a consequence that is why was sometime back we discussed networks if you look at the way now we in India we carryout nuclear space okay is it a scientific question or a political question.

Okay let us say we very often say that it is an alliance between science and politics maybe at times there is a disagreement even within the political establishment as well as within the scientific establishment and so on but what we what we try to what we in tend to discuss here that how even in India extending the discussion from Europe and America how anti-nuclear a pro solar energy movement are taking roots in even in E okay next I was that is why Langdon winner

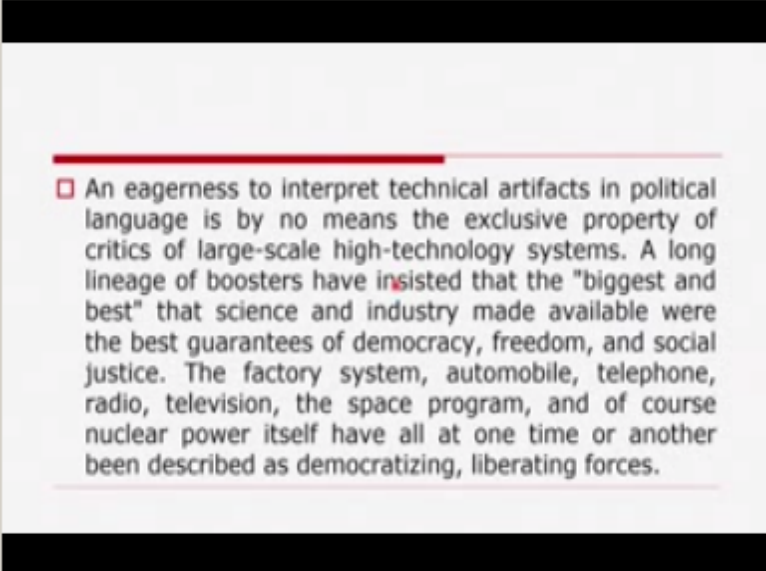
tried to quote head that the increased deployment of nuclear power facilities must blame society towards authoritarian indeed.

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Self-reliance of a nuclear power as the principal source of energy may be possible only in a totalitarian state even the views of many proponents of appropriate technologies and including spinnaker okay small is beautiful yes smoker alternate as appropriate technology and the soft energy path has contains that dispersed solar sources are more compatible than centralized technologies with social liquidity freedom and cultural pluralism whenever we try to design a technology we must keep at least three things in mind so the liquidity freedom and cultural privilege.

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- An eagerness to interpret technical artifacts in political language is by no means the exclusive property of critics of large-scale high-technology systems. A long lineage of boosters have insisted that the "biggest and best" that science and industry made available were the best guarantees of democracy, freedom, and social justice. The factory system, automobile, telephone, radio, television, the space program, and of course nuclear power itself have all at one time or another been described as democratizing, liberating forces.

And eagerness to interpret technical at effects in political language is by no means the exclusive property of critics of large-scale high technology systems and long lineage of boosters have insisted that the biggest and best that Science and Industry made available where the best guarantees of democracy freedom and social justice the factory system automobile telephones radio television the space program and of course nuclear power themselves have all at one time or another been described as democratizing liberating forces which they are not okay.

Next I was referring to some time back that one must watch modern times by Charlie Chaplin and others I mean one can read critique of everyday life by Hindi letters and soon if you look at this even, even one can look at the city by Jamal and George Jamal and so on if you look at this how the, the state propagated technological systems that know the, the biggest the best that if you have to have if you want to make developments possible then you must a factory system auto mobile telephone radio television the space program.

And of course nuclear power okay because they were considered and today also by the state they are considered Democratizing liberating forces okay but to what extent they are Democratizing and liberating forces is must be interrogated must be questioned okay because the, the kind of human-alien listen that we have witnessed because of mindless industrialization okay in Europe and North America and so okay it has laid human civilization okay to more human more anti-democratic undemocratic situations okay in this sense.

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□ David Lilienthal, in T.V.A.: Democracy on the March, for example, found this promise in the phosphate fertilizers and electricity that technical progress was bringing to rural Americans during the 1940s. In a recent essay, The Republic of Technology, Daniel Boorstin extolled television for "its power to disband armies, to cashier presidents, to create a whole new democratic world - democratic in ways never before imagined, even in America." Scarcely a new invention comes along that someone does not proclaim it the salvation of a free society.

Our enlistment now we must bring about the light we must bring about an organized critique to such view that the factory system automobile telephone radio television the space program and of course nuclear power themselves have all at one time or another being described as democratic democratizing or liberating forces Lilienthal according to Linnaean third democracy on the March for example found this communes in the phosphate fertilizers and electricity their technical progress was bringing to rural Americans during the 1940's in an essay the Republic of Technology boosting extolled television for its power to defend armies.

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□ An eagerness to interpret technical artifacts in political language is by no means the exclusive property of critics of large-scale high-technology systems. A long lineage of boosters have insisted that the "biggest and best" that science and industry made available were the best guarantees of democracy, freedom, and social justice. The factory system, automobile, telephone, radio, television, the space program, and of course nuclear power itself have all at one time or another been described as democratizing, liberating forces.

To capture presidents to create a whole new Democratic world Democratic in ways never before imagined even in America firstly a new invention comes along that someone does not proclaim it in the salvation of a free society then in the context of such factory system of the mobile telephone radio television the space program and of course of course we declare those things but at what cost okay.

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□ It is no surprise to learn that technical systems of various kinds are deeply interwoven in the conditions of modern politics. The physical arrangements of industrial production, warfare, communications, and the like have fundamentally changed the exercise of power and the experience of citizenship. But to go beyond this obvious fact and to argue that certain technologies in themselves have political properties seems, at first glance, completely mistaken. We all know that people have politics, not things.

In such context what kind of a free open democratic society we are going to have okay this is anymore it is no surprise to learn that technical systems of various kinds are deeply interval in the conditions of modern polity the physical arrangements of industrial production warfare communications and the like has fundamentally changed the exercise of power and the experience of fidelity but to go beyond this obvious fact and to argue that certain technologies in themselves have political properties since at first less completely mistaken.

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□ To discover either virtues or evils in aggregates of steel, plastic, transistors, integrated circuits, and chemicals seems just plain wrong, a way of mystifying human artifice and of avoiding the true sources, the human sources of freedom and oppression, justice and injustice. Blaming the hardware appears even more foolish than blaming the victims when it comes to judging conditions of public life.

We all know that people have politics not things that is what London winners challenge that no even, even think even at effective in technology they also have political they have they have deposits they are inherently political in nature to discover ideas virtues your every in aggregates of steel plastic transistors integrated circuits and chemical seems just plain wrong a way of mystifying human and act afire and of avoiding the true sources the human sources of freedom and operation justice and Industry blaming the hardware.

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□ Hence, the stern advice commonly given those who flirt with the notion that technical artifacts have political qualities: What matters is not technology itself, but the social or economic system in which it is embedded. This maxim, which in a number of variations is the central premise of a theory that can be called the social determination of technology, has an obvious wisdom. It serves as a needed corrective to those who focus uncritically on such things as "the computer and its social impacts" but who fail to look behind technical things to notice the social circumstances of their development, deployment, and use.

As there is even more foolish than blaming the victim when it comes to judging conditions of public life hence the stern advice commonly given to those who flirt with the notion that technical artifacts of political qualities here is the most important thing in this article in the central argument of this article is that what matters is not technology itself but the social or economic system in which it is embedded.

And I repeat what matters is not technology itself but the social or economic system in which it is embedded such Maxim which in a number of variations is the central premise of a theory that can be called the social determinism of technology as an obvious wisdom it starts as a needed corrective to those who focus uncritically on such things as the computer and its social impact but who fail to look behind technical things to notice the social circumstances of their development deployment and age.

Then what comes to our point of discussion now that what matters is not technology itself but the social or economic system in which it is embedded I mean it is the Reeboks to technological determinist extend that, that, that, that, that serves as a needed corrective to those who focus uncritically on such things as the computer and its social impact okay but who fail to look behind technical things to notice the social circumstances of their development deployment and image.

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□ This view provides an antidote to naive technological determinism - the idea that technology develops as the sole result of an internal dynamic, and then, unmediated by any other influence, molds society to fit its patterns. Those who have not recognized the ways in which technologies are shaped by social and economic forces have not gotten very far.

When we say the computer and its impact social impact it is the it is the society which has created the computer it is not the computer which has created the society okay yet that the problem with the proponents of technological determinism this view provides an antidote to naïve technological determination the idea that technology develops there is the sole result of an internal dynamic and then unmediated by any other influence molds society to it to fit its pattern.

And those who have not recognized the ways in which technologies are stepped by social and economic forces has not gotten very far then what is the technological determinism that technological determinism refers to the idea that technology develops as the sole result of an internal dynamic and then unmediated by any other influence molds society to create better okay and that is why those proponents of technological determinism often refer to the fact.

That often refer to the statement like the computer and its social impact okay this is important I mean this is a rebus to that kind of thinking that no it is not the technology which has created our economic culture and politics but it is our economy culture and politics which is which have been able to say what kind of technology we are going to happen okay.

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□ But the corrective has its own shortcomings; taken literally, it suggests that technical things do not matter at all. Once one has done the detective work necessary to reveal the social origins - power holders behind a particular instance of technological change - one will have explained everything of importance. This conclusion offers comfort to social scientists: it validates what they had always suspected, namely, that there is nothing distinctive about the study of technology in the first place.

But the corrective has its own short comings if I say that not only economical quality only society has created it also has its own sort soft coming taken literally it suggests the technical things do not matter at all one, one has done the detective work necessary to reveal the social origin power holders behind a particular instance of technological change one will have explained everything of importance this conclusion of comfort to social scientists it validates what they had always had always suspected namely that there is nothing distinctive about the study of technology in the first place which is equally wrong which is equally an extreme which is equally wrong.

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□ Hence, they can return to their standard models of social power - those of interest group politics, bureaucratic politics, Marxist models of class struggle, and the like - and have everything they need. The social determination of technology is, in this view, essentially no different from the social determination of, say, welfare policy or taxation.

Hence they can return to their standard model of social power those of politics bureaucratic politics Marxist modules of class struggle and the like and has everything they need the social determination of Technology is in this view essentially is no different from the social determination of say welfare policy of Texas that is when we talk about the relationship between technology and politics we must look at we must go beyond these two extremes that is technological deterministic new as well as the social deterministic.

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□ There are, however, good reasons technology has of late taken on a special fascination in its own right for historians, philosophers, and political scientists; good reasons the standard models of social science only go so far in accounting for what is most interesting and troublesome about the subject. In another place I have tried to show why so much of modern social and political thought contains recurring statements of what can be called a theory of technological politics, an odd mongrel of notions often crossbred with orthodox liberal, conservative, and socialist philosophies. The theory of technological politics draws attention to the momentum of large-scale socio-technical systems, to the response of modern societies to certain technological imperatives, and to the all too common signs of the adaptation of human ends to technical means.

There are however good reasons technology that technology has of late taken on a special fascination in its own right for historians philosophers and political scientists sociologists for good reason that the standard models of social science only go so far in accounting for what is most interesting and troublesome about the subject in another place winners has tried to solve why so much of modern politics social.

And political first contains recurring statements of what can be called a theory of technological politics and odd mongrel of snow things often cross planes which also the liberally conservative and socialist philosophy the theory of technological politics draws attention to the momentum of momentum of large-scale socio technical systems to the response of modern societies to certain technological imperative and to those all-too-common signs of the adaptation of human age to technical means.

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□ In so doing it offers a novel framework of interpretation and explanation for some of the more puzzling patterns that have taken shape in and around the growth of modern material culture. One strength of this point of view is that it takes technical artifacts seriously. Rather than insist that we immediately reduce everything to the interplay of social forces, it suggests that we pay attention to the characteristics of technical objects and the meaning of those characteristics. A necessary complement to, rather than a replacement for, theories of the social determination of technology, this perspective identifies certain technologies as political phenomena in their own right. It points us back, to borrow Edmund Husserl's philosophical injunction, to *the things themselves*.

In so doing such framework offers a normal frame work of interpretation and explanation for some of the more puzzling patterns that have taken states in and around the growth of modern material culture one strength of this point of view is that it takes technical artifact seriously rather than insist that we must immediately reduce everything to the interplay of social forces it suggests that we pay attention to the characteristics of technical objects.

And the meaning of those characteristic a necessary complement to rather than replacement for your ideas theories of theories of the social determination of technology this perspective identifies certain technologies as political phenomena in their own right it points us back to borrow whose will is philosophically injunction to the things themselves it is very important who is a term to the things depth.

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□ In what follows I shall offer outlines and illustrations of two ways in which artifacts can contain political properties. First are instances in which the invention, design, or arrangement of a specific technical device or system becomes a way of settling an issue in a particular community. Seen in the proper light, examples of this kind are fairly straightforward and easily understood. Second are cases of what can be called inherently political technologies, man-made systems that appear to require, or to be strongly compatible with, particular kinds of political relationships.

In what follows winners try to offer outlines and illustrations of two ways in which artifacts can contain political properties first are instances in which the invention design or arrangement of a specific technical device or system becomes the way of settling an issue in a particular community then in the proper light examples of this kind of fairly straightforward and easily understood second are cases of what can be called inherently political technologies man-made systems that appear to require and tend to refine that that appears to require or to be strongly compatible with particular kinds of political relationships.

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□ Arguments about cases of this kind are much more troublesome and closer to the heart of the matter. By "politics," I mean arrangements of power and authority in human associations as well as the activities that take place within those arrangements. For my purposes, "technology" here is understood to mean all of modern practical artifice, but to avoid confusion I prefer to speak of technologies, smaller or larger pieces or systems of hardware of a specific kind. My intention is not to settle any of the issues here once and for all, but to indicate their general dimensions and significance.

Argument about cases of this kind are much more troublesome and closer to the heart of the matter by politics winners meant arrangements the power and authority in human associations as well as the activities that take place within those arrangements for such purposes technology here is understood to mean all of modern practical artifice and to avoid confusion winner prefer to speak of technologies smaller or larger pieces of systems of hardware of a kind his intention his purpose is not to settle any of the issues here once and for all.

But to indicate their general dimensions and significance technical arrangements as forms of order then let us go one by one then first one is I mean important that first are the instances in which the invention design or arrangement of a specific technical device or system becomes a way of settling an issue in a particular community and second or cases of what can be called inherently political technologies management systems that appear to require or to be strongly compatible with particular kinds of political career.

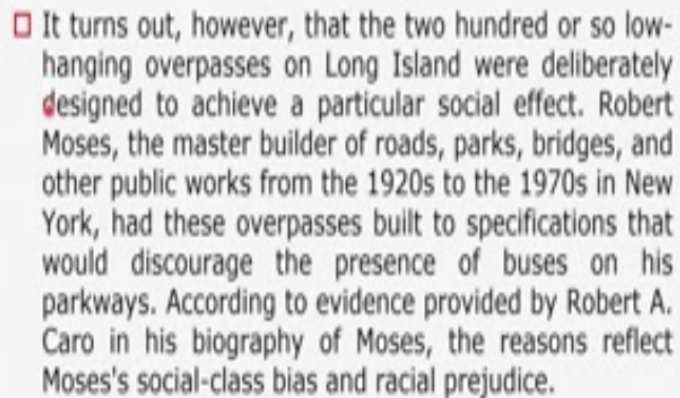
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Technical Arrangements as Forms of Order

□ Anyone who has traveled the highways of America and has become used to the normal height of overpasses may well find something a little odd about some of the bridges over the parkways on Long Island, New York. Many of the overpasses are extraordinarily low, having as little as nine feet of clearance at the curb. Even those who happened to notice this structural peculiarity would not be inclined to attach any special meaning to it. In our accustomed way of looking at things like roads and bridges we see the details of form as innocuous, and seldom give them a second thought.

Now anyone who is travel the highways of America we are going back and just where we are trying to go back a little that anyone who has travelled the highways of America and has become nice to the normal height of overpasses may well find something like a little odd about this about some bridge some of the bridges over the Parkway on Long Island of New York many of the overpasses winner points out that are extraordinarily low having as little as nine feet of clearance at the curve will those who happen to notice the structural security would not be inclined to attach any special meaning to it.

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□ It turns out, however, that the two hundred or so low-hanging overpasses on Long Island were deliberately designed to achieve a particular social effect. Robert Moses, the master builder of roads, parks, bridges, and other public works from the 1920s to the 1970s in New York, had these overpasses built to specifications that would discourage the presence of buses on his parkways. According to evidence provided by Robert A. Caro in his biography of Moses, the reasons reflect Moses's social-class bias and racial prejudice.

In our accustomed way of looking at things like roads and bridges we see the details of form as innocuous and seldom give them a second thought it turns out however that the 200 or so low hanging overpasses on Long Island were deliberately designed to achieve a particular social effect Robert Moses the master builder of roads for business and other public works from the 1920s to the 1970s in New York had these overpasses built to specifications that would discourage presence of muscles on, on his pathways according to evidence provided by Robert A. Caro in his bag a few of muscles the ribbons reflect muscles social class bias.

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□ Automobile owning whites of "upper" and "comfortable middle" classes, as he called them, would be free to use the parkways for recreation and commuting. Poor people and blacks, who normally used public transit, were kept off the roads because the twelve-foot tall buses could not get through the overpasses. One consequence was to limit access of racial minorities and low-income groups to Jones Beach, Moses's widely acclaimed public park. Moses made doubly sure of this result by vetoing a proposed extension of the Long Island Railroad to Jones Beach.

And this prejudice automobile owning whites of upper and comfortable middle classes as he called them would be free to use the pathways I mean methods used to call them whites of no operand comfortable middle classes as he called them it would be free to use the pathways for decrease and in community poor people and blacks who normally used public transit were kept off the road.

Because the 12-foot tall buses could not get through the overpasses one consequence was to limit access to racial minorities and low-income groups to Jones Beach muscles widely acclaimed public park muscles made doubly tears of this result by bettering a proposed extension of the Long Island Railroad to John's beach either.

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□ As a story in recent American political history, Robert Moses's life is fascinating. His dealings with mayors, governors, and presidents, and his careful manipulation of legislatures, banks, labor unions, the press, and public opinion are all matters that political scientists could study for years. But the most important and enduring results of his work are his technologies, the vast engineering projects that give New York much of its present form. For generations after Moses has gone and the alliances he forged have fallen apart, his public works, especially the highways and bridges he built to favor the use of the automobile over the development of mass transit, will continue to shape that city.

As a story in recent American political history as winner points out that muscles life is fascinated his dealings with muscles dealings with mayors governors and presidents and his careful manipulation of legislators banks labor unions the press and public opinion are all matters that political scientists could study for years so solutions group study for years but the most important and enduring results of his work are his technology the vast engineering projects that gave New York much of its present form for generation.

After muscle has gone in the alliance she forced have fallen apart his public works especially the highways and bridges he built to favor the use of the automobile over the development of mass transit will continue to save that pity that is why in this context I gave you this such example like the way public road in India are constructed they are essentially a deeper district.

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□ Many of his monumental structures of concrete and steel embody a systematic social inequality, a way of engineering relationships among people that, after a time, becomes just another part of the landscape. As planner Lee Koppleman told Caro about the low bridges on Wantagh Parkway, "The old son-of-a-gun had made sure that buses would never be able to use his goddamned parkways."

Many of most monumental structures of concrete and still embody a systematic social inequality a way of engineering relationships among people that after a time becomes just another part of the landscape as planner Koppleman told Caro that the new that the low bridges on one car park with the, the old son of a gun had made sure that buses would never be able to use his government.

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□ Histories of architecture, city planning, and public works contain many examples of physical arrangements that contain explicit or implicit political purposes. One can point to Baron Haussmann's broad Parisian thoroughfares, engineered at Louis Napoleon's direction to prevent any recurrence of street fighting of the kind that took place during the revolution of 1848. Or one can visit any number of grotesque concrete buildings and huge plazas constructed on American university campuses during the late 1960s and early 1970s to defuse student demonstrations.

Histories of architecture City Planning and Public Works contain many examples of physical arrangement that contain explicit or implicit political purposes one can point to Baron Haussmann's broad Parisian thoroughfares engineered that Louis Napoleon's direction to prevent any recurrence to strict fighting of the kind that took place during the Revolution of 1848 on one can visit any number of not as concrete buildings and humans pleasures constructed on American University campuses during the late 1960s and early1970s to be few student demonstrations.

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- Studies of industrial machines and instruments also turn up interesting political stories, including some that violate our normal expectations about why technological innovations are made in the first place. If we suppose that new technologies are introduced to achieve increased efficiency, the history of technology shows that we will sometimes be disappointed. Technological change expresses a panoply of human motives, not the least of which is the desire of some to have dominion over others, even though it may require an occasional sacrifice of cost-cutting and some violence to the norm of getting more from less.
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Studies of industrial listens and instruments also turn up interesting political stories including some that violate our normal expectations about why technological innovations are made in the first place if we suppose that new technologies are introduced to achieve increased efficiencies the history of technology so that we will contend to be disappointed technological change expresses the end of life of human motives not the least of which is the desire of some to have dominion over others even though it may require an occasional sacrifice of first cutting and some violence to the norm of more from less.

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□ One poignant illustration can be found in the history of nineteenth century industrial mechanization. At Cyrus McCormick's reaper manufacturing plant in Chicago in the middle 1880s, pneumatic molding machines, a new and largely untested innovation, were added to the foundry at an estimated cost of \$500,000. In the standard economic interpretation of such things, we would expect that this step was taken to modernize the plant and achieve the kind of efficiencies that mechanization brings. But historian Robert Ozanne has shown why the development must be seen in a broader context.

One poignant illustration can be found in the history of 19th century industrial mechanization excited McCormick Reaper manufacturing plant in Chicago in the middle of 1880's pneumatic holding machines a new and largely untested innovation were added to the foundry at an estimated cost of 5,00,000 installed in the standard economic interpretation of such things we would expect that this staple is taken to modernize the plant and achieves the kind of official preset mechanization bring out okay but historian Robert Ozanne has shown why the development must be seen in a broader context.

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□ At the time, Cyrus McCormick II was engaged in a battle with the National Union of Iron Molders. He saw the addition of the new machines as a way to "weed out the bad element among the men," namely, the skilled workers who had organized the union local in Chicago. The new machines, manned by unskilled labor, actually produced inferior castings at a higher cost than the earlier process. After three years of use the machines were, in fact, abandoned, but by that time they had served their purpose-the destruction of the union.

We will see at the time Cyrus McCormick ii was engaged in a battle with a national union of iron molders McCormick saws the addition of the new method as a way to weed out the bag element among the men namely the skilled workers who had organized a union local in Chicago the newness in manned by unskilled labor actually produced inferior castings at a higher cost than the earlier person after three years of in the methods were in fact abundant but by that time they had served their purpose the destruction of itself.

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□ Thus, the story of these technical developments at the McCormick factory cannot be understood adequately outside the record of workers' attempts to organize, police repression of the labor movement in Chicago during that period, and the events surrounding the bombing at Haymarket Square. Technological history and American political history were at that moment deeply intertwined.

Thus the story of these technical developments at the McCormick factory cannot be understood adequately outside the record of workers attempts to organize police repression of the labor movement in Chicago during that period and the events surrounding the bombing at Haymarket Square technological history and the American political history whereas that movement deeply interpreted.

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□ In cases like those of Moses's low bridges and McCormick's molding machines, one sees the importance of technical arrangements that precede the use of the things in question. It is obvious that technologies can be used in ways that enhance the power, authority, and privilege of some over others, for example, the use of television to sell a candidate. To our accustomed way of thinking, technologies are seen as neutral tools that can be used well or poorly, for good, evil, or something in between. But we usually do not stop to inquire whether a given device might have been designed and built in such a way that it produces a set of consequences logically and temporally prior to any of its professed uses.

In cases like those of Moses McCormick's molding metals one feels the importance of technical arrangements that precedes the use of the fields in question it is obvious that technologies can be used in ways that enhance the power authority and privilege of some over others for example the use of television to spell a candidate to our accustomed way of thinking technologies are seen as neutral tools that can be used will or poorly for good evil or something in between but we usually do not stop to inquire whether a given device might have been designed and built in such a way that it produces a set of consequences logically and temporarily prior to any of its professed uses, uses.

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□ Robert Moses's bridges, after all, were used to carry automobiles from one point to another; McCormick's machines were used to make metal castings; both technologies, however, encompassed purposes far beyond their immediate use. If our moral and political language for evaluating technology includes only categories having to do with tools and uses, if it does not include attention to the meaning of the designs and arrangements of our artifacts, then we will be blinded to much that is intellectually and practically crucial.

Robert Moses bridges after all we are used to carry automobiles from one point to another McCormick's methods were used to make metal castings both technologies however encompassed proposals far beyond their immediately which if our moral and political language for evaluating technology includes only categories having to do with poles and noodles if it does not include attention to the meaning of the designs and arrangements of our artifacts then we will be blind it too much that is intellectually and practically crucial.

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□ Because the point is most easily understood in the light of particular intentions embodied in physical form, I have so far offered illustrations that seem almost conspiratorial. But to recognize the political dimensions in the shapes of technology does not require that we look for conscious conspiracies or malicious intentions. The organized movement of handicapped people in the United States during the 1970s pointed out the countless ways in which machines, instruments, and structures of common use - buses, buildings, sidewalks, plumbing fixtures, and so forth - made it impossible for many handicapped persons to move about freely, a condition that systematically excluded them from public life.

Because the point is most easily understood in the light of particular intentions embodied in physical form, I have so far offered illustrations that seem almost conspiratorial. But to recognize the political dimensions in the shapes of technology does not require that we look for conscious conspiracies or malicious intentions. The organized movement of handicapped people in the United States during the 1970s pointed out the countless ways in which machines, instruments, and structures of common use - buses, buildings, sidewalks, plumbing fixtures, and so forth - made it impossible for many handicapped persons to move about freely, a condition that systematically excluded them from public life.

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□ It is safe to say that designs unsuited for the handicapped arose more from long-standing neglect than from anyone's active intention. But now that the issue has been raised for public attention, it is evident that justice requires a remedy. A whole range of artifacts are now being redesigned and rebuilt to accommodate this minority. Indeed, many of the most important examples of technologies that have political consequences are those that transcend the simple categories of "intended" and "unintended" altogether.

It is safe to say that designs unsuited for the handicapped arose more from the long-standing neglect than from any one is active intent but now that the issue has been raised for public attention it is evident that justice requests a remedy if whole range of attacks are now being redesigned and rebuilt to accommodate this minority indeed many of the most important examples of technologies that have political consequences and those that transcends the simple categories of intended and unintended altogether as we have discussed in the case of Weber's as well as much and especially much.

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□ These are instances in which the very process of technical development is so thoroughly biased in a particular direction that it regularly produces results counted as wonderful breakthroughs by some social interests and crushing setbacks by others. In such cases it is neither correct nor insightful to say, "Someone intended to do somebody else harm." Rather, one must say that the technological deck has been stacked long in advance to favor certain social interests, and that some people were bound to receive a better hand than others.

These are instances in which the very process of technical development is so totally biased in a particular direction that it regularly produces results counted as wonderful best food by some social interest and cursing setbacks by others in such cases it is neither correct nor insightful to say someone intended to lose somebody else on rather one must say that technological deck has been stacked long in advancing to favor certain social interests and that some people were bound to receive of better and than other.

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