

Is Science Neurotic?

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Nicholas Maxwell argues that science misrepresents its own core aim and, as a result, suffers from self-deception.

It seems, on the face of it, absurd to suggest that science is neurotic. Some scientists, along with other people, may be neurotic; even the odd pet. But how can a vast, impersonal intellectual endeavour like science be called neurotic? Is not this to attribute a mind to science, an ego, id and superego? What could be more nonsensical?

And even if it did somehow make sense to say of science that it is neurotic, wouldn't the assertion be patently false? Science has, after all, met with quite extraordinary success at improving our knowledge and understanding of the natural world. Could such an incredibly successful enterprise really be *neurotic*? If neurosis meets with such success should we not try to acquire it, rather than hope to be cured of it?

But let us consider a classic example of neurosis: the Oedipus complex. A boy loves his mother, and as a result is furiously jealous of, and hates, his father. But his father is big and powerful, and not easy to get rid of; and besides the boy also loves his father. So the hatred is repressed. Nevertheless it persists into adult life, and one day, purely by accident, while caring lovingly for his elderly and ill father, the son mixes a lethal dose of medicine, and finally succeeds in fulfilling his long-repressed desire. But the act is rationalized away as a ghastly accident.

Put in a more abstract way, what one has here is something like the following. The son, whatever else he may be, is a being with aims, whether acknowledged or repressed. There is a basic desire or aim, A: to love his mother. There is a secondary, highly problematic, repressed aim, B: to kill his father. There is a third, declared, but somewhat unreal aim, C: to love, to care for, his father. The son supposes himself to be pursuing aim C while in reality he is pursuing aim B: actions performed in pursuit of B (administration of a lethal dose of medicine) are rationalized in terms of the pursuit of C (it was an accident): see diagram.

The advantage of construing the Oedipus complex as a very special case of something much more general, namely the pursuit of problematic, repressed (or unacknowledged) aims under the smokescreen of apparently pursuing some unproblematic, acknowledged aim, is that it becomes possible to attribute neurosis to *anything* that can be construed (1) to pursue aims more or less successfully, (2) to represent (to itself or to others) the aims it pursues, and (3) almost inevitably, to *misrepresent* (some) aims that it is pursuing.

The aim-pursuing thing might be a person; or it might be an animal, a robot, a group of people, an institution, or a political, religious or cultural movement in so far as these can be construed to be aim-pursuing entities.

Neurosis, as I have sketchily characterized it, is a condition that almost *any* aim-pursuing entity is likely to fall into, in so far as it is sufficiently sophisticated to represent, and hence misrepresent, the aims that it is pursuing. It is especially likely to arise when aims are problematic. Neurosis, conceived of in this way, is not a sickness of the psyche, the mind or the id; it does not require that there are mental acts of repression and rationalization; it does not presuppose, even, that the thing that suffers from neurosis is conscious or has a mind, not even in the sense that animals can be said to be conscious, or at least sentient. All that is required is that the thing in question pursues aims, represents the aims that it pursues, and hence on occasion misrepresents its aims.

The notion of neurosis that I have indicated might be called "rationalistic neurosis" to distinguish it from Freudian or psycho-analytic notions. Rationalistic neurosis is a

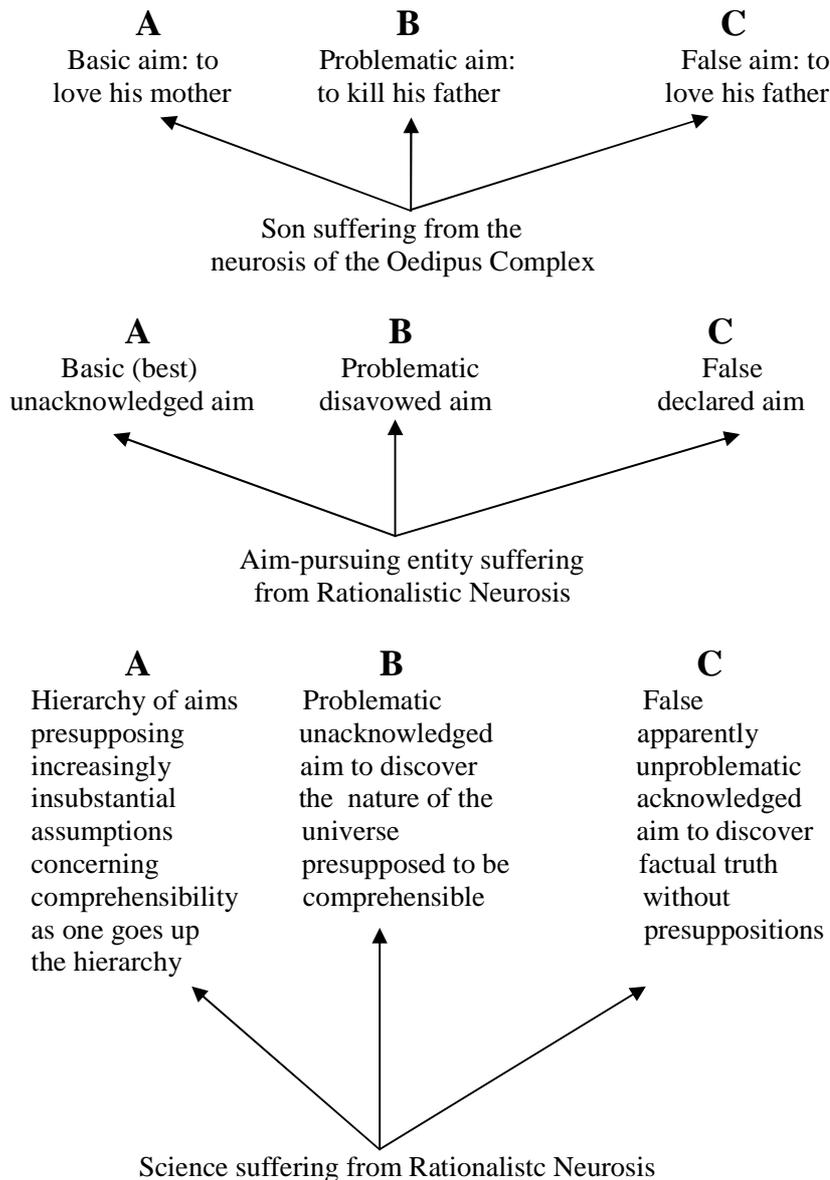


Diagram 1: From the Oedipus Complex to the Neurosis of Science

methodological notion, a notion that belongs to the theory of rational aim-pursuing.

It is especially damaging from the standpoint of rationality because, as the term “rationalization” implies, it subverts reason. Once a being has fallen into the pattern of confusion of rationalistic neurosis, “reason” becomes a hindrance instead of a help. The more “rationally” the being pursues its declared, false aim C, the worse off it is from the standpoint of pursuing its real, problematic aim B, the further away it is from *solving* the problems associated with the aim B, thus coming to pursue the really desirable aim A. Not only does this subversion of reason block progress; it has the added disadvantage of bringing reason into disrepute.

Science is an institutional endeavour that pursues aims; it is certainly sufficiently sophisticated to represent its aims, both to itself and to the public, in terms of its official “philosophy” (a philosophy of science being a view about what the aims and methods of science are, or ought to be). Thus, in terms of our new notion, it certainly makes sense to declare that science suffers

from rationalistic neuroses. But is it true?

The Neurosis of Natural Science

For science to suffer from rationalistic neurosis, all that we require is that the real, problematic aim of science, B, differs from the official, declared aim, C. Just this is the case. A real aim of science, B, problematic and hence repressed, is to discover in what way the universe is comprehensible, it being presupposed from the outset that the universe is comprehensible (to some extent at least).

The universe is comprehensible if there is *something* (God, society of gods, cosmic purpose, unified pattern of physical law), which exists everywhere, throughout all phenomena, in an unchanging form, and which, in some sense, determines or is responsible for all change and diversity, and in terms of which all change and diversity can, in principle, be explained and understood. If this *something* is a unified pattern of physical law, then the universe is *physically* comprehensible. If there is not just one *something* responsible for all change, but a number of distinct *somethings*, then the universe is only comprehensible *to some extent*. The fewer the number, N, of distinct *somethings* that there are (other things being equal), so the more nearly perfectly comprehensible the universe is, perfect comprehensibility obtaining if $N = 1$.

Acknowledging this aim involves acknowledging that science accepts, from the outset as it were, as an article of faith, that the universe *is* comprehensible (to some extent at least). But on what basis can this be known? To accept this substantial thesis about the nature of the universe as an article of faith makes science look more like a religion than what it is supposed to be, the sober, objective acquisition of reliable factual knowledge based on evidence. The aim is too problematic to be officially acknowledged, and hence is repressed, or disavowed.

Instead, the scientific community holds, officially as it were, that the basic intellectual aim of science, C, is to discover factual truths about the universe, nothing being permanently presupposed about the nature of the universe independently of evidence. This declared, official aim seems unproblematic; adopting it does not commit science to making some vast assumption about the nature of the universe, independently of the evidence. Adopting this aim enables scientists to hold on to the official view that the essential thing about science — that which distinguishes science from religions and other enterprises — is that in science claims to knowledge are accepted and rejected impartially on the basis of evidence, *no thesis about the nature of the universe being accepted permanently as a part of scientific knowledge independently of empirical considerations* (see Diagram 1). According to this view, considerations that have to do with simplicity, unity or explanatory power may influence choice of theory, in addition to empirical considerations; this must not, however, commit science to making the permanent assumption that the universe itself is simple, unified or comprehensible.

But this official philosophy of science, which I shall call *standard empiricism*, taken for granted by scientists and non-scientists alike, is untenable. Elementary considerations show that science cannot possibly have the specified aim, and cannot possibly proceed in the specified way. All versions of standard empiricism are untenable.

Given any scientific theory, however well verified empirically, there will always be infinitely many rival theories, equally well, or even better, supported by the evidence, which make different predictions, in an arbitrary way, for phenomena not yet observed.

Consider, for example, Newtonian theory, a theory that has met with extraordinary empirical success. It is easy to formulate endlessly many rival theories which are just as empirically successful as Newtonian theory, or even more successful empirically. Thus, one rival theory might assert: everything occurs as Newtonian theory asserts up till midnight tonight when gravitation, instead of being attractive, becomes, abruptly, a repulsive force. A second rival theory asserts: everything occurs as Newtonian theory predicts, except for the case of any two solid gold spheres, each having a mass of a thousand tons, moving in otherwise empty space up to a mile apart, in which case the spheres attract each other by means of an inverse cube law of

gravitation (instead of Newton's inverse square law). There is no limit to the number of rivals to Newtonian theory that can be concocted in this way, each of which has all the predictive success of Newtonian theory as far as observed phenomena are concerned but which makes different predictions for some as yet unobserved phenomena. Theories of this type can even be concocted which are *more* empirically successful than Newtonian theory, by adding onto Newton's theory independently testable and corroborated laws, or by arbitrarily modifying Newton's theory, in this entirely *ad hoc* fashion, so that the new theory yields correct predictions where Newton's theory does not, as in the case of the orbit of Mercury for example (which very slightly conflicts with Newtonian theory).

One can set out to refute these rival theories by making the relevant observations or experiments, but as there are infinitely many of them, and each needs a different experiment to be refuted, this may take some time. Thus, if science really did take seriously the idea that theories must be selected on the basis of evidence alone, science would be swamped by an infinity of empirically equally successful rival theories; science would come to an end.

And it would be the end of technology too. For, whenever well established scientific laws are used in connection with some industrial, engineering or medical process, however prosaic and standard, such as building a car or bridge, or manufacturing a drug, empirically more successful laws, concocted in the way just indicated, would predict utterly different outcomes: atomic explosions, collapsing bridges, drugs that are deadly poisons. Reliance on evidence alone would stymie science, stymie industry, and indeed all of human life.

None of this happens in practice because, in scientific practice, given an accepted, well verified theory, such as Newtonian theory, quantum theory, or general relativity, almost all the infinitely many equally empirically successful (and more successful) rival theories are, in comparison, grotesquely *ad hoc*, or disunified ("disunified" because these theories are, in effect, two or more distinct theories stuck arbitrarily together). Such theories are, in practice, excluded from scientific consideration on the grounds that they postulate abrupt, arbitrary changes in the laws for some restricted range of phenomena. The laws fail to be *invariant* as one moves, in imagination, through space and time, or from one range of phenomena to another. These empirically successful rival theories are all rejected, or rather not even considered, not for empirical reasons, but because of their *ad hoc*, patchwork quilt character, their lack of unity, invariance, and hence explanatory power.

Most scientists and philosophers of science would agree with the argument so far. It is the next step which will provoke horrified disagreement.

For now comes the crucial point. In persistently excluding infinitely many such empirically successful but *ad hoc*, or disunified theories, science in effect makes a big assumption about the nature of the universe, to the effect that it is such that no *ad hoc* (or disunified) theory is true, however empirically successful it may appear to be for a time. Without some such big assumption as this, the empirical method of science collapses. Science is drowned in an infinite ocean of empirically successful *ad hoc* theories.

If scientists only accepted theories that postulate atoms, and persistently rejected theories that postulate different basic physical entities, such as fields — even though many field theories can easily be, and have been, formulated which are even more empirically successful than the atomic theories — the implication would surely be quite clear. Scientists would in effect be assuming that the world is made up of atoms, all other possibilities being ruled out. The atomic assumption would be built into the way the scientific community accepts and rejects theories — built into the implicit *methods* of the community, methods which include: reject all theories that postulate entities other than atoms, whatever their empirical success might be. The scientific community would accept the assumption: the universe is such that no non-atomic theory is true.

Just the same holds for a scientific community which rejects all *ad hoc* (or disunified) rivals to accepted theories, even though these rivals would be even more empirically successful if they

were considered. Such a community in effect makes the assumption: the universe is such that no *ad hoc* theory is true (unless implied by a true unified theory).

Thus the standard empiricist idea that science has the aim of improving knowledge of factual truth, *nothing being presupposed about the nature of the universe independently of evidence* is untenable. Science makes one big, persistent assumption about the universe, namely that it is such that no *ad hoc* theory is true. It assumes that the universe is such that there are no pockets of peculiarity, at specific times and places, or when specific conditions arise (such as gold spheres), that lead to an abrupt change in laws that prevail elsewhere. Science assumes, in other words, that there is a kind of uniformity of physical laws throughout all phenomena, actual and possible. Furthermore, science *must* make this assumption (or some analogous assumption) if the empirical method of science is not to break down completely. The empirical method of science of assessing theories in the light of evidence can only work if those infinitely many empirically successful but *ad hoc*, disunified theories are permanently excluded from science independently of empirical considerations; to do this is just to make the big, permanent assumption about the nature of the universe.

This establishes that science does indeed suffer from rationalistic neurosis. The official, acknowledged aim C (to acquire knowledge of factual truth, nothing being presupposed about the truth) cannot be the *real* aim of science. The *real* aim is the highly problematic, unacknowledged one, B, of acquiring knowledge of factual truth *presupposed to be physically comprehensible*.

Freeing Science of Neurosis

In order to free itself of neurosis, science needs to acknowledge explicitly that the untestable, and thus metaphysical, thesis *the universe is physically comprehensible* is an integral part of theoretical scientific knowledge, more secure, less likely to be overthrown in future, indeed, than any testable physical theory such as quantum theory or general relativity. A number of benefits would flow from this repudiation of neurosis (as I have argued at length in my *The Comprehensibility of the Universe*, Oxford University Press, 2003). First, there is a dramatic increase in the *scope* of scientific knowledge, in that the metaphysical thesis that the universe is physically comprehensible becomes a central item of current theoretical knowledge. (This knowledge is, of course, conjectural in character since, as Karl Popper has shown, all scientific knowledge is conjectural.) Second, as a consequence of acknowledging the comprehensibility thesis explicitly, science can tackle explicitly the profound *problems* associated with this thesis. Third, in order to facilitate this, the comprehensibility thesis can be represented as a hierarchy of metaphysical theses concerning the comprehensibility and knowability of the universe, these theses becoming less and less substantial, and thus more and more likely to be true, as one goes up the hierarchy: see diagram 2. In this way, a framework of relatively unproblematic theses, and associated methods, high up in the hierarchy, is specified, within which much more substantial and problematic theses, and associated methods, low down in the hierarchy, can be critically assessed and, we may hope, improved, in the light of advancing knowledge. There is something like positive feedback between improving scientific knowledge, and improving theses and methods, aims and methods. As knowledge improves, our knowledge-about-how-to-improve-knowledge improves as well. Fourth, this hierarchical conception of scientific method provides a rational, if fallible and non-mechanical method of scientific discovery: new metaphysical theses, low down in the hierarchy, can be developed and transformed into testable theories. Science becomes natural philosophy in that it integrates science, philosophy, metaphysics and methodology.

And it does not stop here. It is not just that there are problematic metaphysical assumptions implicit in the aims of science. There are problematic value assumptions, and political assumptions too. The scientific search for *explanatory truth* is a special case of the more general search for *valuable truth*, in turn a means towards the human use of such knowledge to help *enhance the quality of human life*. Value and political assumptions implicit in the aims of science are, if anything, even more problematic than metaphysical assumptions. As a consequence,

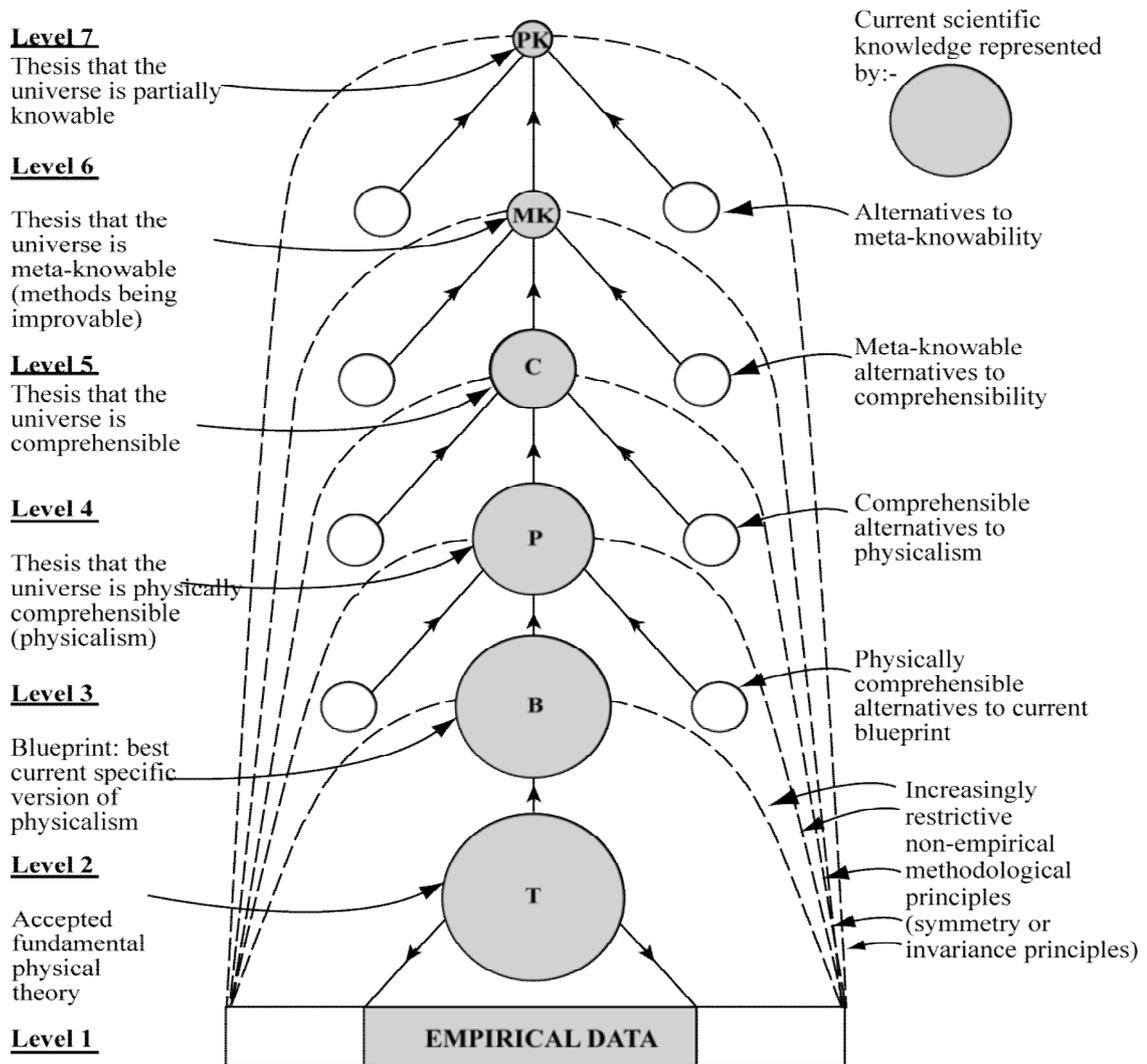


Diagram 2: Hierarchical Conception of Science

science tends to leave such assumptions unacknowledged within the intellectual domain, thus compounding scientific neurosis. What needs to be done is the exact opposite: precisely because these value and political assumptions are highly problematic, they need to be made explicit as an integral part of the scientific enterprise, so that scientists and non-scientists alike can subject them to sustained critical scrutiny in the hope that this will lead to them being improved.

These days science is under attack from many quarters. There are those who object to such products of science as GM foods and nanotechnology. Others criticize science for its arrogance, its spurious claims to objectivity, to possessing the unique road to knowledge of truth. Others oppose what they see as the powerful and harmful influence of scientific rationality. But the real problem, I suggest, is scientific neurosis, overlooked equally by those who defend, and those who attack, science. In order to develop a kind of science, and a kind of academic inquiry more generally, which really does serve the best interests of humanity, it is essential that science is

freed of its current neurosis. The repressed and highly problematic assumptions implicit in the aims of science need to be openly acknowledged, and exposed to sustained public and scientifically enlightened criticism, the intention being to improve the aims, the priorities, of scientific research, and the value of science to humanity.

Abolishing the neurosis of science might even lead on to abolishing the crippling neurosis of so many of our other institutions – financial, commercial, industrial, political, global.

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