

# Bunkum, Flim-Flam and Quackery: Pseudoscience as a Philosophical Problem

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## Summary

In the first half of the paper, it is argued that while the prospects for a criterion for demarcating scientific theories from pseudoscientific ones are exceedingly dim, it is a mistake to fall back to the position that these differ only with regard to how well they are confirmed. One may admit that different pseudoscientific theories are flawed in different ways yet still insist that their flaws are structural rather than empirical in character. In the second half of the paper, this view is extended to cover the cases of pseudoscientific correlations and therapies, and it is suggested that the pseudosciences are best thought of as radically flawed practices.

## Résumé

Quoique les tentatives de définir un critère permettant de séparer les théories scientifiques de théories pseudoscientifiques restent excessivement floues, ce serait une erreur de revenir à une position selon laquelle elles ne diffèrent que par la qualité de leur confirmation. On peut admettre que différentes théories pseudo-scientifiques ont différentes sortes de défauts et pourtant maintenir que ces défauts sont de caractère plus structurel qu'empirique. Dans la seconde partie de l'article, cette conception est étendue au cas des corrélations et des thérapies pseudoscientifiques et il est suggéré que les pseudosciences doivent être interprétées comme des pratiques radicalement faussées.

## Zusammenfassung

In der ersten Hälfte der Arbeit wird argumentiert, dass es ein Fehler wäre, auf die Auffassung zurückzukehren, wonach wissenschaftliche und pseudowissenschaftliche Theorien sich allein durch die Frage unterscheiden würden, wie gut sie bestätigt sind, obschon die Aussichten auf ein Abgrenzungskriterium gering sind. Man kann einräumen, dass verschiedene pseudowissenschaftliche Theorien aus verschiedenen Gründen versagen und trotzdem darauf beharren, dass ihre Mängel mehr struktureller als empirischer Natur sind. In der zweiten Hälfte wird diese Auffassung auf die Fälle vor pseudowissenschaftlichen Korrelationen und Therapien ausgedehnt, und es wird nahegelegt, dass Pseudowissenschaften am besten als radikal misslungene Praktiken gedeutet werden.

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Just as illness can throw light on health, pseudoscience can illuminate science. In both cases, the normal appears in sharper relief when contrasted with the abnormal, and the better our understanding of failure, the better our understanding of success.

*Pseudoscientific attitudes* When considering pseudoscience, it is natural to focus on the manner in which pseudoscientists argue for their conclusions and respond to criticism. To be a scientist, we are inclined to say, is to have a certain sort of attitude; to be a pseudoscientist is to lack it. Thus, it is often argued that scientists are open-minded, pseudoscientists close-minded, and that whereas scientists treat criticism in an objective manner, pseudoscientists treat it as a personal affront<sup>1</sup>. From this point of view, the problem of characterizing pseudoscience is similar to the problem of characterizing madness. The object is to determine a criterion for distinguishing between cranks and persons of sober sense and sound mind.

Pursuing this line of thought, one might argue that pseudoscientists typically fail to conform to the kinds of norms that Robert Merton has delineated for the case of science<sup>2</sup>. Here the claim is that pseudoscientists do not deserve to be taken seriously since they flaunt the 'prescriptions, proscriptions, preferences, and permissions' that are 'binding on the man of science'. In particular, it might be suggested that pseudoscientists compromise the Mertonian norms of 'disinterestedness' and 'organized skepticism' and perhaps even those of 'communism' (which requires that all results be treated as public property) and 'universalism' (which requires that ideas be evaluated independently of the personal, social, political and national characteristics of their proponents). On this view, the pseudoscientist deserves no better treatment than the conventional scientist who steps out of line.

Without doubt there is something to this contention just as there is surely something to Merton's conception of a scientific ethos. Leading pseudoscientific lights certainly do often proceed in an uncritical, cranky fashion. But much the same can be said about scientists, who are rarely as uncommitted, as disinterested, as open-minded as proponents of the present view would have us believe. In fact, as Thomas Kuhn has argued, there is a function for dogma in science, and disinterestedness and organized skepticism can even be an impediment to scientific progress<sup>3</sup>. Moreover, it should not be for-

<sup>1</sup> See, e.g., M. Gardiner, *Fads and Fallacies in the Name of Science*, Dover, New York, 1957, Chapter 1.

<sup>2</sup> See, e.g., R.K. Merton, *The Sociology of Science*, University of Chicago Press, Chicago, 1973, Chapter 13. The following quote comes from p. 269.

<sup>3</sup> See T.S. Kuhn, 'The Function of Dogma in Scientific Research', in A.C. Crombie (ed.) *Scientific Change*, Heinemann, London, 1963.

gotten that many sociologists of science recognize a role for 'counternorms' which require what the Mertonian norms forbid<sup>4</sup>.

But even setting this difficulty aside, the problem remains of what makes a particular theory or doctrine pseudoscientific. It is one thing to say that pseudoscientists normally have certain general attitudes or traits, quite another to say that the theories they defend are radically flawed. For instance, one can hardly criticize the contention that extraterrestrials have visited the earth on the grounds that its proponents hold it dogmatically rather than as an hypothesis to be rigorously tested. The typical ufologist may indeed be closed-minded and contemptuous of other points of view, but this is not why we reject claims about little green people and flying saucers as pseudoscientific. Even if advocates of extraterrestrial visitation were always open-minded, disinterested and critical, nothing would change with regard to the pseudoscientific character of their view: it would remain as much a supersitition as ever.

*Pseudoscientific theories* As a rule, philosophers interested in the nature of pseudoscientific theories avoid this last difficulty because they are primarily concerned with the problem of specifying as precisely as possible how pseudoscientific theories differ from scientific ones. Their working assumption is that there is something that scientific theories possess and pseudoscientific ones lack, not that there is something that differentiates pseudoscientists from scientists. For them, the difference between pseudoscientific and scientific theories is no more dependent on considerations having to do with attitudes, preferences, personality and the like than is the difference between fool's gold and the real thing.

Unsurprisingly, philosophers have proposed a number of different ways of demarcating pseudoscience from science (and more generally spurious from genuine knowledge). Some have argued that pseudoscientific claims are unverifiable on the grounds that to be scientific is to be meaningful and to be meaningful is to be verifiable. Others have suggested that the crucial difference between science and pseudoscience lies in its confirmability, their view being that a hypothesis or theory is scientific just in the event it is amenable to empirical confirmation. And yet other philosophers, including most notably Karl Popper, have insisted that science has the virtue of always being capable of being falsified (and hence improved), whereas pseudoscience is compatible with every state of affairs (and hence uninformative)<sup>5</sup>.

<sup>4</sup> Counternorms are discussed in I.I. Mitroff, *The Subjective Side of Science*, Elsevier, Amsterdam, 1974, Chapters 1 and 3.

<sup>5</sup> The history of attempts to demarcate science from pseudoscience is sketched in L. Laudan, 'The Demise of the Demarcation Problem', in R.S. Cohen and L. Laudan (eds.), *Physics, Philosophy and Psychoanalysis*, Reidel, Dordrecht, 1983, pp. 111-127.

Such suggestions, however, labour under the difficulty that they classify some science as pseudoscience and some pseudoscience as science. Scientific information cannot be defined in terms of its verifiability since mathematical knowledge, which is verifiable, is not science and scientific generalizations (which always outstrip the data) can never be fully verified. Confirmability fails since some pseudoscientific hypotheses are undoubtedly confirmable (e.g., the contention that there exists a Loch Ness monster), and it is at least arguable that some of the more abstruse parts of science function as stipulations rather than as confirmable claims. Finally, scientificity cannot be equated with falsifiability since many pseudosciences have falsifiable, indeed false, observational consequences (e.g., scientific creationism), while many sciences incorporate singular existential claims which are beyond falsification strictly understood (e.g., the physicist's claim that there is a maximum speed at which particles can travel).

In response to counterexamples like these, one might attempt to develop a more sophisticated demarcation criterion or argue that we should forego contrasting pseudoscience with science and instead regard it merely as bad science. On the former view, our present lack of a demarcation criterion is simply a problem to be solved. On the latter view, which has recently been defended by Larry Laudan, it is a mistake to think of pseudoscience and science as differing in kind; we should instead think of them as differing only with regard to how well they conform to the facts<sup>6</sup>.

*Demarcationism and retrospectivism rejected* Neither of these options is unproblematic however. While there are certainly similarities among the various pseudosciences, the prospects for a demarcation criterion which covers them all are exceedingly dim. When we examine particular pseudosciences, what we discover is not a single common flaw, but rather a range of substantially different shortcomings. Yet it is equally implausible to hold that the difference between pseudoscience and science is just a matter of degree. Pseudoscience is not just ill-supported scientific theory; its flaws are deeper, more structural, more conceptual in character. Contrary to Laudan, 'pseudoscientific' and 'unscientific' are not 'hollow phrases which do only emotive work'<sup>7</sup>.

With regard to the first point, consider Darwin's theory of natural selection, action theory as developed by Talcott Parsons and Freudian psycho-

<sup>6</sup> See *ibid.*, p. 124.

<sup>7</sup> *Ibid.*, p. 125.

analysis, all of which have been branded as pseudoscientific more than once<sup>8</sup>. When we examine the objections which have been leveled against these theories, what we find is that they have been challenged in a variety of different ways. Thus, natural selection has been said to be truistic since it treats survival as a matter of fitness and takes survival to indicate fitness. Action theory has been criticized because it merely repeats what everyone knows in a misleading and confusing way. And psychoanalysis has been dismissed for the quite different reason that it incorporates a set of subsidiary claims (concerning repression, ambivalence and the like) that shields it against refutation. Moreover, we have every reason to believe that an examination of other cases would reveal still other types of flaw.

As for the second point — that it is implausible to think of pseudoscience as being merely bad science — notice that the criticisms of Darwin's, Parson's and Freud's theories just mentioned have nothing to do with the question of how well they are supported by the evidence. In each case, the claim is that the theory should be rejected because it is conceptually unsound. To dismiss a theory because it is truistic or because it dresses up platitudes in misleading terminology or because it incorporates a device for deflecting refutations is not to reject it as ill-supported by the evidence; it is rather to recognize that an empirical investigation of its scientific merit is entirely unnecessary. 'Pseudoscience' and 'unscientific' do in fact do useful work: they mark the important distinction between theories that are structurally flawed and those that are merely ill-founded.

To do justice to the variety of different sorts of theories which are plausibly classified as pseudoscientific, we must set aside the suggestion that there is a single flaw that they all have. And to do justice to the insight that the pseudosciences are structurally flawed, we must resist the temptation to view them as merely lacking in empirical support. 'Demarcationists' like Popper and 'retrospectivists' like Laudan are both partly right and partly wrong. Popper is right to suggest that pseudoscience differs radically from science but wrong to suppose that this means that the difference between them can be codified in advance. Laudan is right to be skeptical about the existence of a demarcation criterion but wrong to think that this means that theories can

<sup>8</sup> On Darwin, see, e.g., C. Patterson, *Evolution*, British Museum (Natural History), London, 1978, especially p. 147; on Parsons, see S. Andreski, *Social Science as Sorcery*, André Deutsch, London, 1972, especially p. 61 and C. Wright Mills, *The Sociological Imagination*, Oxford University Press, New York, pp. 15-33; and on Freud, see K. Popper, *Conjectures and Refutations*, Harper and Row, New York, 1968, pp. 34-35 and pp. 37-38. Here and in what follows, it should be kept in mind that my concern is with the character of certain criticisms that have been leveled against Darwin, Parsons and Freud, not with whether these criticisms are just.

only be judged retrospectively with regard to how well they have stood up to empirical scrutiny<sup>9</sup>.

*Pseudoscientific theory and fallacious argument* If these observations are correct, there is an important analogy to be drawn between pseudoscientific theories and fallacious arguments. In both cases, it may indeed be necessary to engage in empirical analysis to determine what is being claimed. A pseudoscientific theory, like a fallacious argument, may be obscurely presented and even when clearly presented it may misrepresent what its proponents intend. Beyond this, however, empirical analysis is neither required nor appropriate. We no more need to know anything about the world to say that theories are pseudoscientific than we need to know anything about it to say that arguments are invalid. Judgements about scientificity, like judgements of validity, have nothing to do with empirical well-foundedness and truth.

Bearing the analogy with fallacious arguments in mind, we can better appreciate the claim that pseudoscientific theories can be judged to be radically flawed even in the absence of a demarcation criterion. Despite the efforts of some philosophers to formalize informal logic, it is implausible to think that we have or need rules for discriminating fallacious arguments from logically sound ones. We have no general criterion for determining whether an argument involves a hasty generalization or an illegitimate appeal to authority, yet this does not preclude our being on occasion entirely justified in rejecting arguments on the grounds that they involve these fallacies. In such cases, it would surely be a mistake to refrain from criticizing the validity of our opponents' arguments in favour of a consideration of the facts to which they allude.

Also worth noticing here is that we generally go about showing that a theory is pseudoscientific in much the same way as we go about showing that an argument is fallacious. When criticizing pseudoscientific theories, as when criticizing fallacious arguments, we proceed by providing reasons for thinking that they involve familiar flaws or that they involve flaws that we ought to recognize in the future. In both areas, criticism is partly a matter of assimilating new cases to old and partly a matter of extending the principles exemplified by old cases to cover new ones. Just as our views about clear-cut fallacies guide rather than determine our evaluations of arguments, so our views about clear-cut cases of pseudoscience provide us with a revisable baseline from which we can examine whether new theories are pseudoscientific or not.

<sup>9</sup> Put otherwise, my claim here is that we should set aside Popper's and Laudan's common assumption that demarcationism is the only alternative to retrospectivism.

Finally with regard to the present analogy, it should not be forgotten that philosophers and others frequently criticize pseudoscientific theories on the grounds that they involve what are normally taken to be logical fallacies. Thus, Popper complains that astrology involves the so-called Deiphi fallacy, the reason that it falls short being that it incorporates the 'soothsayer's trick' of couching its predictions in the vaguest of terms<sup>10</sup>. Furthermore, in rejecting psychoanalysis and Marxism on the grounds that they crucially involve notions with no independent application, Popper is in effect claiming that they should be rejected because they commit the fallacy of circular reasoning<sup>11</sup>. Indeed, in retrospect, it makes good sense to view the study of pseudoscientific ideas as one of the more intriguing branches of informal logic.

*Pseudoscientific hypotheses and therapies* These observations seem plausible enough in the case of theories which are structurally rich. But how plausible is it to think that the same kind of account is appropriate for pseudosciences such as E.S.P., ufology or clairvoyance, which have little theoretical structure? Although undoubtedly pseudoscientific, these doctrines can hardly be said to be structurally unsound. Nonetheless, it is not unreasonable to hope that the present account can be generalized to cover them as well.

Consider first the claims urged by advocates of extra-terrestrial visitation and the pseudoscientific correlations produced by proponents of E.S.P. Regarded as theories, such claims and correlations can only be retrospectively criticized as ill-supported. However, we can fit such pseudosciences to our present scheme if we widen our perspective to take into account the procedures which are characteristically used to defend them. In particular, we may argue that ufology can be submitted to criticism in advance of empirical because it typically involves the suspect strategy of shuffling forward new cases of extra-terrestrial visitation once old ones are shown to be problematic. And we can treat parapsychology as a pseudoscience on the grounds that it fails to conform to the standard canons of good experimentation and sound statistical analysis.

Similarly, pseudoscientific predictions such as those made by clairvoyants and pseudoscientific therapies such as naturopathy and orgone therapy, can be analyzed by noting the spurious character of the confirmations and cures that are alleged to establish their authenticity. On the present account, the clairvoyant's predictions are pseudoscientific whether or not they are correct

<sup>10</sup> K.R. Popper, *op. cit.*, p. 37.

<sup>11</sup> *Ibid.*, especially p. 38.

because the very same predictions could have been made without resorting to cards, tea leaves, crystal balls or whatever<sup>12</sup>. And naturopathy and orgone therapy should be discounted because their apparent success does nothing to establish their therapeutic efficacy. What matters in such cases is not whether cure follows therapy but whether the therapy produced it: correlations are one thing, causes another.

In each of these cases, what is being criticized is not the theory itself — indeed none of these pseudosciences contains very much theory — but rather the characteristic procedures associated with it. Nonetheless, the inadequacies isolated have much the same character as those mentioned earlier. We should like to classify the claims of the proponent of extraterrestrial visitation, the correlations of the parapsychologist, the predictions of the clairvoyant and the therapies of the naturopath and the orgone therapist as pseudoscientific by analogy with the more theoretical kinds of pseudoscience mentioned earlier. From this standpoint, the clearest cases of pseudoscience are theories which are truistic, which comprise ponderous restatements of the obvious, which involve devices for deflecting criticism; other cases of pseudoscience are appropriately considered under the same head because they are subject to criticism on similar grounds.

*Pseudoscientific practices* How then should we think of the pseudosciences? Perhaps the most helpful way is to treat them as radically flawed practices, i.e., as radically flawed complexes of theories, methods and techniques. This way we recognize the range of different kinds of endeavour that are normally lumped together under the rubric of ‘pseudoscience’, the involved nature of these endeavours, and the fact, often stressed by philosophers, that theory and method are closely intertwined. Moreover, when we take astrology, ufology, naturopathy and the rest as pseudoscientific practices, we can readily acknowledge the myriad of different ways in which pseudosciences are structurally flawed and the relative unimportance of their empirical content.

On this account, then, to say that a practice is flawed is to say that its constituent theories, methods and techniques considered as a whole make it unworthy of serious attention. As already noted, some practices are theoretically suspect whereas others fall short on account of the unsatisfactory character of their methodology. But cases involving a conspiracy between theory and method are also common. For instance, some parapsychologists appeal to theoretical considerations about the effects of unsympathetic observers to

<sup>12</sup> Evidently, successful predictions count in favour of a theory only if they are improbable given generally accepted background knowledge.



account for their subjects' inability to perform in the laboratory, and some practitioners of nonconventional medicine reject standard statistical tests of their therapies by noting that it is a consequence of their general viewpoint that representative groups of patients do not exist<sup>13</sup>.

When we focus on practices we can also rehabilitate some of the remarks of Popper and other philosophers concerning pseudoscientific methods and attitudes. For we can now see their remarks as misleading observations about scientific practices. Thus, we may retrieve Popper's claims about pseudoscientific methods (in particular those about immunizing strategems) by reading them as remarks not about methods as such but rather as being about the specific methods integral to specific practices. And when he argues that pseudoscience differs from science in that its practitioners are unwilling to specify in advance what would falsify their theories, we may take him to be making a point not about the pseudoscientists themselves but about the manner in which the practices with which they are associated are structurally flawed<sup>14</sup>.

Furthermore, we can now better appreciate why it is often difficult to distinguish pseudoscience from science and why it is reasonable to hold — as Popper does — that science may degenerate into pseudoscience. Here we need to notice firstly that when we focus on practices, we shall expect many debates concerning pseudoscience to be inconclusive. For it is an important fact about practices of the kind under consideration that the claims and especially the methods that they involve are rarely fully explicit, let alone precisely defined. Secondly, claims about the degeneracy of certain theories makes good sense once we recognize that a practice may change even though its theoretical content remains much the same. When Popper complains that Marxism has degenerated from being a science to being a pseudoscience, his point is presumably that Marxist theory has been accompanied by a change in the Marxist's characteristic procedures and that this has had the effect of destroying the scientific status of the practice as a whole<sup>15</sup>.

*Pseudoscience as a social institution* Finally, a more general point. If we think of the pseudosciences in the terms of practices rather than in terms of beliefs, we shall be less astonished by their quite extraordinary durability. To think of

<sup>13</sup> Such pseudosciences differ from scientific practices which just happen to be untestable. In the latter case, auxiliary hypotheses capable of rendering a practice testable are assumed to exist, whereas in the case of the former their existence is explicitly excluded.

<sup>14</sup> Popper makes reference to pseudoscientific attitudes and methods in *op. cit.*, p. 37 and in his *Unended Quest*, Open Court, La Salle, 1976, pp. 41-43.

<sup>15</sup> Popper claims that Marxism has degenerated from being a science to being a pseudoscience in *op. cit.* (note 8), pp. 37.

the pseudosciences as bodies of doctrine is to regard them as something that can be adopted, revised and replaced at will, and it becomes mysterious why it is so difficult to dislodge them. But when we view them as practices, we are in effect taking them to be social institutions, and social institutions are, of course, notorious for their inertia and resilience. If becoming an adherent of a particular pseudoscience involves becoming part of a practice, and becoming part of a practice involves the internalization of a certain way of acting and style of thought, what is surprising is not so much that critics of pseudoscience have had so little effect as that they have any effect at all.

In this area, as in most others, understanding and explaining the phenomenon is one thing, eliminating it another. Contrary to what many philosophers seem to suppose, it is a mistake to think that once we get clear about the character and sources of pseudoscience, it will disappear like a bad dream. If we grant, as surely we must, that pseudoscientific practices trade on deep needs and provide many people with something to fall back on in an inhospitable world, it is naive to hope that an appreciation of their general nature (or even a fuller recognition of the grip they have on our thinking) will contribute significantly to their demise. What is required is not just better analysis but new outlets for the desires and insecurities to which the pseudosciences so successfully cater. Pseudoscience is in this respect rather like poverty: an understanding of what it is about, although important, contributes all too little to its eradication<sup>16</sup>.

<sup>16</sup> It is perhaps also worth noting briefly that philosophers and others frequently overstate the danger that the pseudosciences pose. We should indeed deprecate racist, nationalistic and sexist pseudosciences; and we should not overlook the harm that pseudoscientific therapies often cause. But it is surely a mistake to lump all the pseudosciences together and to complain that pseudoscience as a whole constitutes a major social problem. In our society many pseudosciences function as entertainment, and these pale in comparison with real social ills such as economic inequality, incompetent political leadership and authoritarianism in the workplace.