# **LOVE** SCIENCE

*by Sherrilyn Roush*

The late Berkeley philosopher Paul Feyerabend took perhaps the most permissive attitude possible towards "fringe" or "marginal" science. This flowed from a more general view about how science works best in promoting both knowledge and happiness. He argued that in order to maximize the empirical testability of our theories—a goal even a falsificationist like Karl Popper should love—we must compare them not just to observations, but to other incompatible, even apparently falsified, theories. Methodologically, this is clearly sound, since which observations we make and how we construe them are affected by the ideas we use and the concepts we consider. We often have to consider contrasting ideas in order to find the observations that show the weaknesses of those ideas we already have. Further, Feyerabend saw that if testability alone is the goal of science, then there is no principled way to limit the ideas and theories that ought at any time to be given an audience. The oldest, the kookiest, the most disreputable ideas have a necessary role to play. Like John Stuart Mill he thought that one of the benefits of a truly free marketplace of ideas was that it would allow advocacy of unpopular views as well as respected ones, so that the ugly ducklings could keep the respected ideas honest, and stay alive for the day when they might show the insight they can bring.

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One could think of the pursuit of truth along these lines as an investigation of an elephant by several people with blindfolds on, each of whom has access only to his own portion of the animal. One would think it was a tree trunk, another a fire hose, a third maybe a whip, another an outsized yoga ball. None of these claims would be right, but if one of these people were too eager and insistent in drawing conclusions and didn't listen to the very different and seemingly crazy ideas of the others, he might never think of observing beyond his region of the elephant. He would also, Feyerabend thought, lead a cramped and unfulfilled life.

An obvious objection to this outlook is that we don't have the resources to water a thousand flowers. The more vigorous such an enlightened pursuit of all avenues to the truth was, the more it would slow down acquisition of the kinds of particular and precise truths that got us to the moon and give us new prescription drugs. Finding the mechanism of a particular chemical reaction, for example, is an expensive endeavor, and requires making assumptions for the time being instead of having disputes about every possible question. Resources are limited, and in the long run we're all dead. If every idea gets attention, no idea will get enough for us to probe the world in depth in the short run. Pursuit of the whole truth (and ironically of maximum theory-testing) competes with the approach and benefits we have come to expect from mainstream


"Bigfoot" casts: where's the DNA? Photo by Deborah Stalford.

science. If it's a choice between curing cancer and Big Foot Studies, who can be blamed for dismissing the latter?

However, I don't think these are our choices. It seems to me to follow from the fact that our resources are limited, and thus that mainstream science must enforce a focus on those possibilities our evidence says are most probable, that laypeople have not just a right but a responsibility to record their impressions of anomalous phenomena such as a large primate species in the Upper Northwest, or a UFO, or paranormal psychological events. Though from everything scientists have learned so far it may be unlikely, yet it is certainly possible that there are phenomena behind these impressions that mainstream science has not yet discovered. If any of these things do exist, then scientists are set up to miss them. Non-scientists should explore these anomalous things if we care about our species gaining a whole knowledge of the world, precisely because the scientists can't.

But though limited resources means that laypeople have a responsibility to keep records of their impressions, the very same fact also means that individual laypeople at a particular time have no right to expect mainstream scientists to take their claims seriously. The scientists, generally speaking, mustn't. If we want cures for cancers, and serious development of population biology, then scientists with hard-won expertise must focus on the probable possibilities they know how to work with. If we want to know about primates, then scientists do best to study the many primate species we already know exist. Jane Goodall, a pioneering primatologist, says she is a romantic and hopes, and even somehow believes, that a Sasquatch species exists. But she doesn't spend her professional time hiking in the Pacific Northwest to find it. Thus, in my view, both scientists and their lay and marginal counterparts could use an adjustment of attitude. Scientists shouldn't scoff with quite so much contempt at lay people who profess to have evidence of odd occurrences and things. But then, they wouldn't need to if lay people understood that they have no right to expect their claims to jump to prominence at any given time. The tendency of government funding agencies to ignore studies of, for example, paranormal psychological phenomena does not come merely from prejudice.

A nice compromise, but what is the point of the lay observations if there is no good reason to expect them to be taken seriously? The story

of the discovery of meteorites illustrates one purpose. From ancient writers to early modern peasants, there was a steady trickle of testimony about rocks falling from the sky. Often rocks were even presented as specimens. Ancient writers—who supposedly preferred speculation to observation—and lay people—who were supposedly impressionable—were exactly what Enlightenment thinkers warned us about, so modern scientists paid little attention. Meteors were known to astronomers, though unexplained, but the idea of their connection to these falling rocks was a long time coming. A meteor, being bright and high, can be seen for miles around, a meteorite, being dark and low, is seen only where it falls. A meteor had some chance of being witnessed by at least one scientist or credible amateur, a meteorite very low chance of being witnessed by anyone with standing.

The connection was made when a scientist saw how it was possible for a meteor and a falling rock to fit together as stages of one event, an extraterrestrial rock burning as it pushed through the relatively thick atmosphere, and plopping cold to the ground when it reached the thinner air. He tested this idea by looking at all the humble records he could find in libraries and museums, where there were records of lay people reporting the events and sometimes bringing the rocks, to see if the dates matched the dates of the meteors. Though the match was not perfect, its extent combined with the lack of coordination between the scientific and lay sources could not really be believed to be a coincidence.

Lay testimony and lay-presented objects are not strong evidence, for systematic reasons. Although a proffered caste of a Big Foot footprint is a physical specimen, it is only the result of a process about which it itself gives us no information. The chain of evidence from phenomenon to scientist is broken. By contrast, the scientific community has, effectively, an extensive mutual surveillance and control system covering the production of evidence. There are many witnesses to the carrying out of an experiment, there are referees to publications; discovery of fraud is career-ending, and fear of discovery is heightened by the surveillance. A layperson does not have a professional scientific career to lose so the incentive structure is open-ended. The inherent weakness of lay evidence is another reason, alongside limitation of resources, why no one should expect a given piece of it to be hailed as a breakthrough by establishment science. But the case of meteorites illustrates another fact about evidence, namely, that weak evidence in large quantities can be strong if the conditions are right. If a pattern in the evidence is comprehensive or repeated, and an explanation can be imagined, and the sources have significant independence, if the pattern has features a lay person couldn't have known he should fabricate, then a vast amount of weak evidence can justify more serious and rigorous consideration by scientists. Once in a while, a credible, adventurous scientist will take the bait.

The case of meteorites has been held up by some lay investigators of odd phenomena as a vindication of their demand that scientists wake up and take them seriously. The laypeople who were ridiculed as impressionable and crazy were right! But no single report of rocks falling from the sky was ever significant evidence on its own. Each only gained significance, eventually, as part of a large body of such testimony, and as it fit with developing mainstream investigations of known phenomena. Generally speaking, recognition of the significance of testimony from untrained laypersons can be expected, if at all, only collectively and in the long run. Such investigation is a genuine contribution to the mission of science, but one for which a person cannot expect any tangible reward in his lifetime. As such, it is a labor of love. We might call it love science.

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# Paolo Mancosu Wins Guggenheim Fellowship

Paolo Mancosu, who has been teaching in the Philosophy Department since 1995, was awarded a prestigious Guggenheim fellowship for 2008-2009.

The Guggenheim Foundation specifies that "Guggenheim Fellows are appointed on the basis of impressive achievement in the past and exceptional promise for future achievement." One-hundred and ninety fellowships were granted in all fields of knowledge out of more than 2,600 applicants. "I am especially pleased because philosophers have not done too well in the competition in recent years" said Mancosu.

In addition, Paolo was also offered a fellowship at the Institute for Advanced Study in Princeton for the Spring term 2009, which he has accepted. He will be on leave during 2008-2009 working on several different projects. The main project will consist in bringing to completion a book to be published by Oxford University Press entitled *The Adventure of Reason*. The book brings together some of his essays in the history and the philosophy of logic and mathematics during the period 1900-1940. "What is distinctive about my approach to these topics is the mix of historical, technical, and philosophical issues" said Mancosu.

In addition to finishing his book, Paolo plans to pursue further work in the area of the philosophy of mathematical practice (explanation, visualization, style, etc.) and in philosophy of logic (logical consequence, theories of truth). During his year of leave, Paolo will visit research institutions and give talks in several countries including, among others, France, Spain, Denmark, Germany, Portugal, and Brazil.

Paolo has been engaged in several publication projects. His most recent book, *The Philosophy of Mathematical Practice*, was published by Oxford University Press in June 2008. He has also edited a special issue of *Synthese* entitled "Interpolations: Essays in honor of William Craig." The special issue, which will appear by the end of 2008, celebrates the work and career of William Craig, professor emeritus in philosophy. (See the article on the "Interpolations" conference on p. 10 of this Newsletter.)

For the past three years Paolo has been the Chair of the Group in Logic and the Methodology of Science. "It has been a very rewarding experience," said Mancosu. "But now I feel ready for a year fully devoted to research."