Proving Negatives and the Paranormal

Is it really impossible to prove a negative, or is that often-heard statement merely a platitude that happens to be false?

Tony Pasquarello

BY THE VERY nature of their intellectual orientation, skeptical inquirers find themselves more often than not propounding and defending negative propositions, e.g., those that deny the existence of certain entities (ancient astronauts, Bigfoot, the Loch Ness monster) or deny the occurrence or validity of certain phenomena (dowsing, psychokinesis, telepathy). To those who level cries of "negativism" against such proponents, no retort is necessary, for the charge represents a mere emotive sentimentality, a longing for a bygone world of fairies and goblins banished from reality by the progress of science and philosophy. What is peculiar, however, is encountering the embarrassed, apologetic stance of the skeptics themselves in advancing negative propositions as though they believed themselves engaged in a rationally futile enterprise, jousting with rubber erasers against some eternal logical law carved in the very marble of the mind. Innumerable articles in atheist-humanist publications reveal this common sorry spectacle—argument after devastating argument against the existence of God followed by a few patronizing whimpers to the effect that ". . . of course, no one can prove a negative." At a recent Oberlin College debate between Duane Gish and Fred Edwords, editor of *Creation/Evolution,* I was astonished that, in the midst of demolishing Gish with a barrage of telling points, Edwords should suddenly volunteer

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the concession that "naturally, it's impossible to prove a negative." Then again, in a piece in the SKEPTICAL INQUIRER, Dale Beyerstein renders the traditional homage to this supposedly inviolable maxim by favorably citing the "truism that it is impossible to prove the nonexistence of something. . . ."[1]

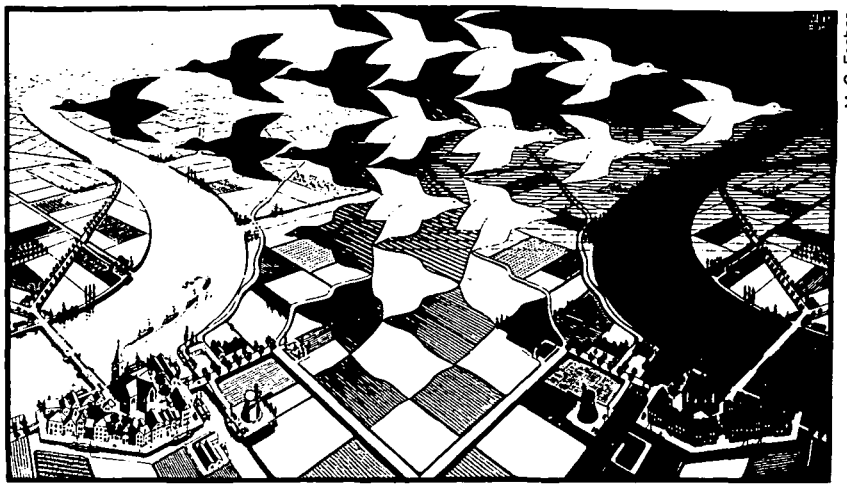
What's a Negative?

One wishes that Beyerstein had included some references supportive of this "truism." In fact, a check of the indices of some fifty formal and informal logic texts in my office, under the headings "nonexistence," "negatives, "proving negatives," etc., turned up absolutely nothing. Nor do any of the Aristotelian treatises on logic and rhetoric mention this "truism." A brief search of several encyclopedias and casual inquiries among colleagues—some of them logic specialists—likewise produced "negative" results. Gradually, there dawns a sneaking suspicion that the impossibility of proving a negative might be one of the universally accepted platitudes that unfortunately just happens to be false!

Proponents of the anti-negativist thesis (we can't prove a negative) have seldom been clear on just what is to count as a negative proposition. Are these only propositions containing "no" or "not," or also propositions containing "non," or indeed any term formed with an initial negative particle, such as "illiterate," "immoral," "irresponsible," etc.? What of exclusive ("only") or exceptive ("all but") linguistic structures whose function is partly negative? What of double or triple negatives?

Furthermore, is the anti-negativist thesis about *any* negative proposition ("Whales are not fishes") or specifically directed at negative *existential* propositions ("There are no mermaids")? It is perfectly plausible to maintain that *all* classical negative propositions are negative-*existential* ones since they all deny the possibility of finding a specified combination of attributes—"Whales are not fishes" is equivalent to "There are no whales that are fishes."

On the traditional characterization of negatives, it might be worth noting that: (1) Of the fifteen unconditionally valid syllogistic forms, ten have a negative proposition as the conclusion. Hence, at least these ten are "proofs of a negative." (2) All categorical propositions, affirmative or negative, have a logically equivalent but qualitatively opposite obverse form (e.g., for "All whales are mammals," "No whales are nonmammals"). Hence, if we can prove an affirmative—I hope we can do that!—we have also proved its negative equivalent. (3) The explosive development of logic in this century has rendered the distinction between affirmative and negative propositions almost wholly insignificant. It makes little difference whether our systematic apparatus for discussing the Shroud of Turin contains the term fake or authentic, for "fake" means "not authentic" and "authentic" means "not fake."



M. C. Escher

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Proving Nonexistence Simply

The most cursory of glances is sufficient to establish that there is no elephant in my bedroom and the same glance proves that there is a bed in the room. Slightly more rigorous inspection ascertains the nonexistence of a starlet in my bedroom. It might be quite arduous to show that there are no ants in the room, but it could be done. Indeed, it might be just as difficult to show that there *are* ants in the bedroom; it is possible that neither the negative nor the affirmative claim may be resolved until examination of that last cubic inch is complete. These simple and direct (unproblematic) cases of proving nonexistence contain some extremely important points.

1. When, in observing my bedroom, we see that there is no elephant there, we have *proved,* in all the appropriate logical and epistemological senses of that term, that there exists no elephant there. Thus the nonexistence of an elephant in my bedroom is beyond any reasonable doubt; it is known to be a fact; it is conclusively verified; it is absolutely certain; it is automatically believed by all those making the observation; and so forth. Furthermore, both commonsense practice and ordinary language usage agree that this is the pertinent way of proving that there is no elephant in my bedroom; as in most other cases, we look! (Look here, Aunt Millie. I'll prove to you that there's no intruder in your bedroom. We just looked in the closet; now let's look under the bed. See! No one here.) But, if looking proves the nonexistence of an elephant in my bedroom, it must be wrong (incorrect) to assert that it is "impossible to prove

the nonexistence of something." Since we do it all the time, it can be neither technically nor logically impossible to do.

And, as for its being the appropriate mode of proving nonexistence, consider how ludicrous it would be, in that context, to provide any laborious, didactic demonstration, deductive or inductive, of either the existence or nonexistence of an elephant in my bedroom.

2. "There are ants." "There are no ants." These assertions are perceived as logically odd precisely because no domain or realm is specified. Those purported ants produce an almost palpable itch to inquire, "Where?" In my kitchen? Garden? Bedroom? In the vast majority of existential claims, such a domain specification is explicit or implicit, often as an integral part of the entity characterization. Our grasp of the terms of characterization usually includes both *where* to look (the domain) and *how* to look (the type of entity). Thus, "No primes exist between 13 and 17" clearly specifies the domain and the type of search to be conducted—mathematical rather than empirical.

Descriptions and Domain

Part of the difficulty in assessing existential claims for paranormal entities is that in many, though not all, cases such claims are domain inspecific—"God exists"; "There are vampires"; "Spirits are real." And, because we inherit centuries, even millennia, of confused proliferation regarding entity descriptions—descriptions that are themselves massive accretions of speculation, fantasy, and invention—considerable fuzziness over domain is precisely what one would expect. Without a concrete physical presence providing a healthy check to fertile imaginations, is it any wonder that paranormal entity-descriptions just "growed like Topsy"? Everything—all proving or disproving, all verification or confirmation, all evaluation of affirmative or negative claims—everything depends on the clarity, completeness, constancy, and consistency of the entity-description. I cannot maintain that the Sears Tower is in Mansfield, Ohio, because the Sears Tower itself is *there* in Chicago, a spectacular restraint to the brashness of my thesis. But, were I to claim that mermaids have freckles, my speculation is as legitimate as any other, consistent with the defining properties of mermaids. Were my influence to be of considerable scope, "freckled" could become part of the lore of mermaids, eventually to be incorporated in the definition, as much a part of mermaid essence as "alluring" is now.

Difficulty and Inconsistency

The notion that we cannot prove nonexistence may really be a confused version of the thesis that verification of affirmative existential claims ("There are ants in the kitchen") requires only one positive instance, while examination of the entire domain is necessary to prove the negative ("There

are no ants in the kitchen"). Perhaps the germ of truth intended is merely that it is always more difficult to verify negative existential claims. Yet even this "germ" may turn out to be virulently misleading.

It is rarely acknowledged, or even noticed, that the confirmational difference between affirmative and negative existential propositions is wholly attributable to the fact that the former are *particular* while the latter are always universal with respect to the domain. So it is hardly surprising that one instance proves the affirmative claim since the claim *is* only that there exists at least one entity of the sort described. Universal propositions can be hard to confirm, whether affirmative or negative, because they do refer to the entire universe, either conceived literally as the physical universe or the planet Earth, or the universe of discourse or context—e.g., the room, the Loch, etc. In short, the affirmative–negative distinction is here irrelevant; what anti-negativism has failed to observe is that its claim is really about the particular-universal distinction.

In passing, we might note that if the entity-description involves an internal inconsistency (self-contradiction), then nonexistence is de facto proved. Indeed, this has often been the method of choice for many of the more infamous paranormal entities—e.g., God[2]—any two of whose attributes often appear to be, if not overtly, at least potentially inconsistent.

Even if we disregard the appeal to logical inconsistency, considerations remain that indicate a virtual parity between the verification of affirmative and negative existential statements. It is far easier to verify that there is no elephant or starlet in my bedroom than to verify the presence of an ant in the same room. Nor do we have to actually examine the entire domain to do it. For, when a consistent empirical existential claim contains a relatively clear and complete entity-description, ease of verification is seen to really be a matter of the size of the entity relative to the domain (scale), the number of objects in the domain (density), the similarity of the given entity to other objects in the domain (resemblance), and quite possibly other factors. I do not have to examine the entire bedroom domain (the closet, the dresser drawers, etc.) because, knowing the meaning of the term "elephant," I know that an elephant cannot fit into a closet or drawer; painstaking examination may be necessary to prove any proposition about ants.

Common sense harbors a bit of wisdom concerning verification; curiously enough, it concerns the verification of an affirmative proposition, not a negative one. It compares the difficulty of certain tasks to "looking for a needle in a haystack." It is hard to find a needle in a haystack, or to decide that there is no needle there; harder still to find a straw-colored needle; still easier to find a beach ball, or to confirm its nonexistence there. All these cases show that the simplicity or difficulty of verification has little to do with affirmative or negative, but rather with matters of scale, density, and resemblance.

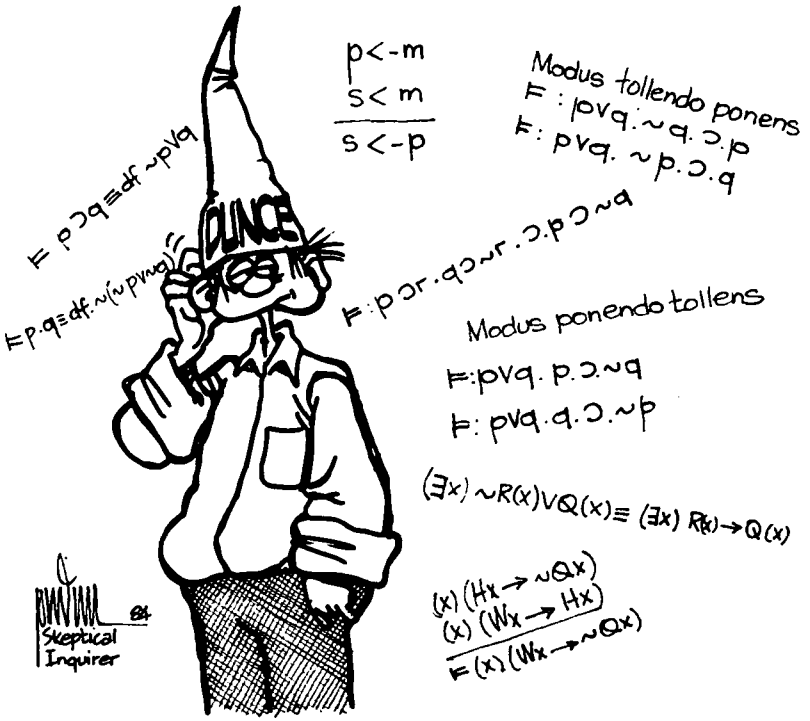
Let it be granted that nonexistence cannot be proved if the entity-

description is seriously lacking in clarity or completeness; but, then, neither can existence be proved under those conditions. Nonempirical entities tend to be metaphysically "skinny" critters; they can always be gratuitously inserted into any domain. That invisible little man who turns off the refrigerator light when the door is closed—can anyone prove that he's not there? Here, the proper response is to ask, How is an invisible, intangible, miniature man a *man*? Why not call the entity a marsupial, or a Martian, for that matter? And if the reply were: "Well it's not really a man in the usual sense, but still there really is an unspecified sort of something in some way in the refrigerator; you prove there isn't!" no responsible inquirer would feel any logical or moral obligation to answer the challenge. Here is the extreme case, a paradigm of the gradual evisceration of an originally substantial thesis (there's a man there) so as to render it immune to falsification (there's something there). When the entity is put on this stringent metaphysical diet, the resultant description is so thin as to be empty. Whose existence or nonexistence in the domain is to be proved?

When, however, a given characterization is not vacuous but is of sufficient content and clarity to be evaluated, but the domain itself is remote or inaccessible (the past may be construed as an inaccessible domain), then ordinary probability assessments are relevant and constitute the proof of either existence or nonexistence.

Inconstancy and the Nonmaterial

Description fuzziness, inconstancy, and domain inspecificity are subtle ploys evolved over centuries for ensuring that the nonexistence of an entity in a domain goes undetected. Chameleonlike pawns, paranormal entities are often shifted from sphere to sphere, from here to there, sometimes characterized as this, then later as that. Pity the poor language analyst attempting to trace out the complex entailments and family relations among a network of relevant concepts: "paranormal," "metaphysical," "nonmaterial," "nonempirical," "nonspatial," "spiritual," "mental," "domain-free," "universal," etc. Beware of any simplistic judgments concerning synonymy or implications among these; in truth, we simply do not know, in any comprehensive sense, what these terms mean. Numbers are nonmaterial, but surely not spiritual and perhaps not mental. Are they metaphysical? Universal? God claims a universal domain—he is characterized as "omnipresent"—yet even the staunchest believer might balk at saying that God is literally *in* the intestinal tract of a skunk, or a member of the series of natural numbers. The individual mind—notice that the mind is never characterized as "mental"—purported to be nonmaterial, seems oddly restricted to bodily quarters. My mind, alas, stays fairly close to this Italianate body, never liberated to go traipsing about the beaches at Nice or St. Tropez. Ghosts, poltergeists, and other assorted spirits are, of course, spiritual—Are they? Or are they composed of that wonderfully



ambiguous stuff ectoplasm?—yet exhibit a decided affinity for specific houses, crypts, and graveyards.

One particularly insidious aspect of muddled, shifting entity-descriptions involves the frequent switching from the physical to the spiritual, and back again, ad infinitum. The Christian deity is one such example.

The same ambivalence plagues the entire entourage of spiritual entities—angels, demons, ghosts, heaven, hell—all are normally classified as utterly spiritual, while at the same time exhibiting some surprisingly solid and substantial properties. A very large portion of the history of theological musings can be seen as the wide, often frantic pendulum swings between the spiritual and the physical. On the one hand, we have the quite understandable attempt to make nonstandard entities more "real" by providing them with matter or body. On the other hand, we see them—or their nonexistence—conveniently made detection-proof by the insistence that they are not only and not always physical. When the domain and entity-descriptions are sufficiently specific and coherent and domain inspection is possible, and when the inspection comes perilously close to proving that the entity simply does not exist, that elusive entity is given sanctuary in the realm of the "spiritual," thereby insulating it from apprehension.

Bigfoot proponents have learned all these lessons well, providing us with a contemporary sample of evasive maneuvers: In the treasury of

Bigfoot tidbits, often reported in the SKEPTICAL INQUIRER, that same pattern is manifest. To give the monster his due, Bigfoot has always been a sharply described creature favoring a quite definite habitat, the high country of the Pacific Northwest. But, since years of investigation and field study have produced nothing tangible, we come near to unmasking him as a fraud; we have almost proved his nonexistence. Voilà! The predictable reaction—reports of Bigfoot sightings in other states, particularly Ohio (how could he survive a Columbus summer?) and claims that he is so hard to spot because he is, after all, a hyperspatial being presumably capable of warping between different dimensions or universes.

The moral is surely evident. When in the course of scientific investigation we approach a point of wholly warranted justification in claiming that a certain entity does not exist, then champions of the entity simply enlarge, alter, or shift domains entirely, or change the entity-description, thereby protecting and perpetuating the entity's bare possibility.

Explanatory Hypotheses

A psychic surgeon performs seeming wonders, complete with an appropriate display of blood and guts (the excised tumor); an investigator duplicates the feat of digital dexterity, using a fake digit containing chicken innards, and suggests that this is how psychic surgery is really done. Hasn't the surgeon been unmasked?

A psychokineticist claims to move such objects as balanced pencils and dollar bills by the vibrations of his mind alone; an investigator[3] achieves the same results by wafting imperceptible puffs of air toward the objects. Doesn't this blow away the psychic's claim?

In each instance, the answer is a mixed one. Frequently, a fully explanatory, satisfying alternative hypothesis as to the true cause of the phenomenon in question is the best that we can practically obtain. Such explanations do constitute a form of disproof of the paranormal claim that might be termed "weak refutation." But alternative hypotheses are usually consistent with other hypotheses (always providing that each is fully explanatory), including the truth of the paranormal account itself.

Since the creation, formulation, and testing of hypotheses and their role in scientific methodology constitute the most difficult and intriguing set of problems in the philosophy of science, a detailed treatment can hardly be provided here that would cover all types of explanations. Those most prominent in discussions of the paranormal are *alternative* explanations—accounts of how a given event might have come about in a perfectly normal way; postulations of naturalistic causes for various sightings; ingenious scenarios providing plausible modes in which certain results might have been forthcoming without violating ordinary scientific laws. These hypotheses mirror, quite expectedly, the staggering diversity of the paranormal phenomena themselves. Some explanations are meant to account

only for *this* sighting, *that* event; others are broader in scope, purporting to be the explanation for *all* of a certain sort of observation or event. Naturally those that are most specified and restricted are the easiest to conclusively confirm and *do* rule out the paranormal, *for that observation.* "What you are now observing and take to be a flying saucer is really a street light on the opposite hill" is such a hypothesis, capable of complete, decisive confirmation. Also critical in evaluating the adequacy of hypotheses are the temporal parameters of the event—the question of whether it is current, past, or distantly past.

Lumping a very large number of diverse events under one heading, such as "UFO phenomena," can produce conceptual muddiness, for it is surely not the case that there is one and only one explanation for all UFO sightings. A wild assortment of hypotheses, including weather balloons, inversion effects, the planet Venus, advertising planes, swarms of luminous insects, experimental aircraft—not to mention those many other explanations based on the psychological state of the subject[4]—has been advanced to account for UFOs, and there is little doubt that each is the correct explanation for some subset of the sightings and that collectively they may well account for all the sightings. Nevertheless, little green extraterrestrials may have been circling the earth in flying saucers for these past fifty years and could be there now. Alternative hypotheses do not eliminate the paranormal account and, unless the entire stratosphere can be monitored with a far greater efficiency than we now do the U.S.-Mexican border, there cannot be strong refutation of flying saucers.

Here, the immensity of the domain bars direct inspection and strong refutation. In the case of ancient astronauts, the inaccessibility of the remote past is the prohibitive factor. In both cases, alternative explanations account for all the sightings or alleged evidence, while the aforementioned probability assessments—where the primary negative exponent will be those vast, incomprehensible interstellar distances—establish the improbability of extraterrestial visitors, ancient or modern.

Weak refutation often appears to be conclusive because there is a natural tendency to supply those intuitive principles that, taken together with the explanatory hypothesis, strengthen the refutation to near-deductive limits. Those tacit additional assumptions are the familiar ones: among others (1) Occam's Razor—the simplest explanation is the correct one; (2) Naturalistic Commitment—the explanation within the bounds of known natural law is correct; (3) Uniqueness of Causes—for any given type of event, sufficiently specified, there can be only one cause. Joe Nickell's brilliant replication of all relevant Shroud characteristics by rubbing and daubing bas-reliefs, using only fourteenth-century techniques and materials, is a splendid example of such an attractive alternative hypothesis.[5] Nickell's enthusiasm is so contagious, and his achievement so remarkable, that we unwittingly make those imperceptible inferential leaps from "it could have been made in this way" to "this is the only way it

could have been made" and thence to "this is how it was made." But it must be emphasized that the Nickell hypothesis does not of itself eliminate other explanations, not even the one including that infamous "burst of spiritual radiant energy" at the moment of Resurrection.

No, the "fake thumb" explanation does not prove that the psychic surgeon is not operating paranormally, but films of the "surgeon" using a fake thumb *do*—and such films exist. And, while the "blowing" hypothesis does not prove that James Hydrick is a fraud, Hydrick's own admission that blowing is his modus operandi most decidedly does![6] Here are wonderfully clear examples of the contrast between weak refutation (alternative hypotheses) and strong refutation. I would venture the suggestion that part of the motivation for anti-negativism is the fascination with and concentration on alternative explanations, coupled with the perception that weak refutation is indecisive because alternative explanations do not prove that a given entity does not exist. In this perception, anti-negativism is entirely correct. We cannot prove a negative, or nonexistence, *in that way,* but it is fallacious to spring to the generalization that we can never prove a negative; in addition to weak refutation, strong refutation is often viable. Explanations in terms of a peculiarly shaped new waterbed and dark-gray designer bedding may explain prior elephant sightings in my bedroom but do not prove that there is no elephant there. However, to reiterate an opening point, *looking does.*

Conclusion: The Loch Ness Monster

Most of the issues raised here can be illustrated, and perhaps clarified and unified, by a summarization in terms of the Loch Ness monster. Here is one paranormal question that many believe has the best chance of being decisively settled in the near future. Our analysis shows why this is so.

The Loch Ness creature is really a modern phenomenon stemming from the early 1930s, there having been only ten or so dubious observations prior to that time. Luxuriant imaginations have not had time to flower out of control, a circumstance favoring a rather stable and clearly defined entity-description. Nor does there appear to be any internal logical inconsistency: the creature is a quite possible one. Never has a serious breath of nonempirical or nonmaterial scandal touched the creature; whatever its specific nature, it has always been characterized as a very solid, fleshy being. Thus the creature scores well on consistency and completeness, clarity and constancy of description.

As for domain, the loch is a nicely circumscribed, virtually closed domain, rather large in volume but relatively small, since the creature is also rather large and estimates of number would range from a minimum breeding population to perhaps 200 or 250 animals. This restricted domain means that, unlike Bigfoot, the creature cannot wander off to be reported elsewhere. Other monsters are reported in other lochs, but they are *other*

monsters. The criteria of scale and resemblance also tend to favor ease of confirmation or disconfirmation—several large animals that don't look much like anything else in a reasonably confined area. And the loch is accessible and easily reached. Basically the only hindrances to confirmation are the great loch's depth in spots (up to 700 ft.) and the turbidity of the water due to enormous quantities of suspended peat particles. Both tend to make visual examination difficult; but then Loch Ness is not the Marianas Trench.

Scientists have compiled an impressive mass of ecological information concerning Loch Ness, forming a solid data base from which to calculate the possibility that a specific candidate is, in fact, the monster. For, if we know, say, the predatory habits or temperature limitations of a certain sort of animal, and we also know the temperatures and food supplies in the loch, then we can make responsible probability estimates as to whether that animal is the Loch Ness monster. For example, just such calculations produce high probability rankings for amphibians and thick-bodied eels, and low rankings for reptiles.

But in addition to probabilistic speculation, the loch provides a fertile field for the generation of alternative hypotheses. From ducks to otters, fishing birds to fishing boats, vegetation mats to gas bubbles, there has been no shortage of explanations. Perhaps the best among these, for sheer brilliance and scientific perspicaciousness, is that of Robert Craig.[7] He suggests that Scots Pine trees, plentiful about the loch, die, sink to the bottom, and form resin-covered watertight logs. Eventually, decomposition produces internal gases that form blisters at the truncated limb ends and cause the log to rise to the surface. The blisters burst, the log is propelled, swims, fizzles—mimicking all monster movements and appearances—then sinks again to its watery grave: Another monster sighting is recorded. Yet, having created a virtually perfect alternative explanation, Craig, in his justifiable pride, tends to overstate the import of weak refutation: "All that is needed to confirm this highly plausible hypothesis is to dredge the bottom for blistered logs."

We may well inquire, What hypothesis? That the monster does not exist? That the monster really is blistered logs? Strictly speaking, if we find these logs, that only confirms the theory that there are blistered logs in the loch. Craig forgets that there might be as many fetching blistered logs as you like performing their hydrodynamic ballet, Swan Loch—or is it Swan Log?—and there might be Nessie, an actual aquatic animal, playfully swimming alongside.

So much for probability estimates and weak refutations. Finally, can there be strong refutation? Can we prove that the Loch Ness monster does not exist? (And this particular "can" is more than bare logical or even empirical possibility; "can" here means practicality or feasibility.) Why of course we can! We can drain, strain, or seine the loch. Or, more pragmatically, we can devise any number of scientific technologies that amount to

the same thing—the functional equivalent of examining every portion of the domain capable of containing a creature of that description. This, after all, is what a number of Loch Ness research teams have been doing for years, and their tools—sonar, submersibles, cameras, and microphones—are simply devices for examining the domain. It makes no difference whether we describe their efforts as trying to find the monster or trying to prove there is none, for these are, as we have insisted, two sides of the same coin.[8]

To say that something exists is really to say that certain properties that we ordinarily take to be important, essential, defining, or "core" properties can be found *in combination.* Since we never find the upper-half of a woman combined with the lower-half of a fish, we say that there are no mermaids. Two of the central characteristics of the Loch Ness monster are, at least, that it is an animal and that it is big. A log is big, but not an animal. A duck is an animal, but not big. Yes, we may find items that have been taken to be, or mistaken for, the creature. But if thorough examination of the domain does not discover the proper combination of characteristics, then we have proved that the monster does not exist. And, in so doing, have another confirming instance of what deserves to become the new, and this time, authentic truism: "It is always possible to prove the nonexistence of something."

Notes

1. Dale Beyerstein. "Skepticism, Closed-Mindedness, and Science Fiction." SKEPTICAL INQUIRER (Summer 1982).

2. The interface between religion and the paranormal is so rich and so obvious that no apology is needed for classifying the Deity as a paranormal entity. If the Shroud, exorcism, spirits, spiritualism, reincarnation, miracles, and gods, tribal or Olympian, are all paranormal issues, then so is the existence of God.

3. In both cases mentioned, at least one investigator was the redoubtable James Randi.

4. It could be helpful to divide alternative hypotheses into objective and subjective—the former based upon actual, but misinterpreted, external events; the latter emphasizing alterations in the perceptual state due to drugs, stress, etc.

5. Joe Nickell, "The Turin Shroud: Fake? Fact? Photograph?" *Popular Photography* (Nov. 1979). See also his *Inquest on the Shroud of Turin* (Buffalo, N.Y.: Prometheus Books, 1983).

6. James Randi. " 'Top Psychic' Hydrick: Puffery and Puffs." SKEPTICAL INQUIRER (Summer 1981).

7. Robert P. Craig. "Loch Ness: The Monster Unveiled." *New Scientist* (Aug. 5, 1982).

8. Most of the information on Loch Ness is taken from the definitive work: Roy P. Mackal, *The Monsters of Loch Ness* (Chicago: Swallow Press, 1976). ●