Mixing Humans and Nonhumans Together: The Sociology of a Door-Closer*

JIM JOHNSON[1], *Columbus Ohio School of Mines*

Is sociology the study of social questions, or is it the study of associations? In this paper the author takes the second position and extends the study of our associations to nonhumans. To make the argument clearer, the author chooses one very humble nonhuman, a door-closer, and analyzes how this "purely" technical artifact is a highly moral, highly social actor that deserves careful consideration. Then the author proposes a vocabulary to follow human and nonhuman relations without stopping at artificial divides between what is purely technical and what is social. The author builds "its" or "his" own text in such a way that the text itself is a machine that exemplifies several of the points made by the author. In particular, the author is constructed and deconstructed several times to show how many social actors are inscribed or prescribed by machines and automatisms.

The most liberal sociologist often discriminates against nonhumans. Ready to study the most bizarre, exotic, or convoluted social behavior, he or she balks at studying nuclear plants, robots, or pills. Although sociology is expert at dealing with human groupings, when it comes to nonhumans, it is less sure of itself. The temptation is to leave the nonhuman to the care of technologists or to study the impact of black-boxed techniques upon the evolution of social groups. In spite of the works of Marx or Lewis Mumford and the more recent development of a sociology of techniques (MacKenzie and Wacjman, 1985; Bijker, Hughes, and Pinch, 1986; Winner, 1986; Latour, 1987), sociologists still feel estranged when they fall upon the bizarre associations of humans with nonhumans. Part of their uneasiness has to do with the technicalities of complex objects and with the absence of a convenient vocabulary allowing them to move freely from studying associations of human to associations of nonhumans. In this paper I want to contribute to the reinsertion of nonhumans into the mainstream of American sociology by examining an extremely simple technique and offering a coherent vocabulary that could be applied to more complex imbroglios of humans and nonhumans.

Reinventing the Door

On a freezing day in February, posted on the door of the Sociology Department at Walla Walla University, Washington, could be seen a small hand-written notice: "The door-closer is on strike, for God's sake, keep the door closed." This fusion of labor relations, religion, advertisement, semiotics, and technique in one single insignificant fact is exactly the sort of thing I want to help describe. As a technologist teaching in an engineering school in Colombus, Ohio, I want to challenge some of the assumptions sociologists often hold about the "social context" of machines.

Walls are a nice invention, but if there were no holes in them, there would be no way to get in or out; they would be mausoleums or tombs. The problem is that, if you make holes in the walls, anything and anyone can get in and out (bears, visitors, dust, rats, noise). So architects invented this hybrid: a hole-wall, often called a *door*, which, although common enough,

* A version of this paper was delivered at Twente, Holland, in September, 1987. This paper owes a lot to Madeleine Akrich's work.

1. See page 304 for the social deconstruction of the authors.

has always struck me as a miracle of technology. The cleverness of the invention hinges upon the hinge-pin: instead of driving a hole through walls with a sledge hammer or a pick, you simply gently push the door (I am supposing here that the lock has not been invented; this would over-complicate the already highly complex story of this door). Furthermore, and here is the real trick, once you have passed through the door, you do not have to find trowel and cement to rebuild the wall you have just destroyed; you simply push the door gently back (I ignore for now the added complication of the "pull" and "push" signs).

So, to size up the work done by hinges, you simply have to imagine that every time you want to get in or out of the building you have to do the same work as a prisoner trying to escape or a gangster trying to rob a bank, plus the work of those who rebuild either the prison's or the bank's walls.

If you do not want to imagine people destroying walls and rebuilding them every time they wish to leave or enter a building, then imagine the work that would have to be done in order to keep inside or to keep outside all the things and people that, left to themselves, would go the wrong way. As Maxwell could have said, imagine his demon working *without* a door. Anything could escape from or penetrate into the department, and there would soon be complete equilibrium between the depressing and noisy surrounding area and the inside of the building. Techniques are always involved when asymmetry or irreversibility is the goal; it might appear that doors are a striking counter example since they maintain the hole-wall in a reversible state, but the allusion to Maxwell's demon clearly shows that such is not the case. The reversible door is the only way to irreversibly trap inside a differential accumulation of warm sociologists, knowledge, papers, and also, alas, paperwork; the hinged door allows a selection of what gets in and what gets out so as to locally increase order or information. If you let the drafts get inside, the drafts will never get outside to the publishers.

Now, draw two columns (if I am not allowed to give orders to the reader of *Social Problems* then take it as a piece of strongly worded advice). In the right column, list the work people would have to do if they had no door; in the left column write down the gentle pushing (or pulling) they have to do in order to fulfill the same tasks. Compare the two columns; the enormous effort on the right is balanced by the little one on the left, and this thanks to hinges. I will define this transformation of a major effort into a minor one by the word *translation* or *delegation*; I will say that we have delegated (or translated or displaced or shifted out) to the hinge the work of reversibly solving the hole-wall dilemma. Calling on a sociologist friend, I do not have to do this work nor even to think about it; it was delegated by the carpenter to a character, the hinge, that I will call a nonhuman (notice that I did not say "inhuman"). I simply enter the department of sociology. As a more general descriptive rule, every time you want to know what a nonhuman does, simply imagine what other humans or other nonhumans would have to do were this character not present. This imaginary substitution exactly sizes up the role, or function, of this little figure.

Before going on, let me cash out one of the side benefits of this table: in effect, we have drawn a scale balance where tiny efforts balance out mighty weights. The scale we drew (at least the one that you drew if you have obeyed my orders—I mean, followed my advice) reproduces the very leverage allowed by hinges. That the small be made stronger than the large is a very moral story indeed (think of David and Goliath). By the same token, this is also, since at least Archimedes' days, a very good definition of a lever and of power: the minimum you need to hold and deploy astutely in order to produce the maximum effect. Am I alluding to machines or to Syracuse's King? I don't know, and it does not matter since the King and Archimedes fused the two "minimaxes" into one single story told by Plutarch: the defense of Syracuse. I contend that this reversal of forces is what sociologists should look at in order to understand the "social construction" of techniques and not at a hypothetical social context they are not equipped to grasp. This little point having been made, let me go on with the

story (we will understand later why I do not really need your permission to go on and why, nevertheless, you are free not to go on, although only *relatively* so).

Delegating to Humans

There is a problem with doors. Visitors push them to get in or pull on them to get out (or vice versa), but then the door remains open. That is, instead of the door you have a gaping hole in the wall through which, for instance, cold rushes in and heat rushes out. Of course, you could imagine that people living in the building or visiting the department of sociology would be a well disciplined lot (after all, sociologists are meticulous people). They will learn to close the door behind them and retransform the momentary hole into a well-sealed wall. The problem is that discipline is not the main characteristic of people. Are they going to be so well-behaved? Closing a door would appear to be a simple enough piece of know-how once hinges have been invented; but, considering the amount of work, innovations, sign-posts, recriminations that go on endlessly everywhere to keep them closed (at least in Northern regions), it seems to be rather poorly disseminated.

This is where the age-old choice, so well analyzed by Mumford (1966), is offered to you: either to discipline the people or to *substitute* for the unreliable people another *delegated human character* whose only function is to open and close the door. This is called a groom or a porter (from the French word for door) or a gatekeeper, or a janitor, or a concierge, or a turnkey, or a gaoler. The advantage is that you now have to discipline only one human and may safely leave the others to their erratic behavior. No matter who these others are and where they come from, the groom will always take care of the door. A nonhuman (the hinges) plus a human (the groom) have solved the hole-wall dilemma.

Solved? Not quite. First of all, if the department pays for a porter, they will have no money left to buy coffee or books or to invite eminent foreigners to give lectures. If they give the poor little boy other duties besides that of porter, then he will not be present most of the time, and the damned door will stay open. Even if they had money to keep him there, we are now faced with a problem that two hundred years of capitalism has not completely solved: how to discipline a youngster to reliably fulfill a boring and underpaid duty. Although there is now only one human to be disciplined instead of hundreds (in practice only dozens because Walla Walla is rather difficult to locate), the weak point of the tactic is now revealed: if this one lad is unreliable then the whole chain breaks down. If he falls asleep on the job or goes walkabout, there will be no appeal; the damned door will stay open (remember that locking it is no solution since this would turn it into a wall, and then providing every visitor with the right key is an impossible task). Of course, the little rat may be punished or even flogged. But imagine the headlines: "Sociologists of science flog porter from poor working class background." And what if he is black, which might very well be the case, given the low pay? No, disciplining a groom is an enormous and costly task that only Hilton Hotels can tackle, and that for other reasons that have nothing to do with keeping the door properly closed.

If we compare the work of disciplining the groom with the work he substitutes for, according to the list defined above, we see that this delegated character has the opposite effect to that of the hinge. A simple task, forcing people to close the door, is now performed at an incredible cost; the minimum effect is obtained with maximum spending and spanking. We also notice, when drawing the two lists, an interesting difference. In the first relationship (hinges vis-à-vis work of many people), you not only had a reversal of forces (the lever allows gentle manipulations to heavy weights) but also a reversal of *time*. Once the hinges are in place, nothing more has to be done apart from maintenance (oiling them from time to time). In the second set of relations (groom's work versus many people's work), not only do you fail to reverse the forces, but you also fail to modify the time schedule. Nothing can be done to

prevent the groom who has been reliable for two months from failing on the sixty-second day; at this point it is not maintenance work that has to be done, but the same work as on the first day—apart from the few habits that you might have been able to *incorporate* into his body. Although they appear to be two similar delegations, the first one is concentrated in time, whereas the other is continuous; more exactly, the first one creates a clear-cut distinction between production and maintenance, whereas in the other the distinction between training and keeping in operation is either fuzzy or nil. The first one evokes the past perfect ("once hinges had been installed"); the second the present tense ("when the groom is at his post"). There is a built-in inertia in the first that is largely lacking in the second. A profound temporal shift takes place when nonhumans are appealed to: time is folded.

Disciplining the Door-Closer

It is at this point that you have this relatively new choice: either to discipline the people or to substitute for the unreliable humans a delegated nonhuman character whose only function is to open and close the door. This is called a door-closer or a "groom." The advantage is that you now have to discipline only one nonhuman and may safely leave the others (bellboys included) to their erratic behavior. No matter who they are and where they come from—polite or rude, quick or slow, friends or foes—the nonhuman groom will always take care of the door in any weather and at any time of the day. A nonhuman (hinges) plus another nonhuman (groom) have solved the hole-wall dilemma.

Solved? Well, not quite. Here comes the deskilling question so dear to social historians of technology: thousands of human grooms have been put on the dole by their nonhuman brethren. Have they been replaced? This depends on the kind of action that has been translated or delegated to them. In other words, when humans are displaced and deskilled, nonhumans have to be upgraded and reskilled. This is not an easy task, as we shall now see.

We have all experienced having a door with a powerful spring mechanism slam in our face. For sure, springs do the job of replacing grooms, but they play the role of a very rude, uneducated porter who obviously prefers the wall version of the door to its hole version. They simply slam the door shut. The interesting thing with such impolite doors is this: if they slam shut so violently, it means that you, the visitor, *have* to be very quick in passing through and that you *should* not be at someone else's heels; otherwise your nose will get shorter and bloody. An unskilled nonhuman groom thus presupposes a skilled human user. It is always a trade-off. I will call, after Madeleine Akrich, the behavior imposed back onto the human by nonhuman delegates *prescription* (Akrich, 1987). How can these prescriptions be brought out? By replacing them by strings of sentences (usually in the imperative) that are uttered (silently and continuously) by the mechanisms for the benefit of those who are mechanized: do this, do that, behave this way, don't go that way. Such sentences look very much like a programming language. This substitution of words for silence can be made in the analyst's thought experiments, but also by instruction booklets or explicitly in any training session through the voice of a demonstrator or instructor or teacher. The military are especially good at shouting them out through the mouthpiece of human instructors who delegate back to themselves the task of explaining, in the rifle's name, the characteristics of the rifle's ideal user. As Akrich notes, prescription is the moral and ethical dimension of mechanisms. In spite of the constant weeping of moralists, no human is as relentlessly moral as a machine, especially if it is (she is, he is, they are) as "user friendly" as my computer.

The results of such distributions of skills between humans and nonhumans is well known: members of the department of sociology will safely pass through the slamming door at a good distance from one another; visitors, unaware of the *local cultural condition*, will crowd through the door and will get bloody noses. This story is of the same form as that about the

buses loaded with poor blacks that could not pass under driveways leading to Manhattan parks (Winner, 1980). So, inventors get back to their drawing board and try to imagine a nonhuman character that will not prescribe the same rare local cultural skills to its human users. A weak spring might appear to be a good solution. Such is not the case because it would substitute for another type of very unskilled and undecided groom who is never sure about the door's (or his own) status: is it a hole or a wall? Am I a closer or an opener? If it is both at once, you can forget about the heat. In computer parlance, a door is an OR, not an AND *gate*.

I am a great fan of hinges, but I must confess that I admire hydraulic door-closers much more, especially the old copper plated heavy one that slowly closed the main door of our house in Colombus, Ohio. I am enchanted by the addition to the spring of an hydraulic piston which easily draws up the energy of those who open the door and retains it, then gives it back slowly with a subtle variety of implacable firmness that one could expect from a well trained butler. Especially clever is its way of extracting energy from each and every unwilling, unwitting passer-by. My military friends at the academy call such a clever extraction an "obligatory passage point," which is a very fitting name for a door; no matter what you feel, think, or do, you have to leave a bit of your energy, literally, at the door. This is as clever as a toll booth.

This does not quite solve all the problems, though. To be sure the hydraulic door-closer does not bang the noses of those who are not aware of local conditions, so its prescriptions may be said to be less restrictive. But it still leaves aside segments of human populations. Neither my little nephews nor my grandmother could get in unaided because our groom needed the force of an able-bodied person to accumulate enough energy to close the door. To use the classic Langdon Winner's motto (1980), because of their prescriptions these doors *discriminate* against very little and very old persons. Also, if there is no way to keep them open for good, they discriminate against furniture removers and in general everyone with packages, which usually means, in our late capitalist society, working or lower-middle class employees (who, even coming from a higher strata, has not been cornered by an automated butler when he or she had their hands full of packages?). There are solutions though: the groom's delegation may be written off (usually by blocking its arm) or, more prosaically, its delegated action may be opposed by a foot (salesman are said to be expert at this). The foot may in turn be delegated to a carpet or anything that keeps the butler in check (although I am always amazed by the number of objects that fail this trial of force, and I have very often seen the door I just wedged open politely closing when I turned my back to it).

As a technologist, I could claim that, provided you put aside maintenance and the few sectors of population that are discriminated against, the groom does its job well, closing the door behind you constantly, firmly, and slowly. It shows in its humble way how three rows of delegated nonhuman actants (hinges, springs, and hydraulic pistons) replace, 90 percent of the time, either an undisciplined bell-boy who is never there when needed or, for the general public, the program instructions that have to do with remembering-to-close-the-door-when-it-is-cold. The hinge plus the groom is the technologist's dream of efficient action, at least it was until the sad day when I saw the note posted on Walla Walla Sociology Department's door with which I started this article : "the groom is on strike." So not only have we been able to delegate the act of closing the door from the human to the nonhuman, we have also been able to delegate the little rat's lack of discipline (and maybe the union that goes with it). On strike. Fancy that! Nonhumans stopping work and claiming what? Pension payments? Time off? Landscaped offices? Yet it is no use being indignant because it is very true that nonhumans are not so reliable that the irreversibility we would like to grant them is complete. We did not want ever to have to think about this door again—apart from regularly scheduled routine maintenance (which is another way of saying that we did not have to bother about it)—and here we are, worrying again about how to keep the door closed and drafts outside.

What is interesting in the note on the door is the humor of attributing a human character

to a failure that is usually considered as "purely technical." This humor, however, is more profound than the synonymous notice they could have posted "the groom is not working." I constantly talk with my computer, who answers back; I am sure you swear at your old car; we are constantly granting mysterious faculties to gremlins inside every conceivable home appliance, not to mention cracks in the concrete belt of our nuclear plants. Yet, this behavior is considered by moralists, I mean sociologists, as a scandalous breach of natural barriers. When you write that a groom is "on strike," this is only seen as a "projection," as they say, of a human behavior onto a nonhuman cold technical object, one by nature impervious to any feeling. They call such a projection anthropomorphism, which for them is a sin akin to zoophily but much worse.

It is this sort of moralizing that is so irritating for technologists because the automatic groom is already anthropomorphic through and through. "Anthropos" and "morphos" together mean either what has human shape or what gives shape to humans. Well the groom is indeed anthropomorphic, and in three senses: first, it has been made by men, it is a construction; second it substitutes for the actions of people, and is a delegate that permanently occupies the position of a human; and third, it shapes human action by prescribing back what sort of people should pass through the door. And yet some would forbid us to ascribe feelings to this thoroughly anthropomorphic creature, to delegate labor relations, to "project"—that is to say, to translate—*other* human properties to the groom. What of those many other innovations that have endowed much more sophisticated doors with the ability to see you arrive in advance (electronic eyes), or to ask for your identity (electronic passes), or to slam shut—or open—in case of danger? But anyway, who are you, you the sociologists, to decide forever the real and final shape of humans, to trace with confidence the boundary between what is a "real" delegation and what is a "mere" projection, to sort out forever and without due inquiry the three different kinds of anthropomorphism I listed above? Are we not shaped by nonhuman grooms, although, I admit, only a very little bit? Are they not our brethren? Do they not deserve consideration? With your self-serving and self-righteous social problems, you always plead against machines and for deskilled workers; are you aware of *your* discriminatory biases? You discriminate between the human and the inhuman. I do not hold this bias but see only actors—some human, some nonhuman, some skilled, some unskilled—that exchange their properties.

So the note posted on the door is an accurate one. It gives a humorous but exact rendering of the groom's behavior: it is not working; it is on strike (notice, that the word "strike" is also an anthropomorphism carried from the nonhuman repertoire to the human one, which proves again that the divide is untenable). What happens is that sociologists confuse the dichotomy human/inhuman with another one: *figurative/non-figurative*. If I say that Hamlet is the figuration of "depression among the aristocratic class," I move from a personal figure to a less personal one (class). If I say that Hamlet stands for doom and gloom, I use less figurative entities; and if I claim that he represents western civilization, I use non-figurative abstractions. Still, they all are equally actants, that is to say entities that *do* things, either in Shakespeare's artful plays or in the commentators' more tedious tomes. The choice of granting actants figurativity or not is left entirely to the authors. It is exactly the same for techniques. We engineers are the authors of these subtle plots or *scenariis*, as Madeleine Akrich (1987) calls them, of dozens of delegated and interlocking characters so few people know how to appreciate. The label "inhuman" applied to techniques simply overlooks translation mechanisms and the many choices that exist for figuring or de-figuring, personifying or abstracting, embodying or disembodying actors.

For instance, on the freeway the other day, I slowed down because there was a guy in a yellow suit and a red helmet waving a red flag. Well, the guy's moves were so regular and he was located so dangerously and had such a pale although smiling face that, when I passed by, I recognized it to be a machine (it failed the Turing test, a cognitivist would say). Not only was

the red flag delegated, not only was the arm waving the flag also delegated, but the body appearance was also added to the machine. We engineers could move much further in the direction of figuration, although at a cost; we could have given him/her (careful here, no sexual discrimination of robots) electronic eyes to wave only when there is a car approaching or regulated the movement so that it is faster when cars do not obey. Also we could have added—why not?—a furious stare or a recognizable face like a mask of President Reagan, which would have certainly slowed drivers down very efficiently. But we could also have moved the other way, to a *less* figurative delegation; the flag by itself could have done the job. And why a flag? Why not simply a sign: "work in progress"? And why a sign at all? Drivers, if they are circumspect, disciplined, and watchful will see for themselves that there is work in progress and will slow down.

The *enunciator* (a general word for the author of a text or for the mechanics who devised the machine) is free to place or not a representation of himself or herself in the script (texts or machines). The engineer may delegate or not in the flag-mover a shape that is similar to him/herself. This is exactly the same operation as the one I did in pretending that the author of this article was a hardcore technologist from Colombus, Ohio. If I say "we, the technologists," I propose a picture of the author-of-the-text which has only a vague relation with the author-in-the-flesh, in the same way as the engineer delegates in his flag-mover a picture of him that bears little resemblance to him/her.[2] But it would have been perfectly possible for me and for the mechanics to position no figurated character at all as the author *in* the scripts *of* our scripts (in semiotic parlance there would be no narrator). I would just have had to say things like "recent developments in sociology of science have shown that" instead of "I," and the mechanics would simply have had to take out the dummy worker and replace it by cranks and pullies.

Appealing to Gods

Here comes the most interesting and saddest lesson of the note posted on the door: people are not circumspect, disciplined, and watchful, especially not Walla Walla drivers after the happy-hour on Friday night. Well, that's exactly the point that the note made: "The groom is on strike, *for God's sake*, keep the door closed." In our societies, they are two systems of appeal: nonhuman and super-human, that is machines and gods. This note indicates how desperate its frozen and anonymous authors were (I have never been able to trace them back and to honor them as they deserved). They first relied on the inner morality and common sense of humans. This failed; the door was always left open. Then they appealed to what we technologists consider the supreme court of appeal, that is, to a nonhuman who regularly and conveniently does the job in place of unfaithful humans. To our shame, we must confess that it also failed after a while. The door was again always left open. How poignant their line of thought is! They moved up and backward to the oldest and firmest court of appeal there is, there was, and ever will be. If human and nonhuman have failed, certainly God will not deceive them.

2. The author-in-the text is Jim Johnson, technologist in Columbus, Ohio, who went to Walla Walla University, whereas the author-in-the-flesh is Bruno Latour, sociologist, from Paris, France, who never went to Columbus nor to Walla Walla University. The distance between the two is great but similar to that between Steven Jobs, the inventor of Macintosh, and the figurative nonhuman character who/which says "welcome to Macintosh" when you switch on your computer. The reason for this use of pseudonym was the opinion of the editors that no American sociologist is willing to read things that refer to specific places and times which are not American. Thus I inscribed in my text American scenes so as to decrease the gap between the prescribed reader and the pre-inscribed one. (*Editors' Note:* Since we believed these locations to be unimportant to Bruno Latour's argument, we urged him to remove specific place references that might have been unfamiliar to U.S. readers and thus possibly distracting. His solution seems to have proven our point. Correspondence to the author-in-the-flesh should go to Centre de Sociologie de l'Innovation, Ecole Nationale Supérieure des Mines, 62 boulevard Saint-Michel, 75006 Paris, France.)

I am ashamed to say that, when I crossed the hallway this fatal February day, the door *was* open. Do not accuse God, though, because the note did not appeal directly to Him (I know I should have added "Her" for affirmative action reasons, but I wonder how theologians would react). God is not accessible without mediators. The anonymous authors knew their catechisms well, so instead of asking for a direct miracle (God Him/Herself holding the door firmly closed or doing so through the mediation of an angel, as has happened in several occasions, for instance when Paul was delivered from his prison), they appeal to the respect for God in human hearts. This was their mistake. In our secular times, this is no longer enough.

Nowadays nothing seems to do the job of disciplining men and women and forcing them simply to close doors in cold weather. It is a similar despair that pushed the road engineer to add a Golem to the red flag to force drivers to beware—although the only way to slow drivers is still a good traffic-jam. You seem to always need more and more of these figurated delegates aligned in rows. It is the same with delegates as with drugs; you start with soft ones and end by shooting up. There is an inflation for delegated characters too. After a while they weaken. In the old days it might have been enough just to have a door for people to know how to close it. But then, the embodied skills somehow disappeared; people had to be reminded of their training. Still, the simple inscription "keep the door closed" might have been sufficient in the good old days. But you know people; they no longer pay attention to such notices and need to be reminded by stronger devices. It is then that you install automatic grooms, since electric shocks are not as acceptable for men as for cows. In the old times, when quality was still good, it might have been enough just to oil it from time to time, but nowadays even automatisms go on strike.

It is not, however, that the movement is always from softer to harder devices, that is, from an autonomous body of knowledge to force through the intermediary situation of worded injunctions, as the Walla Walla door would suggest. It also goes the other way. Although the deskilling thesis appears to be the general case (always go from intra-somatic to extra-somatic skills; never rely on undisciplined men, but always on safe delegated nonhumans), this is far from true. For instance, red lights are usually respected, at least when they are sophisticated enough to integrate traffic flows through sensors. The delegated policemen standing there day and night is respected even though it has no whistles, gloved hands, and body to enforce this respect. Imagined collisions with the other cars or with the absent policemen are enough to keep drivers and cars in check. The thought experiment "what would happen if the delegated character was not there," is the same as the one I recommended above to size up its function. The same incorporation from written injunction to body skills is at work with car user manuals. No one, I guess, will cast more than a cursory glance at the manual before igniting the engine. There is a large body of skills that we have now so well embodied or incorporated that the mediations of the written instructions are useless. From extra-somatic they have become intra-somatic. Incorporation in human or in nonhuman bodies is also left to the authors/engineers.

Offering a Coherent Vocabulary

It is because humans, nonhumans, and even angels are never sufficient in themselves and because there is no one direction going from one type of delegation to the other, that it is so useless to impose a priori divisions between which skills are human and which ones are not human, which characters are personified and which remain abstract, which delegation is forbidden and which is permissible, which type of delegation is stronger or more durable than the other. In place of these many cumbersome distinctions why not take up a few simple descriptive tools?

Following Madeleine Akrich's lead, we will speak only in terms of *scripts* or scenes or

scenarios played by human or nonhuman actors, which may be either figurative or nonfigurative. Humans are not necessarily figurative; for instance you are not allowed to take the highway policeman as an individual chum. He/she is the representative of authority, and if he/she is really dumb, he/she will reject any individualizing efforts from you, like smiles, jokes, bribes, or fits of anger. He/she will fully play the administrative *machinery*.

Following Akrich, I will call the retrieval of the script from the situation *description*. These descriptions are always in words and appear very much like semiotic commentaries on a text or like a programming language. They define actors, endow them with competences and make them do things, and evaluate the sanction of these actions very much like the narrative program of semioticians.

Although most of the scripts are in practice silent either because they are intra- or extra-somatic, the written descriptions are not an artifact of the analyst (technologist, sociologist, or semiotician) because there exist many states of affairs in which they are *explicitly* uttered. The gradient going from intra-somatic to extra-somatic skills through discourse is never fully stabilized and allows many entries revealing the process of translation. I have already listed several entries: user manuals, instruction, demonstration or drilling situations (in this case a human or a speech-synthesizer speaks out the user manual), practical thought experiments ("what would happen if instead of the red light a policemen were there"). To this should be added the innovator's workshop where most of the objects to be devised are still at the stage of projects committed to paper ("if we had a device doing this and that, we could then do this and that"); market analysis in which consumers are confronted with the new device; and, naturally, the training situation studied by anthropologists where people faced with a foreign device talk to themselves while trying out various combinations ("what will happen if I attach this lead here to the mains?"). The analyst has to capture these situations in order to write down the scripts. The analyst makes a thought experiment by comparing presence/absence tables and collating all the actions done by actants: if I take this one away, this and that other action will be modified.

I will call the translation of any script from one repertoire to a more durable one *transcription* or *inscription* or encoding. Translation does not have here only its linguistic meaning but also the religious one, "translation of the remains of St Christel," and the artistic one, "translating the feelings of Calder into bronze." This definition does not imply that the direction always goes from soft bodies to hard machines, but simply that it goes from a provisional less reliable one to a longer-lasting, more faithful one. For instance, the embodiment in cultural tradition of the user manual of a car is a transcription, but so is the replacement of a policeman by a traffic-light. One goes from machines to bodies, whereas the other goes the other way. Specialists of robotics have very much abandoned the pipe dream of total automation; they learned the hard way that many skills are better delegated to humans than to nonhumans, whereas others may be moved away from incompetent humans.

I will call *prescription* whatever a scene presupposes from its *transcribed* actors and authors (this is very much like "role expectation" in sociology, except that it may be inscribed or encoded in the machine). For instance, a Renaissance Italian painting is designed to be viewed from a specific angle of view prescribed by the vanishing lines, exactly like a traffic light expects that its users will watch it from the street and not sideways. In the same way as they presuppose a user, traffic lights presuppose that there is someone who has regulated the lights so that they have a regular rhythm. When the mechanism is stuck it is very amusing to see how long it takes drivers before deciding that the traffic light is no longer mastered by a reliable author. "User input" in programming language is another very telling example of this inscription in the automatism of a living character whose behavior is both free and predetermined.

This inscription of author and users in the scene is very much the same as that of a text. I already showed how the author of this article was ascribed (wrongly) to be a technologist in

Ohio. It is the same for the reader. I have many times used "you" and even "you sociologists." If you remember well, I even ordered you to draw up a table (or advised you to do so). I also asked your permission to go on with the story. In doing so, I built up an *inscribed reader* to whom I prescribed qualities and behavior as surely as the traffic light or the painting prepared a position for those looking at them. Did you *subscribe* to this definition of yourself? Or worse, is there any one at all to read this text and occupy the position prepared for the reader? This question is a source of constant difficulties for those who do not grasp the basics of semiotics. Nothing in a given scene can prevent the inscribed user or reader from behaving differently from what was expected (nothing, that is, until the next paragraph). The reader-in-the-flesh may totally ignore my definition of him or her. The user of the traffic light may well cross on the red. Even visitors to the department of sociology may never show up because Walla Walla is too far away, *in spite of* the fact that their behavior and trajectory have been perfectly anticipated by the groom. As for the computer user input, the cursor might flash for ever without the user being there or knowing what to do. There might be an enormous gap between the prescribed user and the user-in-the-flesh, a difference as big as the one between the "I" of a novel and the novelist. It is exactly this difference that so much upset the authors of the anonymous appeal posted on the door. It is because they could not discipline people with words, notes, and grooms, that they had to appeal to God. On another occasion, however, the gap between the two may be nil: the prescribed user is so well anticipated, so carefully nested inside the scenes, so exactly dovetailed, that it does what is expected. To stay within the same etymological root, I would be tempted to call the way actors (human or nonhuman) tend to extirpate themselves from the prescribed behavior *des-inscription* and the way they accept or happily acquiesce to their lot *subscription*.

The problem with scenes is that they are usually well prepared for anticipating users or readers who are at close quarter. For instance, the groom is quite good in its anticipation that people will push the door open and give it the energy to reclose it. It is very bad at doing anything to help people arrive there. After fifty centimeters, it is helpless and cannot act, for example, to bring people to Washington state. Still, no scene is prepared without a preconceived idea of what sort of actors will come to occupy the prescribed positions. This is why I said that, although *you* were free not to go on with this paper, *you* were only "relatively" so. Why? Because I know you are hard-working, serious American sociologists, reading a serious issue of *Social Problems* on sociology of science and technology. So, I can safely bet that I have a good chance of having you read the paper thoroughly! So my injunction "read the paper up to the end, you sociologist" is not very risky. I will call *pre-inscription* all the work that has to be done upstream of the scene and all the things assimilated by an actor (human or nonhuman) before coming to the scene as a user or as an author. For instance, how to drive a car is basically pre-inscribed in any (western) youth years before he or she comes to passing the driving licence test; hydraulic pistons were also pre-inscribed for slowly giving back the energy gathered years before innovators brought them to bear on automated grooms. Engineers can bet on this pre-determination when they draw up their prescriptions. This is what Gerson and his colleagues call "articulation work" (Fujimura, 1987). A lovely example of efforts at pre-inscription is provided by Orson Welles in *Citizen Kane* , where the hero not only bought a theater for his singing wife to be applauded in, but also bought the journals that were to do the reviews, bought off the art critics themselves, and paid the audience to show up—all to no avail, since the wife eventually quit. Humans and nonhumans are very, very undisciplined no matter what you do and how many predeterminations you are able to control upstream of the action.

Drawing a side-conclusion in passing, we can call *sociologism* the claim that, given the competence and pre-inscription of human users and authors, you can read out the scripts nonhuman actors have to play; and *technologism* the symmetric claim that, given the competence and pre-inscription of the nonhuman actors, you can easily read out and deduce the

behavior prescribed to authors and users. From now on, these two absurdities will, I hope, disappear from the scene, since the actors at any point may be human or nonhuman and since the displacement (or translation, or transcription) makes the easy reading-out of one repertoire into the next impossible. The bizarre idea that society might be made up of human relations is a mirror image of the other no less bizarre idea that techniques might be made up of nonhuman relations. We deal with characters, delegates, representatives, or, more nicely, lieutenants (from the French "lieu" "tenant," i.e., holding the place of, for, someone else); some figurative, others nonfigurative; some human, others nonhuman; some competent, others incompetent. You want to cut through this rich diversity of delegates and artificially create two heaps of refuse: "society" on one side and "technology" on the other? That's your privilege, but I have a less messy task in mind.

A scene, a text, an automatism can do a lot of things to their prescribed users at close range, but most of the effect finally ascribed to them depends on a range of other set-ups being aligned. For instance, the groom closes the door only if there are people reaching the Sociology Department of Walla Walla. These people arrive in front of the door only if they have found maps and only if there are roads leading to it; and, of course, people will start bothering about reading the maps, getting to Washington state and pushing the door open only if they are convinced that the department is worth visiting. I will call this *gradient* of aligned set-ups that endow actors with the pre-inscribed competences to find its users a *chreod* (a "necessary path" in the biologist Waddington's Greek): people effortlessly flow through the door, and the groom, hundreds of times a day, recloses the door—when it is not stuck. The result of such an alignment of set-ups is to decrease the number of occasions in which words are used; most of the actions become silent, familiar, incorporated (in human or in nonhuman bodies)—making the analyst's job so much harder. Even the classic debates about freedom, determination, predetermination, brute force, or efficient will— debates which are the twentieth century version of seventeenth century discussions on grace—will be slowly eroded away. (Since *you* have reached this point, it means I was right in saying earlier that you were not at all free to stop reading the paper. Positioning myself cleverly along a chreod, and adding a few other tricks of my own, I led you *here* . . . or did I? Maybe you skipped most of it; maybe you did not understand a word of it, oh you undisciplined American sociologist readers!)

There is one loose end in my story: why did the little (automatic) rat go on strike? The answer to this is the same as for the question earlier of why few people show up in Walla Walla. It is not because a piece of behavior is prescribed by an inscription that the predetermined characters will show up on time and do the job expected of them. This is true of humans, but it is truer of nonhumans. In this case the hydraulic piston did its job, but not the spring that collaborated with it. Any of the words above may be used to describe a set-up at any level and not only at the simple one I chose for the sake of clarity. It does not have to be limited to the case where a human deals with a series of nonhuman delegates; it can also be true of relations among nonhumans. In other words, when we get into a more complicated lash-up than the groom, we do not have to stop doing sociology; we go on studying "role expectation," behavior, social relations. The non-figurative character of the actors should not intimidate us.

The Lieutenants of Our Societies

I used the story of the door-closer to make a nonhuman delegate familiar to the ears and eyes of sociologists. I also used reflexively the semiotic of a story to explain the relations between inscription, prescription, pre-inscription, and chreods. There is, however, a crucial difference between texts and machines that I have to point out. Machines are lieutenants;

they hold the places and the roles delegated to them, but this way of shifting is very different from other types (Latour, 1988b).

In story-telling, one calls *shifting out* any displacement of a character either to another space or to another time or to another character. If I tell you "Millikan entered the aula," I translate the present setting—you and me—and shift it to another space, another time, and to other characters (Millikan and his audience). "I," the enunciator, may decide to appear or to disappear or to be represented by a narrator who tells the story ("that day, I was sitting on the upper row of the aula"); "I" may also decide to position you and any reader inside the story ("had you been there, you would have been convinced by Millikan's experiments"). There is no limit to the number of shiftings out a story may be built with. For instance, "I" may well stage a dialogue inside the aula between two characters who are telling a story about what happened at the Academy of Science in Washington, DC. In that case, the aula is the place *from which* narrators shift out to tell a story about the Academy, and they may or may not *shift back in* the aula to resume the first story about Millikan. "I" may also *shift in* the entire series of nested stories to close mine and come back to the situation I started from: you and me. All these displacements are well-known in literature departments and make up the craft of talented writers.

No matter how clever and crafty are our novelists, they are no match for engineers. Engineers constantly shift out characters in other spaces and other times, devise positions for human and nonhuman users, break down competences that they then redistribute to many different actants, build complicate narrative programs and sub-programs that are evaluated and judged. Unfortunately, there are many more literary critiques than there are technologists and the subtle beauties of techno-social imbroglios escape the attention of the literate public. One of the reasons for this lack of concern may be the peculiar nature of the shifting-out that generates machines and devices. Instead of sending the listener of a story into another world, the technical shifting-out inscribes the words into another matter. Instead of allowing the reader of the story to be at the same time away (in the story's frame of reference) and here (in his armchair), the technical shifting-out forces him to chose between frames of reference. Instead of allowing enunciators and enunciatees a sort of simultaneous presence and communion with other actors, technics allow both of them to ignore the delegated actors and to walk away without even feeling their presence.[3]

To understand this difference in the two directions of shifting out, let us venture out once more onto a Columbus freeway. For the umpteenth time I have screamed to Robin, "don't sit on the middle of the rear seat; if I brake too hard, you're dead." In an auto shop further along the freeway I come across a device *made for* tired-and-angry-parents-driving-cars-with-kids-between-two-and-five (that is too old for a baby seat and not old enough for a seat belt) and-from-small-families (that is without other persons to hold them safely) and-having-cars-with-two-separated-front-seats-and-head-rests. It is a small market but nicely analyzed by these Japanese fellows and, given the price, it surely pays off handsomely. This description of myself and the small category into which I am happy to *subscribe* is *transcribed* in the device—a steel bar with strong attachments to the head rests—and in the advertisement on the outside of the box. It is also *pre-inscribed* in about the only place where I could have realized that I needed it, the freeway. Making a short story already too long, I no longer scream at Robin and I no longer try to foolishly stop him with my extended right arm: he firmly holds the bar that protects him—or so I believe—against my braking. I have delegated the continuous injunction of my voice and extension of my right arm (with diminishing results as we know from Feschner's law) to a reinforced, padded, steel bar. Of course, I had to make two detours: one to my wallet, the second to my tool box. Thirty bucks and five minutes later I had fixed

3. To the shame of our trade, it is an art historian, Michael Baxandall (1985), who offers the most precise description of a technical artifact (a Scottish Iron Bridge) and who shows in most detail the basic distinctions between delegated actors which remain silent (black-boxed) and the rich series of mediators who remain *present* in a work of art.

the device (after making sense of the instructions encoded with Japanese ideograms). The detour plus the translation of words and extended arm to steel is a shifting out to be sure, but not of the same type as that of a story. The steel bar has now taken over my competence as far as keeping my son at arms length is concerned.

If, in our societies, there are thousands of such lieutenants to which we have delegated competences, it means that what defines our social relations is, for the most part, prescribed back to us by nonhumans. Knowledge, morality, craft, force, sociability are not properties of humans but of humans *accompanied by* their retinue of delegated characters. Since each of those delegates ties together part of our social world, it means that studying social relations without the nonhumans is impossible (Latour, 1988a) or adapted only to complex primate societies like those of baboons (Strum and Latour, 1987). One of the tasks of sociology is to do for the masses of nonhumans that make up our modern societies what it did so well for the masses of ordinary and despised humans that make up our society. To the people and ordinary folks should now be added the lively, fascinating, and honorable ordinary mechanism. If the concepts, habits, and preferred fields of sociologists have to be modified a bit to accommodate these new masses, it is small price to pay.

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