

This assumption lies behind the recent emphasis on hands-on experience for introducing phenomena and principles of the world and of science to children and adults in hands-on interactive science centres, such as Frank Oppenheimer's Exploratorium in San Francisco, and our Exploratory in England, in Bristol, as well as other hands-on science centres in America, Canada, India and many other countries. But, if active interaction is so important, can we gain new knowledge from such hands-off experience as television? This is an experimental question. It should be possible to find out, by the methods of experimental psychology, just what people can learn from static or moving pictures and how much is added by interaction through active touch. Physics used to be called, as it still is in Scotland, Experimental Philosophy. What we need is a broad-based experimental investigation of truth. But just as physics cannot say what electrons are made of, and psychologists cannot say what mind is made of – indeed, these may be essentially meaningless questions – so, perhaps, we cannot ask at a deeper level what truth is. For it seems that we can only describe and explain *relations*. The trouble about asking for the 'substance' of matter, or mind, is that we are asking for more than relations, and so for more than we can discover by exploratory behaviour or experiment, or games with or against nature.

The trouble about truth is that the relation or link between perceptions and propositions to 'objective truth' is a bridge with only one visible pier. The other end of the bridge, if there is one, lies in a sea of mystery. This, surely, is something of what Newton meant when he described himself as like a boy playing on the beach, picking up especially beautiful pebbles from an infinity of wonders.

Bruno Latour

CLOTHING THE NAKED TRUTH

2.4.8 A sentence does not hold together because it is true, but *because it holds together* we say it is 'true'. But what does it hold on to? Many things. Why? Because it has tied its fate to anything at hand that is more solid than itself. As a result no one can shake it loose without shaking everything else.

Nothing more, you the religious, nothing less, you the relativists.

QUAESTIO I: IS SCIENTIFIC TRUTH DISMANTLED BY TAKING REASON AWAY?

SINCE SCIENTIFIC TRUTH is based on a series of rational procedures to sort out legitimate from illegitimate claims, no account of how science proceeds can do away with reason. Depriving oneself of notions like rationality, objectivity, scientific method, rules of logic, is voluntarily to choose dementia since it is abandoning the only touchstone we have left to discriminate dementia from normality.

It is so difficult to do away with these notions that the very people who criticize science in the making, develop social studies of science and claim to be relativists are nevertheless scholars whose works are indistinguishable in practice and in form from those they attack. They constantly imply that rational procedures are necessary to discriminate their truer claims from the wrong-headed

ideas of their adversaries. In rationally denying the importance of reason, they vindicate the claims of rationalists.

The links that were forged during the Enlightenment between the scientific research programme, the political emancipation of the people and ethical responsibility are so strong that it is impossible to have one without the two others. Dismantling rationality as the main foundation of science is in effect to advocate reactionary politics and it leads to moral relativism. The Enlightenment comes in one package. To depreciate the importance of reason is to advocate obscurantism.

To do away with rationality is impossible, self-contradictory and dangerous for democracy as well as for the mores.

Sed contra

To this I will answer that there is a confusion being made among rationalists between cause and consequence. A statement is true that *resists* all attempts to bend it or to break it. On this everyone agrees. The disagreement starts when we want to account for the resistance of a statement to dispute and dissent. Depending on their denomination, rationalists claim that the main source of robustness comes from the presence either of consistent logical rules, or of exact representation of an object out there, or of an efficient action. The problem is that, when a study of science in the making is carried out, these three alternative sources of robustness appear along with many others. Moreover the 'coherence' of a logical demonstration, the 'exactness' of a representation, or the 'efficiency' of all action are words used *after* the statement has resisted trials. They are cheers after the victory but do not account for this victory itself. In order for them to be bellowed, hundreds of other allies have to be present at the same time, allies about whom and about which rationalists are strangely silent. The study of all the allies which have to be recruited and mustered for a statement to be held true, that is to resist all attempts at breaking or bending it, is feasible and necessary. Rationalists just confuse cause and consequence, the cheers of the victor with the army that made the victory possible. They confuse what is held together – that is truth – with what is holding the whole lot together.

Exemplum

Louis Pasteur is said to have defeated his opponent Pouchet¹ because he demonstrated rationally and objectively that the spontaneous generation advocated by Pouchet was at best an artifact, at worst a fraud. For the rationalists such a debate is now closed; the winners take all. Not only did Pasteur win, but he also won *because* he was the most rational of the two. There is an asymmetry between Pasteur and Pouchet in their use of reason and their access to truth, an asymmetry which is extended to the way the modern scholar treats the two: Pasteur is studied thoroughly and with respect, Pouchet lightly and with disdain.

For a relativist scholar, reason and truth have to be put aside for a moment, so that a symmetry can be artificially recreated between two equally honest, equally rational, equally hard-working men. Once the scale has been calibrated, the debate is reopened and the allies on both sides of the scale are carefully weighed one after the other. A new asymmetry is going to be visible when the scale tips, but this asymmetry is not to come from the scholars' own handling of the affair, but from the weight of the allies Pasteur brings into the fray.

Pasteur is a member of the Academy; his opponent is not. He can expound his own point of view at full length in the house journal; his opponent is allowed only an abstract. The Commission set up by the Academy to judge their two claims is made up only of Pasteur's colleagues and admirers; his opponent has no one on the commission sympathetic to his claim. Pasteur invokes God, the support of the Church, Law and Order, on behalf of his demonstration that spontaneous generation cannot occur; his opponent is associated with atheism, darwinism and social revolution. Pasteur traces a complete dichotomy between his religious or political opinions and his science; his opponent, chaffing under the accusation of atheism, mixes moral argument with his experimental set up, etc. . . .

On the two sides of the balance allies are added: the Academy, God, the scientific method, etc. They *all have to be counted* until the scale tips irreversibly. Not only the third one. Not only the first one (see below, *quaestio* 2). Which scholar most resembles

the rationalist's portrait of the perfect objective scientist? Is it the one who decides from the beginning that there is a complete asymmetry between the objective Pasteur and the irrationalist Pouchet? Or is it the one who, after calibrating the balance, lets the scale tip under the weight of all the unexpected allies brought into the dispute? The second one of course. But nonetheless it is the first who preaches lessons on scientific method, morality and rationality!

Respondeo

*The only way to study science in the making is to follow how heterogeneous sets of allies are tied together, without ever using words like 'rationality', 'objectivity', 'methodological rules' and such like. All these terms might be useful in a controversy but they do not describe the controversy. They might add some robustness to an emerging network, they do not sum up the strength of this network. To the study of reason we prefer that of network, or, to say it in French, to *raison* we prefer the *réseaux*. We can tell rationalists what Laplace told Napoleon when he asked him what was God's place in his scheme: 'Sire, I do not need this hypothesis.' To confuse rationality with science is like confusing the war cries with the actual moves and know-how of the karateka. To be sure, war cries play some role in intimidating the opponent, but it is not fitting for a scholar to be so easily impressed.

*The accusation of self-contradiction falls by the wayside here too. All scholars, no matter if they believe in rationality or not, do use the same stratagems and get by, mustering as many allies as they can, in order somehow to strengthen their claims and make them more robust so as to withstand trials. Depriving ourselves of rationality is not weakening our own discourse, since we claim, on the contrary, that these allies have *never* been alone on the side of the strong claims. Instead of being self-contradictory as if we were requesting for ourselves a privileged access to truth that we would deny others, we are simply *self-exemplifying*. Our own claims too gain in robustness if we tie their fate to other more solid claims until they withstand trials so well that no one can bend or break them.

*The Enlightenment was conceived two centuries ago as a war machine against religion and the *ancien régime*. Science was sup-

posed to clear up the dark ages of superstition and absolutism, and since ethics was left without a prop, rationality was employed to prop it up. Today, we are entangled in scientifico-political imbroglios that promise total (nuclear) illumination and total darkness at once. The beautiful metaphor of light against night has been so obscured that it is time, after two centuries of loyal service, to give up the 'Enlightenment'. It is *because* we want to disentangle the scientifico-political imbroglios defining our new social links that we should abstain from the notions of 'reason' and 'truth'. Rationalists crown the victors by calling them 'rational' and depreciate the losers by branding them as 'irrational', and such behaviour is taken as the epitome of morality (see below, *quaestio* 3)! On the contrary, using such labels has become unethical since they are what hides from view the hundreds of heterogeneous allies that are contributing to the overall robustness of science and politics.

To do away with rationalism is inevitable, self-exemplifying and necessary in order to understand anew what democracy and ethics are.

QUAESTIO 2: IS RATIONALITY TO BE REPLACED BY SOCIAL FACTORS?

It is impossible not to use rationality – even though it is far from a good notion (see above, *quaestio* 1) – because of the terrible consequences that its rejection would entail. By jeopardizing the three possible definitions of scientific truth (coherence, adequacy of representation to its object, efficacy) in order to account for the robustness of our sciences, we are left with only one issue: the weak social ties that make up our society will have to bear the weight of all our certitudes. Physics will be explained not by the structure of the world but by the organization of a Science Research Council; astronomy will be accounted for not by the stars and the galaxies, but by the professional interests of Greenwich Observatory; the robustness of genetics will come not from what the chromosomes do, but from the consensus achieved by bourgeois biologists. The rich and robust repertoire of the natural sciences will be explained by the poor and weak repertoire of the social sciences: we will get consensus instead of objectivity; social

interests instead of truth; society instead of the world. It is to avoid these dire issues that rationality, as a stop-gap solution, is necessary. Without it, we readily sink.

By doing away with rationality, no reality is left. Everything becomes socially constructed – the Eiffel Tower, quarks, black holes, this table, my mother-in-law, oil reserves. . . . The solidity of reality is now replaced by dreams or social ties. It is not only science that is thrown away, it is common sense. Relativism replaces realism. Since everything is socially constructed I could just as well throw myself into the air from the top of the Empire State Building and ‘negotiate’ with gravity! No, we need to retain some common sense and be able to thump on a table that solidly resists and proves itself not to be a dream or a social construction.

By replacing rationality with mere social factors everything fades away and becomes a plot of devious, interested Machiavellian Princes selling their ideas and grabbing for power. There is no longer any possibility of distinguishing between dream and reality, between archaic and modern thought, between witchcraft and science. Everything is equal. All the cows are equally grey. It is the very principle of all possible discriminations that is taken away when rationality is thrown out.

Sed contra

To this I will answer that there is some misunderstanding on the definition of realism. Reality is what resists (*res* in Latin). Let us call *trial* whatever tests this resistance. The favourite gesture of realists, thumping a table, is a trial of that sort. The table resists their fists. They are right in saying that it is solid and real. Nevertheless, it would be absurd to conclude from this trial by fist that smashing the table with a sledge-hammer will have the same result. Another trial will define another relation and hence another reality. This is what relativists say. They cherish reality as much as anyone else, they simply require us to mention the specific trial that defines a specific resistance and hence a specific reality. ‘Realities’ is a word defining a plural; it tells of a *relation*, of a front of resistance; it is not something that exists independently among other less real objects, for instance, representations, dreams, imagination.

Now the question is to decide the causes of resistance to a specific trial. Here it is easy to clear up the mistakes made by both realists

and social relativists. They both believe that the *list* of causes that explain the resistance can be made *in advance once and for all* and that this list is by and large made of *homogeneous* entities. The first denomination believes that the main sources of resistance come from non-human elements; the second that the main sources come from human or social elements. The first are horrified when human elements invade the list; the second are as horrified when non-human elements get into the dispute. The first one screams: ‘This is social relativism!’; the second screams as loudly, ‘This is going back to naive empiricism!’ However, nothing in the doctrines of realism and relativism makes such a homogeneous list necessary. On the contrary, any trial, including the fist and the sledge-hammer ones, invokes and convokes human *and* non-human allies together. And it is most often because of this mixing up and confusion (see below, *quaestio* 5) that the realists and relativists withstand the pressure, thus defining reality. They are both right – the first in stressing non-human allies, the second human ones – but they both have *too narrow a definition of reality*.

Exemplum

There is nothing to stop us from adding allies, one after another, on the scales on which Pasteur and Pouchet have now become commensurable. In the *exemplum* above (see *quaestio* 1). I purposely limited the two lists to social elements (the Academy, God, publications, gate keepers, buddies). Is it enough to tip the balance? Maybe yes, maybe no, it all depends on the specific controversy. In many other cases calling someone atheist in front of a commission in which he has no friend would have been enough to settle the debate. Here it is not enough because Pouchet is able to use Pasteur’s own protocol and to display microbes doing all sorts of tricks; for instance, they reproduce like devils even after he heated the flasks in which Pasteur said that nothing could appear any more because the milieu had been sterilized by heat. Why not add the microbes to the list of allies Pouchet enlists? What stops us? Who said that the Academy commission or God were always enough, and for ever would be, to win over a colleague? If the controversy heats up a bit many other elements have to be brought into the fray. Pasteur has now to bring his own microbes into the dispute to counterbalance his opponent’s flasks.

Pouchet's allies	Pasteur's allies	
a lot of them	none	human allies
none	a lot of them	non-human allies

dichotomy

Asymmetric treatment: a dichotomy is made in the list of allies

Figure 1.

He has to modify his experimental protocol and, for instance, to increase the heat.

It would be unfair to be realist for Pouchet (he has not got the microbes in his camp) and relativist for Pasteur (he has got all his buddies well mobilized on his behalf). It would be as unfair (*quaestio 1, exemplum*) to be relativist for Pouchet (he has a lot of ideological and social interests to defend) and realist for Pasteur (of course he won, he was right after all and had the microbes for him). The only possible fair treatment is to see how each of them makes the list of human and non-human allies *longer* in order to resist the settlement of the controversy to their adversary's benefit. There is no reason to impose any compartment or any dichotomy among the types of allies mobilized in the controversy since the actors make no such compartment and mix them at will. Even the very distinction between human and non-human elements slowly fades away to be replaced by a gradient of hybrids arrayed in tiers.

Respondeo

*It is wrong to believe that we are faced with only two branches of this terrible alternative: either rationalism or social relativism.

Pouchet's allies	Pasteur's allies	
no supporter accused of atheism provincial abstracts only protocols	supporters Academy in Paris full articles good protocols	human
ill equipped ferments after sterilization etc.	well equipped no ferments after more heat etc.	non-human

No dichotomy

Symmetric treatment: all the allies are listed, no matter how long and heterogeneous the list

Figure 2.

We do not have to choose between these two equally impoverished versions of reality: the object out there, the social in here. To deny the Scylla of rationalism is not to be thrown on to the Charybdis of sociologism. We do not have to trade black holes for consensus, particle physics for professional interests, or biology for Research Councils' petty politics. Such an alternative would mean that the list of allies one should mobilize to withstand a trial is determined in advance and has to be made either of human or of non-human elements. It would especially mean that we know in advance what society is made of and what nature is made of. It is the refreshing aspect of scientific controversies to play havoc with any definition of both, by unexpectedly tying microbes with gods, heat with Academies, and flasks with commission reports. Rationality is not a solution – not even a stop-gap solution – to untangle these imbroglios brought about by scientists engaged in heated controversies. Far from being what saves us from shipwreck, rationality rocks the boat by forcing us to the most absurd choice – nature *or* society – as if there were a possible *a priori* distinction between the two. Having to choose between realism and social relativism is like having to choose who is the most reactionary and the most despotic between the Shah-in-Shah or

Khomeini – a hard task indeed.

*Who cherishes reality most? Those who try to explain it by depriving the things to be tried out of half of their resources and allies, or those who let the things have on their side as many heterogeneous allies as they see fit? Who offers the fairest and most realistic account of Pasteur's victory and of Pouchet's defeat? Those who make a dichotomy between nature and society – Figure 1 in the *exemplum* above – or those who do not even understand the meaning of such a divide – Figure 2? Are we going to be crucified until the Last Judgement between the Object and the Subject, one being the exclusive property of realist scientists and the other being the exclusive property of social relativists? In this divide and crucifixion, it is reality that suffers most, because the trials of resistance are made up of neither nature nor society. The only people who take reality seriously are those who let the actors plait for themselves weaker and softer ties as in a macramé. Even the decisive realists' acts – thumping a table and pointing their fingers – are studied more precisely by us than by them, because we add to the table the long network that has made the world inscribed on its surface. And if someone claims that it is Newton's law of gravity alone that threw dozens of businessmen from Wall Street skyscrapers on Black Thursday, let him go straight to his retirement home. No! Reality is taken seriously only once the twin brothers of realism and social relativism are put to rest. Fasolt and Faffner are guarding the only treasure worth finding: the world.

*Far from being the only touchstone allowing us to distinguish between truth and falsity, witchcraft and science, pseudo-science and science, myths and reality, rationality is what makes incommensurable all these activities, thus rendering the causes of their distinctions opaque. Rationality is Brennus's word thrown on to the scale; '*vae victis*'; 'you, the losers, you will also be irrational'; 'whoever does not have, even what he has will be taken away from him' (Mark 4:25). The only way to render Pouchet and Pasteur commensurable and then to register why at one point the balance tips on Pasteur's behalf – see below, *quaestio* 3 – is first to do away with rationality, with objectivity, with scientific method or to suppose that the two colleagues are both equally well endowed with them. The only way to detect the practical *asymmetries* among beliefs is to treat them with complete *symmetry*.

The notions of rationality, like that of truth or objectivity, muddle the issues. They add obscurity to obscurity. On the contrary, it is complete relativity that makes all the trials of resistance commensurable.

QUAESTIO 3: IF TRUTH IS DISMANTLED ARE WE LED TO IMMORALITY?

Rationality is indispensable – even though it is fraught with difficulties (*quaestio* 1 and 2) – because it is the only way of maintaining any distinction between might and right. Without it, the powerful are also made right, force and reason are equal, there is no ground left to dissent, no court of appeal to dispute authority and we are led back to obscurantism and despotism.

The adversaries of rationality may be easily defeated. If they were right the winner in scientific disputes would be the one who has the strongest muscles, or the best political connections or the biggest armoured tanks. Since it is almost never the case, this means that there is something else that tips the balance in their favour. It is this 'something else', this unforced consensus, that we call rationality and objectivity. To take this 'something else' away is to abandon any hope of ever understanding why a controversy is settled and consensus eventually achieved.

Rationality is what allows us to distinguish politics or business from science. If we give it away, then there is no reason to resist political influences contaminating the results of the sciences and imposing their definition of what the world should be like. Every objective scientific result will be censored and bent to please elected representatives, businessmen or bureaucrats. It is the end of the only pure and free realm left in the fabric of our societies.

But the worst consequence of irrationalism is that any group endowed with enough resources will be able to impose their truth over everyone else's, and the public, deprived of the notion of reason, will be made defenceless. If Nazis come to power, then 'Jewish science' will be forbidden everywhere, relativism and irrationalism will be defied. If enough people gather together to deny that the Holocaust took place, will that mean that the Holocaust did *not* take place? It is to this horrible conclusion that those who deny rationality are inevitably led. They begin by weakening the

objectivity of gravity and black holes, and they end up weakening the objectivity of evil itself. Dismantling scientific truth in any small way leads to immorality in a large way.

Sed contra

To this I will answer that there is a misunderstanding over the notion of force. 'Force' looks very different when it is considered *in opposition* to reason, and when it is seen as what designates the complete *gradient* of resistance where reality is tested (see above, *quaestio* 2). 'Pure force' is an expression that takes meaning only because it is opposed to 'argumentation', 'rationality', 'objectivity', 'rational discussion' and so on. It is devoid of any meaning once this contrast is removed and when a gradient of forces is allowed to settle. When such is the case, arguments also have some force; logical connections are not without strength either; legal barriers exert some pressure as well; taboos seem to have quite a lot of clout also. When the two extremes – pure might and pure right – are forgotten, all the relations of forces may start to unfold. Thus, in order to study the way reality is built through trials of resistance, it is necessary *not to make any a priori distinction between might and right*. If such an argument seems too reminiscent of some warlike philosophies of the past, simply substitute the word 'weakness' for the word 'force'. Trials of weaknesses, shows of weakness, that's how reality is shaped. Rationalists seem to ignore that material resistance is better obtained by disseminating the pressures than by concentrating them on one point: if it existed, the rationality they invoke to bear the weight of the whole scientific construction would burst, as Atlas would do had he really to carry the world on his shoulders.

Exemplum

How do we account for Pasteur's victory? Shall we say that he is the one who speaks the loudest? Or that he is the tallest? Or that he has the best showmanship? Or that he is the toughest salesman? Maybe yes, maybe no. As any student of war and politics knows there is no sure recipe for success. The only general rule is that you should have more allies, more resources, that they should be mobilizable, well positioned and have good morale.

Apart from this, victory depends on the specific situation. Pasteur indeed makes *striking* experiments; he uses the energy of the microbes to make them do all sorts of games in front of his audience: at will they infect flasks or respect the pure sterile medium, become visible or invisible, appear or disappear. Is the *force* of his demonstration different *in kind* from the *force* of his argumentation? And are these two different from the forces arrayed by the Academy, or by the invocation of God's name? No. It is their coming together and their being invoked together that eventually tips the balance on Pasteur's behalf, at least for a while. Pouchet gives up, his microbes have deserted him. Is it insane to say that he has been 'forced' to give up? The force of evidence, the force of truth, the force of demonstration are plaited from many different coloured threads. Nothing is made clearer by pretending that a demonstration is not strong *like* an armoured tank is strong – especially not that scientifico-military imbroglio: a tank demonstration.

Respondeo

*If no artificial divide between might and right is made, then the settlement of scientific controversies becomes understandable at last. The source of victory is the same for scientific, moral, philosophical or political controversies – the four being hardly distinguishable. Victory is not to be found in one ally, nor in the sum of allies, but in the *n + 1 ally* that tips the balance of force, *everything else having been made equal by the adversary*. In Pasteur's case it might be the swan-neck flask experiment that eventually breaks the camel's back. In Napoleon's case it might be Grouchy's tardy arrival at Waterloo that eventually turned the tide. In Kennedy's case it might have been 100,000 votes. There are no general causes for these victories. Let us simply weigh the successive resources and ponder the influence of the *n + 1 ally*, instead of messing up the whole account by throwing 'something else' in the balance, that is rationality. Who are more honest, those who say that the *n + 1 ally* is just as necessary as all the others, or those who throw in Brennus's sword and call it 'rationality'? Who is more blatantly trying to impress? Where is the violence? Where is the show of force?

*Fortunately Mrs Thatcher is providing the *in vivo* experiment

that shows the absurdity of the belief in the importance of reason. She is really trying to limit the production of science to its bare bones; that is pure rationality. No one had done it before and this is why rationalists had the field to themselves. They claimed that pure, free, objective science was everything, but money and resources were flowing in through the back door. Now, the money is cut. Rationality is left alone to support the scientific enterprise. What will be left? 'Everything' say the mystics of science. 'Nothing' say the sociologists of science like myself. Devious political interests do not bend the straight path of reason. They give science its flesh and its soul. It is not I who mixes up the Empress, God, the Academy, swan-neck flasks and bacteria in order to prove that spontaneous generation does not exist. It is Pasteur himself. It is he who constantly *translates* political interests into microbe cultures and vice versa. Rationalists impute to the analyst's own devious mind what the scientists do. No doubt, this unfair treatment is another proof of their high sense of morality. The pure science untainted by political and industrial interests will be exactly what Mrs Thatcher means it to be: nothing. Is this what rationalists want?

*Since Plato, the touchstone of morality has been the distinction between might and right. Nevertheless, this distinction should be abandoned for morality to be effective again. 'Truth' is what is held together, not what holds together (see above, *quaestio* 1). To confuse the cause with the effect is to overlook the masses of resources that have constantly to be brought in and mobilized in order for an account to resist. To believe that truth can 'defend itself' or 'will eventually triumph' is to deprive it of the only allies that can make one account stronger than the others. If the account 'the Holocaust took place' is in danger of being dismantled, who will defend it best? Those who thump on their table and endlessly repeat that since it has really taken place it cannot be rationally denied by anyone in his right mind? Or those who will look for which resources to bring in, which powers to convoke, maybe which society to rebuild in order for this statement to remain indisputable for a bit longer? There is no way to expect that a terrible statement millions of people would like to dissolve away will require *less* resources and *less* work in order to be maintained in existence, than a small statement about black holes or pions that interests twelve people in the whole world and means

nothing to billions of others. Scientists are ready to build a billion pounds' worth of accelerators to answer the latter point and not a penny for the former, which is supposed to glow on its own black light. It is *because* we have studied the resources that are necessary to believe minor points in the natural sciences that we are so concerned by the lack of resources to believe major issues in the historical sciences or in politics. We had to dissolve the distinction between might and right so that the *work* of those who hold on to a belief be made manifest. You cannot have truth on one side and the mixed crowd of allies on another. To believe that you can is to dismantle truth for good. Is this what rationalists really want in the depth of their hearts? Longing for the naked truth is like longing for the purely spiritual: they are both dangerously close to nothingness. I prefer truth warmly clothed, incarnated and strong.

QUAESTIO 4: HAVE THINGS EXISTED BEFORE BEING SOCIALLY CONSTRUCTED?

No matter how subtle they try to be, relativists are unable to escape this absurd consequence of classic idealism: scientific facts did not exist before being 'socially constructed'. How silly! Were there no electrons before Millikan? No microbes before Pasteur? And before Newton's day, was there no gravity acting on stones, planets, apples and stars? Relativists have no way of escaping their rather crude version of the story of the tree falling in the forest unheard by anyone.

Conversely, relativists can be led to accept the existence of everything which has been 'socially deconstructed'. They will have to say that angels and witches really existed in the middle ages, since people believed in them, that flying saucers are really flying for those who accept them; and that organisms really sprouted spontaneously, at least until Pasteur disproved Pouchet and his fellow travellers.

What is absurd for the *past* existence or inexistence of facts is still more absurd for their *present* existence or inexistence. Relativists are forced to say that gravity exists only 'locally' in the laboratory, as if it were not acting on stones, planets, apples and stars well *outside* the laboratory; and, conversely, they are forced to

say that witchcraft also exists 'locally', in the countryside, as if it could be true in one place and false in another!

Witches may depend on the spirit of a period but not gravity. Anyway, what should render relativists eternally silent is the well-known mismatch between what some scientists or artists have done and their time. Many people have been totally unknown in their own country and culture, and only many years later, even after their death, have turned out to be right, respected and credited. So, any attempt to relate the right ideas of scientists with their time and milieu is at best a hopeless task, at worst a cheat.

Sed contra

To this I will answer that there is a slight confusion being made here between *existence* and *essence*, a slight excess in going from one to the other, an excess I wish to avoid. We should be very careful in using verbs in the past tense. Are we allowed to conclude from the fact that something 'existed' between t_1 and t_2 that it has *never* existed? Are we to conclude from the fact that something *has* existed since t_2 , that it has *always* existed, even at t_1 ? The same care needs to be taken as far as space is concerned. From the fact that something exists *only* in between settings s_a and s_b , are we immediately permitted to deduce that it exists *nowhere* else? Conversely, that something exists in between settings s_a and s_b , does this mean that we are allowed to say that it thus exists *everywhere*, even in settings s_c, s_n ? The specification of times and settings reveals the temporal and local *existence* of things, that is to say, their *history*. Erasing times and settings defines the *essence* of things, that is their lack of historicity. The transformation of existences into essences, of history into anhistoricity, is made by jumping without warrant *beyond* networks of relations: if angels are deconstructed now, it is taken as a proof that they were always invalid; on the other hand, if electrons are constructed, it is taken as a proof that they were always out there; if witchcraft is still believed in in only a few places, it is immediately taken as a proof that it should really exist nowhere; and if gravity is demonstrated to exist in a few laboratories, it is concluded that it should be everywhere, even where there is no laboratory to show it. In each of the four situations a *supplement* of weakness or of power is added to the networks. I claim that we can live better without this supplement.

Such an excess is not only unjust (see above, *quaestio* 3) and unwarranted, it also has the unhappy effect of distinguishing between the history of things that wax and wane and the anhistoricity of things that know not flux and change. In practice, this means that there can be history only of this sublunar world, our base world of human beliefs and opinions, but that there can be no history of the supralunar world, the world of things that have always and everywhere been patiently awaiting discovery.

Worse, the very distinction between a human society and a non-human nature comes from this transformation of existences into essences: what could have hidden electrons for so long, when they were there all along? What could have made people believe in angels for so long, when really there were never any angels at all? What could make people disbelieve gravity, even when it is demonstrated in laboratories? What could still make people believe in witchcraft in a few faraway places, when it exists nowhere? Answer: society. It is society that is made the source of all the biases and distortions that make people believe in things that do not exist and delay the discovery of those which do exist. Society is in large part the *artificial* solution found to account for all the delays and distortions due to the *artificial* addition of essences to the networks. Take away essences and you will discover this refreshingly new breathing space: a society made only of human and social relations is no longer needed; conversely, things too have their history which is more than occasionally tied to our own.

Exemplum

Let us first treat the Pasteur-Pouchet debate as the rationalists would like us to do. For this we add the adverbs 'never', 'always', 'nowhere', 'everywhere' to the complex networks described in the former *exempla*. Pouchet believed for too long in a spontaneous generation that had never been there. Pasteur, on the other hand, finally discovered, around 1860, the ferments carried by air that had always pestered humanity – corrupting their food and their best-planned experiments everywhere. To account for Fouchet's stubbornness, for Pasteur's discovery and for the belated recognition of micro-organisms, we simply employ the convenient social factors that society generously affords – cultures, traditions, establishment, classes, prejudices – you name them. In a such classic,

reasonable, plausible and stale account, one thing is lost: history, and in particular the history of microbes.

Let us now *drain* off this excess of adverbs, so typical of rationalists' accounts, from the Pasteur-Pouchet debate. What is left are temporal and local shifting networks of relations among actors (or 'actants' as they are pedantically known), defined by what they do and what others do to them.

Pouchet accuses Pasteur of destroying the nature of the forces able spontaneously to recreate life because of the heat he employs in sterilizing his culture medium and of the air he excludes. This is a strong objection that Pasteur has to meet head on if he wants to convince his audience. In a famous experiment, he devises a flask with a long swan neck and he leaves the top of the neck open so that air can still get in. In spite of this, liquids which have been sterilized remain clean. However, when he breaks the necks the liquids get dirty after a few hours and, after a few days, they are as full of micro-organisms as Pouchet would have expected. The only modification has been the breaking of the neck. The air, Pasteur concludes, was able to sneak through the neck and reach the liquid, but the slightly heavier micro-organisms got trapped in one of the two curves and could not reach the liquid in which they thrive so well.

Without Pouchet's challenge, Pasteur would not have needed to devise this elegant experiment. Thus Pouchet *constitutes* part of the swan-neck flask, he is tied to it, he is part of it. If Pasteur had not wanted to convince his audience that all contaminations of cultures in the new emerging microbiology were due to external ferments sneaking in because of carelessness, he would not have needed to search for swan necks either. His audience and the new profession are also co-producers of the flasks, they are tied to them, they are part of them. But what about the ferments? In how many other situations during the entire course of history has air been purified that way and, because of the trial imposed by the swan neck, been sorted out into micro-organisms on the one hand and pure air on the other? None. This is what rationalists and social relativists always fail to see. The swan-neck experiment is new for Pouchet, for Pasteur, for the profession of microbiologists, but also *for the microbes*, and, yes, *for the air* as well. You can't imagine ferments independently of the swan-neck flasks, any more than you can imagine Pasteur's career, or Pouchet's

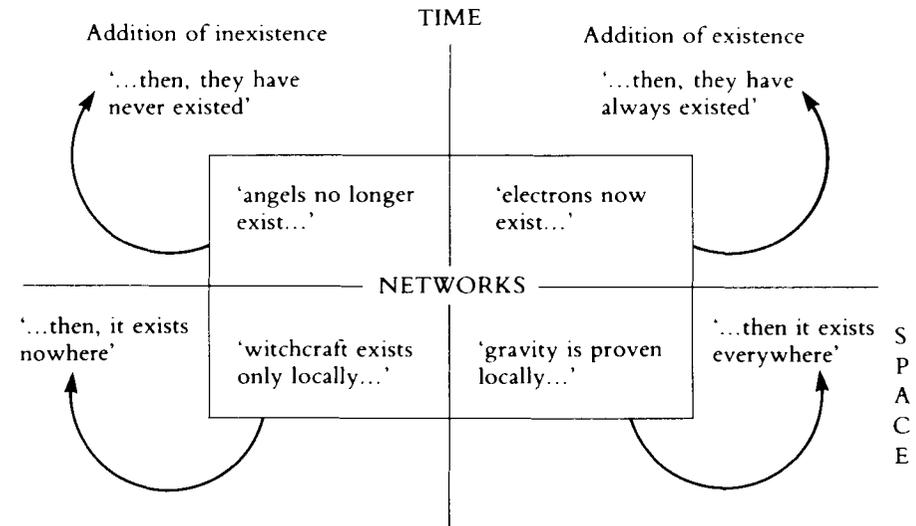


Figure 3.

fate without them, because the shape of all the protagonists – human and non-human – is being modified by the flasks as much as the flasks are being modified by all the other actors. This is why things have a history. This has nothing to do with idealism; it is not because we impose our human categories to a ferment out there, it is because the ferment in the swan-neck flask experiment is a *new* ferment, defined in part, like any other actor, by all the others whose fates are tied to it, including ourselves. The air itself is not the same air before and after Pasteur, and Pasteur is not the same after this sorting out of air. Nor is French society. This is why you should not bungle the analysis of networks by drowning them with adverbs such as 'never', and 'nowhere', 'always' and 'everywhere'.

Respondeo

*Trees fall in the forest, but those elected to fall in the presence of men are not exactly the same, since one more element is added to them – the eye or, more probably, the saw. Newton happens to gravity, and is an event that modifies it as much as they both modify England and physics. Is this idealism? How would one define an electron *before* Millikan? Either you use the definition

that Millikan gave and retrospectively suppose that it was there all along before, even without laboratories, cloud chambers, American physics and Millikan – which is impossible – or you remain silent – which is a much better tack than accusing relativists of absurdity. No one would ask where Caesar was before Rome or where the *Night Watch* was before Rembrandt. Please simply consider that the history of non-human actors is on a par with that of humans. If you find this parity hard to accept remember that it is only your (or Plato's) very urge retrospectively to grant non-humans an empire of essences that creates the very dichotomy between what has and what does not have history.

*Poor Smith, in Orwell's *1984*, was forced to cut and paste the only issue of *The Times* that was used as record of the past. Every new event was rewritten in a way that made it as if it had always existed; and every figure who had been purged away was written off as far back in the past as was necessary. As usual, rationalists admire in science what they hate in politics. If Russian historians claim that there had never been any Trotsky and that he had never been the head of the Red Army, rationalists are incensed by this tinkering with history; but if someone asserts that electrons have always been there even before Millikan tied his fate to theirs, or that spontaneous generation had never been there after all, they swallow those lies hook, line and sinker. In each case, however, it is the very same argument, the same retrospective tampering with historical records, the same denegation of what has and has not been. What happens later in the course of history should never be strong enough to eliminate what has been. You may if you wish act like the pharaohs who erased the names of their predecessors and put their own in their place, but do not accuse *us* of immorality.

*You are allowed to *believe* that gravity exists everywhere outside the laboratories that demonstrate its presence. This is a constitutional right. But suppose you want to *prove* its action here. What will you be forced to do? To build a lab, or to bring instruments *here*. Now, who are the most scientifically sound? Those who say that the conditions of the proof should always be specified, or those who like to believe in things they cannot prove? The local character of an existence cannot be used either by excess or by default, either to expand it everywhere at no cost, or to deny

that it exists at all. Gravity and flying saucers circulate in tiny networks that rarely intersect one another. Instead of jumping to unwarranted conclusions about total existence or total inexistence, we prefer to count the nodes of those networks, to see what they tie together and to study how they measure up to one another. Where is the absurdity?

*The idea of a society surrounding works, deeds and facts that would sometimes be in accordance with it and sometimes escape it comes from the same retrospective tinkering with local and temporal networks. Social influence is supposed to be an homogeneous atmosphere that surrounds every deed equally at a given time. It should come as no surprise that lots of events appear to *escape* such an absurd definition of society. But this is no proof that they get free from history. They simply escape the crude definition that some sociologists and historians provide of a *zeitgeist*. If a scientist dies unknown, if his manuscripts are passed along for several generations, if another scientist later on uses them for developing his theories and, by chance, gives credit to the poor fellow who is made the author of a theory he never held, if people launch a subscription for building a statue to the unknown scientist, if textbooks are rewritten to make room for the new old forerunner, I fail to see in what possible way all these events could be out of normal history. When some events are said to escape society and the spirit of a period, first *rework* the definition of that society and that period, and only then reach for your guns to silence relativists.

QUAESTIO 5: CAN WE LIVE WITHOUT A DIVIDE BETWEEN
HUMANS AND NON-HUMANS?

The absurdity of social relativists lies in their denial of the importance of material *constraints*. Not everything is equally possible. Despite the wishes of people or society, *cut-off* points exist at which sheer technical limits render certain avenues possible or impossible, quite independently of our desires. An account of technical and scientific progress that does not pay full justice to these constraints may amuse and sometimes enlighten but, in the end, it is simply wrong. The knowledge of technologists should be added to that

of sociologists if we want to get a full picture.

The solution offered by relativists (see above, *quaestio 2*) leads to another extravaganza. They want to treat all actors on a par. In order to avoid the absurd consequences of *social* relativism, they want us to reach a much odder conclusion: people, animal and things are all mixed up in the same huge melting-pot. By erasing all boundaries between human and non-humans, we would be led to claim that scallops think, bicycles argue, microbes fight, computers have volition, trees suffer under the saw, baboons build social theories . . . Under the guise of such a naive anthropomorphism is hidden a crude and reactionary form of animism or of futurism. A qualitative distinction between human and non-human is mandatory in order to avoid treating men and women like animals or robots. Relativists want us to weaken the already frail dykes that keep barbarians at bay.

Even if we could accept the moral sequels of mixing up human and non-human, relativists cannot avoid the technical difficulty that only humans talk. Our ability to speak is enough to maintain an absolute gap between us and things. Whenever whales, microbes, stars, scallops or electrons are *said* to speak, it is always through a human intermediary who grants or denies them words. Relativists talk *a lot* about the speech-acts of non-humans – if they were coherent, should that not be enough to silence them?

Sed contra

To this I will answer that, although coherent, I have no reason to remain silent. The very opposition between rationalists and social relativists has already destroyed the absolute divide between human and non-human beyond repair. In order to explain the settling of human controversies, rationalists or technologists must posit an outside non-human essence whose constraints are enough to impose, in the end, a consensus. To this, social relativists answer that the consensus is reached by humans, and only through social means, since there is no outside essence which is constraining enough to silence us. The two positions are both mirror images of each other. The more rationalists insist on the constraints emanating from things, the *easier* it is for social relativists to demonstrate that things are not determinate enough to do that job. The more sociologists insist on the social means to reach consensus,

	Rationalists or technologists	Social relativists
What is asserted in theory	 THEY ASSERT THAT there are non-humans out there	THEY ASSERT THAT ONLY HUMANS make a difference 
What is done in practice	circle BUT IN PRACTICE THEY SPEAK FOR THEM	BUT IN PRACTICE THEY LET non-humans sneak in 
Sum	Non-humans' eminence is both asserted and negated	Non-humans' eminence is both negated and reasserted \equiv

Figure 4.

the *easier* it is for rationalists and technologists to demonstrate that something has been left aside: things and their constraints. The further one side is pushed, the further the other goes (see above, *quaestio 2*). I call this a child's swing. It is fun, but not very suitable for grown-ups.

Steps toward a more intriguing game may be taken if we compare what the twins claim to do with what they do in practice. Rationalists or technologists are quick to mark a cut-off point, after which they invoke the eminent rights of things in themselves; in practice, however, they are still quicker to push things aside while fiercely arguing on their behalf, thus themselves entirely occupying the scene. Conversely, social relativists delight in denying any importance to outside constraints. However, in practice, they demarcate another cut-off point, and then let things sneak in through the back door whenever they wish to settle a dispute *for good*. This is very embarrassing for both schools because if we sum the four quadrants, the two groups end up equal (see Figure 4). They play the *same* game, but in a mirror. One group invokes non-humans while denying them a role; the other invokes humans while denying them a role.

What is wrong in this too predictable game that always ends

up at the same point? The respective *roles* granted to things and to humans. If we modify the attribution of roles the whole game opens up.

Since, in practice, *no one* is able to deny for good the presence of non-humans in achieving consensus (rationalism), *or* to make them play the part of a final arbiter that settles disputes for good (social relativism), why not modify the scenario once and for all? Non-humans are party to all our disputes, but instead of being those closed, frozen and estranged things-in-themselves whose part has been either exaggerated or downplayed, they are actors like all others – open or closed, active or passive, wild or domesticated, far or close, depending on their (and our) negotiating strength. When they enter the scene they are endowed with all the non-human powers that rationalists like them to have, *plus* the warmth and uncertainty that social relativists recognize in humans.

Since, in practice, *no one* is able to make humans play the part of a final arbiter which can settle disputes for good, *or* to deny for good their importance in achieving consensus, why not modify the scenario once and for all? Instead of acting like those social animals whose part has been minimized or exaggerated, humans are *spokespersons* – who talk, represent and interpret non-humans. When they do enter the scene, they are granted all the powers of discussion, speech and negotiation sociologists like them to have, but *in addition* they endorse the fate of all the non-humans for whom rationalists and technologists are so concerned.

Relativists do not enjoy being swung back and forth from ‘social factors’ to ‘technical factors’. They have jumped out of the swing and rewritten the libretto so that they will no longer be faced with these silly twin characters: the social animal on the one hand, the thing on the other.

Respondeo

*The argument about ‘constraints’ is right only as long as one believes, first, that there could be, on the one hand, someone – or something – free and, on the other, limits imposed on this freedom from the outside, and, second, only if there existed between the two entities a cut-off point at which freedom would

give way to necessity. A free, infinitely pliable human being could then be ‘limited by’ material constraints, or – depending on whether one is a rationalist or a social relativist – an infinitely interpretable thing could be ‘limited by’ social constraints. However, once you rewrite the scripts and put human and non-human on a par, the whole debate about constraints and cut-off points disappears because there is no longer any place for a free, flexible or infinitely pliable character. We are all for hardness and robustness (see above, *quaestio 2*), but the hard reality does not arise abruptly at some given point. So, instead of identifying cut-off points, let us spread the sources of hardness all along the networks, and instead of constraints let us talk only of *resources*. Gravity is not a ‘constraint over’ bridge designers’ freedom. It is one of their many resources.

*Who mixes up the fate of humans and non-humans? Those hundreds of thousands who bring microbes to bear on our lives, atoms to heat our houses, electrons to carry our voices, fossilized skulls which modify our genealogies, radio-waves which disseminate our President’s speeches? Or, we, the dozens of social scientists who try to reconstruct how the former render the boundaries between human and non-human more meaningless every day? Who is building the huge melting-pot where humans, animals, natural things and artifacts exchange properties? We or those we try to follow? Who is extravagant? Those who breed hybrids? Or those who are trying to rework all of social science, so that we might understand how hybrids can so easily be created *in spite* of the ‘strict boundary’ between human and non-human? What is the more barbarian? To define a politics that considers all spokespersons equally – no matter if they represent a human or non-human constituency – or to cling to version of politics that does not include the politics *of things*?

*It is easy to trace an absolute gap, between humans who speak and non-humans who are mute, only if we do not think about the matter for more than ten seconds. At the eleventh, matter starts to become much less clear. First, lots of humans are talked *about* by others – journalists, politicians, social scientists, to name just a few – but you rarely hear their voices directly. Second, most non-humans are said to communicate, write and answer *directly* in laboratories or through instruments. Microbes, electrons, gravity do the talking and the writing, not Pasteur, Millikan

or Newton – indeed this is the very reason why most realists and many rationalists cannot swallow relativists' arguments; they are the ones who most need to blur the absolute distinction between who is speechless and who is not. Third, *who* is speaking when spokespersons speak? The representatives, or their constituency? If they are faithful, they will simply be the mouthpiece of their constituency – as Hobbes would say, they are only the actors of whom the authors are the multitudes. So, it is only when the spokespersons are unfaithful that a distinction may be made between those who are speechless and their representatives. In the absence of a controversy over representation it is impossible to tell apart those who speak directly or those who speak indirectly. But when a controversy flares up, the main argument of the representatives is to say that they 'simply carry out' what the others say, or wish to say . . . See? You cannot silence the spokespersons, either by telling them that they are the only ones who talk or by telling them that they are simply talking in the name of other speechless creatures. Language is a faculty *whose exact distribution is the very outcome* of our fiercest struggles. This is why we cannot grant it all to humans without rendering the politics of things forever obscure.

STORIES ABOUT REPRESENTATION

Dismantling
TRUTH

REALITY IN THE
POST-MODERN WORLD

Edited by

Hilary Lawson
and Lisa Appignanesi

Based on a series of papers presented at a
conference at the ICA and related materials

Weidenfeld and Nicolson
London

The paper 'Science as Solidarity' has appeared entitled 'Dismantling the Truth: Objectivity and Science' in Nelson et al (eds) *The Rhetoric of the Human Sciences: Language and Argument in Scholarship and Public Affairs* (Madison, The University of Wisconsin Press), and is printed here by kind permission of the publisher.

'Stories about Stories' and all introductory material © Hilary Lawson 1989
 'Science as Solidarity' © The University of Wisconsin Press 1987
 'Rationality, Truth and the New Fuzzies' © W. H. Newton-Smith 1989
 'After Truth: Post-Modernism and the Rhetoric of Science' © Hugh Tomlinson 1989
 'Realism in the Social Sciences' © David Ruben 1989
 'The Meaning of Experiment' © H. M. Collins 1989
 'Touching Truth' © Richard L. Gregory 1989
 'Clothing the Naked Truth' © Bruno Latour 1989
 'The Ideology of Representation and the Role of the Agent' © Steve Woolgar 1989
 'Lying on the Couch' © John Forrester 1989

First published in Great Britain in 1989 by
 George Weidenfeld & Nicolson Ltd
 91 Clapham High Street, London SW4 7TA

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the copyright owner.

Printed in Great Britain at The Bath Press, Avon

Contents

<i>Prefatory Note</i>	vi
<i>List of Contributors</i>	vii
STORIES ABOUT STORIES	
<i>Hilary Lawson</i>	xi
STORIES ABOUT TRUTH	
<i>Hilary Lawson: Introduction</i>	3
<i>Richard Rorty: Science as Solidarity</i>	6
<i>W. H. Newton-Smith: Rationality, Truth and the New Fuzzies</i>	23
<i>Hugh Tomlinson: After Truth: Post-Modernism and the Rhetoric of Science</i>	43
<i>David Ruben: Realism in the Social Sciences</i>	58
STORIES ABOUT SCIENCE	
<i>Hilary Lawson: Introduction</i>	79
<i>H. M. Collins: The Meaning of Experiment: Replication and Reasonableness</i>	82
<i>Richard L. Gregory: Touching Truth</i>	93
<i>Bruno Latour: Clothing the Naked Truth</i>	101
STORIES ABOUT REPRESENTATION	
<i>Hilary Lawson: Introduction</i>	129
<i>Steve Woolgar: The Ideology of Representation and the Role of the Agent</i>	131
<i>John Forrester: Lying on the Couch</i>	145
<i>Notes and References</i>	167
<i>Index</i>	175