8 ▶ Redefining the social link: from baboons to humans

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▶ REDEFINING THE NOTION OF SOCIAL

Sciences of society currently subscribe to a paradigm in which 'society', although difficult to probe and to encompass, is something that can be the object of an ostensive definition [that is, a definition in which society is something that is 'there', that can be pointed to, so to speak]. The actors of society, even if the degree of activity granted them varies from one school of sociology to the next, are *inside* this larger society. Thus, social scientists recognize a difference of scale: the micro-level (that of the actors, members, participants) and a macro-level (that of society as a whole) (Knorr and Cicourel 1981). In the last two decades this ostensive definition of society has been challenged by ethnomethodology (Garfinkel 1967) [ethnomethodology is a view of sociology in which society is achieved through interaction, rather than society being the given, existing, structure within which interaction takes place] and by the sociology of science (especially of the social sciences (Law 1986) and the sociology of technology (Latour 1986b). In light of these studies, the conventional distinctions between micro- and macro-levels become less clear-cut and it is more difficult to accept a traditional definition of society. Instead, society is more compellingly seen as continually constructed or 'performed' by active social beings who violate 'levels' in the process of their 'work'.

The two positions, the ostensive and the performative model, differ in principle and in practice, with crucial consequences for how the social link is characterized. These two views can be summarized as follows:

Ostensive definition of the social link:

1 It is, *in principle*, possible to discover the typical properties of what holds a society together, properties which could explain the social link and its evolution, although *in practice*, it may be difficult to detect them.
2 These properties or elements are social. If other properties are included then the explanation of society is economic, biological, psychological, etc.
3 Social actors (whatever their size – micro or macro) are *in* the society as defined in #1. To the extent that they are active, their activity is restricted because they are only part of a larger society.
4 Because actors are in the society, they can be useful informants for scientists interested in discovering the principles of society. But because they are only *part* of society, even if they are 'aware', they can never see or know the whole picture.
5 With the proper methodology, social scientists can discover the principles of what holds society together, distinguishing between actors' beliefs and behavior. The picture of society as a whole, thus devised, is unavailable to the individual social actors who are within it.

According to the traditional paradigm, society exists, actors enter it adhering to rules and a structure that are already determined. The overall nature of the society is unknown and unknowable to the actors. Only scientists, standing outside of society, have the capacity to understand it and see it in its entirety.

Performative definition of the social link:

1 It is impossible, *in principle*, to establish properties which would be peculiar to life in society, although, *in practice*, it is possible to do so.
2 A variety of elements or properties contribute to the social link as defined by social actors. These are not restricted to the purely social and can include economic, biological, psychological, etc.
3 *In practice*, actors (no matter what their size, macro or micro) define, for themselves and for others, what society is, both its whole and its parts.
4 Actors 'performing' society know what is necessary for their success. This may include a knowledge of the parts and of the whole and of the difference between beliefs and behavior.
5 Social scientists raise the same questions as any other social actor and are themselves 'performing' society, no more and no less than nonscientists. They may, however, have different practical ways of enforcing their definition of what society is.

According to the performative view, society is constructed through the many efforts to define it; it is something achieved in practice by all actors, including scientists who themselves strive to define what society is. To use Garfinkel's expression (1967), social actors are transformed, in this view, from 'cultural dopes' to active achievers of society. This shifts the emphasis from looking for the social link in the *relations between actors* to focusing on *how* actors achieve this link in their search for what society is.

Going from the traditional to the performative framework creates two

sets of inverse relationships, one that reveals a strange symmetry among all actors and another that points out a new asymmetry. The first inverse relationship is the following: the more active the actors, the less they differ from one another. This shift in definition is tantamount to saying that actors are full fledged social scientists researching what the society is, what holds it together and how it can be altered. The second inverse relationship is this: the more actors are seen to be equal, *in principle*, the more the *practical* differences between them become apparent in the means available to them to achieve society. Let us now see how we can apply these principles in the case of baboon societies. . . .

The trend [in studies of baboons] has been in the direction of granting baboons more social skill and more social awareness (Griffin 1981, 1984) than the sociobiological 'smart biology' argument allowed. These skills involve negotiating, testing, assessing and manipulating (Strum 1975a,b, 1981, 1982, 1983a,b,c, in press; Western and Strum 1983). A male baboon, motivated by his genes to maximize his reproductive success, cannot simply rely on his size, strength or dominance rank to get him what he wants. Even if dominance was sufficient, we are still left with the question: how do baboons know who is dominant or not? Is dominance a fact or an artefact? If it is an artefact, whose artefact is it – is it the observer's, who is searching for a society into which he can put the baboons? (Even in the classic dominance study, the investigator had to intervene by pairing males in contests over food, in order to 'discover' the dominance hierarchy.) Or is it a universal problem, one that both observer and baboon have to solve?

If baboons are constantly testing, trying to see who is allied with whom, who is leading whom, which strategies can further their goals, as recent evidence suggests, then both baboons and scientists are asking the same questions. And to the extent that baboons are constantly negotiating, the social link is transformed into a process of acquiring knowledge about 'what the society is'. To put it in a slightly different way, if we grant that baboons are not *entering into a stable structure* but rather negotiating what that structure will be, and monitoring and testing and pushing all other such negotiations, the variety of baboon society and its ill fit to a simple structure can be seen to be a result of the 'performative' question. The evidence is more striking in reverse. If there was a structure to be entered, why all this behavior geared to testing, negotiating and monitoring . . .?

We can summarize the baboon data and argument as follows: first, the traditional, ostensive, definition of baboon society has been unable to accommodate the variety of data on baboon social life. As a result, some information has been treated as 'data' and other information as discrepancies to be ignored or explained away. Second, more recent studies demonstrate that baboons invest a great deal of time in negotiating, testing, monitoring and interfering with each other.

A performative definition of society allows us to integrate both sets of 'facts'. Under this definition, baboons would not be seen as being *in* a group. Instead they would be seen as striving to define the society and the groups in which they exist, the structure and the boundaries. They would not be seen as being *in* a hierarchy, rather they would be ordering their social world

by their very activity. In such a view, shifting or stable hierarchies might develop not as one of the principles of an overarching society into which baboons must fit, but as the provisional outcome of their search for some basis of predictable interactions. Rather than entering an alliance system, baboons performing society would be testing the availability and solidity of alliances without knowing for certain, in advance, which relationships will hold and which will break. In short, performative baboons are social players actively negotiating and renegotiating what their society is and what it will be.

SOCIAL COMPLEXITY AND SOCIAL COMPLICATION

When we transform baboons into active performers of their society does this put them on a par with humans? The performative paradigm suggests an important distinction. What differs is the *practical* means that actors have to enforce their version of society or to organize others on a larger scale, thereby putting into practice their own individual version of what society is.

If actors have only themselves, only their bodies as resources, the task of building stable societies will be difficult. This is probably the case with baboons. They try to decide who is a member of the group, what are the relevant units of the group that have to be considered, what is the nature of the interaction of these other units, etc., but they have no simple or simplifying means to decide these issues or to separate out one at a time to focus upon (see references above). Age, gender, and perhaps kinship can be taken as givens in most interactions. To the extent that dominance systems are linked to kinship, dominance rank may also be a given (Chapais and Schulman 1980; Hausfater *et al.* 1982). But even age, kinship and kinship-linked dominance may be the object of negotiation at critical points (Altmann in 1980; Cheney 1977; Chepko-Sade and Sade 1979; Popp and DeVore 1979; Trivers 1972; Walters 1981; Wasser 1982; Wasser and Barash 1981). A profusion of other variables impinge simultaneously. This is the definition of *complexity*, 'to simultaneously embrace a multitude of objects'. As far as baboons are concerned they assimilate a variety of factors all at once.

For the rest of our discussion we will consider that baboons live in *complex societies* and have complex sociality. When they construct and repair their social order, they do so only with limited resources, their bodies, their social skills and whatever social strategies they can construct. A baboon is, in our view, the ideal case of the *competent member* portrayed by ethnomethodologists, a social actor having difficulty negotiating one factor at a time, constantly subject to the interference of others with similar problems. These limited resources make possible only limited social stability.

Greater stability is acquired only with additional resources; something besides what is encoded in bodies and attainable through social skills is

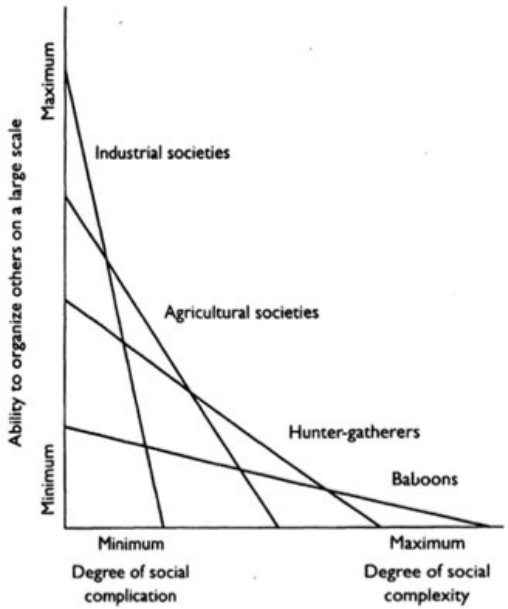

Figure 8.1 Complexity versus complication: the trade-off

needed. Material resources and symbols can be used to enforce or reinforce a particular view of 'what society is' and permit social life to shift away from complexity to what we will call *complication*. Something is 'complicated' when it is made of a succession of simple operations. Computers are the archetype of a complicated structure where tasks are achieved by the machine doing a series of simple steps. We suggest that the shift from complexity to complication is the crucial *practical* distinction between types of social life.

To understand this point better, we might look at what baboon-watchers do in order to understand baboon social life. First, individuals are identified and named, and the composition of the group is determined by age, sex and kinship, and perhaps also dominance rankings. Items of behavior are identified, defined and coded. Then attention is consciously focused on a subset of individuals, times, and activities, among the variety of interactions that occur simultaneously. Of course we could interpret this procedure as merely a rigorous way of getting at the social structure that exists and informs baboon societies. This interpretation of the scientific work fits nicely with the ostensive definition of society. In our view, however, the work that human observers do in order to understand baboon societies is the very same process that makes human societies different from baboon ones. Modern scientific observers replace a complexity of shifting, often fuzzy and continuous behaviors, relationships and meanings with a complicated array of simple, symbolic, clear-cut items. It is an enormous task of simplification.

How does the shift from social complexity to social complication happen? Figure 8.1 illustrates how we imagine this progression. The first line represents a baboon-like society in which socialness is complex, by our use of that term, and society is complex but not complicated because individuals are unable to organize others on a large scale. The intensity of their social negotiation reflects their relative powerlessness to enforce their version of society on others, or to make it stick as a stable, lasting version.

The second line positions hypothetical hunter-gatherers who are rich in material and symbolic means to use in constructing society compared to baboons, although impoverished by comparison with modern industrial societies. Here language, symbols, and material objects can be used to simplify the task of ascertaining and negotiating the nature of the social order. Bodies continue their social strategies in the performation of society, but on a larger, more durable, less complex scale. Material resources and the symbolic innovations related to language allow individuals to influence and have more power over others thereby determining the nature of the social order.

Line 3 represents agricultural societies where even more resources can be brought to bear in creating the social bond. In fact, the social bond can be maintained in the relative absence of the individuals. These societies are more complicated and more powerful than hunter-gatherer groups and the performation of society is possible on a larger scale because negotiations at each step are much less complex.

Modern industrial societies are depicted by the fourth line on the diagram. Here individuals are able to organize and 'mobilize' others on a grand scale. According to our scheme, the skills in an industrial society are those of simplification making social tasks *less complex* rather than making them more complex by comparison with other human and animal societies. By holding a variety of factors constant and sequentially negotiating one variable at a time, a stable *complicated* structure is created. Through extra-somatic resources employed in the process of social complication, units like multinational corporations, states and nations can be constituted (Latour 1987). The trend as we have sketched it, is from complex sociality, as found among baboons, to complicated sociality as found among humans. Starting with individuals who have little power to affect others, or enforce their version of society, or make a lasting social order, we encounter a situation where individuals employ more and more material and 'extra-social' means to simplify social negotiations. This gives them the ability to organize others on a large scale, even when those others are not physically present. By using additional new resources, social actors can make weak and renegotiable associations, like alliances between male baboons, into strong and unbreakable units (Callon and Latour 1981; Latour 1986a).

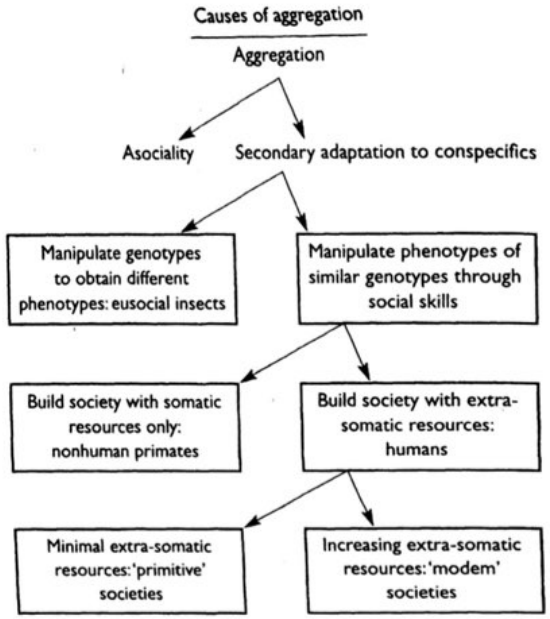

Figure 8.2 The evolution of the performative social bond

THE EVOLUTION OF THE PERFORMATIVE SOCIAL BOND

Our use of a performative framework produces two important permutations. Firstly, it grants full activity to all social participants. Individually and together they create society and, in theory, they are all equal. But, secondly, new asymmetries are introduced when we consider what practical means actors have to enforce their own definition of the social bond and to organize others according to individual views of what society is.

The performative framework we are advocating, in effect, gives back to the word 'social' its original meaning of association. Using this definition we can compare the *practical* ways in which organisms achieve societies. Figure 8.2 summarizes our views about the possible evolution of the performative social bond. We focus on the types of resources that actors have with which to create society and to associate, but we do not restrict the idea of 'resources' in any sense.

Aggregations of conspecifics is the first meaning of social in various accounts of the origin of society (see Latour and Strum 1986 and references included there). However most accounts fail to distinguish between this aggregation and the origin of social skills. Once aggregation occurs, whatever its cause (e.g. Alcock 1975; Hamilton 1971), two different strategies are possible in our model. The first is for the actor to depart, fleeing others as

soon as possible. This option generates asocial animals who exist alone except for brief reproductive interludes and temporary associations.

The second option is of greater interest. If the aggregated individual is not going to flee, he or she must adapt to a new environment of conspecifics. This is the meaning of social most common in the animal behavior literature: to modify one's behavior in order to live in close proximity to others of the same species. Acquiring the skill to create society and hold it together is then a SECONDARY adaptation to an environment made up, in large part, of conspecifics. In order not to be exploited by their new social environment, individuals must become smarter at manipulating and maneuvering around each other.

Once the social option has been chosen, two other possibilities appear. In the first, it is the genotypes that are modified until they are socially distinct. Insect societies are an example where the actors' own bodies are irreversibly molded. In the second possibility we find a different meaning of social. In this case the genotypes produce similar phenotypes. These phenotypes are then manipulated by the ever-increasing social skills of individuals. This option also branches into two alternatives.

Baboons provide an example of the first. Social skills are necessary to enroll others in the actor's definition of what society is. But baboons have only 'soft tools' and can build only 'soft' societies. They have nothing more to convince and enlist others in their definition than their bodies, their intelligence and a history of interactions built up over time. This is a *complex* task and only socially 'smart' and skillful individuals may hope to be successful in baboon society.

The second possibility is to acquire additional means of defining and strengthening the social bond. Here we have the human case where the creation of society uses material resources and symbols to simplify the task. Social interactions become more *complicated* but not more complex. Much of the skill necessary to achieve society in the other, baboon-like, option now resides in the creation of symbolic and material bonds. The result is that actors rather than appearing to create society, now appear to be inserted into a material society that overpowers them (the traditional paradigm discussed earlier).

For human societies there is an additional branching: 'primitive' societies are created with a minimal amount of material resources; increasing such resources produces 'modern' societies. Thus technology becomes one way of solving the problem of building society on a larger scale. In this sense even modern technology is social. It represents a further resource in the mobilization of individuals in the performation of society.

To summarize our theoretical model, once individuals are aggregated and choose not to avoid each other, there must be a secondary adaptation to a new competitive environment of conspecifics. Two strategies are possible: manipulate the genotypes to obtain different phenotypes (eusocial insects) or manipulate the phenotypes of similar genotypes through increasing social skills. Similar bodies adapting to social life have, themselves, two possibilities: build the society using only social skills (nonhuman primates) or utilize additional material resources and symbols, as necessary, to define

the social bond (human societies). In the human step different types of societies are created depending upon the extent of new resources that are used.

POLITICS

What relevance does our exploration of the meanings of social have for politics? . . .

The thrust of our argument is to draw a closer parallel between what we call 'social' and what has been defined as political. These efforts do not erase the significant differences between ants, baboons and, for instance, the technocrats of the Pentagon. Rather they highlight the source of those differences in a new way: the resources used and the practical work required in mobilizing them. In our definition of resources, genes, power, language, capital, and technology, for instance, are all seen as strategic means of enhancing one's influence over others in increasingly more durable ways. Politics is not one realm of action separated from the others. Politics, in our view, is what allows many heterogeneous resources to be woven together into a social link that becomes increasingly harder and harder to break.

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1 ▶ Do artifacts have politics?

Langdon Winner

In controversies about technology and society, there is no idea more provocative than the notion that technical things have political qualities. At issue is the claim that the machines, 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. Since ideas of this kind have a persistent and troubling presence in discussions about the meaning of technology, they deserve explicit attention. . . .[1]

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. 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.

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. 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.

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. 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.

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.[2] The theory of technological politics draws attention to the momentum of large-scale sociotechnical 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. 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 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. 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,[3] 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.

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.

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. 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.[4]

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. 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.'[5]

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. 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.

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. 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.[6] 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. 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.

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. 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.

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. 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. . . .

I would offer the following general conclusions. The things we call 'technologies' are ways of building order in our world. Many technical devices and systems important in everyday life contain possibilities for many different ways of ordering human activity. Consciously or not, deliberately or inadvertantly, societies choose structures for technologies that influence how people are going to work, communicate, travel, consume, and so forth over a very long time. In the processes by which structuring decisions are made, different people are differently situated and possess unequal degrees of power as well as unequal levels of awareness. By far the greatest latitude of choice exists the very first time a particular instrument, system, or technique is introduced. Because choices tend to become strongly fixed in material equipment, economic investment, and social habit, the original flexibility vanishes for all practical purposes once the initial commitments are made. In that sense technological innovations are similar to legislative acts or political foundings that establish a framework for public order that will endure over many generations. For that reason, the same careful attention one would give to the rules, roles, and relationships of politics must also be given to such things as the building of highways, the

creation of television networks, and the tailoring of seemingly insignificant features on new machines. The issues that divide or unite people in society are settled not only in the institutions and practices of politics proper, but also, and less obviously, in tangible arrangements of steel and concrete, wires and transistors, nuts and bolts.

INHERENTLY POLITICAL TECHNOLOGIES

None of the arguments and examples considered thus far address a stronger, more troubling claim often made in writings about technology and society – the belief that some technologies are by their very nature political in a specific way. According to this view, the adoption of a given technical system unavoidably brings with it conditions for human relationships that have a distinctive political cast – for example, centralized or decentralized, egalitarian or inegalitarian, repressive or liberating. This is ultimately what is at stake in assertions like those of Lewis Mumford that two traditions of technology, one authoritarian, the other democratic, exist side by side in Western history.[7] In all the cases I cited above the technologies are relatively flexible in design and arrangement, and variable in their effects. Although one can recognize a particular result produced in a particular setting, one can also easily imagine how a roughly similar device or system might have been built or situated with very much different political consequences. The idea we must now examine and evaluate is that certain kinds of technology do not allow such flexibility, and that to choose them is to choose a particular form of political life. . . .

Arguments to the effect that technologies are in some sense inherently political have been advanced in a wide variety of contexts, far too many to summarize here. In my reading of such notions, however, there are two basic ways of stating the case. One version claims that the adoption of a given technical system actually *requires* the creation and maintenance of a particular set of social conditions as the operating environment of that system. [This] view is offered by a contemporary writer who holds that 'if you accept nuclear power plants, you also accept a techno-scientific-industrial-military elite. Without these people in charge, you could not have nuclear power.'[8] In this conception, some kinds of technology require their social environments to be structured in a particular way in much the same sense that an automobile requires wheels in order to run. The thing could not exist as an effective operating entity unless certain social as well as material conditions were met. The meaning of 'required' here is that of practical (rather than logical) necessity. Thus, Plato thought it a practical necessity that a ship at sea have one captain and an unquestioningly obedient crew.

A second, somewhat weaker, version of the argument holds that a given kind of technology is strongly *compatible with*, but does not strictly require, social and political relationships of a particular stripe. Many advocates of

solar energy now hold that technologies of that variety are more compatible with a democratic, egalitarian society than energy systems based on coal, oil, and nuclear power; at the same time they do not maintain that anything about solar energy requires democracy. Their case is, briefly, that solar energy is decentralizing in both a technical and political sense: technically speaking, it is vastly more reasonable to build solar systems in a disaggregated, widely distributed manner than in large-scale centralized plants; politically speaking, solar energy accommodates the attempts of individuals and local communities to manage their affairs effectively because they are dealing with systems that are more accessible, comprehensible, and controllable than huge centralized sources. In this view, solar energy is desirable not only for its economic and environmental benefits, but also for the salutary institutions it is likely to permit in other areas of public life. . . .[9]

There are, then, several different directions that arguments of this kind can follow. Are the social conditions predicted said to be required by, or strongly compatible with, the workings of a given technical system? Are those conditions internal to that system or external to it (or both)? Although writings that address such questions are often unclear about what is being asserted, arguments in this general category do have an important presence in modern political discourse. They enter into many attempts to explain how changes in social life take place in the wake of technological innovation. More importantly, they are often used to buttress attempts to justify or criticize proposed courses of action involving new technology. By offering distinctly political reasons for or against the adoption of a particular technology, arguments of this kind stand apart from more commonly employed, more easily quantifiable claims about economic costs and benefits, environmental impacts, and possible risks to public health and safety that technical systems may involve. The issue here does not concern how many jobs will be created, how much income generated, how many pollutants added, or how many cancers produced. Rather, the issue has to do with ways in which choices about technology have important consequences for the form and quality of human associations.

If we examine social patterns that comprise the environments of technical systems, we find certain devices and systems almost invariably linked to specific ways of organizing power and authority. The important question is: Does this state of affairs derive from an unavoidable social response to intractable properties in the things themselves, or is it instead a pattern imposed independently by a governing body, ruling class, or some other social or cultural institution to further its own purposes?

Taking the most obvious example, the atom bomb is an inherently political artifact. As long as it exists at all, its lethal properties demand that it be controlled by a centralized, rigidly hierarchical chain of command closed to all influences that might make its workings unpredictable. The internal social system of the bomb must be authoritarian; there is no other way. The state of affairs stands as a practical necessity independent of any larger political system in which the bomb is embedded, independent of the kind of regime or character of its rulers. Indeed, democratic states must try to find ways to ensure that the social structures and mentality that

characterize the management of nuclear weapons do not 'spin off' or 'spill over' into the polity as a whole.

The bomb is, of course, a special case. The reasons very rigid relationships of authority are necessary in its immediate presence should be clear to anyone. If, however, we look for other instances in which particular varieties of technology are *widely perceived* to need the maintenance of a special pattern of power and authority, modern technical history contains a wealth of examples.

Alfred D. Chandler in *The Visible Hand*, a monumental study of modern business enterprise, presents impressive documentation to defend the hypothesis that the construction and day-to-day operation of many systems of production, transportation, and communication in the nineteenth and twentieth centuries require the development of a particular social form – a large-scale centralized, hierarchical organization administered by highly skilled managers. Typical of Chandler's reasoning is his analysis of the growth of the railroads.

> Technology made possible fast, all-weather transportation; but safe, regular, reliable movement of goods and passengers, as well as the continuing maintenance and repair of locomotives, rolling stock, and track, roadbed, stations, round-houses, and other equipment, required the creation of a sizable administrative organization. It meant the employment of a set of managers to supervise these functional activities over an extensive geographical area; and the appointment of an administrative command of middle and top executives to monitor, evaluate, and coordinate the work of managers responsible for the day-to-day operations.

Throughout his book Chandler points to ways in which technologies used in the production and distribution of electricity, chemicals, and a wide range of industrial goods 'demanded' or 'required' this form of human association. 'Hence, the operational requirements of railroads demanded the creation of the first administrative hierarchies in American business.'[10]

Were there other conceivable ways of organizing these aggregates of people and apparatus? Chandler shows that a previously dominant social form, the small traditional family firm, simply could not handle the task in most cases. Although he does not speculate further, it is clear that he believes there is, to be realistic, very little latitude in the forms of power and authority appropriate within modern sociotechnical systems. The properties of many modern technologies – oil pipelines and refineries, for example – are such that overwhelmingly impressive economies of scale and speed are possible. If such systems are to work effectively, efficiently, quickly, and safely, certain requirements of internal social organization have to be fulfilled; the material possibilities that modern technologies make available could not be exploited otherwise. Chandler acknowledges that as one compares sociotechnical institutions of different nations, one sees 'ways in which cultural attitudes, values, ideologies, political systems, and social structure affect these imperatives.'[11] But the weight of argument

and empirical evidence in *The Visible Hand* suggests that any significant departure from the basic pattern would be, at best, highly unlikely.

It may be that other conceivable arrangements of power and authority, for example, those of decentralized, democratic worker self-management, could prove capable of administering factories, refineries, communications systems, and railroads as well as or better than the organizations Chandler describes. Evidence from automobile assembly teams in Sweden and worker managed plants in Yugoslavia and other countries is often presented to salvage these possibilities. I shall not be able to settle controversies over this matter here, but merely point to what I consider to be their bone of contention. The available evidence tends to show that many large, sophisticated technological systems are in fact highly compatible with centralized, hierarchical managerial control. The interesting question, however, has to do with whether or not this pattern is in any sense a requirement of such systems, a question that is not solely an empirical one. The matter ultimately rests on our judgments about what steps, if any, are practically necessary in the workings of particular kinds of technology and what, if anything, such measures require of the structure of human associations. Was Plato right in saying that a ship at sea needs steering by a decisive hand and that this could only be accomplished by a single captain and an obedient crew? Is Chandler correct in saying that the properties of large-scale systems require centralized, hierarchical managerial control?

To answer such questions, we would have to examine in some detail the moral claims of practical necessity (including those advocated in the doctrines of economics) and weigh them against moral claims of other sorts, for example, the notion that it is good for sailors to participate in the command of a ship or that workers have a right to be involved in making and administering decisions in a factory. It is characteristic of societies based on large, complex technological systems, however, that moral reasons other than those of practical necessity appear increasingly obsolete, 'idealistic,' and irrelevant. Whatever claims one may wish to make on behalf of liberty, justice, or equality can be immediately neutralized when confronted with arguments to the effect: 'Fine, but that's no way to run a railroad' (or steel mill, or airline, or communications system, and so on). Here we encounter an important quality in modern political discourse and in the way people commonly think about what measures are justified in response to the possibilities technologies make available. In many instances, to say that some technologies are inherently political is to say that certain widely accepted reasons of practical necessity – especially the need to maintain crucial technological systems as smoothly working entities – have tended to eclipse other sorts of moral and political reasoning.

One attempt to salvage the autonomy of politics from the bind of practical necessity involves the notion that conditions of human association found in the internal workings of technological systems can easily be kept separate from the polity as a whole. Americans have long rested content in the belief that arrangements of power and authority inside industrial corporations, public utilities, and the like have little bearing on public institutions, practices, and ideas at large. That 'democracy stops at

the factory gates' was taken as a fact of life that had nothing to do with the practice of political freedom. But can the internal politics of technology and the politics of the whole community be so easily separated? A recent study of American business leaders, contemporary exemplars of Chandler's 'visible hand of management,' found them remarkably impatient with such democratic scruples as 'one man, one vote.' If democracy doesn't work for the firm, the most critical institution in all of society, American executives ask, how well can it be expected to work for the government of a nation – particularly when that government attempts to interfere with the achievements of the firm? The authors of the report observe that patterns of authority that work effectively in the corporation become for businessmen 'the desirable model against which to compare political and economic relationships in the rest of society.'[12] While such findings are far from conclusive, they do reflect a sentiment increasingly common in the land: what dilemmas like the energy crisis require is not a redistribution of wealth or broader public participation but, rather, stronger, centralized public management – President Carter's proposal for an Energy Mobilization Board and the like.

An especially vivid case in which the operational requirements of a technical system might influence the quality of public life is now at issue in debates about the risks of nuclear power. As the supply of uranium for nuclear reactors runs out, a proposed alternative fuel is the plutonium generated as a by-product in reactor cores. Well-known objections to plutonium recycling focus on its unacceptable economic costs, its risks of environmental contamination, and its dangers in regard to the international proliferation of nuclear weapons. Beyond these concerns, however, stands another less widely appreciated set of hazards – those that involve the sacrifice of civil liberties. The widespread use of plutonium as a fuel increases the chance that this toxic substance might be stolen by terrorists, organized crime, or other persons. This raises the prospect, and not a trivial one, that extraordinary measures would have to be taken to safeguard plutonium from theft and to recover it if ever the substance were stolen. Workers in the nuclear industry as well as ordinary citizens outside could well become subject to background security checks, covert surveillance, wiretapping, informers, and even emergency measures under martial law – all justified by the need to safeguard plutonium.

Russell W. Ayres's study of the legal ramifications of plutonium recycling concludes: 'With the passage of time and the increase in the quantity of plutonium in existence will come pressure to eliminate the traditional checks the courts and legislatures place on the activities of the executive and to develop a powerful central authority better able to enforce strict safeguards.' He avers that 'once a quantity of plutonium had been stolen, the case for literally turning the country upside down to get it back would be overwhelming.' Ayres anticipates and worries about the kinds of thinking that, I have argued, characterize inherently political technologies. It is still true that, in a world in which human beings make and maintain artificial systems, nothing is 'required' in an absolute sense. Nevertheless, once a course of action is underway, once artifacts like nuclear power plants

have been built and put in operation, the kinds of reasoning that justify the adaptation of social life to technical requirements pop up as spontaneously as flowers in the spring. In Ayres's words, 'Once recycling begins and the risks of plutonium theft become real rather than hypothetical, the case for governmental infringement of protected rights will seem compelling.'[43] After a certain point, those who cannot accept the hard requirements and imperatives will be dismissed as dreamers and fools.

The two varieties of interpretation I have outlined indicate how artifacts can have political qualities. In the first instance we noticed ways in which specific features in the design or arrangement of a device or system could provide a convenient means of establishing patterns of power and authority in a given setting. Technologies of this kind have a range of flexibility in the dimensions of their material form. It is precisely because they are flexible that their consequences for society must be understood with reference to the social actors able to influence which designs and arrangements are chosen. In the second instance we examined ways in which the intractable properties of certain kinds of technology are strongly, perhaps unavoidably, linked to particular institutionalized patterns of power and authority. Here, the initial choice about whether or not to adopt something is decisive in regard to its consequences. There are no alternative physical designs or arrangements that would make a significant difference; there are, furthermore, no genuine possibilities for creative intervention by different social systems – capitalist or socialist – that could change the intractability of the entity or significantly alter the quality of its political effects.

To know which variety of interpretation is applicable in a given case is often what is at stake in disputes, some of them passionate ones, about the meaning of technology for how we live. I have argued a 'both/and' position here, for it seems to me that both kinds of understanding are applicable in different circumstances. Indeed, it can happen that within a particular complex of technology – a system of communication or transportation, for example – some aspects may be flexible in their possibilities for society, while other aspects may be (for better or worse) completely intractable. The two varieties of interpretation I have examined here can overlap and intersect at many points.

These are, of course, issues on which people can disagree. Thus, some proponents of energy from renewable resources now believe they have at last discovered a set of intrinsically democratic, egalitarian, communitarian technologies. In my best estimation, however, the social consequences of building renewable energy systems will surely depend on the specific configurations of both hardware and the social institutions created to bring that energy to us. It may be that we will find ways to turn this silk purse into a sow's ear. By comparison, advocates of the further development of nuclear power seem to believe that they are working on a rather flexible technology whose adverse social effects can be fixed by changing the design parameters of reactors and nuclear waste disposal systems. For reasons indicated above, I believe them to be dead wrong in that faith. Yes, we may be able to manage some of the 'risks' to public health and safety that nuclear power brings. But

as society adapts to the more dangerous and apparently indelible features of nuclear power, what will be the long-range toll in human freedom?

My belief that we ought to attend more closely to technical objects themselves is not to say that we can ignore the contexts in which those objects are situated. A ship at sea may well require a single captain and obedient crew. But a ship out of service, parked at the dock, needs only a caretaker. To understand which technologies and which contexts are important to us, and why, is an enterprise that must involve both the study of specific technical systems and their history as well as a thorough grasp of the concepts and controversies of political theory. In our times people are often willing to make drastic changes in the way they live to accord with technological innovation at the same time they would resist similar kinds of changes justified on political grounds. If for no other reason than that, it is important for us to achieve a clearer view of these matters than has been our habit so far.

NOTES

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2 Langdon Winner, *Autonomous Technology: Technics-out-of-Control as a Theme in Political Thought* (Cambridge, Mass.: M.I.T. Press, 1977).

3 The meaning of 'technology' I employ in this essay does not encompass some of the broader definitions of that concept found in contemporary literature, for example, the notion of 'technique' in the writings of Jacques Ellul. My purposes here are more limited. For a discussion of the difficulties that arise in attempts to define 'technology,' see Ref. 2, pp. 8–12.

4 Robert A. Caro, *The Power Broker: Robert Moses and the Fall of New York* (New York: Random House, 1974), pp. 318, 481, 514, 546, 951–958.

5 *Ibid.*, p. 952.

6 Robert Ozanne, *A Century of Labor-Management Relations at McCormick and International Harvester* (Madison, Wis.: University of Wisconsin Press, 1967), p. 20.

7 Lewis Mumford, 'Authoritarian and Democratic Technics,' *Technology and Culture*, 5 (1964): 1–8.

8 Jerry Mander, *Four Arguments for the Elimination of Television* (New York: William Morrow, 1978), p. 44.

9 See, for example, Robert Argue, Barbara Emanuel, and Stephen Graham, *The Sun Builders: A People's Guide to Solar, Wind and Wood Energy in Canada* (Toronto: Renewable Energy in Canada, 1978). 'We think decentralization is an implicit component of renewable energy; this implies the decentralization of energy systems, communities and of power. Renewable energy doesn't require mammoth generation sources of disruptive transmission corridors. Our cities and towns, which have been dependent on centralized energy supplies, may be able

10 ▶ Making 'white' people white

Richard Dyer

The photographic media and, *a fortiori*, movie lighting assume, privilege and construct whiteness. The apparatus was developed with white people in mind and habitual use and instruction continue in the same vein, so much so that photographing non-white people is typically construed as a problem.

All technologies work within material parameters that cannot be wished away. Human skin does have different colours which reflect light differently. Methods of calculating this differ, but the degree of difference registered is roughly the same: Millerson (1972: 31), discussing colour television, gives light skin 43 per cent light reflectance and dark skin 29 per cent; Malkiewicz (1986: 53) states that 'a Caucasian face has about 35 per cent reflectance but a black face reflects less than 16 per cent'. This creates problems if shooting very light and very dark people in the same frame. Writing in *Scientific American* in 1921, Frederick Mills, 'electrical illuminating engineer at the Lasky Studios', noted that

> when there are two persons in [a] scene, possibly a star and a leading player, if one has a dark make-up and the other a light, much care must be exercised in so regulating the light that it neither 'burns up' the light make-up nor is of insufficient strength to light up the dark make-up.
>
> (1921: 148)

The problem is memorably attested in a racial context in school photos where either the black pupils' faces look like blobs or the white pupils have theirs bleached out.

The technology at one's disposal also sets limits. The chemistry of different stocks registers shades and colours differently. Cameras offer varying degrees of flexibility with regard to exposure (affecting their ability to take a wide lightness/darkness range). Different kinds of lighting have different

colours and degrees of warmth, with concomitant effects on different skins. However, what is at one's disposal is not all that could exist. Stocks, cameras and lighting were developed taking the white face as the touchstone. The resultant apparatus came to be seen as fixed and inevitable, existing independently of the fact that it was humanly constructed. It may be – certainly was – true that photo and film apparatuses have seemed to work better with light-skinned peoples, but that is because they were made that way, not because they could be no other way.

All this is complicated still further by the habitual practices and uses of the apparatus. Certain exposures and lighting set-ups, as well as make-ups and developing processes, have become established as normal. They are constituted as the way to use the medium. Anything else becomes a departure from the norm, or even a problem. In practice, such normality is white. . . .

Innovation in the photographic media has generally taken the human face as its touchstone, and the white face as the norm of that. The very early experimenters did not take the face as subject at all, but once they and their followers turned to portraits, and especially once photographic portraiture replaced painted portraits in popularity (from the 1840s on), the issue of the 'right' technology (apparatus, consumables, practice) focused on the face and, given the clientele, the white face. Experiment with, for instance, the chemistry of photographic stock, aperture size, length of development and artificial light all proceeded on the assumption that what had to be got right was the look of the white face. This is where the big money lay, in the everyday practices of professional portraiture and amateur snapshots. By the time of film (some sixty years after the first photographs), technologies and practices were already well established. Film borrowed these, gradually and selectively, carrying forward the assumptions that had gone into them. In turn, film history involves many refinements, variations and innovations, always keeping the white face central as a touchstone and occasionally revealing this quite explicitly, when it is not implicit within such terms as 'beauty', 'glamour' and 'truthfulness'. Let me provide some instances of this.

The interactions of film stock, lighting and make-up illustrate the assumption of the white face at various points in film history. Film stock repeatedly failed to get the whiteness of the white face. The earliest stock, orthochromatic, was insensitive to red and yellow, rendering both colours dark. Charles Handley, looking back in 1954, noted that with orthochromatic stock, 'even a reasonably light-red object would photograph black' (1967: 121). White skin is reasonably light-red. Fashion in make-up also had to be guarded against, as noted in one of the standard manuals of the era, Carl Louis Gregory's *Condensed Course in Motion Picture Photography* (1920):

> Be very sparing in the use of lip rouge. Remember that red photographs black and that a heavy application of rouge shows an unnaturally black mouth on the screen.
>
> (316)

Yellow also posed problems. One derived from theatrical practices of make-up, against which Gregory inveighs in a passage of remarkable racial resonance:

> Another myth that numerous actors entertain is the yellow grease-paint theory. Nobody can explain why a performer should make-up in chinese yellow. . . . The objections to yellow are that it is non-actinic and if the actor happens to step out of the rays of the arcs for a moment or if he is shaded from the distinct force of the light by another actor, his face photographs BLACK instantly.
>
> (ibid.: 317, emphasis in original)

The solution to these problems was a 'dreadful white make-up' (actress Geraldine Farrar, interviewed in Brownlow 1968: 418) worn under carbon arc lights so hot that they made the make-up run, involving endless retouching. . . .

Colour brought with it a new set of problems, explored in Brian Winston's article on the invention of 'colour film that more readily photographs Caucasians than other human types' (1985: 106). Winston argues that at each stage the search for a colour film stock (including the development process, crucial to the subtractive systems that have proved most workable) was guided by how it rendered white flesh tones. Not long after the introduction of colour in the mid-1930s, the cinematographer Joseph Valentine commented that 'perhaps the most important single factor in dramatic cinematography is the relation between the colour sensitivity of an emulsion and the reproduction of pleasing flesh tones' (1939: 54). Winston looks at one such example of the search for 'pleasing flesh tones' in researches undertaken by Kodak in the early 1950s. A series of prints of 'a young lady' were prepared and submitted to a panel, and a report observed:

> Optimum reproduction of skin colour is not 'exact' reproduction . . . 'exact reproduction' is rejected almost unanimously as 'beefy'. On the other hand, when the print of highest acceptance is masked and compared with the original subject, it seems quite pale.
>
> (David L. MacAdam 1951, quoted in Winston 1985: 120)

As noted above, white skin is taken as a norm but what that means in terms of colour is determined not by how it is but by how, as Winston puts it, it is 'preferred – a whiter shade of white' (ibid.: 121). Characteristically too, it is a woman's skin which provides the litmus test. . . .

A last example of the operation of the white face as a control on media technology comes from professional television production in the USA. In the late 1970s the WGBH Educational Foundation and the 3M Corporation developed a special television signal, to be recorded on videotape, for the purpose of evaluating tapes. This signal, known as 'skin', was of a pale orange colour and was intended to duplicate the appearance on a television set of white skin. The process of scanning was known as 'skinning'. Operatives would watch the blank pale orange screen produced by tapes prerecorded with the 'skin' signal, making notes whenever a visible defect appeared. The fewer defects, the greater the value of the tape (reckoned in

several hundreds of dollars) and thus when and by whom it was used. The whole process centred on blank images representing nothing, and yet founded in the most explicit way on a particular human flesh colour.

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