

# The powers of association

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## Abstract

This article starts with a paradox: when an actor simply *has* power nothing happens and s/he is powerless; when, on the other hand, an actor *exerts* power it is others who perform the action. It appears that power is not something one can possess – indeed it must be treated as a consequence rather than as a cause of action. In order to explore this paradox a diffusion model of power in which a successful command moves under an impetus given it from a central source is contrasted with a translation model in which such a command, if it is successful, results from the actions of a chain of agents each of whom ‘translates’ it in accordance with his/her own projects. Since, in the translation model, power is composed here and now by enrolling many actors in a given political and social scheme, and is not something that can be stored up and given to the powerful by a pre-existing ‘society’, it follows that debates about the origins of society, the nature of its components, and their relationships become crucial data for the sociologist. It also follows that the nature of society is negotiable, a practical and revisable matter (performative), and not something that can be determined once and for all by the sociologist who attempts to stand outside it (ostensive). The sociologist should, accordingly, seek to analyse the way in which people are associated together, and should, in particular, pay attention to the material and extrasomatic resources (including inscriptions) that offer ways of linking people that may last longer than any given interaction. In the translation model the study of society therefore moves from the study of the social as this is usually conceived, to a study of methods of association.

The problem of power may be encapsulated in the following paradox: when you simply *have* power – *in potentia* – nothing

happens and you are powerless; when you *exert* power – *in actu* – others are performing the action and not you. To take an example, Amin Gemayel in his palace officially has power over the Lebanon, but since very few people act when he orders things, he is powerless in practice. Power is not something you may possess and hoard. Either you have it in practice and *you* do not have it – others have – or you simply have it in theory and you do not have it.

What makes the difference between power ‘in potentia’ and power ‘in actu’? The actions of others. Power over something by someone is a *composition* made by many people – I will call this the ‘primary mechanism’ – and *attributed* to one of them – this will be called the ‘secondary mechanism’.<sup>1</sup> The amount of power exercised varies not according to the power someone has, but to the number of other people who enter into the composition. This is why the notion of power becomes less and less useful when power increases or decreases. Progressive ‘gain’ or ‘loss’ is not usually part of the concept of power. History is full of people who, because they believed social scientists and deemed power to be something you can possess and capitalise, gave orders no one obeyed!

In spite of this essential paradox the notion of power is often used something happens. A dictator is obeyed, we say, because ‘he has got’ power; a manager is able to move his headquarters because, as we like to say, ‘he is powerful’; a dominant female monkey is able to grab the best feeding sites because ‘she holds’ a powerful rank. These explanations are as tautological as the ‘dormitive virtue of the opium poppy’ dear to Molière’s physicians. The exercise of power is no more the cause of anything than the ‘dormitive virtue’ is the cause of the deep sleep of patients who have smoked opium. Power is, on the contrary, what has to be explained by the action of the others who obey the dictator, the manager, or the dominant female. If the notion of ‘power’ may be used as a convenient way to *summarise* the consequence of a collective action, it cannot also *explain* what holds the collective action in place. It may be used as an effect, but never as a cause. The job that was done by the Cartesians when they criticised the ‘occult qualities’ like that of ‘dormitive virtue’ must now be done on this other ‘occult quality’ (since the notion of power has the same lenitive effect on the critical stamina of many social scientists as that of the poppy on the opium-taker).

If there were any way of getting rid of the notion of power this

point would be obvious. But it is so useful as a stop gap solution to cover our ignorance, to explain (away) hierarchy, obedience or hegemony, that it is, at first sight, hard to see how to do without this pliable and empty term. In this article I explore a few alternative possibilities that would allow social scientists to treat the exercise of power as an effect rather than as a cause.

### (1) From diffusion to translation

What makes the notion of power both so useful and so empty is a philosophical argument about the nature of collective action. This argument should be dealt with first if we want to do away with the 'powerful virtue' of power.

To explain the spread in time and space of an order, of a claim, of an artefact, there are two possibilities. The first is to endow the order, the claim, or the artefact – let us call it a token – with an inner force similar to that of inertia in physics. According to the inertia principle the token will move in the same direction as long as there is no obstacle. In such a model – let us call it the diffusion model – the displacement of a token through time and space does not have to be explained. What is in need of explanation is the slowing down or the acceleration of the token which results from the action or reaction of other people. For instance, scientific progress is easily understood within the diffusion model. It is not the spread of accurate facts about nature that has to be explained, but only its slowing down or its distortion caused by backward minds, countries or cultures. To take another example, technical progress is mostly (though not always) interpreted from the standpoint of the diffusion model: steam engines, electricity or computers are endowed with inertia such that they can hardly be stopped except by the most reactionary interest groups or nations; their inertial force is not what has to be explained, but rather the ability of some groups to slow them down – those that are said to be 'closed' to progress – or to accelerate them – those that are 'open' to progress. Other examples should show that fashion, ideas, gadgets, goods and life styles are also granted enough inertia to spread through society which is seen as a *medium* with various degrees of resistance.

The model of diffusion thus defines three important elements in the spread of a token through time and space: the initial force that triggers the movements and which constitutes its only energy; the

inertia that conserves this energy; and the medium through which the token circulates. Clearly, when it is used as a cause to explain collective action, the notion of power is considered in terms of the diffusion model: what counts is the initial force of those who *have* power; this force is then transmitted in its entirety; finally, the medium through which power is exerted may diminish the power because of frictions and resistances (lack of communication, ill will, opposition of interest groups, indifference). In such a model, when we see that an order given by a manager has been executed by two hundred people we conclude that the force that displaced the latter should be placed in the hands of the manager. To be sure, the order as it is executed is not quite the order that was given, but such distortions may be attributed to frictions and resistances which deflected and slowed down the pace of the original force. The advantage of such a model is that everything may be explained either by talking about the initial force or by pointing to the resisting medium: when an order is faithfully executed, one simply says that the masters had a lot of power; when it is not, one merely argues that the masters' power met with a lot of resistance. Stalin thus had a great deal of clout while Amin Gemayel has many enemies.

This model of diffusion may be contrasted with another, that of the model of translation. According to the latter, the spread in time and space of anything – claims, orders, artefacts, goods – is in the hands of people; each of these people may act in many different ways, letting the token drop, or modifying it, or deflecting it, or betraying it, or adding to it, or appropriating it. The faithful transmission of, for instance, an order by a large number of people is a rarity in such a model and if it occurs it requires explanation. In other words, there is no inertia to account for the spread of a token. When no one is there to take up the statement or the token then it simply stops.

More importantly, displacement is not caused by the initial impetus since the token has no impetus whatsoever; rather it is the consequence of the energy given to the token by everyone in the chain who does something with it, as in the case of rugby players and a rugby ball. The initial force of the first in the chain is no more important than that of the second, or the fortieth, or of the four hundredth person. Consequently, it is clear that the energy cannot be hoarded or capitalised; if you want the token to move on you have to find fresh sources of energy all the time; you can never rest on what you did before, no more than rugby players can rest

for the whole game after the *first* player has given the ball its *first* kick.

The third aspect of the translation model is the most important. Each of the people in the chain is not simply resisting a force or transmitting it in the way they would in the diffusion model; rather, they are doing something essential for the existence and maintenance of the token. In other words, the chain is made of *actors* – not of patients – and since the token is in everyone's hands in turn, everyone shapes it according to their different projects. This is why it is called the model of translation. The token changes as its moves from hand to hand and the faithful transmission of a statement becomes a single and unusual case among many, more likely, others.

In the two models the elements to be considered are utterly different: in the translation approach the initial force does not count for more than any other; force is never transmitted in its entirety and no matter what happened earlier, it can stop at any time depending on the action of the person next along the chain; again, instead of a passive medium through which the force is exerted, there are active members shaping and changing the token as it is moved. Instead of the *transmission* of the same token – simply deflected or slowed down by friction – you get, in the second model, the continuous *transformation* of the token. When, as a result of unusual circumstances, it is made to stay the same, this is what requires an explanation.

Clearly, the notion of power would look entirely different if it were considered in terms of the translation model. The obedience to an order given by someone would require the alignment of all the people concerned by it, who would all assent to it faithfully, without adding or subtracting anything. Such a situation is highly improbable. The chances are that the order has been modified and composed by many different people who slowly turned it into something completely different as they sought to achieve *their* own goals. How can we be so sure of this? Simply because if it were not the case, then the order would not have been 'obeyed' in the first place, and the person who gave the order would be said to be powerless! 'Power' is always the illusion people get when they are obeyed; thinking in terms of the diffusion model, they imagine that others behave because of the masters' clout without ever suspecting the many different reasons others have for obeying and doing something else; more exactly, people who are 'obeyed' discover what their power is really made of when they start to lose

it. They realise, but too late, that it was 'made of' the wills of all the others.

A shift from the diffusion to the translation model is thus the first move that will allow social scientists to understand power as a consequence and not as a cause of collective action.

## (2) From a past to a present-day origin for society

If we wish to transform the 'occult quality of power' into something the social scientist can study we have to make use of the translation model. This, however, is not easy for we are obliged to modify, so to speak, the *timing* of the origins of society.

Since Durkheim, social scientists have considered political philosophy to be the prehistory of their science. Sociology had become a positive science only once it stopped bickering about the origins of society and instead *started with* the notion of an all-embracing society that could then be used to explain various phenomena of interest. The question of its origins thus became one of those obsolete problems better left to philosophers. Viewed in such a framework, the notion of power becomes convenient for sociologists. There is always enough already accumulated energy to explain, say, the spread of the multinationals, Pinochet's dictatorship, male domination in black ghettos, the division of labour in factories, and so on. You start with so many inequalities that their origins seem to be irrelevant. It thus seems unproblematic to say that Reagan, Napoleon, the City of London, or capitalism 'have got power' – unproblematic, that is, so long as you are able to draw on the big reservoir of energy provided by an ever present and overarching society.

If you apply the translation model, this reservoir dries up immediately. You no longer have any stored-up energy to explain why a President is obeyed and a multinational grows since these effects are a consequence of the actions of multitudes. You are thus faced with multitudes that wonder how to act as one. This problem is typical of the kind of question raised by political philosophers since the time of Aristotle. Power is *not yet* there as it is in the social sciences. It is composed *first*, as for instance in Hobbes' or Rousseau's theories of contract. This position raises problems for sociologists since it means moving backwards and reopening the question of the origins of society that they thought

they had exorcised once and for all when they became respectable scientists. It might mean going back to prehistory. . .

Fortunately the drift is not that big. When we apply the translation model we simply have to understand that the origins of society are still with us today and that debates about how it all began are still shaping our behaviour here and now. If we make such a hypothesis, then all the debates about what holds society together stop being endless and fruitless; instead they themselves become *one of the ways* of holding society together and enrolling enough people to constitute power. Elsewhere I have argued that debates about the origins of society do not occur at random but turn about a small number of items:<sup>2</sup> (a) the *units* in terms of which each person defines the society (family, genes, classes, kin, individuals, cities); (b) the *qualities* these units are endowed with (foresight, social skills, greed, blind force, selfishness); (c) the *form* the relations between units take (exchange, calculation, parasitism, exploitation, asymmetry) and when it is appropriate (d) the *currency* with which the relations are calculated (money, number of offspring, energy, pleasure and pain, power) as well as (e) the *time-delay* with which these calculations take place (a day, a year, a generation, a million years) and (f) the *degree of reciprocity* deemed acceptable (one to one barter, potlatch, personal balance, market or generalised exchange).

When these questions are considered, a new order emerges from the continuous debates about what it is that holds us all together. The order obtained is a function of the options selected from the above 'questionnaire' and the composition of society that results accordingly differs radically. Any modification, no matter how small or how scientific, to each of the answers might have enormous consequences. Sociobiology is a good case in point: a shift from group to kin selection, for instance, leads the costs and benefits of all the actors in society to be modified.<sup>3</sup> To take another example, to trace the division of labour between men and women a few thousand years earlier (or later) entails a complete change in what women can and cannot do today.<sup>4</sup> Establish the drives of social actors on the basis of natural instead of divine laws, and the legitimisation of all the powers in society changes signs.<sup>5</sup>

The origins of society are no longer behind us, and the task is not the discovery of the 'real' units, the 'real' qualities, the 'real' currency, and the 'real' time delay that make up society. The task before us is rather to use the screams and furies of the entire range of groups dissatisfied with the genealogy of their positions,

because each of these fierce debates – whether in the political or the scientific arena – are deciding on the composition of society *now*, before our very eyes. It is clear, for instance, that if the units are two classes engaged in a constant struggle whose form is defined and counted in terms of the use of labour value then society is made to move in one direction: some members will be defined by others as parasitic exploiters who hold great power.<sup>6</sup> If, to take another example, the units are kin clans whose qualities are good self control, the form of their relations that of obedience and the currencies those of honour and shame, then *another* society will be defined.<sup>7</sup> A third is constructed if the units 'are genes that stop at nothing to propagate replicas of themselves and which make this calculation in terms of the number of offspring on a thousand-year timescale. In the latter case completely different lists of winners and losers, exploiters and exploited, the powerful and the powerless, and the selfish and the altruistic are proposed.

Either power is something provided by the prior existence of society, or it is something that has to be obtained by enrolling many actors. If the former is the case, then neither power nor society have to be explained. Rather they are what provide the explanation for the behaviour of everything else. If the latter is the case, neither power nor society are used as explanations. These arise out of the modifications that are made to the developing definition of what society is about. The sources of power are in the hands of those who are able to shift around the answers to the questionnaire outlined above. Clearly, if this is accepted then the notion of power becomes a consequence and the translation model may be easily used.

### (3) From an ostensive to a performative definition of the social link

So far I have argued that in order to speak reasonably about power this notion has to be turned upside down and should be treated as a consequence instead of a cause of collective action.<sup>8</sup> However, to do this I was obliged to propose a shift from a diffusion to a translation model. This led us into a difficulty: in order to make this shift possible we had to modify the chronology of society: its origins were not in a remote past. Rather they were ever-present



and constantly open to question in scientific or political debates. This position in turn opens another difficulty: if society is made before our eyes then it cannot *explain* our behaviour but is rather shaped by our collective action. It is no more a cause of the latter than power itself. Does this mean that we have to deny the existence of an overarching society in order to do away with the notion of power? Not exactly, but we have to shift from an ostensive to a performative definition of society. In this way we will understand why each definition of society, each debate about what it is made of, each new science that aims at discovering its function, each new genealogy of man's past, has such an enormous influence over us all. The critique of the notion of power entails a critique of the most cherished notion – that of society. To make this point clear, let me list the basic principles of the ostensive and performative definitions:

### *Ostensive definition*

- 1 *In principle* it is possible to discover properties which are typical of life in society and could explain the social link and its evolution, though *in practice* they might be difficult to detect.
- 2 Social actors, whatever their size, are in the society defined above; even if they are active, as their name indicates, their activity is restricted since they are only parts of a larger society.
- 3 The actors in society are *useful informants* for those who seek the principles that hold society together (see 1), but since they are simply parts of society (see 2), actors are *only informants* and should not be relied upon too much because they never see the whole picture.
- 4 With the proper methodology, social scientists can sort out the actors' opinions, beliefs, illusions and behaviour to discover the properties typical of life in society (see 1) and piece together the whole picture.

Within such a framework, all controversies including those about the origins of society are only *practical difficulties* that will be eliminated with more data, a better methodology and better insulation of the social scientists' endeavour from ideology and

amateurism. Uncertainties, controversies about what the society is, these are only momentary problems hiding a picture of society that can be the object of an ostensive definition.

### *Performative definition*

- 1 It is impossible *in principle* to define the list of properties that would be typical of life in society although *in practice* it is possible to do so.
- 2 Actors, whatever their size, define in practice what society is, what it is made of, what is the whole and what are the parts – both for themselves and for others.
- 3 No assumption is necessary about whether or not any actor knows more or less than any other actor. The 'whole picture' is what is at stake in the practical definitions made by actors.
- 4 Social scientists raise the *same questions* as any other actors (see 2) and find different *practical* ways of enforcing their definition of what society is about.

In this framework, controversies on what society is about cannot be eliminated to let the scientists unfold the whole picture. No matter what their scale and intensity, controversies are part and parcel of the very definition of the social bond. The question: 'What links us together?' is not answerable in principle, but in practice, every time someone raises it a new association is made that does indeed link us together. Society is not the referent of an ostensive definition discovered by social scientists despite the ignorance of their informants. Rather it is performed through everyone's efforts to define it.<sup>9</sup> Those who are powerful are not those who 'hold' power in principle, but those who practically define or redefine what 'holds' everyone together. This shift *from principle to practice* allows us to treat the vague notion of power not as a cause of people's behaviour but as the consequence of an intense activity of enrolling, convincing and enlisting. When the second framework is chosen instead of the first the practical resources necessary to perform society appear clearly. We have to study them if we wish to do away with the notion of power.

#### (4) From matters of principle to practical resources

If power is not something you can hoard and possess, it is something that has to be *made*. Who will make it? *Others*, by definition (see Section 1). These others, the only ones who are really powerful (*in actu*), therefore have to attribute their action to one amongst them who becomes powerful *in potentia*. This means that a constant debate will rage about who obeys and who is obeyed (Section 2). In these continuous struggles there will be as many definitions of 'the whole picture' as there are actors striving to enrol and/or to be enrolled. 'Society' can explain these struggles no more than can 'power'. On the contrary, they are the provisional outcome of many definitions: society is what you perform for as long as you are able to perform it (see Section 3). Does this mean that we are led into utter chaos, society being made and unmade constantly? There is no answer to this question in principle. We may or may not be led into chaos. This depends *only* on the practical resources one may mobilise in order to make a definition hold over time. The whole burden of making society firm has shifted from the society itself (which has become a consequence) to the many material tasks that may enforce or reinforce the provisional bonds made by the actors.<sup>10</sup>

To make this point clear, I will give one example taken from the sociologist who is most far removed from this point of view. Durkheim is the epitome of what I call the ostensive definition of the social link and nowhere is this more clear than in *The Elementary Forms of the Religious Life*.<sup>11</sup> In Book II, Chapters III, V and VII he acknowledges, however, that the clan structure is not tight enough to hold the clan together. These are the only places in the whole book where the overarching society, used elsewhere as a cause to explain everything, is deemed insufficient. Where does Durkheim turn in order to make the clan hold together? To material resources that reinforce the bond:

But if the movements by which these sentiments are expressed are connected with something that endures, the sentiments themselves become more durable. (p. 231)

These resources (flags, names, scarifications, colours, tattoos) are not, he says, simply labels: 'attached to representations already made, in order to make them more manageable: they are an

integral part of them' (idem.). And two pages later, these 'integral parts' of the bond have become their cause:

A clan is essentially a reunion of individuals who bear the same name and rally round the same sign. Take away the name and the sign which materialises it, and the clan is no longer representable. Since the group is possible only on this condition, both the institution of the emblem and the part it takes in the life of the group are thus explained. (344)

Very soon after this passage Durkheim goes back to his usual framework and explains collective behaviour by the existence of society, but for a few pages, and for the vague notion of the clan at least, resources have taken the most important role and have become what ties the clan together. The main point he made during this short lapse is that the *durability* of the definition of the clan depends upon the *duration* of the resources used to make it hold together.<sup>12</sup> The ~~clan~~ *clan* is a weak and short-lived notion, and it becomes longer lasting and stronger with tattoos, flags, names and scarifications. This means that in defining society we need a *longer* list that includes, of course, the notion of clan, but *also* includes flags, colours, names and tattoos. To put it differently: society is not made up of social elements, but of a list that mixes up social and non-social elements.

This becomes clearer when we express its opposite: when a society is made of social elements alone it does not have a stable structure. To find such a situation one has to study not human but animal societies. Elsewhere, with Shirley Strum, I have shown how baboon societies, for instance, manage their intense social lives without the use of what we call extrasomatic resources.<sup>13</sup> They build the collective body with their own bodies alone, using no resources beyond these. This leads to the extreme *complexity* of their social skills, since they have no way of transforming a weak bond into a stronger one other than by using *more* social skills. The result of such an active redefinition of their society is that there is no stable structure, but rather social skills to repair constantly a decaying social order. As they make use of no extrasomatic resources to do this repair we may half-jokingly picture the baboons as the ideal 'competent member' as defined in ethnomethodology.

For human society, however, the baboon model works no better than the ethnomethodological one, since what counts in holding

the society together is mostly extrasomatic. Each performative definition of what society is about is reinforced, underlined and stabilised, by bringing in new and non-human resources. The same social skills applied among non-human primates to other bodies, are now applied in human societies to things that hold bodies in place.<sup>14</sup> The notion of power is emptied of all its potential at this point. 'Power' is now transferred to the many resources used to strengthen the bonds. The power of the manager may now be obtained by a long series of telephone calls, record-keeping, walls, clothes and machines, just as the clan depends upon the use of new items such as tattoos and scarifications to perform its definitions. The exact composition of the list is not important for the present argument. What counts is that *it is open ended*, that the so-called social elements are simply *items among* many others in a much longer list; that they cannot be used to *replace* all the other elements; or even used as their headings.

Yet if social elements are of so little use, something must have gone wrong somewhere in the definition of the social. I have to tackle this final point in order to empty the notion of power of its powers of fascination.

### (5) Conclusion: from the study of society to that of associations

The argument above may be summarised in one sentence: society is not what holds us together, it is what is held together. Social scientists have mistaken the effect for the cause, the passive for the active, what is glued for the glue. Appealing to a reserve of energy, be it 'capital'<sup>15</sup> or 'power', to explain the obedient behaviour of the multitudes, is thus meaningless. This reservoir is full only as long as you do not need it, that is as long as others dutifully fill it. It is empty when you need it, that is when the others are no longer filling it. There is no way out of this paradox. No matter how much power one appears to accumulate, it is always necessary to obtain it from the others who are doing the action – this is what I called the shift from diffusion to translation. Thus it is always necessary to redefine who is acting, why it is necessary to act together, what are the boundaries of the collective, how responsibility should be allocated, what are the best metalanguages to define collective action – this is what I call maintaining the origins of society in the present. The result of such a continuous definition and redefinition of what collective action is about is to

transform society from something that exists and is in principle knowable into something which is built equally, so to speak, by every actor and that is in principle unknowable – it involves shifting from an ostensive to a performative definition. From where do inequalities between the definitions of society performed by each actor come if it is not from a stable society? From a miscellaneous list of extrasomatic resources mobilised by actors to enforce their definition – this is what I called shifting from matters of principle to practices.<sup>16</sup> Stable states of society can be achieved, but not with social elements alone. As long as it is simply social skills that are brought in, one does not get a society more stable and more technically developed than that of the baboons or the chimpanzees.<sup>17</sup> The only way to understand how power is locally exerted is thus to take into account everything that has been put to one side – that is, essentially, techniques.<sup>18</sup>

All the above shifts then lead to a slight but necessary redefinition of what sociology is about. As a science of society, it cannot go very far since, following what I have argued above, it will always treat effects as causes. It will use notions of 'power' and 'capital' when these have to be locally *composed*; it will talk of 'classes', 'ranks' and 'values' when these are the outcome of a continuous debate on how to classify, to rank and to evaluate; it will try to make society hang together with 'hierarchies', 'professions', 'institutions' or 'organisations' whereas the practical details that make it possible for these entities to last for more than a minute will escape attention; finally, despairing of finding something strong enough to tie us together, sociology will invent notions like 'legitimacy', 'authority', 'roles', 'culture', or 'Zeitgeist', even though such notions are efficient only when everything else is solidly tied together. Making society hang together with social elements alone is like trying to make a mayonnaise with neither eggs nor oil – that is, out of hot air alone.

An alternative way of defining sociology is to make it the study of *associations* rather than of those few ties that we call social. If this new definition is accepted, another type of explanation becomes available to the analyst. He or she can use all the forces that have been mobilised in our human world to explain why it is that we are linked together and that some orders are faithfully obeyed while others are not. These forces are heterogeneous in character: they may include atoms, words, lianas or tattoos. They are also, themselves, bound together to create machines and machinations that keep us all in place.

This paper has presented a negative argument: it has suggested that the notion of power should be abandoned. Now study of the stuff of which society is made may begin in earnest. In the false start made by sociology something was forgotten, something that at first seemed unimportant: the glue strong enough to hold us together, the glue that takes the form of all the sciences and technologies.

## Notes

This paper is a personal rendering of ideas that have often been discussed with Michel Callon and Shirley Strum. I thank John Law for his help in bringing it to the light of day.

- 1 The most complete study of this problem is that of Tolstoy in *War and Peace* (1957). The primary mechanism is that of the half million soldiers in the Great Army, each of them doing more or less what they want – fleeing, killing, dying. The secondary mechanism gives a solution to what the collective is doing at any moment: Napoleon leads the great army and is the cause of its moves.
- 2 See Latour and Strum (1985): among the origin stories studied in this article are those of Sigmund Freud, Richard Dawkin, René Girard, Thomas Hobbes, Richard Leakey, Karl Marx and Jean-Jacques Rousseau.
- 3 This is the major revolution introduced by sociobiology in the calculation of all social links. To get an idea of this shift, compare E. O. Wilson's book on insects (1971) which uses a traditional group selection political philosophy with his *Sociobiology* (1975) which uses kin selection.
- 4 See, for instance Hrdy (1981). The notion of genealogy is useful to map all these debates; each new position on the past modifies the genealogy (and thus the rights and duties) of every group in present society.
- 5 This is, for instance, the change made by Hobbes, in his *Leviathan* (1981).
- 6 It is never sufficiently emphasised that Marxism is in effect a mode of calculating all the exchanges practised in a society. If labour value is used as a standard, then the same capitalist who appeared to pay for everything at its price when counted in exchange value, appears as an exploiter. The indignation of the exploited is maintained as long as the accounting system is enforced. If all the exchanges in a society are now counted in *kilocalories* a quite different list of the exploited and parasites is drawn up.
- 7 No difference is to be made at this point between so called traditional and so called modern societies. Potlatch, for instance, is simply obtained by giving different answers to the same questionnaire (Mauss: 1923; 1967).
- 8 This is again what Tolstoy does in his book: Napoleon's moves, his genius, his competence, his inefficiency – none of these explain what happened to the Great Army. For an historical and philosophical commentary see Latour (1984).
- 9 The shift is analogous to that in physics between prerelativism (where it is necessary to have a referent to make good measurements) and relativism where it is necessary *not* to have any referent to make good and compatible measurements. See Callon and Latour (1985) and Strum and Latour (1984).

- 10 See the work of Elihu Gerson and his colleagues on 'tasks'.
- 11 Durkheim (1915).
- 12 In French, 'durée' and 'dureté'. On this point see Latour (1984), second part.
- 13 See Strum and Latour (1984); among the most relevant work on baboon societies see Strum (1982; 1983a; 1983b; and Westermarck, 1982).
- 14 This implies a different way of considering technology and its relations with society. On this see Callon and Latour (1981).
- 15 The critique made here of power could be addressed to the notion of 'capital' which is so popular, for instance, in Pierre Bourdieu's sociology. France is full of firms and banks that, because they held vast amounts of capital, thought that this was enough to exist and hold sway for ever. The factories are now closed and the banks bankrupt. For a critique of capital see Thevenot (1984).
- 16 This is what John Law calls 'heterogeneous engineering'. See Law (1985) and this volume.
- 17 Technical development is inversely proportional to that of social skills, so that, paradoxically, we are led to consider non-human primate societies as more complex than human ones. See Strum and Latour (1984).
- 18 This is in effect the same result as that obtained by Michel Foucault (1977) when he dissolved the notion of a power held by the powerful in favour of micro-powers diffused through the many technologies to discipline and keep in line. It is simply an expansion of Foucault's notion to the many techniques employed in machines and the hard sciences.

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