SCIENTISTS AND ANOMALOUS PHENOMENA: PRELIMINARY RESULTS OF A SURVEY

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Introduction

In the summer of 1978, we surveyed 300 professional scientists on two types of anomalous phenomena, Bigfoot and the Loch Ness Monster (hereinafter referred to as Nessie). Three kinds of scientists were involved: physical anthropologists, marine biologists, and physical chemists. All held Ph.D. degrees or the equivalent, and were professionally employed at universities, research institutions or federal agencies. Half of each group was sent a Bigfoot questionnaire; the other half of each group was sent a Nessie questionnaire. Thus, we can compare responses from both physical anthropologists and marine biologists on either Bigfoot or Nessie. The physical chamists served as a control group, since they were presumably not professionally concerned one way or the other by the question of the existence of either of these creatures. As it turned out, our choice of physical chemists for this control group was a good one.

The purpose of this article is not to present the statistically significant results from the survey. Statistical analyses are still underway, and results will be presented at some future time (King and Greenwell, in pareparation). Rather, we wish here to discuss some of the more general results, and, in particular, the reactions and critical comments on the part of many of the respondents, some of which were striking and unexpected.

Some respondents limited themselves to criticizing what they believed to be the widespread public acceptance of Bigfoot and Nessie (although a 1978 Gallup Poll found that only 13% of the American public believe in the existence of these creatures, far less than the belief in ESP [51%], precognition [37%], or astrology [29%]). Others criticized any studies whatsoever related to these topics, and some questioned the very purpose of the survey we were conducting, our motivations, and even the design of our questionnaire (this even though the exact purpose of the study was not known to them). Some respondents did not seem able to distinguish between the study of Bigfoot or Nessie as possible biological animals, which certainly falls within their areas of speciality, and the study of attitudes toward the possible existence of such creatures, which is a legitimate pursuit within the framework of social psychology.

Justification for Study

As our motivations and purposes were sometimes questioned, we shall first discuss the reasoning behind, and justification for, our survey. In looking at the history of scientific progress, one finds more often than not heated controversy between the proponents of new theoretical frameworks (or even slight shifts in existing theoretical frameworks), and those who ardently maintain that the existing frameworks are correct. Much has been written on these topics, and we do not intend to review this literature here. Suffice it to say that what many have called "establishment science" has been constantly battered by the adherents of new theories, laws, or effects, and most often science has ignored or rejected these claims. As the overwhelming majority of the claims have been ill-founded for one reason or another, one could state that this has been a proper approach by the scientific establishment. One may also wonder, however, to what extent the atittude of scientists (in rejecting such claims) is related to psychological causes, such as social conformity, rather than to a critical examination and assessment of the data themselves.

If social factors are indeed involved, the implications for the future of scientific progress are important, and the study of this interesting social phenomenon falls within the province of psychology. We thus decided to attempt to measure such attitudes on two continuing and controversial areas, the question of the existence of Bigfoot and Nessie.

Method

The names and addressed of 300 professional scientists were used in the survey. One hundred physical anthropologists were identified from the Fifth International Directory of Anthropologists, published in 1975 by the University of Chicago Press. The Directory contains addresses and biographies on all Associates of the professional journal Current Anthropology. Care was taken to select only physical anthropologists with Ph.D. degrees, and affiliated with academic or research institutions in the U.S. and Canada. One hundred physical chemists were identified from the 1977 edition of the American Chemical Society's Directory of Graduate Research. The Directory contains descriptions of all major chemistry departments in the U.S. and Canada, including faculty biographies. Likewise, care was taken to select physical chemists with Ph.D. degrees, and affiliated with U.S. or Canadian institutions. One hundred biological limnologists and oceanographers (for simplicity here referred to as marine biologists) were identified from the 1976 Membership Directory of the American Society of Limnology and Oceanography. The Directory contains the addresses and specialities of all the Society's members. Again, care was taken to select only biological (rather than physical or chemical) limnologists and oceanographers with Ph.D. degrees, and affiliated with U.S. or Canadian academic or research institutions.

A Bigfoot questionnaire and a Nessie questionnaire were designed and mailed to the target individuals with a cover letter. The two questionnaires were very similar in format and the types of questions asked. The cover letter, from the Department of Psychology at The University of Arizona, stated that their views were specifically being sought as part of a larger, national study of controversial topics on the fringes of science (in order not to arouse suspicion as to real purpose of the study, we also mentioned acupuncture, ESP, and UFOs).

Half of each group of physical anthropologists, physical chemists, and marine biologists was sent a Bigfoot questionnaire (50 x 3 = 150); the other half of each group was sent a Nessie questionnaire (50 x 3 = 150). A stamped, self-addressed envelope was enclosed with each questionnaire. All the questionnaires were mailed on June 6, 1978. Sixty-four percent of the returned questionnaires were mailed back within two weeks of their estimated receipt. Almost 79% were mailed back within four weeks.

Preliminary Results

Questionnaires were mailed to 300 scientists; 181 responded, representing a response rate of 60%. Of these, two respondents merely sent satirical questionnaires of their own (which purported to solicit further information on the nature of our survey), and one wrote a letter but refused to complete a questionnaire. Thus, 178 questionnaires were returned, representing a (usuable) response rate of 59%. (A few enveloped had been returned by the Postal Service as undeliverable; we replaced these with new mailings to new target individuals in order to ensure that exactly 300 questionnaires were received.)

Of the returned questionnaires, 53% were on Bigfoot (physical anthropologists 22%, physical chemists 13%, marine biologists 18%), and 47% were on Nessie (physical anthropologists 17%, physical chemists 13%, marine biologists 17%). Overall, then, the highest response rate was from physical anthropologists on Bigfoot. It is interesting to note that the control chemists responded equally on both topics.

Our first finding, which was not altogether unexpected, was that acceptance of Bigfoot (as a living species "still unknown to science") among all three groups was far lower than the acceptance of Nessie (as a living species "still unknown to science"), 10.6% and 31% respectively ($X^2 = 9.85$, df = 1, $P < .005$). Physical anthropologists and marine giologists accept Bigfoot at an equal rate, 12.8% and 12.5% respectively, while only 4.3% of the physical chemists do so; 23.3% of the physical anthropologists and 30.4% of the physical chemists accept Nessie, while 38.7% of the marine biologists do so.

Among all three groups, 40.4% believe that ordinary animals, such as bears, are involved in Bigfoot reports, and 34.5% believe that Nessie reports involve such misidentifications. However, 69.1% believe that Bigfoot reports involve hoaxes, imagination, and myths

(physical anthropologists 74.4%, marine biologists 78.1%), while only 47.6% believe the same for Nessie reports (physical anthropologists 56.7%, marine biologists 38.7%) ($X^2 = 8.09$, df = 1, $P < .005$).

For those who reject Bigfoot and Nessie as real biological creatures (89.4% and 69% respectively), it is interesting to learn of their reasons for doing so. They cite the lack of fossil evidence (51% for Bigfoot, but only 6% for Nessie), the lack of specimens, or parts thereof (83% for Bigfoot, but only 54% for Nessie), the lack of bones (70.2% for Bigfoot, but only 35.7% for Nessie), too large a size (4.3% for Bigfoot, 1.2% for Nessie), the lack of nutritional resources in the environments where they are reported (10.6% for Bigfoot, and 17.9% for Nessie) the unlikelihood of remaining so long "undetected by science" (42.6% for Bigfoot, 32.1% for Nessie), or that their existence was simply "too bizarre to consider" (2.1% for Bigfoot, 2.4% for Nessie). Fewer physical anthropologists than marine biologists (35.9% versus 46.9%) accept the rationalization that Bigfoot could not have remained so long "undetected by science," and, conversely, fewer marine biologists than physical anthropologists (25.8% versus 40%) accept the same rationalization for Nessie.

One of the most interesting results from our survey is the different perceptions of the impact that the discovery of such animals would have "on science." Only 3.3% of the physical anthropologists believe that the discovery of Nessie would have a "severe" impact, 36.7% believing that it would have a "moderate" impact, and 60% believing it would have only a "slight" impact. When it comes to Bigfoot, however, the reverse effect occurs: 51.3% of the physical anthropolosists believe that its discovery would have a "severe" impact, 30.8% believe it would have a "moderate" impact, and only 7.7% believe it would have a "slight" impact. This consensus among physical anthropologists on Bigfoot is not shared by their scientific colleagues in physical chemistry and marine biology. Only 13% of the physical chemists believe Bigfoot's discovery would have a "severe" impact on science-60.9% a "moderate" impact, and 17.4% a "slight" impact. Among the marine biologists, 21.9% believe it would have a "severe" impact, 53.1% a "moderate" impact, and, again, 21.9% a "slight" impact.

Despite the relatively low proportion of scientists who accept the existence of Bigfoot or Nessie, the majority would, nevertheless, support research in these areas. Among all three groups, 56.4% favor Bigfoot research (physical anthropologists 61.5%, physical chemists 42.4%, marine biologists 64.5%). At the same time, however, most feel very strongly that such research should not involve federal funds: 51% are opposed to federal funding for Bigfoot (physical anthropologists 61.5%, physical chemists 39.1%, marine biologists 56.3%), versus 29% who do favor federal support (physical anthropologists 35.8%, physical chemists 30.4%, marine biologists 35%), and 20% who are uncertain. An even greater majority of 63.1% is against federal funding for Nessie research (physical anthropologists 63.4%, physical chemists 60.9%, marine biologists 64.5%) versus 25% who do favor such federal support

(physical anthropologists 30%, physical chemists 21.7%, marine biologists 22.6%) and 11.9% who are uncertain. Perhaps the greater likelihood of success in finding Nessie is offset by the fact that U.S. tax dollars would be spent on solving a "foreign" problem at a time when scientists have been finding it increasingly difficult to fund projects of local or national relevance.

Among physical anthropologists, 59% claim to have read scientific literature on Bigfoot (another 5.1% remember seeing but not reading scientific literature), and 77.4% of marine biologists claim to have read scientific literature on Nessie (another 9.7% remember seeing but not reading scientific literature). Also, 33.3% of physical anthropologists have actually read physical anthropologist John Napier's 1973 book on Bigfoot;[1] another 46.2% are aware of the book, but have not read it. Among marine biologists, only 9.7% have read biologist Roy Mackel's 1976 book on Nessie,[2] and only another 16.1% are aware of it. That is, 74.2% are unaware of Mackal's book. We also find that 30.8% of physical anthropologists claim to have met a Bigfoot witness, whereas only 12.9% of marine biologists claim to have met a Nessie witness.

Data on age groups, academic or professional ranks, and sex have also been obtained, but must await further analyses. Self-identification by the respondents was optional in both questionnaires; respondents who left the personal data box blank were therefore also providing some form of data. We find that 71.8% of the physical anthropologists identified themselves when responding on Nessie. Likewise, 51.6% of the marine biologists identified themselves when responding on Nessie, but only 37.5% did so when responding on Bigfoot. Our control group of physical chemists identified themselves equally (26.1%) on both.

Finally, the number of comments of criticisms is of interest, as are the comments themselves. In the Bigfoot category, 48.8% of physical anthropologists accepted our invitation to comment (although some comments began on page 1, presumably before they had read our invitation on page 3!), 30.8% being "informative" comments, 10.3% being "abusive" comments, and 7.7% being both. (By subjective analysis, we categorized as "abusive" those comments critical of our survey, our motivations or intentions, or our questionnaire design. If a questionnaire contained several abusive or several informative comments, which was often the case, we counted themas a single comment for each questionnaire.) Among the marine biologists, only 25% made comments, 21.9% being informative and 3.1% being both informative and abusive (no responses were abusive only).

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[1] Bigfoot: The Yeti and Sasquatch in Myth and Reality. New York: E.P. Dutton.

[2] The Monsters of Loch Ness. Chicago: Swallow Press.

In the Nessie category, 45.1% of marine biologists made comments, 38.7% being informative, 3.2% being abusive, and 3.2% being both. Among the physical anthropologists, only 16.6% made comments, 10% being informative, 3.3% being abusive, and 3.3% being both. In both the Bigfoot and Nessie instances, 8.6% of the physical chemists provided comments, and they were divided equally among the informative and abusive kind.

Respondents' Comments

There was nothing in our questionnaire or cover letter that hinted at anything but a sincere interest in obtaining their views on a controversial topic. Why, then, were we subjected to abusive comments? We can report, in this regard, that an informal Bigfoot survey conducted in 1974 by Joel Hurd among 500 anthropologists, biologists, and environmentalists, failed to elicit any abusive comments whatsoever (Hurd, King, and Greenwell, in preparation). Could it be that a questionnaire elicits more abusive comments than a personal letter? Or perhaps the fact that our survey was connected with an academic institution (unlike Hurd's) provided a license for criticism. Whatever the reasons, and in spite of the fact that we at no time indicated any belief in, or acceptance of, either Bigfoot or Nessie, there was a pervasive assumption that, because we were conducting a survey on them, we must necessarily be convinced of their existence. This assumption was not limited to the "abusive" respondents. One physical anthropologist, who clearly accepted the reality of Bigfoot, seemed delighted by our survey, and commented: "Bully for our side!"

Most of the comments make very interesting reading, and selected sets are reproduced below. Although 43% of all the respondents voluntarily identified themselves, we are keeping all identities confidential. We can state, however, that some of the respondents are leading authorities in their fields of speciality.

SELECTED COMMENTS ON BIGFOOT

Physical Anthropologists

(1) There is an absence of physical evidence to support the existence of this hypothetical creature, and quite significant theoretical basis for doubting its existence. I can't take all the time gratis to go into all the details now...but think that if you're really serious you might want to expend some of your own resources on an effort to explore the reasons why a number of open-minded scientists with experience in the field doubt that this is a fruitful subject for investigation.

(2) There are some supposed observations which are obvious confusions; there is some purposeful fakery. But you cannot deny the hundreds of observations by reliable individuals who have nothing to gain by making such observations public, and you cannot deny the miles of footprints -- often found in places where no one would be expected to make such footprints.

(3) Although I feel this research would probably be a waste of time, I would never presume to say that anyone "should not" do it -- everyone should have the freedom to make an ass of himself, if that is what he wants.

(4) I am doing it (Bigfoot research). I am a member of the National Academy of Sciences.

(5) Until and unless there is more tangible evidence.., it would be absurd for a sensible scientist to undertake or for federal funds to be devoted to such research. It does make some sense to investigate why so many people believe things without acceptable evidence, and I suppose that is what you are up to...

(6) We lose 2/3 aircraft per year in the mountains here (Seattle). If we cannot find a large static object in forests, why is it not possible to have difficulty finding a moving, smaller object (especially if these are rare and attempting to avoid contact)?

(7) I am inclined to be skeptical about Bigfoot, but feel inclined to accept the existence of...ESP, UFOs the Loch Ness Monster...

(8) I...consider it quite possible that an unknown-to-science large hominid may be living in Asia (but probably not in America).

(9) Severe problem (in Bigfoot research) would be publicity. Would pose major logistic problems. Also, there are ethical problems. If sufficient safeguards can be worked out, the research should be done.

(10) The amateurs are doing too good a job to have this particular endeavor befuddled with federal controls. There should be some fun left for the truly imaginative, who have carried the investigation ball and deserve the rewards.

(11) In that a lack of something can't be proved in the strict logical sense, I tell my students that it is far wiser to claim to believe (in Bigfoot) because if they don't exist, who's to prove you wrong?

(12) There is some doubt in my mind whether this questionnaire will yield thoroughly valid and useful results.

(13) What are you trying to accomplish with this questionnaire?

(14) This is not a well-constructed questionnaire.

(15) This is a poorly-designed questionnaire.

(16) Leading, loaded questions...

(17) Bully for our side!

Physical Chemists

(1) Most of the time the orthodox scientists are right. We should have an open mind for the heavier-than-air plane, the ignoble gases, and the coelacanth, but this does not suggest we should not keep our guard up against the Velikovskys, the Uri Gellers, and probably Bigfoot.

(2) We have questions of much higher priority...Surely you can find problems in our society which better merit your talents, my time, and Arizona's resources?

(3) When can we talk about UFOs?

Marine Biologists

(1) ...at this point, I believe it (Bigfoot) is extremely unlikely for strictly biological reasons: there simply is not space enough for a small group of hominids to live at the hunting-gathering stage of culture in northwest California without leaving much more evidence of their existence than the scattered sightings. Furthermore, most hominids are much too curious about their surroundings to stay hidden in such fashion.

(2) Anything that arouses curiosity due to observation or measurable data is worthy of scientific investigation. Otherwise, opinion based on belief will become the stronghold of bigots.

(3) With the number of hunters, etc. in that area for so many years and no material whatsoever to show, actual existence is highly unlikely.

(4) ...I don't feel we should close the door to such supposed "nonsense" -- but prove it by private support.

(5) I'm an agnostic with respect to Bigfoot. I'm willing to believe on the basis of concrete evidence.

(6) I would approve of a limited program to specifically resolve the question of (Bigfoot's) existence or non-existence.

(7) Proposals for such (Bigfoot) investigations should be considered and judged on their merits.

(8) I feel that the quality of this particular questionnaire is lacking, and will be cited as a weakness, potentially detracting from any published results.

(9) Obviously, I don't know much about monsters.

(10) You may be right.

SELECTED COMMENTS ON THE LOCH NESS MONSTER

Physical Anthropologists

(1) I have visited and camped on Loch Ness. Great story -- it keeps the tourists coming -- also a beautiful place. I don't believe in the Loch Ness Monster, but I am glad we have the myth.

(2) I would give (Nessie research) money in pure science to competent and productive people, not for projects per se.

(3) I spoke to some of them (tourists at Loch Ness) and recognized that they were there because of faith, not because of scientific training. It is all great fun to believe in monsters, and I'd never discount their existence to the true believers.

(4) I certainly hope you are trying to get at something other than a survey of attitudes regarding the Loch Ness Monster with this questionnaire.

(5) ...and the same goes for ESP, UFOs, Bigfoot, chiropractors, etc. Nonsense.

(6) This arrived with 13¢ postage due.

Physical Chemists

(1) Greatest area of uncertainty is regarding the value of such a survey. Is this a study of Nessie, or to see how many people will respond to such a survey? I hope federal funds are not being used for this!

(2) Scientific method and ethics of science apply to this area and to others -- Bigfoot, ESP, etc.

(3) Confirmation (of Nessie) would have mainly publicity appeal, but probably not all that much impact on science.

Marine Biologists

(1) What are you going to do research on? What is the problem? What is its contribution to mankind? To find an explanation for every unknown problem? That science can always explain the unknown?! Mankind cannot tolerate nor afford such unlimited research outlooks, but must learn to live in harmony with the environment and limited resources first, or his superficial knowledge will get him nowhere but acceleration to extinction!

(2) It is remarkable to me to view the large amount of bias and unscientific reaction of much of the scientific community to reports of the "Loch Ness Monster" and UFOs. In view of many reports from reliable observers of both these phenomena, scientists should be open-minded and apply the scientific method to these topics. Otherwise, we abandon the field to amateurs and/or mystics. We may be ignoring questions of tremendous significance to mankind.

(3) The myth about the Loch Ness Monster appears to be the result of a combination of: sightings of fish, schools of fish, itinerant mammals (groups of otters, seals), honest misconceptions, and humbug. Research should be left to students, interested laymen, and retired scientists.

(4) ...if there is a phenomenon in the Loch -- be it physical or biological -- it is the scientist who should be entrusted in doing his/her best to explain it.

(5) I can think of dozens of projects that would be deemed by me to be more worthwhile in preference to a search for such animals.

(6) It is poor science to simply deny truth to observations such as Nessie, even if "truth" is not probable. I would not have given much credence to Nessie before the MIT team publicized its results...

(7) Should any firm evidence turn up, research should certainly be conducted and perhaps federally financed. Until that time comes, scientists' time will be more productive elsewhere. I personally would like to see it (Nessie) proved, but haven't much hope.

(8) Please recall that within a few years past living coelacanth fish have been found living in the waters off Madagascar. Until they were found living, they had always been presumed extinct for millions of years...If it has happened once, why might it not happen again? Pots of fish bait lowered to great depth off the California coast and time-lapse photographs have shown that there are very large unidentifiable animals which have visited the pots to feed. Might there not be other Nessies?

(9) I personally find it very difficult to accept a "Loch Ness Monster" or Ogopogo in Okanagan Lake (British Columbia) because such a large creature should have been detected by now. Especially for Loch Ness with all the attempts to find the Monster, it seems unlikely that more firm evidence should be so obviously wanting. However, I do believe that such a "monster" could exist in the marine environment; i.e. "Cadborosaurus" from Victoria, B.C., could easily exist. The ocean is large enough for such a critter to have escaped notice or capture by scientists.

(10) I believe that there are still unknowns out there. Scientists would be conceited indeed to assume that knowledge is now complete.

(11) At the moment I have not seen any evidence except some rather fuzzy photos. As a scientist, I would need more evidence -- data -- before volunteering any opinion as to its (Nessie's) classification... ...let's spend U.S. money on basic research on basic problems.

(12) I'm rather suspicious of your motives, particularly the manner in which some questions are asked. There may be something to these stories -- undoubtedly hundreds of prehistoric genera exist in oceans and large lakes -- really a sampling problem.

(13) ...I have talked to people who claim to have talked to people who claim to have seen it (Nessie).

(14) Not U.S. dollars for Scotland expedition!

(15) We could use such a shaking.

(16) What the hell are you trying to find out?

Conclusions

Until statistically significant results are available, it would be premature to present definitive conclusions. What is apparent at this time is that there is considerably more skepticism among scientists about the existence of Bigfoot than there is about the existence of Nessie, although the existence of both is doubted by the majority of physical anthropologists and marine biologists surveyed. The consensus seems to be to attribute such reports to imagination, hoaxes, myths, and exagerated tales, rather than to honest misidentifications of ordinary animals. The lack of specimens, parts of specimens, or even of bones, seems to be the principal reason for rejecting such reports, and many respondents believe that such animals could not remain so long "undetected by science." Nevertheless, most scientists seem to bend over backward when it comes to the question of research on these topics, and would support such research provided federal funds are not involved.

There is at least one important difference in the attitudes of the scientists surveyed which correlates with their diverse disciplinary backgrounds, and this difference may help in the understanding of the social factors involved in the acceptance or rejection of anomalous phenomena by scientists. Most physical anthropologists, unlike the marine biologists and physical chemists believe that the discovery of Bigfoot would have a "severe" impact "on science" (we were very careful to phrase the question in terms of "science" -- not "anthropology"). Does this imply that physical anthropologists have a different concept of what science is? Or, alternatively, are physical anthropologists conforming to what they perceive to be the "correct" attitude within their discipline (i.e., Bigfoot is so unlikely that its discovery would have a severe impact)?

The data also seem to indicate that physical anthropologists are more negative about Bigfoot than marine biologists are about Nessie, and perhaps this should not be surprising. Bigfoot, if it exists, is a terrestrial primate, and its discovery would fly in the face of the belief that all North American land mammals have been identified and studied. Nessie, on the other hand, supposedly exists in an underwater habitat, which, although smaller in area than Bigfoot's supposed habitat, is much harder to survey (some marine biologists even mentioned the great likelyhood of such creatures surviving undetected in the oceans).

Also, being a primate and a hominoid, possibly even a hominid, Bigfoot would be a close genetic relative of man, perhaps too close for comfort, and the legal and moral implications involved could be substantial. The emotion aroused in both believers and disbelievers, some of which is captured in the above quotes, is perhaps a reflection of this awareness. Nessie, on the other hand, does not threaten man's elevated status in the animal kingdom.

We should also remember that the marine biology subjects of our survey were American and Canadian professionals, whereas Nessie supposedly inhabits a far-off and romantic spot of Europe. It would be interesting, in this regard, to compare our survey results with those from a similar survey of British (particularly Scottish) marine biologists.

The physical chemists played an important role in our survey. Although they generally doubted the existence of Bigfoot and Nessie (and cited the lack of physical evidence as reasons for doing so more than did the physical anthropologists and marine biologists), they tended to attribute Bigfoot reports more to honest misidentifications than to outright hoaxes, imaginations, or myths. They also tended to be more moderate on the question of financial support for Bigfoot or Nessie research.

If there is a "proper" scientific attitude, one would expect the responses of all three groups to be very much the same. As in many instances they were not, the respondents must have been influenced by other, non-empirical factors. We will not at this time propose what these other factors may be, other than to state that they necessarily must fall within the realm of psychology.

When further statistical analyses are completed, we may be able to shed more light on this interesting social phenomenon.