SCIENCE CONFRONTS THE PARANORMAL

EDITED BY KENDRICK FRAZIER

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Introduction

Why examine the paranormal? Why should intelligent scholars, scientists, teachers, students, and laymen pay any attention at all to claims of psychic powers, ESP, clairvoyance, psychokinesis, or pottergeists—tet alone the fringe-science subjects of astrology, UFOs, speculative archaeology, creationism, and cryptozoology? Even cursory consideration shows that the subjects are replete with exaggeration, deceit, fraud, misperception, selfdelusion, and other prominent foibles of the human race. Shouldn't they perhaps just be ignored and automatically discounted?

Certainly many scientists and scholars do take this attitude. It is hard to blame them. In the narrowest sense, the scrutiny of paranormal claims offers little professional gain. Examination of the latest psychic fad that infatuates the public is unlikely to lead to scientific advancement or prestigious publication. Doing science is time-consuming and difficult, and there's little enough time to attend to one's own specialized research without worrying about investigating exotic claims that have little likelihood of validity and devoting time to disabusing the public about them. That view is understandable. But it is also an example of living in an ivory tower or, to mix metaphors and altitudes, of sticking one's head in the sand.

I will suggest at least four reasons responsible scholars, and their students, should devote some attention to examining the paranormal. The first I will consider at some length; the others, more briefly.

1. The public is interested. Indeed, large proportions of the public believe in paranormal powers. More than likely you have a close friend, relative, or next-door neighbor who has a strong interest and a more than mild belief in one or more aspects of the paranormal. Almost everyone has had some extraordinary and mystifying experience that may seem unexplainable except by resorting to the paranormal. Paranormal claims abound in the media. This is so not just in the notorious (if amusing) supermarket tabloids with their latest headlines about the woman who has been impregnated by a (choose one) UFO alien, Bigfoot monster, or roving horny spirit. Your own daily newspaper is very likely to carry at least one national or local story a week on some claim that comes under the loose rubric of paranormal or fringe-science beliefs. It almost certainly prints a daily artrology column. (I doubt very much if it has a daily astronomy column.)

A widely syndicated Washington political columnist who won a pulitzer prizefor his investigative acumen has devoted not one but five columns to the assertion that people in the Pentagon and the intelligence services are taking seriously claims of psychic warfare and spying by mental "remote-viewing." His own attitude toward these assertions seems to range from fun-poking to uncritical acceptance.

Magazines, books, and radio and TV talk-shows all have a full complement of psychics offering advice and making predictions. Serious magazines like *Forbes, Computerworld,* and the *Journal* of Defense and Diplomacy have recently published lengthy articles repeating claims of psychic powers without even a hint of critical

scientific perspective. Reader's Digest Books and more recently Time-Life Books have heavily promoted and distributed books or book series on "mysteries of the unknown." The paranormal sells. It wouldn't sell if people weren't broadly interested and, to a large degree, accepting.

A 1984 Gallup poll of 506 American teenagers, aged 13 to 18, found these answers to the question, "Which of the following do you believe in?": angels, 69 percent; ESP, 59 percent; astrology, 55 percent; clairvoyance, 28 percent; Bigfoot, 24 percent; witchcraft, 22 percent; ghosts, 20 percent; Loch Ness monster, 18 percent. Such polls are decidedly unsatisfying. 1 always want to know the depth of the "belief" in question and on what assumptions it is based. But they do give a general idea of levels of paranormal belief, which despite fluctuations are always fairly high.

I divide the public's interest in the paranormal into two broad types: The first stems from the intrinsic appeal of the subject. It appeals to our curiosity, our sense of wonder, and the human need for fantasy and diversion. It can be fun. It is fascinating to consider whether some people have the power to read minds, see distant events, cause objects to move, or know the future. It is intriguing to ponder amazing-sounding coincidences. Who can deny that it is interesting to wonder if somewhere there are large unknown creatures roaming the earth's land or lakes or if we have ever been visited by extraterrestrial beings?

The second is the understandable human need for comforting beliefs. To some, the daily challenges of life may be a bit more bearable if they feel their destiny is shaped by cosmic forces (the positions of the planets) or other factors beyond their control (their date of birth). It can be an impersonal world, and the thought that the universe has some personal interest in and influence over one's destiny has broad appeal. The same can be said if there are people one can consult who seemingly have special insight into one's life and personality and special powers to know what's in store.

Note that one doesn't have to believe wholeheartedly in such matters to find some such comfort. It's enough to feel that, just perhaps, there's something to it—just a slight influencing of the odds in one's favor. What can it hurt? When a chronically or fatally ill relative has exhausted all medical help, who can blame the human impulse to consult unconventional practitioners and untested remedies that promise a cure? And who, really, relishes the thought of a loved one dying and for evermore being cut off from one's life? Spiritualism, the forerunner of much of modern parapsychology, was motivated by such universal concerns. Many other people find their fundamentalist religious views threatened by science's discoveries, e.g., that the earth is 4.6 billion years old, that all life slowly evolved over time, and that we ourselves are a result of the long process of evolution. For people whose belief structure would crumble if they had to accept that the story of Genesis is a beautiful parable rather than a literal historical account, adamant resistance to all competing notions is understandable, if regrettable.

Now we begin to see why the hold that paranormal systems of thought have had on human culture is so pervasive; why, even in a scientific and technological world, paranormal beliefs are no less evident than in earlier historical times; and why they will undoubtedly always be with us.

We can also begin to see why it is important to understand the effect of the broad public interest and belief in the paranormal on human thought and culture. Where interest is so high and the need to believe so great, the seeds for misinterpretation are sown. Psychologists have produced an abundant body of knowledge on how our own beliefs, biases, and preconceptions influence our perception. In a very real sense, we believe what we want to believe, and we see what we want to see. Our minds are wondrous mechanisms, capable of extraordinary feats. But, in filtering out all the available perceptual data except that most important to the task at hand, our minds, with our own subconscious help, can deceive us. We are always selecting what to focus attention on and, except in those infrequent times when we force ourselves to operate in the most analytical and objective mode, we have a way of searching for information that reinforces our beliefs and ignoring all that doesn't.

All this makes us very human. It also make us susceptible to error. Such distortions are generally unimportant, because in our daily life our perceptions are continually being compared with the real world and undergoing correction. We couldn't cross the street or drive a car if they weren't, let alone function in our jobs. But beliefs in the paranormal, because they operate at the level of deep-seated psychological needs, seem to be remarkably immune to the error-correcting processes of daily life. And thus many people go on believing in things that more objective inquiries may indicate either are probably not so or are far less likely to be so than is generally believed.

All this is fertile ground for scholarly inquiry. It leads us into discovering more about how our minds work. It allows us to understand better how the natural world does, and does not, operate. Hardly trivial questions ! It also makes us struggle with the problems of the gap between what scientists (who *are* involved in a continual, organized, error-correcting process) know about the natural world and what the public thinks it knows. That gap has always existed and always will, but if it becomes too large science and society become excessively decoupled, to the eventual detriment of both. Scholars and others who cannot at least understand why people are attracted to the paranormal and don't know the arguments being made are not in a good position to counter the many misconceptions that arise. Nonscientific people whose aspirations, motives, and psychological needs fail to gain at least some degree of sympathetic hearing from scientists and scholars are going to be pushed toward pro-mystical positions antagonistic to science.

2. Public *education.* If an informed and rational citizenry is indeed important to a democracy (as I believe it is), then scientists have an obligation to help the public understand the difference between sense and nonsense, good science and bad science, scientific speculation and outright fantasy. They must help their students and the public sort out the many competing claims for truth in controversies of interest, including the paranormal. Scientists who wish to counter paranormal claims or to correct misinformation about them must become well informed. It is not enough to state positions. One must be armed with facts. And one must be prepared for attacks from unexpected directions. Sometimes these attacks are carried out with surprising cleverness and effectiveness. The scientist who expects his scientific knowledge is enough to carry the day in a public debate with a committed believer in a paranormal belief system will soon learn otherwise. The early years of the debates with

creationists showed that one has to know what arguments to expect and what specific counterarguments to marshal.

3. *Intellectual* honesty. Scientists and scholars are supposed to be engaged in discovering the truth, wherever it may be. To the scientific mind many of the claims of paranormal powers may seem highly unlikely, even outrageous, in light of well-accepted scientific principles. But scientists must never rule out a claim on that basis alone. All claims should be put to the test of evidence. Many paranormal claims have been tested and found wanting, but that doesn't rule them out; it only decreases further the probability of their being valid. The proper approach to an untested claim is open-minded skepticism. Trained psychologists and natural scientists must be willing to devote some time to examining and testing claims on the fringes of science for several reasons. First, if they don't, persons with far fewer credentials for credibility will, and that allows more potential misinformation into the system. Second, there's always a chance they will find something important or, at least, scientifically interesting. More than likely it will not be what the proponents of paranormality expected or wanted, but there is still a chance some novel properties of nature or of human capacity can be identified. If not that, at least we start to learn more about how the mind and perceptions work to make people think that paranormal powers are at play or, to take a typical fringe-science claim, that alien spacecraft have landed. Third, just plain intellectual honesty requires investigation before reaching conclusions. The investigation doesn't have to be first-person; no one can investigate everything. It can be part of the cumulative scientific effort by all manner of qualified specialists, who then publish the results for examination by others. But, if a number of responsible, well-trained scholars don't devote some time to examining claims, then science stands vulnerable to accusations of being closed-minded. That is not a good position to be in.

4. Opportunity to teach *real* science. The appeal of the paranormal provides a wonderful opportunity to teach real science. The natural fascination people have with the paranormal and with astrology, UFOs, and the like can be converted into a curious audience willing to hear about the science involved. Astronomers and physicists can use questions about astrology to pull students into discussions of the cultural basis of constellations, the problem of precession, the scale of the solar system and the universe, the principles of gravitation and electromagnetism, and virtually any other topic in astronomy and physics. They can do the same thing with UFOs. Psychologists can use case studies about psychic claims to make any number of points about human perception, the limitations of observation, the flexibility of the mind, and so on. The interest in fringe medicine can be used as a springboard to discussions of the mind/body problem, the placebo effect, and human physiology. Questions raised about creationism can lead into the most central topics of biology, geology, and astronomy.

Carl Sagan has said that the wonders of real science far surpass the supposed and imagined mysteries of fringe science, and I agree. Scientists have an opportunity to show that science deals with awesome mysteries and concepts, from the mind-boggling information content of human DNA to the physics of the first 10^{-30} second of the existence of the universe. It's a fascinating world, and science is always on the frontier looking out into the unknown. People want to share in that adventure and experience. And they will, with just a bit of encouragement and guidance. Then they

are with you, learning and exploring together, in a partnership of science.

In 1976, the Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP) was founded in Buffalo, New York, to consider all of these matters. This international group of prominent philosophers, psychologists, physical and biological scientists, science writers, and several magicians (experts in deception and in the investigation of "psychic" powers) were concerned that the public fascination with the paranormal was beginning to have some negative consequences for education and science and society at large. They wanted to encourage the investigation of paranormal and fringe-science claims in a responsible, scientific way. One important goal was to obtain and disseminate to the public accurate, scientifically reliable information about the paranormal, in contrast to the mish-mash of mostly unevaluated claims and misinformation that was then available. They founded a quarterly publication, the *Skeptical Inquirer,* to carry the results of these inquiries and serve as a forum for discussion of the wide range of issues involved. The *Skeptical* Inquirer has achieved some prominence in this role. Hundreds of scientists, scholars, and writers from around the world have contributed their evaluative skills and talents. It has published several thousand pages of critiques, essays, and research reports on virtually every topic in the realm of the paranormal and fringe science. These represent a considerable body of evaluative material that never before existed.

The chapters in this volume are taken from articles published during the past five years in the *Skeptical Inquirer.* (A companion volume, *Paranormal* Borderlands of Science, consists of articles published in the first five years, 1976-1981.) The selection process was difficult. Some excellent articles could not be included. I have tried to emphasize articles especially substantial in content while also general in their approach and, I hope, useful to the reader. I have organized them into two somewhat arbitrary sections: those that address claims involving, in the broadest sense, alleged unknown mental powers and other matters that might fall into the fields of psychology or parapsychology. ("Assessing Claims of Paranormal Phenomena") and those that address exotic claims from outside science about the rest of the natural world ("Evaluating Fringe Science").

I hope you find them interesting, useful, and enjoyable. I also hope that, in sifting through the world of things that may or may not be so, you retain your sense of wonder and mystery, which is the motivating force for all science and exploration.

KENDRICK FRAZIER

Part I

Assessing Claims of Paranormal Phenomena

Parapsychology and Belief

1

Debunking, Neutrality, and Skepticism in Science

Paul Kurtz

The term paranormal was not invented by the Committee for the Scientific Investigation of Claims of the Paranormal but has been widely used, first by parapsychologists and later by others to refer to anomalous phenomena that allegedly could not be explained in terms of the existing categories of science. “Paranormal” refers to that which is “beside” or even “beyond” the range of normal experience and explanation. It is used to depict phenomena like clairvoyance, precognition, telepathy, psychokinesis, levitation, poltergeists, astral projection, automatic writing, communication with discarnate spirits, and so on.

Most skeptics deny that the term paranormal has any clearly identifiable meaning. Like the “noumenal,” “occult,” or even “supernatural,” its precise referents are vague and ambiguous. The boundaries of human knowledge are constantly expanding and being refined, and what was unknowable yesterday may become scientifically explicable the next day; thus the DNA code, the concept of black holes, and newly postulated subatomic particles surely cannot be said to have been “paranormal” when they were initially proposed. Is the paranormal simply equivalent to that which is “unfamiliar” or “strange” at one state in the development of human knowledge? If so, that would not make it unusual. The term *paranormal* has also been stretched far beyond parapsychology to other, so-called mysterious powers within the universe not contained within the parameters of our existing conceptual framework. It has been used to refer to such disparate phenomena as reincarnation, life after life, biorhythms, astrology, UFOs, Chariots of the Gods, the Bermuda Triangle, monsters of the deep—whether Nessie, Chessie, or Champie—Bigfoot, cattle mutilations, human spontaneous combustion, psychic archaeology, and faith healing; in short, almost anything that comes within the range of human imagination and is thought to be “incredible.”

On the current world-scene, belief in the paranormal is fed and reinforced by a vast media industry that profits from it; and it has been transformed into a folk religion, perhaps the dominant one today. Curiously, it is often presented as “scientifically warranted” and as a new, if bizarre, conception of reality that is breaking down our naturalistic-materialistic view of the universe.

Contemporary science is rapidly expanding in many directions: On the macrolevel, astronomy reports exciting new discoveries. The quest for extraterrestrial life is one of the most dramatic adventures of our time. This is grist for science fiction and the poetic imagination, outstripping that which has been verified or is technologically

feasible today. On the microlevel, physicists postulate new particles in an attempt to unravel the nature of physical reality. And in the life sciences, biologists are decoding the genetic basis of life and are on the threshold of creating new forms. At the same time, the information revolution unfolds stunning new applications.

Men and women have always been fascinated by the depths of the unknown. As far back as we can trace there has been an interest in the occult and the magical. The persistence and growth of ancient paranormal beliefs in our highly educated scientific-technological civilization is a puzzling phenomenon to many of us. There are many reasons for this, not the least of which are the fast pace of scientific progress, the role of science fiction in stimulating the imagination, and the breakthrough into space beyond our planet. And so people ask, for example, why is it not possible for the mind to engage in remote viewing of far distant scenes and events, precognate or retrocognate, or to exist in some form separate from the body. Present-day science for many seems to demonstrate that virtually *anything* is possible, and that what was once thought to be impractical or unreal can later be found to be so. And they think perhaps psi phenomena, biorhythms and horoscopes, faith healing and extraterrestrial UFOs are genuine. There is some confusion in the public mind between the possible and the actual, and for many people the fact that something is possible converts it into the actual.

Some skeptics have dissented, maintaining that since paranormal concepts contradict the basic conceptual categories by which we understand and interpret the world, they may be rejected on a priori grounds. In my view, it is difficult to impose preconceived limits to inquiry or to rule out such claims as logically “impossible.” The history of science is littered with such vain attempts. Whether or not paranormal phenomena exist and, if they do, how they may be interpreted can only be determined in the last analysis within the process of scientific verification and validation and not antecedent to it.

What Should Be the Role of Science?

Now the question is often raised: How should science deal with the paranormal ?

One familiar response is that science should ignore the paranormal entirely. Many scientists until recently considered it beneath their dignity to become involved in what they viewed as patent nonsense. This has not been the response of those scientists and scholars associated with CSICOP. We believe that such claims ought to be investigated because of the widespread public interest and also because some paranormalists on the borderlands of science claim to have made significant discoveries.

If one decides to examine such claims, how does one proceed? One way is to debunk nonsensical paranormal beliefs. Martin Gardner quotes H. L. Mencken to the effect that “one horse-laugh is worth a thousand syllogisms.” Some people have insisted that debunking is not an appropriate activity, particularly for academic scientists. To “debunk” means “to correct a misapprehension, to disabuse, set right, put straight, open the eyes or clear the mind, disenchant, or dispose of illusion, unfoil, unmask, or tell the truth” **(Roget’s** Thesaurus). Some of the claims that are made—

even by scientists and scholars—are preposterous and debunking is not an illegitimate activity in dealing with them. Sometimes the best way to refute such a claim is to show how foolish it is, and to do so graphically. Indeed, debunking, in its place, is a perfectly respectable intellectual activity that any number of great writers have engaged in with wit and wisdom: Plato and Socrates, Voltaire, Shaw, and Mencken, to mention only some. Surely it has a place within philosophy, politics, religion and on the borderlands of science and pseudoscience. It should not, however, be abused but should be used with caution; and it should be based upon a careful examination of the facts.

But there are dangers here: Sometimes what appears to be bunkum because it does not accord with the existing level of "common sense" may turn out to be true. Mere prejudice and dogma may supplant inquiry. If one debunks, he had better command an arsenal of facts and marshal evidence to show why something is improbable or even downright false. We can ask, Does sleeping under a pyramid increase sexual potency? Do plants have ESP and will talking to them enhance their growth? Do tape-recorders really pick up voices of the dead? All of these claims have been proposed by paranormalists within the past decade. They should not be rejected out of hand. On the other hand, at some point—after inquiry, not before—they may deserve forceful debunking; this is particularly the case when scholarly critiques of inflated claims go unnoticed by the public. Jeane Dixon and Uri Geller, for example, seem as unsinkable as rubber ducks—though some of us have attempted to make duck soup out of them. Thus we are concerned not simply with paranormal beliefs in the laboratory but with their dramatization in the media.

Another response to the paranormalists is to maintain that we should examine each and every claim—however far-fetched—that anyone makes, and to give it equal and impartial hearing. There are literally thousands of claims pouring forth each year. One cannot possibly deal with them all. We receive a goodly number of calls and letters every week at the offices of CSICOP from people who claim that they have prophetic powers, are reincarnated, or have been abducted aboard UFOs. Some of our critics nevertheless have insisted that this is the only appropriate response for science to make: to be neutral about them all. After all, were not Galileo and Semmelweis, and even Velikovsky, suppressed by the scientific and intellectual establishments of their day? And might not we in our day likewise reject an unconventional or heretical point of view simply because it is not in accord with the prevailing intellectual fashion? I repeat: This is a danger that we need especially to avoid. For the history of science is full of radical departures from established principles. Thus we must keep an open mind about unsuspected possibilities still to be discovered.

However, one should make a distinction between the open mind and the open sink. The former uses certain critical standards of inquiry and employs rigorous methodological criteria that enable one to separate the genuine from the patently specious, and yet to give a fair hearing to the serious heretic within the domain of science. Isaac Asimov has made a useful distinction between *endoheresies,* which are deviations made within science, and *exoheresies,* which are deviations made outside of science by those who do not use objective methods of inquiry and whose theories cannot be submitted to test, replication, validation, or corroboration. Even here one

must be extremely cautious, for an exoheretic may be founding a new science. A protoscience may thus be emerging that deserves careful appraisal by the scientific and intellectual community. Or the exoheretic may simply be a crank—even though he or she may have a wide public following and be encouraged by the powerful effects of extensive media coverage. Simple neutrality in the face of this may be a form of self-deception.

Philosopher Paul Feyerabend has maintained that there are virtually no standards of scientific objectivity and that one theory can be as true as the next. But I submit that he is mistaken. If we cannot always easily demarcate antecedent to inquiry pseudo from genuine science, we can after the fact apply critical standards of evaluation. Within these limited confines, then, I submit that some debunking is not only useful but necessary, particularly if we are to deal with the realities of belief in our media-coddled society. Given the level of ready public acceptance of the "incredible" and a tendency toward gullibility, one horse-laugh in its appropriate setting may be worth a dozen scholarly papers, though never at the price of the latter.

There is still another response to bizarre claims. In the last analysis this is the most important posture to assume; namely, if a paranormal claim is seriously proposed and if some effort is made to support it by responsible research methods, then it does warrant serious examination. I am not talking about antiscientific, religious, subjective, or emotive approaches to the paranormal, which abound, but efforts by serious inquirers to present hypotheses or conclusions based upon objective research. This is the case with parapsychology, which today deserves a fair and responsible hearing. Going back at least a century, some of the important thinkers—philosophers, psychologists, and physical scientists—have investigated the psychical: William James, Henry Sidgwick, H. H. Price, Oliver Lodge, William Crookes, and more recently Gardner Murphy and J. B. Rhine. Their work deserves careful analysis, though it is not immune to strong criticism on methodological and evidential grounds. Similarly for some aspects of recent UFO and astrological research. If there are falsifiable claims and conceptually coherent theories, then they need rigorous testing and careful logical analysis by independent scientific investigation. And here neutrality in the process of evaluation is the only legitimate approach; take a hypothesis, examine the experimental data reported, attempt to replicate the experiment, make predictions, and see if the theories are logically consistent and can be verified.

That this same neutrality should apply to fortune telling, horoscopes, tarot cards, palmistry, fortune cookies, and other popular fields is another matter. Take them into the laboratory to see if you can get results. But if you get no results, then the only response.often is to debunk them.

What Is Skepticism?

Now it is no secret that CSICOP has been identified with the skeptical position. We have said that we do not find adequate support for many or most of the claims of the paranormal that have been made both within and without science. We have been

bitterly attacked by paranormal magazines and newspapers (such as *Fate* magazine) for publishing debunking articles at the same time these publications purvey misinformation to the public and seek to sell everything from crystal balls to Ouija boards. We believe that both debunking and careful scientific examination should be done. In regard to the latter, we often find in the parasciences a lack of replication, inadequate experimental design (as in J. B. Rhine's early experiments), and questionable interpretation of statistical data (as in the remote-viewing experiments of Targ and Puthoff). Sometimes—but only sometimes—there is fraud or deceit (as in the case of S. G. Soal, Walter Levy, and others), but underlying it all there is a strong will to believe (as Project Alpha has shown).

Skepticism is among the oldest intellectual traditions in philosophy, and it can be traced back to ancient philosophers like Carneades, Pyrrho, and Sextus Empiricus, and in modern thought to Descartes, Locke, Berkeley, Hume, and Kant. Today skepticism is essential to the very life-blood of scientific inquiry.

There are many forms that skepticism can assume. One form it may take is universal doubt, the attitude that the reality of the senses and the validity of rational inference should be mistrusted. For this form of skepticism one must adopt an *epoche* in regard to all things; that is, assume the role of the agnostic and suspend judgment. Since one position is as good as the next, and all positions may be equally false, none can be said to be true. In philosophy, this has led to extreme solipsism, where one doubts not only the reality of the external world but one's own existence. In ethics, it has led to extreme subjectivism, a mistrust of reason, and a denial that there are any objective ethical standards; for values, it is held, are rooted in personal taste and caprice. In science, universal skepticism has led to methodological anarchism, the view that all scientific positions depend upon the mere prejudices of the scientific community and the shifts in paradigms that occur. If this is the case, astrology would be as true as astronomy and psychic phenomena as real as subatomic physics. Such a form of skepticism is easily transformed into the kind of "neutralism" discussed above—since all positions may be equally true or false, we have no way of judging their adequacy.

Universal skepticism is negative, self-defeating, and contradictory. One cannot consistently function as a total skeptic but must assume certain principles of inquiry, some of which turn out to be more reliable than others. We must act upon the best evidence we have, as our beliefs confront the external world independent of our wishes. Moreover, we do have well-tested hypotheses that may be held with varying degrees of probability and incorporated into the body of knowledge. The skeptic's own universal principle that there is no reliable knowledge must apply to itself; and, if so, we are led to doubt its range of applicability. A universal skepticism is limited by its own criteria. If we assume it to be true, then it is false; since if it applies to everything, it applies to itself, and hence universal skepticism cannot be universal. I do not wish to become impaled by the logic of types. The point I want to make is simply that the most meaningful form of skepticism is a selective one. This maintains that doubt is limited to the context of inquiry. We cannot at the same time doubt all of our presuppositions, though we may in other contexts examine each in turn. The doubt that properly emerges is within a problematic context of inquiry and thus can be settled only by the relevant evidence—though perhaps not completely.

What I mean is that the scientific community is always faced with new research problems, and it seeks solutions to these problems (a) in the theoretical sciences, through explanations of what is happening and why, (b) in the technological and applied sciences, by resolving questions of application. There are alternative theories or hypotheses that may be proposed and compete for acceptance. Some of them may fall by the wayside; those that win out seem to accord best with the relevant data and the conceptual framework at hand, though these may in turn be eventually modified.

Clearly, a researcher should suspend judgment until he can confirm his hypothesis and until it is corroborated by other inquirers. However, no one law or theory can be said to be final or absolute, or to have reached its ultimate formulation. Here Charles Peirce's famous "principle of fallibilism" plays a role: for we may be in error, we may uncover new data, or alternative hypotheses may be found to fit the data more adequately. Thus we must be prepared to admit new hypotheses, however novel or unlikely they may at first appear. Science is open to revision of its theories: The self-corrective process is on-going. We must always be willing to entertain and not rule out new ideas. This applies to the established sciences, but also to newly emerging proto- or para-sciences.

Conclusion

I am often asked why belief in the paranormal is so strong in the world today, and especially in highly developed and highly educated scientific-technological societies like our own. There are many explanations that can be and have been given. I wish to conclude by mentioning only two.

First is the fact that we exist in a religious culture of longstanding historic traditions, and dissenting points of view in the area of religion are not given a fair hearing. Since belief in the supernatural and occult remains largely unchallenged, the paranormalist finds a receptive audience. There are at least two cultures existing side by side. On the one hand, the religious, and on the other the rational-philosophic-scientific. Until the religious is submitted to intellectual critique openly and forthrightly, the paranormal will continue to flourish on the fringe of science.

The second reason is that although we are a scientific culture we have not thus far succeeded in our curricula of scientific education in conveying the meaning of science. There is a widespread appreciation for the benefits of scientifc technology, particularly for its economic value, as new industries are being spawned at a breathtaking pace. But at the same time there exists fear of science and its possible implications for other aspects of life. Sadly our elementary and high schools, colleges and universities, turn out specialists who may be extremely competent in their narrow fields of expertise, but who lack an appreciation for the broader scientific outlook. Within their own fields students are able to master their subject matter and apply the methods of science and critical intelligence, but these methods often do not spill over to other areas of belief.

In my view, a major task we face is proper education in science, both in the schools and for the general public. There is a failure to appreciate the importance of skeptical thinking. A truly educated person should come to appreciate the tentative character of

much of human knowledge. The burden of proof always rests upon the claimant to warrant his claim. If all the facts do not support it, then we should suspend judgment.

Science surely is not to be taken as infallible, and some of the defects found in the pseudo- and para-sciences can be found in the established sciences as well, though on a reduced scale. Scientists are fallible, and they are as prone to error as everyone else —though it is hoped that the self-corrective process of scientific inquiry will bring these errors to the light of day. Similarly, it would be presumptuous to maintain that all intelligence and wisdom is on the side of the skeptic; for he may be as liable to error as the next person. Fortunately, we have our critics and they are only too willing to point that out—for which we should be grateful. We have made mistakes and have sought to correct them. We should not trust anyone to have all the truth, and this applies to ourselves as well.

Whether life can be lived truly rationally and whether all of our beliefs can be tested before we accept them is a topic that philosophers have long debated. Suffice it to say that selective skepticism can have a constructive and positive role in life, that some degree of skepticism is important, and that reflective individuals will learn to appreciate its value.

2

The New Philosophy of Science and the ‘Paranormal’

Stephen Toulmin

Over the past thirty years, there has been a major shift of focus on the part of many philosophers of science. This has been associated with a new recognition of the depth and importance of historical change as a factor in shaping our scientific beliefs, ideas, and presuppositions, and in determining the contexts of scientific discovery and even the methods of scientific research. The most widely read book in this new vein has, of course, been Thomas Kuhn’s The *Structure of* Scientific Revolutions. But this work is only the tip of an iceberg, and it is perhaps too vague, superficial. and lacking in detail to help us in any examination of the claims of the paranormal. It is too easy, for instance, for parapsychologists and others to claim the Kuhnian protection of working according to “a different paradigm.” So, here, let me indicate in my own terms—without any resort to the jargon of paradigms—what implications the current shift in philosophy of science has for the work of the Committee for the Scientific Investigation of Claims of the Paranormal.

Our immediate predecessors (as is well known) hoped that the work of defining a proper “method” for the sciences would yield a unique method, applicable to the subject matter of any science and notably to a given science at any stage in its historical development. Thus they sought to move beyond the position of (say) Aristotle, who claimed that each different kind of problem and subject matter needed to be analyzed, discussed, and explained in correspondingly different terms. In turn,